Міністерство освіти і науки, молоді та спорту України
Національний університет харчових технологій

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АНГЛІЙСЬКА МОВА

для студентів технологічних спеціальностей та сфери обслуговування харчової промисловості

Навчально-методичний посібник для студентів І-ІІ курсів напрямів підготовки «Харчові технології та інженерія», «Готельно-ресторанна справа»

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Англійська мова для студентів технологічних спеціальностей та сфери обслуговування харчової промисловості: Навч.-метод. посіб. – К.: НУХТ, 2012.-232 с.

Анотація

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Навчально-методичний посібник спрямований на оволодіння англійською мовою професійного спрямування студентами технологічних спеціальностей та сфер обслуговування харчової промисловості. Посібник складається з трьох частин, які зорієнтовані на формування у студентів-майбутніх фахівців іншомовної комунікативної компетенції за професійним спрямуванням, а також на розвиток навичок перекладу та розуміння оригінальних науково-популярних текстів з професійної тематики.

Додатковий текстовий матеріал містить окрім традиційних тем тексти, що відображають новітні тенденції у розвитку харчової промисловості. З метою більш ефективного систематичного засвоєння фахової англомовної лексики в посібнику подано короткий термінологічний словник.

Комунікативно спрямовані вправи розділів посібника побудовані на автентичних матеріалах, що в цілому сприятиме ефективному оволодінню професійно зорієнтованою англійською мовою і формуванню навичок самостійної роботи студентів.

ISBN

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ВСТУП

Посібник розрахований для роботи зі студентами, що володіють англійською мовою в обсязі програми з іноземних мов для середньої школи та вивчають англійську мову професійного спрямування на факультетах технологічних спеціальностей і сфер обслуговування харчової промисловості в коледжах, інститутах та університетах.

Посібник складається з трьох частин. У першому і другому розділах посібника подані оригінальні тексти з урахуванням специфіки навчальних вимог до студентів та їх майбутньої професійної діяльності, що охоплюють такі загальні теми "What Makes Food Healthy?" і "Technology of Cooking and Food Preservation." Опрацювання автентичних матеріалів за фахом сприятиме не тільки отриманню і розумінню необхідної інформації, а й збагаченню фахової іншомовної лексики та її подальшому вживанню у відповідних ситуаціях.

Тексти з оригінальних джерел супроводжуються лексичним коментарем "Active Vocabulary" і завданнями (Tasks), спрямованими на розвиток комунікативних вмінь і навичок, причому їх можна використовувати як навчальний матеріал в будь-якому порядку в залежності від вибраної теми.

Окрім традиційних тем посібник містить також тексти, що відображають новітні тенденції у розвитку харчової промисловості (наприклад, Оздоровчі продукти та їх роль у раціоні людини; Вегетаріанська їжа: за і проти; Екологія харчування; Фаст фуд; Генетично модифіковані продукти; Нанотехнології та їхня роль в харчовому виробництві; Їжа майбутнього тощо).

Тематика текстів має не тільки велике інформаційне, а й пізнавально-виховне значення, забезпечує багатий лексико-граматичний навчальний матеріал, формує у студентів почуття розуміння і поваги до іншомовної культури, звичаїв і традицій.

Слід відмітити, що в посібнику подаються різні вправи для розвитку діалогічного і монологічного мовлення, які спрямовані на вдосконалення мовленнєвої компетенції студентів і розвиток їх культури мовлення в цілому.

Третій розділ посібника містить додатковий текстовий матеріал, близький за тематикою до попередніх розділів, що дає змогу використовувати ці автентичні тексти для самостійної роботи студентів. З метою більш ефективного систематичного засвоєння фахової англомовної лексики в посібнику подано короткий термінологічний словник (Vocabuulary).

Посібник можна використовувати для аудиторної та самостійної роботи студентів, магістрів.

PART I

WHAT MAKES FOOD HEALTHY?

UNIT 1.

CARBOHYDRATES

From carbohydrates we get most of the energy which we need to act and move, perform work, live. Among the carbohydrates are sugars, starches, and celluloses. All green plants form carbohydrates. Carbohydrates are important in nutrition for many reasons. Some of them make our food sweet. Some of them cling to our teeth and serve as food for bacteria that cause tooth decay.

The body needs carbohydrates in order to use fat efficiently. Some diseases, such as diabetes, develop because the body is unable to use carbohydrates properly. The carbohydrates contain carbon, hydrogen and oxygen. The hydrogen and oxygen usually occur in the same proportion as in water.

Most of the different kinds of carbohydrates are plant products. Plants make them by photosynthesis, a complex chemical process that consists of a series of reactions at least one of which may occur only with the aid of sunlight and the green plant pigment, chlorophyll. Many different kinds of carbohydrates occur in foods. Not all are of equal importance in nutrition. Starch, which consists of glucose units, is the only polysaccharide that man can use efficiently. Nutritionally it is far and away the most important carbohydrate.

Cereal grains, our most important source of carbohydrate are rich in starch; rice, wheat, sorghum, corn maize, millet and rye contain about 70 per cent of starch. Potatoes and other tubers and roots are also rich in starch. Beans and seeds of many other legumes are high in protein, but 40 per cent or more of their dry matter is starch. Only two of the disaccharides (these contain two monosaccharide units) are of much importance nutritionally. One is sucrose-cane sugar or beet sugar, which is available as a highly refined and relatively pure carbohydrate. The other important disaccharide is lactose, or milk sugar, which makes up almost 40 per cent of the solids in fresh whole milk. It is the only carbohydrate of animal origin that is of significance in nutrition. It is made up of one glucose unit and one galactose unit. Galactose is a hexose and differs only slightly in chemical structure from glucose.

The monosaccharides are important in nutrition mainly because they are the units of the more complex carbohydrates. A few of them do occur and are eaten in the free form. Glucose and fructose, a hexose quite closely related structurally to glucose, are in honey and fruits. Relatively few of the other carbohydrates occur widely enough or are utilized well enough by the body to have much nutritional importance. The energy from carbohydrates becomes available to the body when glucose is broken down in the tissues.

Complete breakdown involves oxidation and yields carbon dioxide and water. The oxidative processes which release energy for our activity involve many enzymes and coenzymes.

The enzymes must be synthesized from amino acids, the units of which the proteins in our diet are composed. The coenzymes contain vitamins and often

minerals that also are essential nutrients. A lack of any of them can depress or inhibit important steps in the body's utilization of carbohydrates.

Besides providing energy carbohydrates affect food consumption indirectly through their flavour, through their influence on the amount of water into the stomach.

Active Vocabulary

carbohydrate [kɑ:bəʊ'haɪdreɪt]	вуглевод
nutrition	харчування
nutritional	поживний
nutrient	поживна речовина
starch	крохмаль
fat	жир
carbon	вуглець
hydrogen ['haɪdrədʒən]	водень (гідроген)
oxygen ['ɔksɪdʒən]	кисень (оксиген)
source	джерело
be rich in	бути багатим на …
structure	структура
differ from	відрізнятись від …
breakdown	розпад, розклад
enzyme ['enzaɪm]	ензим, фермент
amino acid	амінокислота
protein ['prəʊtɪɪn]	протеїн, білок
diet	дієта, раціон, їжа
lack of	відсутність, нестача
amount of	кількість

Task 1. Fill in the gaps using the words in the box.

Molecules, carbohydrates, polysaccharides, cornstarch, monosaccharides, enzymes, sucrose, soluble

1. The … are a very important class of compounds from a physiological standpoint, because so many of our important foodstuffs belong to this class. 2. Carbohydrates with general formula $C_4H_2O_4$ are known as … . 3. A polysaccharide is formed from an indefinite number of … of hexose combined together with loss of water. 4. The most valuable of … is starch, the cheapest and most plentiful of our foodstuffs. 5. Monosaccharides as a class is a term used for decomposition brought about by the lower organisms through the … which they contain. 6. Most of the dentrose (or glucose) on the market is prepared from … by hydrolysis in the presence of acids. 7. By far the most important disaccharide is …

often called cane or beet sugar according to the source from which it is obtained. 8. Lactose is not so … as many other sugars and at low temperatures its solubility is very slight.

Task 2. Choose the correct word in bold.

1. How **many/much** sugar would you like?
2. There is **few/ little** salt in this salad.
3. How **many/ much** bananas did you have for breakfast?
4. I didn't eat **many/ much** sausages yesterday.
5. There is **few/little** orange juice in the jug. Will you give me more, please?
6. How **many/ much** tuna salad would you prefer to order?
7. You don't have **many/much** sugar in your tea.
8. I don't like too **many/ much** dressing for this dish.
9. How **many/ much** bacon do you need?
10. We don't have **many/ much** ice creams for the party.

Task 3. Put the words in the box below into the right column.

A FEW	A LITTLE
cake, mushrooms, molecules, hot dogs, hydrogens, eggs, atoms, cream, cereal, corn, chips	

Task 4. Match the word with its definition.

1.	nutrition	a. milk sugar
2.	carbohydrates	b. combination of some molecules of hexose with loss of water
3.	polysaccharide	c. dentrose
4.	glucose	d. monosacharides with general formula $C_4H_2O_4$
5.	sucrose	e. polysacharide
6.	starch	f. disaccharide
7.	lactose	g. green plant pigment
8.	chlorophyll	h. the process of giving or getting the right type of food for good health and growth

Task 5. Translate into English.

1. З органічних сполук в продуктах рослинного походження і в харчуванні людини важливе місце належить вуглеводам. 2. Вуглеводи важливі в харчуванні, оскільки вони є джерелом енергії. 3. Усі вуглеводи, що містяться у харчових продуктах, належать до трьох основних груп: моносахаридів, олігосахаридів або полісахаридів першого порядку та нецукроподібних полісахаридів другого порядку. 4. Вуглеводи синтезуються в зелених частинах рослин в результаті сполучання вуглеця (CO_2) та води

(H_2O). 5. Реакція фотосинтеза трапляється під дією сонячного світла за участю зеленого пігменту-хлорофілу. 6. Вуглеводи розподіляються на групи в залежності від кількості вуглецю, який в них міститься. 7. Крохмаль є найважливішим з полісахаридів. 8. Лактоза міститься у молоці, саме тому її називають «молочний цукор». 9. Висока харчова цінність крохмалю пояснюється його фізико-хімічними властивостями і, в першу чергу, можливістю переходити в розчинний стан. 10. Цукроза міститься у цукровому буряку, цукровому очереті, в багатьох плодах і овочах, хлібних злаках та інших харчових продуктах.

Task 6. Answer the Questions:

1. What do we get from carbohydrates? 2. What do the carbohydrates consist of? 3. Why are the carbohydrates important in nutrition? 4. What is the reason that some diseases such as diabetes develop? 5. What are the different kinds of carbohydrates? 6. What does starch consist of? 7. What is the most important source of carbohydrates? 8. How does galactose differ from glucose? 9. Why are the monosaccharides important in nutrition? 10. When does energy from carbohydrate become available to the body?

Task 7. Read the text without a dictionary and discuss it.

Does Sugar Make You Fat?

For years, dietary carbohydrates, such as potatoes, rice, spaghetti, sugar, bread, and pastries, have been regarded as food that make us fat. It is true that excess consumption of such carbohydrate — rich foods will increase fat deposition. However, dietary fat provides nearly twice calories of carbohydrates per unit of weight. While there are individuals who have a "sweet tooth" and overeat foods containing carbohydrates, the basic problem is not the sugar but the overeating. We know, for example, that many obese people have low sugar intake. They simply take in more calories than they utilize.

For individuals who consume excessive amounts of sweets and starches, decreasing consumption of them will yield weight loss. However, it was not just the sweets that contributed the weight. Rather, the overeating, the excess calories, are to blame. Carbohydrates by themselves do not cause obesity; it is the bad habit of overeating these foods (or any food) that produces the large weight gain.

Task 8.

Do you know any Ukrainian equivalents of the following English idioms? Can you make up any situations to illustrate some of them?

1. full of beans; 2. stag party; 3. flash in the pan; 4. flesh and blood; 5. the apple of someone's eye ; 6. a couch potato 7. a bottleneck; 8. traffic jam; 9. chicken feed; 10. a nest egg.

JUST FOR FUN

When the waitress asked how we'd like our steaks, I said, "Medium", my husband said, "Medium", and our seven-year-old son said trustingly, "Large".

UNIT 2.

FATS AND FATTY ACIDS

Fat makes our meals palatable and satisfying. Some fats and oils are important sources of vitamins A, D, E and K.

Fats provide various amounts of fatty acids known to be essential in diets.

We should bear in mind that natural unsaturated fats are associated with the protein, minerals and vitamins characteristics of the food, as in milk or pork and also carry some vitamins.

Much variety in fats comes from the kinds of fatty acids linked to glycerol.

Fatty acids that have 18 carbons in a chain make up about 8 per cent and those with 16 carbons comprise about 10 to 15 per cent of the fatty acids in average diets.

Short-chain fatty acids occur mostly in milk fat and in coconut oil. Extra long chains occur in fish oils.

Fatty acids that are common in food fats and oils fall into three broad classes according to their degree of saturation. The fully saturated fatty acids make up about 40 to 45 per cent in average diets. Saturated fatty acids may be of any chain length, from 4 to 18 or more carbons.

The most common ones in their chain length are: stearic, palmitic, myristic and lauric.

Beef contains 20 per cent of stearic acid and lard about 12 per cent.

Most animal fats and cottonseed oil contain about 25 to 30 per cent of palmitic acid.

The monounsaturated fatty acids are those with one reactive unsaturated linkage which has 2 hydrogens missing.

The polyunsaturated fatty acids, a heterogeneous group include some essential fatty acids and the extra long-chain fatty acids (20 to 26 carbons) common in fish oils.

The polyunsaturated fatty acids considered essential for nutrition are linoleic, linolenic and arachidonic.

Of the three, linoleic becomes the centre of dietary importance.

Sources of linoleic acid include many grain oils and seed oils. Fats from nuts, pea-nuts, and poultry carry 20 to 30 per cent of the acid. Linoleic acid is necessary for growth and reproduction and helps protect the animal against excessive loss of water and damage from radiation.

Some animal fats and vegetable fats or oils are fairly similar chemically.

Both butterfat and coconut oil, for example, contain high proportions of short-chain fatty acids. Beef fat and coconut oil contain less than 2 per cent of linoleic acid, one of the fatty acids that are essential in diet. Corn oil contains more than 6 times as much linoleic as olive oil, and chicken fat up to 10 times as much as the fat of ruminant animals.

Both animal and vegetable fats contain up to 5 per cent of various fatty substances that are not true fats but may be nutritionally important.

Pork, margarine, and shortenings furnished 30 and 32 per cent of each, respectively, or about equal share of saturated and linoleic acids.

Salad oil furnished only 3 per cent of the linoleic ratio of nearly 1 to 10, or more than the reverse of the first group of foods.

Active Vocabulary

fatty acids	жирокислоти
palatable	приємний на смак
provide	забезпечувати
(un) saturated [ʌn'sʌtʃəreɪtɪd]	(не) насичений (хім.)
degree of saturation	ступінь насиченості
short-chain fatty acids	низькомолекулярні жирокислоти
lard	сало, смалець
animal (plant) fats	тваринні (рослинні) жири
sun flower oil	соняшникова олія
olive oil	маслинова олія
glycerol ['glɪsərɔl]	гліцерин
palmitic	пальмітинова (кислота)
stearic	стеаринова (кислота)
linoleic ['lɪnɔlɪɪk]	лінолева (кислота)
linolenic ['lɪnɔlɪnɪk]	ліноленова (кислота)
arachidonic [ærəkɪ'dɔnɪk]	арахідонова (кислота)
monounsaturated	низькомолекулярна (ненасичена)
polyunsaturated	високомолекулярна (ненасичена)

Task 1. Fill in the gaps using the words in the box.

acid, fats, fatty acids, oil, oxygen, fat, hydrogens, oxygens, carbon, nutritional, lipoids, carbons, hydrogen, oils

1. The main difference between the various kinds of …, depends upon acids which enter into their composition. 2. … makes our meals palatable and satisfying. 3. It's enough … in the … for the experiment. 4. Fats provide various amounts of … known to be essential in diets. 5. Nowadays … is known as new economical fuel for automobiles. 6. Fatty acids are hydrocarbons consisting of a chain series of … each of which is able to carry two … . 7. Linolenic acid has a different and perhaps less important … role than linoleic and occurs only in small amounts of food fats. 8. Always associated with fats are … fatlike compounds containing phosphorus and nitrogen. 9. One … combines with two … in the molecule of carbon dioxide. 10. Without … life on our planet is impossible. 11. Coconut … is very useful and used not only in food production but also in pharmaceutical industry. 12. Sources of linoleic acid include many grain and seed … .

Task 2. Put the words in the box below into the right column.

FEW	LITTLE

Bacteria; data; phenomena; microorganisms; nuclei; viruses; mold; vacuum; formulae; bonuses; cream; money; fat; acid; oil; indices; axis; series; criteria; species; polyhedrons; air; dust; copper; silver; radii; fungi; stamina; oxygen; stigmata; carbon

Task 3. Cross the odd word out.

1. a **bottle** of 7 Up, beer, jam
2. a **bar** of sweets, chocolate, soap
3. a **carton** of milk, beef, apple juice
4. a **box** of chocolates, vinegar, chips
5. a **slice** of cheese, bread, ham
6. a **cup** of coffee, salt, tea
7. a **glass** of wine, meat, mineral water
8. a **jar** of honey, carrots, mustard
9. a **bag** of flour, rice, ketchup
10. a **bowl** of salad, soup, cake

Task 4. Which substances do the following formulas correspond to?

$C_2H_2O_4$; CO_2; H_2O; C_3H_7COOH; $C_{17}H_{33}COOH$; $C_{17}H_{31}COOH$; Al_2O_3; H_2SO_4; HCL; $C_{11}H_{22}O_{11}$; C_2H_5O-R; NaCl; K_2MnO_4

Task 5. Match the word with its definition.

1. fat	a. hydrocarbons
2. glyceride	b. polymolecular
3. fatty acids	c. combination of glycerol and fatty acids
4. saturated	d. monomolecular
5. animal fats	e. made of plants
6. unsaturated	f. tasty
7. plant fats (oils)	g. made of animals
8. palatable	h. chemical combination of some fatty acids with neutral ester of three-atom glycerol spirit.

Task 6. Translate into English.

1. Жири в різних пропорціях містяться майже у всіх харчових продуктах і є важливою їх частиною.
2. В формуванні жирів беруть участь як насичені, так і ненасичені жирові кислоти.

3. Як правило, в жирах містяться високомолекулярні насичені кислоти – пальмітинова, стеаринова, а також ненасичені жирокислоти – олеїнова, лінолева, ліноленова.
4. У деяких продуктах тваринного походження міститься високо насичена арахідонова кислота.
5. Кожна молекула жиру утворюється (походить) з трьох молекул жирокислоти та однієї молекули гліцерина.
6. Яловичий жир і какао-олія містять менш ніж 2% лінолевої кислоти, однієї з найважливіших жирокислот в харчуванні людини.
7. Більшість тваринних жирів і бавовняної олії містить у своєму складі від 25% до 30% пальмітинової кислоти.
8. Суттєві вимоги до кількісних показників вживання лінолевої кислоти у харчуванні дорослих складають 1,5-2,0 % загальних калорій відповідно до 4-5 г в межах 2,500 калорійної цінності продуктів.
9. Кукурудзяна олія містить в 6 разів більше ліноленової кислоти ніж маслинова олія і курячого жиру – в 10 разів більше, ніж жиру жуйних тварин.
10. Значущість жирів у харчуванні обумовлена, по-перше, їхньою високою енергетичною здатністю, по-друге, тим, що деякі жирокислоти (арахідонова, лінолева, ліноленова) є незамінними в якості вітамінів для обміну речовин.

Task7. Answer the questions.

1. What makes our meal palatable?
2. What are the important sources of vitamins A, D, E?
3. What provides various amounts of fatty acids?
4. What are natural unsaturated fats associated with?
5. Where do short-chain fatty acids occur?
6. How many classes of fatty acids do you know?
7. What is the percentage of stearic acid in beef?
8. What polyunsaturated fatty acids are considered essential for nutrition?
9. What do sources of linoleic acid include?
10. What is linoleic acid necessary for?
11. How much fatty substances are there in animal and vegetable fats?

Task 8. Read the text without a dictionary and discuss it.

Fats in our diet: How much is too much?

Fats in our diet have occupied the attention of nutritional scientists for several years. Despite research efforts, many questions remain unanswered. Scientists know that, like carbohydrates and proteins, fats are made up of carbon, hydrogen, and oxygen. However, fat provides more than twice as many calories per molecule

because it has a lower ratio of oxygen to carbon and hydrogen. People are understandably concerned about fats and oils since most people realize that "oil and water don't mix" — and water is the primary ingredient of our bodies. The answers to that concern lie in body chemistry.

Though some foods, such as butter and oils, are most pure fat, the fats in most foods coexist with other nutrients and dietary factors such as protein, carbohydrate, vitamins, and fiber. Vegetable oils and meat are our major sources of fat. This fat may be visible, as in marbled meat, or hidden, as in cheese, nuts, and bakery products.

Task 9. Choose the right answer and explain the meaning of the idiom.

1. "What was the exam like, Jilly? Great! It was a piece of …"
   a) cheese b) cake c) old rope
2. The so-called scandal turned out to be nothing more than a storm in …
   a) a teacup b) an ocean c) a bucket
3. "I'd hate to be the politician who said publicly that in his opinion "the Internet was just a flash in the … ."
   a) fire b) pan c) mirror
4. It was an excellent dinner party. The only … in the ointment was Helen spilling red wine over our new carpet.
   a) finger b) fly c) stone
5. To … the … means to dishonestly change a company's book keeping records in order to steal money.
a) bury the hatchet b) surf the net c) cook the books
6. To … the … is to tell people secret information.
a) spill the beans b) kick the bucket c) talk shop
7. Nimah tends to exaggerate a lot. If I were you I would take everything he says … .
a) take things easy b) take smith by storm c) take with a pinch of salt
8. Julia had a very good relationship with her mother-in-law. They … .
a) really hit it off b) were like two peas in a pod c) got on like a house on fire

JUST FOR FUN

"Can you drive with one arm?"
"Sure."
"Okay, have an apple."

UNIT 3.

PROTEINS

Proteins are of great importance for all life. The living tissues of plants and animals consist of protein material which is continually destroyed in the maintenance of life and must be restored. Constituents which will form proteins in both plant and animal are necessary not only for the construction of new tissues but also to repair losses. A growing plant or a young animal needs more protein in proportion to its size than a fullgrown specimen, but an adequate protein supply never ceases to be essential. Plants have the power of synthesizing protein from nitrogen of inorganic salts, carbon dioxide, and water, but animals lack this ability and are dependent upon what they can get from the plants, either directly or through the medium of other herbivorous animals.

On heating any animal fluid or tissue extract, an unsoluble substance is obtained as a precipitate. If this precipitate is carefully dried and analyzed, it will be found to consist of one or more members of well-defined group of substances of similar chemical and physical properties which are classed together as proteins. The proteins all contain as essential constituents C, H, O and N; many contain S and P also. They are all built up on the same chemical principle, and, therefore, have a number of reactions in common. The ultimate products of oxidation of proteins in the body are acids. Those proteins which contain sulphur and phosphorus are more acidic than those without. Persons with physical disorders traceable to hyperacidity are advised to omit the more acid proteins from their diet.

Composition of Proteins. Proteins, like polysaccharides, can be hydrolyzed by inorganic acids, alkalies, or suitable enzymes. Of these methods, enzyme action is the most advantageous, since it goes on at ordinary temperatures, is less strenuous and, therefore, less apt to lead to undisirable decomposition products. Careful work has shown that hydrolysis takes place in steps, giving products of gradually decreasing complexity until ultimately we obtain a mixture of simple compounds, all of one type, known as amino acids.

The amino acids are derived from the aliphatic acids, such as acetic acid, by such introduction of various substituent groups into the molecule. They are called amino acids from the fact they all contain the amino group, NH_2 attached to the carbon atom nearest to the carboxyl group.

The simplest amino acid is glycine amino-acetic acid.

Over thirty different amino acids have been isolated as derivatives of proteins.

As amino acids are hydrolytic products of proteins, it follows that they must be linked together in the protein molecule by condensation.

In spite of the very great diversity of type, there are certain properties common to proteins in general. They are mostly amorphous, although a few crystallize readily and others can be made to do so with difficulty. Some dissolve in water; others insoluble in water, dissolve in dilute salt solutions. In either case they form colloidal solutions, a fact that is extremely important in the preparation and maintenance of colloidal states in food preparation.

The colloidal nature of proteins is also of great importance in connection with the regulation of cell activities, since this prevents protein substances from diffusing through animal membranes, through which ions pass with ease.

Most proteins coagulate with heat. This change takes place in two steps: denaturation followed by precipitation. If we heat a colloidal solution of pure albumin, it changes from a fairly clear solution to an opalescent one. No coagulation occurs. Denaturation is said to take place. Denaturation of protein changes protein from a water loving (hydrophilic) colloid to a water hating (hydrophobic) colloid. To complete the coagulation, it is necessary to add ions. When ordinary egg white is heated, coagulation of the protein takes place because the egg white has the ions necessary to precipitate the denatured protein.

Active Vocabulary

protein	протеїн, білок
tissue *['tɪʃjʉ]*	тканина
destroy	руйнувати
restore	відновлятись
(un) soluble	(не) розчинний
precipitate (n, v) *[prɪ'sɪpɪteɪt]*	осад, осаджувати
constituents	компоненти, частини
substance *['sʌbstəns]*	речовина
oxidation	окислення
acidity	кислотність
(in) organic acids	(не) органічні кислоти
be isolated *['aɪsəleɪtɪd]*	бути ізольованим, відділеним
be linked	бути з'єднаним, сполучуватись
solution	розчин
dissolve	розчинитись
denaturation	денатурація
coagulate *[kəu'ægjuleɪt]*	коагулювати, згущуватись
heat (n, v)	тепло, нагрівати
albumin *['ælbjumɪn]*	альбумін (білок)
alkali *['ælkəlaɪ]*	луг

Task1. Fill in the gaps using the words in the box.

tissues; average; decrease; animals; molecules; proteins; building; nitrogen; body

1. All our foodstuffs — fats, starches, sugars, and _____ contain the elements of carbon, hydrogen, and oxygen in varying proportions. 2. Most plants make their own protein by combining the _____ from nitrogen-containing materials in the

soil with carbon dioxide from the air and with water. 3. Animals and people cannot use such simple raw materials for _____ the proteins. 4. We must get our proteins from plants and other _____. 5. Next to water, protein is the most plentiful substance in the _____. 6. The proteins in the body _____ are not there as fixed, unchanging substances deposited for a life-time. 7. Some _____ or parts of molecules always are breaking down and others are being built as replacements. 8. The total daily protein needs increase steadily from birth to adolescence and then _____ to a maintenance level for adulthood. 9. The recommended daily protein allowances for adults are 70 grams for the average man who weighs about 154 pounds, and 58 grams for the _____ woman who weighs 128 pounds.

Task 2. Match the word with its definition.

1. proteins	1. water-soluble protein
2. albumin	2. building material of living organisms
3. synthesis	3. organism
4. denaturation	4. microscopic unit of living matter enclosing a nucleus with self-producing genes
5. coagulation	5. loss of natural qualities
6. cell	6. combination of separate elements into a whole
7. tissue	7. mass of cells and sell-products in a body
8. body	8. change to a thick and solid state

Task 3. Choose the right answer.

1. They arrived so late for the meal that the food was …
   a) hard b) lost c) dried d) spoilt
2. In England one eats apple … with pork.
   a) juice b) pudding c) pie d) sauce
3. Ice tea … him after his long journey.
   a) refreshed b) calmed c) recovered d) rested
4. Would you like me to … the tea?
   a) drip b) pour c) spill d) drain
5. His granny can tell fortunes from coffee …
   a) grounds b) leaves c) sediment d) seeds
6. Would you … me some salt, please?
   a) deliver b) give c) pass d) bring
7. This kiwi … rather sour.
   a) senses b) feels c) smells d) tastes
8. Steaks are one of my favourite …
   a) material b) plates c) dishes d) courses
9. Do you like fresh fruits? “Well, it … what kind of fruits”
   a) depends b) matters c) differs d) minds

Task 4. Choose the correct adjective in bold.

1. The menu was **boring/varied** and had a great choice of starters, vegetarian and fish dishes.
2. This restaurant was **expensive/cheap**. We had to pay a lot of money for breakfast.
3. The staff were **polite/rude** enough to explain us some details of the menu.
4. Fruit salad was **delicious/awful**. Avocado tasted hard and pineapples were overriped.
5. The service was very **professional/unqualified**. We had to wait for an hour or so before a waiter came.
6. This pub is **popular/unpopular** with young people. All tables here are always reserved.
7. The restaurant was quite **quiet/noisy**. The music was too loud to hear my girlfriend.

Task 5. Read the following sentences with comparative and superlative forms.

1. Protein is the **most valuable** nutritional component in our food.
2. What proteins are **more acidic**?
3. **The simplest** amino acid is glycine in protein's composition.
4. Vitamins are **as important** in man's nutrition as minerals.
5. Turkey is **less fattening** than chicken.
6. Peaches are **juicier** than bananas.
7. Today the results of the experiment are **better** than yesterday's.

Task 6. Write the comparatives and superlatives of these adjectives:

strong, stale, tough, ripe, disgusting, fantastic, weak, spicy, bitter, nutritious, tasty, hot, bad, good, little, far.

Task 7. Translate into English.

1. Взагалі харчові білки використовуються організмом людини для побудови клітин тканин.
2. Людина і тварини не можуть синтезувати амінокислоти, які необхідні для побудови білкової молекули.
3. В організмі білки, з яких складаються усі найважливіші органи, тканини і речовини, постійно руйнуються та відновлюються, постійно взаємодіючи з речовинами, що містяться в організмі людини і навколишньому середовищі.
4. Для синтезу білків, що будують тканини організму, необхідно, щоб харчовий білок мав в своєму складі усі корисні для нього амінокислоти.

5. Амінокислотний склад білків є важливим показником його харчової цінності.
6. Найбільш корисними за амінокислотним складом є білки тваринного походження – м'язових тканин м'яса, молока, курячого яйця, картоплі, гречаної крупи, горошку.
7. Альбуміни – білки, що розчиняються у воді.
8. Майже третина білка міститься у м'язах організму, близько п'ятої частини – у кістках і хрящах, близько десятої частини – у шкірі.
9. В самій крові людини знаходяться декілька десятків білків.

Task 8. Answer the questions.

1. What is the role of proteins in nutrition? 2. What can you say about constituents which form proteins? 3. How do plants form their proteins? 4. Where do animals get their proteins from? 5. What can you say about a precipitate which you get on heating any animal fluid or tissue extract? 6. What are the essential constituents of the proteins? 7. What proteins are more acidic? 8. What can you say about the composition of proteins? 9. What is the simplest amino acid? 10. What are the outstanding properties common to all proteins? 11. What can you say about the coagulation of proteins?

Task. 9. Read the text without a dictionary and discuss it.

Foods contain different materials that help your body stay strong and healthy. One of the most important of these is protein. They are absolutely necessary if the body is to grow, or if it is to repair any injuries or damage to itself. Some of the principle sources of protein are lean meat, fish, and dairy products like milk and cheese. The sugar and starches, known as carbohydrates, are substances that everyone needs. They supply energy for the body. Potatoes, seed vegetables such as corn or lima means, and grain products like rice, spaghetti, bread, cake, and cookies are some of the foods that are sources of carbohydrates.

Your body also needs other materials called vitamins and minerals. These two important substances help the body to make good use of the foods you eat by making sure the protein and carbohydrates do their jobs. They also help the body to make body tissues such as bones, teeth, muscles, nerves, and blood. By eating animal products like meat, eggs, and milk, and using plenty of fresh vegetables and fresh fruits daily you can be sure of providing your body with the vitamins and the minerals it needs.

Task 10. Choose the right idiom.

1. "How's your father these days?"
   Still_____ and kicking. He's living in Brighton now.
a) easy b) sweet c) alive
2. The lecture was just how the students liked it – short and _____.

a) square b) easy c) sweet
3. You need to eat some more, Mary! You're far too _____!
a) hot b) soft c) skinny
4. "You've lost the game! You've got a _____ chance!"
a) fat b) bad c) real
5. No wonder your car won't start! Your battery's _____.
a) jammed b) empty c) flat
6. I didn't like smoked salmon at first. For me it was an _____ taste. Now I really love it.
a) experienced b) original c) acquired
7. It was the first _____ meal the tramp had had for several days.
a) compact b) round c) square
8. He got _____ for eatig too much sugar.
a) into hot water b) wind of it c) on their nerves

JUST FOR FUN

"My sister is awfully lucky," said one little boy to another.
"Why?"
"She went to a party last night where they played a game in which the men either had to kiss a girl or pay a forfeit of a box of chocolates."
"Well, how was your sister lucky?"
"She came home with thirteen boxes of chocolates. "

UNIT 4.

VITAMINS

Analysts a half century ago used chemical methods to estimate the proteins, fats, carbohydrates, mineral elements and water in foods. They separated the substances in relatively pure form from such natural foods as milk, meat, and cereal grains. They fed mixtures of the purified nutrients to animals, which soon sickened and died. It became plain to the scientists that proteins, fats, carbohydrates, minerals and water are not the only essential constituents of foods. Such studies led to the discovery of the vitamins.

We classify vitamins on the basis of their solubility. Vitamin C (ascorbic acid) and the vitamins of B complex are water soluble. Vitamins A, D, E and K in their natural forms are soluble in fats and such fat solvents as ether and chloroform. We call them the fat soluble vitamins. A deficiency of vitamin A injures the epithelial tissues throughout the body. This deficiency is said to be the cause of much blindness among the populations of the Orient. Vitamin A is necessary for vision. Vitamin A profoundly influences the development of the teeth.

Vitamin A occurs only in foods of animal origin. It is not found in any plant. All yellow and green plants, however, contain yellow pigments that can be converted by chemical cleavage into fragments, one of which is vitamin A.

The commonest of these pigments is carotene, so called because it was first prepared from carrots. Because carotene can be converted into vitamin A, it is often called provitamin A.

The total vitamin A value of milk, cream, butter and eggs is the sum of the vitamin A and the carotene present, but one cannot estimate the vitamin A value of such foods on the basis of their colour alone. Not all of the carotene present in the food eaten is converted into vitamin A. Some passes through the digestive tracts and is excreted as such. Some circulates in the blood, and some is changed in the intestine or liver. It is assumed that two-thirds of the total vitamin A is provided by carotene present In the yellow and green, leafy vegetables and yellow fruits, like kale, spinach, collard greens, mustard greens, carrots, pumpkin, yellow sweet potatoes, apricots, yellow peaches, and cantaloup.

Foods from animal sources, like whole milk, butter, eggs, liver, kidney, and some fish, contain the vitamin in itself. Vitamin A accumulates in the liver. Carotene and vitamin A are insoluble in water. Thus there is no loss by extraction during cooking. Exposure to air or oxygen, especially in presence of heat, however, causes destruction of vitamin A and carotene. Air drying of such foods as eggs and vegetables results in significant loss of vitamin A value. Vacuum drying prevents such loss.

The lack of the vitamin A is the cause of rickets. Scientists discovered in 1922 that the vitamin A in cod-liver oil could be destroyed by oxidation without loss of its antiricketic properties. Then it was apparent that cod-liver oil contains a

second fat soluble vitamin. It was named vitamin D. Sterols are organic compounds widely distributed in animal and plant tissues. They are white, crystalline substances that have physical properties like those of candles. Human skin and the skins of all animals contain a sterol called cholesterol. It is transformed into vitamin D when it is exposed to ultraviolet light.

The vitamin D produced by irradiation of a sterol (ergo-sterol) from yeast is called calciferol, or vitamin D_2. It is dissolved in oil and sold commercially as viosterol. It efficiently protects infants from the development or rickets. Vitamin D_3 which is present in cod-liver oil and other fish-liver oils is effective in the prevention and cure of rickets in both animals and birds.

Vitamin D promotes the absorption of calcium from the digestive tract and lessens the amount in the faeces. Very few foods contain significant amount of the vitamin D. Cow's milk generally is not a good source of vitamin D. Salt-water fish generally contain large amount of vitamin D. Herring, mackerel, and canned salmon and sardines are good sources. Vitamin D is present in the body oil as well as in the fat of the liver. Egg yolk and liver (beef, chick, hog) contain vitamin.

Too much vitamin D can be harmful. Overdosing with concentrates of the vitamin results in loss of appetite, vomiting, diarrhoea and drowsiness. Blood calcium and phosphorus rise to abnormal levels, and calcification of the walls of the blood vessels, heart and various soft tissues may occur. Death may follow.

In 1922 a new vitamin was discovered. It was called vitamin E. Lettuce and wheat germ were found to be rich sources of vitamin E. It was shown to be fat soluble and to have the properties of an alcohol. Vitamin E is widely distributed in both plant and animal tissues. Green leaves and the oil found in the germs of cereal seeds, especially wheat germs oil, are excellent sources of the tocopherols (the word was coined from a combination of the Greek words tokos, child, pherein, bear and the suffix -ol indicating it has the properties of an alcohol).

Considerable tocopherol is present in milk, butter, eggs and liver. Because vitamin E is insoluble in water, there is no loss by extraction in cooking.

Exposure to oxygen and development of rancidity result in the destruction of the tocopherols. People whose diet includes fruit, vegetables, milk, whole grain cereals, meat, and eggs every day are not apt to have deficiencies of vitamin E.

An investigation of beriberi in the late 19th century started the chain of events that led to the discovery of vitamin B complex. Of the 11 substances in the vitamin B complex that now are available in pure form five are components of one or more coenzymes — thiamine, riboflavin, niacin, pyridoxine, and pantothenic acid. Coenzymes are catalysts that have important and often related functions in the biochemical processes by means of which nutrients are used for energy and for building up or maintaining the cells and tissues of the body.

A lack of vitamins of the B complex is one of the forms of malnutrition that often occur throughout the world. Larger amounts are needed during growth and in pregnancy and lactation than in maintenance of health in adult life.

Thiamine, or vitamin B, also known as the antineuritic or antiberiberi vitamin, is a watersoluble compound. It is ready broken down by heat in neutral or alkaline solutions. Its solubility and the ease with which it is destroyed are im-

portant, because overcooking food and discarding the water in which the food is cooked may cause large amounts of the vitamin to be lost.

Thiamine is present in many natural foods but is abundant in few. Lean pork is one of the best sources. Dry beans and peas, certain of the organ meats, and some nuts furnish sizable amounts. Whole wheat and enriched cereals and bread are dependable sources.

The minimum need is approximately 0.20 to 0.23 milligram per 1.000 Calories. Thiamine functions in the body as a coenzyme, which is called cocarboxylase. It acts as catalyst in one of the chemical reactions by which glucose (sugar) is broken down in the tissues to supply energy. In thiamine deficiency, pyruvic acid accumulates in the blood and tissues and there is a change in the ratio of the acid to lactic acid.

Effects of a moderate shortage of thiamine include fatigability, apathy, loss of appetite, nausea, such psychic and personality disturbances as moodiness, irritability, and depression, a sensation of numbness in the legs, and abnormalities of the electrocardiogram.

Vitamin C was officially named "ascorbic acid" to indicate its antiscorbutic function. Its chemical structure is quite simple. The chemical makeup is related to the hexose sugars. These sugars have a backbone of (6) carbon atoms firmly joined to oxygen and hydrogen, but between the second and third carbons there is a double bond, which means chemically that this backbone is not so firm as that of the hexose sugars. These two carbons in vitamin C are free to make changes.

Vitamin C occurs in animals and vegetables extensively but haphazardly. Fresh raw fruit and vegetables contain it, yet few animals need it.

The hydrogen atoms at this point are especially at liberty to wander off, and they have a high preference for any oxygen that may be about. It is when these two hydrogens have left that the vitamin becomes known as L-dehydroascorbic acid. This feature makes it an extremely changeable chemical in solution, and the ability to drop off the two hydrogens is one of its outstanding features.

In human beings, ascorbic acid — chemically fragile though if may be — sidesteps vigorous activity, and any excess not needed for its specific function is eliminated in the urine without being changed. The normal newborn infant has stores of ascorbic acid adequate to prevent development of scurvy for about 5 months.

Deficiency is rare in children more than 15 months old. Infantile scurvy will develop in 3 months or more after breast feeding is stopped if no ascorbitic is given either as a food or a supplement (an additive).

The most marked symptoms are found in growing bones. The recommendation is more than twice the requirement. One hundred milligrams of ascorbic acid eaten each day is a generous supply. Recommendations given in Recommended Dietry Allowances are: for infants 30 milligrams; for children from 1 to 9 years, start at 35 and increase to 60 milligrams; for males 10 to 20 years old, increase gradually from 75 to 100 milligrams.

For the adolescent girl 10 to 20 years old the increase is from 75 to 80 milligrams, for fully grown women 70 milligrams. Because people must depend on

outside supplies of vitamin C, we should know which foods furnish it. Three types of foods that contribute vitamins C generously are citrus fruits, tomatoes and members of the cabbage family. In certain vegetables, such as squash, cucumbers and cabbage the ascorbic acid exists along with an enzyme, ascorbic acid, oxidase, or ascorbase.

When the tissue of these vegetables is mutilated by crushing or cutting and is exposed to the air, the chief function of this enzyme appears to be that of changing the ascorbic acid to dehydroascorbic acid. A point of interest and wonder is that ascorbase has copper as a part of its structure.

Some seasonal and local and regional foods are good sources of ascorbic acid. Among them are berries, melons, chili peppers, pineapple, asparagus, turnip tops and other greens, spinach, chard and kale.

Not only are oranges, grapefruits, lemons, limes, and tangerines especially endowed with vitamin C — they protect it. In the raw state, they have firm skins, even juiced, they retain ascorbic acid tenaciously. The processed products, canned frozen, and pasteurized, keep approximately 90 per cent of their original content.

Active Vocabulary

pure	чистий
purify [ˈpjʊərɪfaɪ]	очищувати
solvent	розчинник
solubility	розчинність
ether	ефір
deficiency [dɪˈfɪʃənsɪ]	дефіцит
injure [ˈɪndʒə]	шкодити, руйнувати
carotene	каротин
be converted into	перетворюватись
digestion [daɪˈdʒestʃən]	засвоєння, травлення (їжи)
destruction	руйнування
liver	печінка
loss of	втрата
lack of	відсутність, нестача
dissolve	розчиняти
rickets	рахіт
properties	властивості
absorption	абсорбція, поглинання
yeast [jiːst]	дріжджі
protect	захищати
prevent	запобігати
egg yolk [eg ˈjəʊk]	жовток (яйця)
harmful	шкідливий
overdoze	передозувати
vomit	блювати

diarrhoea	пронос, діарея
germ [ʤɜːm]	зародок, мікроб
malnutrition	недоїдання
cause (n, v)	причина, спричиняти
greens (herbals)	зелені (салатні) культури
chemical structure	хімічна структура
additive [ˈædɪtɪv]	добавка (харчова)

Task1. Fill in the gaps using the words in the box.

antioxidant, amount, occurs, water soluble, solvents, solubility, colourless, carotene, tissues, absorption, digestive tract

1. We classify vitamins on the basis of their _____. 2. Vitamin C (ascorbic acid) and the vitamins of the B complex are _____. 3. Vitamins A, D, E and K in their natural forms are soluble in fats and such fat _____ as ether and chloroform. 4. The yellow colour of milk and cream is due to _____. 5. Vitamin A is almost _____. 6. Mineral oil reduces the _____ of carotene and vitamin A. 7. Sterols are organic compounds widely distributed in animal and plant _____. 8. Vitamin D promotes the absorption of calcium from _____ and lessens the amount in the faeces. 9. Salt-water fish generally contain large _____ of vitamin D. 10. Vitamin E is an _____ — that is it unites with oxygen both within and outside the body. 11. Vitamin C _____ in animals and vegetables extensively but haphazardly.

Task 2. Match the word with its definition.

1. nutritionalist	1. refined
2. natural food	2. components of nutrition
3. purified	3. ascorbic acid
4. carotene	4. made of animal or plant origin
5. sterols	5. sterol contained in human and all animal's skin
6. vitamin C	6. catalysts of facilitating the functions of related vitamins in biochemical processes
7. coenzymes	7. experts in nutrition
8. nutrients	8. organic compound found in animal and plant tissues
9. cholesterol	9. provitamin A

Task 3. Fill in the chart about vitamins and give their characteristics as in the example:

Vitamin	Principle of classification	Products in which they are found	Function

B complex A D E K			

Vitamin C is one of the most important vitamins in human nutrition. **It is a water soluble** vitamin. It's called ascorbic acid to indicate its antiscorbutic function. Vitamin C occurs mainly **in fresh raw fruit and vegetables** such as citrus fruits, tomatoes, currant, dog rose, walnuts, members of the cabbage family, etc. Vitamin C is known as a **catalyst of oxidation and restoring processes** in the living organism.

Task 4. Translate into English.

1. Вітамінами звуться речовини, що містяться у харчових продуктах. 2. Це такі речовини різної хімічної природи, що синтезуються рослинами, іноді мікробами і тваринними організмами завдяки провітамінам, які містяться в рослинних продуктах. 3. Кожний з вітамінів виконує свою особливу функцію, але загалом вони регулюють процеси обміну речовин. 4. Відсутність вітамінів в їжі спричиняє хворобу, що зветься авітаміноз (цинга, поліневрити тощо), а недостатність призводить до послаблення організму, тобто гіповітамінозу. 5. Усі вітаміни класифікуються за хімічною природою, зокрема, за розчинністю. 6. Вітаміни розподіляються на водо – і жиророзчинні. 7. Вітаміни групи В і С є водорозчинні. 8. Тіамін або вітамін В відомий як антиневрологічний вітамін тому, що він постачає енергію в клітини організму в результаті хімічних процесів. 9. Вітамін С як один із найважливіших бере участь в окисно-відновлюваних процесах у живих клітинах організму. 10. Вітаміни А, D, E, K відносяться до жиророзчинних. 11. За функціональними характеристиками вітамін А називають вітаміном росту і антиінфекційним, оскільки його відсутність призводить до затримки росту і очних хвороб. 12. Вітаміни групи D регулюють кальцієвий обмін. 13. Відсутність кальцію в організмі дитини спричиняє рахіт, хворобу кісткової системи. 14. Багато вітаміну D міститься у жирі тріски та різних морських продуктах. 15. Вітамін Е міститься в зародках хлібних злаків.

Task 5. Answer the questions.

1. How do we classify vitamins? 2. What do we call the vitamins which are soluble in fats? 3. What does a deficiency of vitamin A injure throughout the body? 4. What do we call provitamin A? 5. Are carotene and vitamin A soluble in water? 6. Is there any loss by extraction during cooking? 7. What is the cause of rickets? 8. What can you say about vitamin D? 9. What are sterols? 10. What do human skin and skins of all animals contain? 11. What is cholesterol transformed into when exposed to ultraviolet light? 12. Where is vitamin D present? 13. What

are the properties of vitamin E? 14. What is tocopherol? 15. Is vitamin E soluble in water? 16. What are the properties of vitamin B? 17. Where is vitamin B present? 18. Why was vitamin C named ascorbic acid? 19. What does the deficiency of vitamin C lead to?

Task 6. Which vitamins influence favourably different parts of human body and systems of organism?
Put words below into the right column

Vitamins	Part of the human body and systems of organism

Vit. A; eyes; skin; Vit. C; teeth; blood; bones; Vit. E; Vit. B complex; heart; lungs, Vit. D; nervous system; Vit. K; muscles, hair, nails, liver

Task 7. React to the fallowing statements using positive or negative replies:

1. What about having lunch at that vegetarian restaurant?
1. Let's go on this diet together!
2. I'm not sure they serve organic food there.
3. How do you find this salad?
4. Fruit is a little overriped, is not it?
5. Will you pass me some pepper, please?
6. I'd like two ice creams.
7. I take vitamin additives twice a day and feel better.
8. You should eat more carrots to have better vision.
9. Do you find a balanced diet perfect?

- Sure, what time shall we go?
- Really? Which vitamins are you taking?
- Oh, it smells disgusting.
- I'm afraid, I won't, I don't believe in any diets.
- Right you are. It's an ordinary second class restaurant.
- Why? You aren't right. I'm fond of mellow and juicy fruits.
- Sure. Here it is.
- Hope they do matter for my eyes.
- It depends.
- Which flavours?

Task 8. Comment upon some common ideas about food.

Eating carrots is good for the eyes.
Eating fish is good for the bones.
Eating cheese before going to bed makes you dream.
Yoghurt makes you live long.

Eating nuts is good for brain.
Garlic keeps you from getting colds.
Honey helps you go to sleep.
A cup of tea settles your stomach.
An apple a day keeps the doctor away.

Task 9. Read the text without a dictionary. Do you agree with the author's concern as to vitamin consumption in a human diet?

Vitamins in Food: Our Major Sources

Under certain circumstances, we ingest vitamins from numerous food sources and additionally synthesize small amounts in the body. Our ability to reach daily requirement levels depends upon the foods we eat, how well our bodies synthesize, and how great our needs are. These variables can be complex. For example, many vitamins occur in food in both active and inactive forms. When we ingest vitamin in its active form, the substance is immediately useful to our functions. A vitamin in inactive form is not. Food processing may release the inactive form. Since our knowledge of active and inactive vitamin forms is limited, our best information on vitamin content in food composition tables may ultimately require revision. Similarly, the quantity of vitamins retained in commercially processed foods varies by type of food, processing techniques, and storage methods. Even fresh food vary in vitamin content.

Task 10. Fill in the missing words to form idioms in the sentences below. Choose from the following:

Season; out of reach; ones; his last legs; in stock; at death's door; good shape; doldrums; on

1. I may be getting on a bit, but I'm certainly not _____ yet! I hope to live for at least another ten to fifteen years!
2. Strawberries cost a lot at the moment because they are not in _____.
3. Although she is in her early fifties, she exercises regularly and is still in very _____.
4. Sorry if I'm not very good company today. I'm feeling a bit in the _____.
5. You'd better put those tablets _____ of the children.
6. My mother is a vegetarian and won't eat meat _____ principle.
7. Throughout the flight he was very much _____ edge, and didn't start to relax until the plane had landed.
8. The old man was very weak and was close to death. He was _____.
9. "Two tins of baked beans, please." "I'm afraid, we haven't got any _____ at the moment. But we should be getting some more on Tuesday."

JUST FOR FUN

“You have an admirable cook, yet you are always growling about her to your friends.”
“Do you suppose I want her lured away?”

UNIT 5.

CEREAL GRAINS

The cereal grains are the edible seeds products by certain plants of the grass family. They provide 20 to 80 per cent of the food energy in different countries of the world.

Cereal grains have many natural advantages as foods. They are nutritious. The grains are not bulky. They can be stored for long periods, are transformed cheaply long distances. They are readily processed to give highly refined raw foods.

Four general groups of foods are prepared from the cereal grains and these must be kept in mind by the grower and processor when quality is considered.

Baked products made from flour or meal include pan breads, loaf breads, pastries, pancakes and flat breads.

Milled grain products, made by removing the bran and usually the germ, include white rice, farina, wheat flour, corn-meal, hominy, corn grits, pearled barley, semolina for making macaroni products, prepared breakfast cereals, and soup, gravy and other thickenings.

Whole-grain products include rolled oats, brown rice, popcorn, shredded and puffed grain, breakfast foods, and home-ground meals made from wheat, corn, sorghum, and millet.

Beverages are made from fermented grain products (distilled and undistilled) and from boiled roasted grains.

Preference for a cereal depends on the form and flavour of the food made from it, its amount of nourishment and contribution to health, cost, its general availability, and the food habits of a people.

All cereal grains have high energy value, mainly from the starch fraction but also from the protein and fat. The mineral and vitamin composition varies considerably among the cereals and among varieties within species. It reflects the plates where they are grown, the conditions of storage, and the portion of the kernel that is utilized.

Cereal foods should be eaten and are eaten with meat, fish, vegetables, milk and other foods. The food value of cereals depends on their chemical composition and the availability of the constituents for use by the human body.

Quality standards in cereal grains have to do with the nature of the raw product, the ease of processing wholesome food from it, and the intended use.

Each class or subclass of grain is divided into several grades, which are based primarily on the minimum allowable weight per bushel and maximum limits of moisture, mixtures of various kinds, and damaged kernels.

Wheat is divided into seven market classes according to the botanical type, the area where it is grown or the major use. They are hard red spring (the usual protein content is 12—14 per cent) and hard red winter (9—13 per cent protein), the bread wheats: durum (about 11—14 per cent protein) for macaroni products;

soft red winter (10 per cent protein), the pastry wheats: red drum used as food, and mixed wheat the use of which depends on its composition.

Corn is classed as yellow, white and mixed.

There are special grades for flint corn. Both yellow and white corn are utilized for cornmeal, white corn is favoured for hominy and breakfast foods.

Starch, syrup, sugar and oil made from the different classes are similar in quality. Popcorn is graded on the basis of popping expansion, uniformity, and degree of maturity. Popcorn to be caramelized should pop into smooth mushroom-shaped grain in contrast to the large "butterfly" type most popular for buttering. Yellow popcorn has become more popular than white.

Barley classes distinguish among eastern and western grown sixrowed barley. Subclasses for malting barley and special grades for two-rowed barley further specify market samples for uses requiring special qualities. Oats are classified by colour of the hull as white, red, gray, black, and mixed oats.

White oats are preferred for milling, but yellow and red oats also are used. Rice is graded as rough rice, brown or cargo, and milled rice (bran layers are removed).

There are special grades for unpolished milled rice sometimes called undermilled rice, parboiled milled rice, which was processed before milling by soaking, steaming and drying: and coated milled rice, which receives a coating of glucose and tale.

Grain quality has two general meanings — physical quality, which pertains to cleanliness and freedom from foreign seeds and trash, and processing quality, which means suitability for the use for which the grain is intended.

Physical quality sometimes partly describes the processing quality. Certain market classes are more suitable for the production of consumer food than others. Grain that has been stored for many years, or for a shorter period under poor conditions may be less suitable for food. The fat of such grain begins to break up into simpler compounds, fatty acids and glycerol.

Flour is made from the endosperm, the central part of the wheat kernel, 70 to 75 pounds of flour are commonly obtained from 1000 pounds of wheat. Varieties of wheat may differ markedly in millability. The white wheats as a group are perhaps the easiest to mill, and they produce a high yield of flour. White flour may be divided into two major classes — bread flour and pastry flour. Bread flour is used to make rolls and Vienna bread, as well as the common sliced, wrapped white bread. Pastry flour is used for cakes, cookies, piecrusts, doughnuts, crackers and biscuits.

Pastry flours have about 6 per cent to 9 per cent of protein. They are made from softer wheats compared to those used for bread flours. They generally are made from soft wheats in order to obtain the low-protein type necessary to make pastries and rich cakes.

The strength of soft-wheat flours may be measured by amount of water they absorb in a slightly acid, or weakly alkaline solution. Strength appears to be proportional to the amount absorbed.

Quality of pastry flours may be judged by the feel of a flour-water dough. A good pastry flour will be short one whose dough will stretch relatively little but breaks Instead. Good quality in a cookie flour is measured by (and is directly proportional to) the diameter of the cookies produced.

Semolina, a granular middlings or meal, is used to make spaghetti and macaroni products and noodles.

It is made from a very hard wheat (durum) which is suitable mainly for this purpose. Macaroni quality is measured by mixing and kneading the semolina with water forming the shape of a typical macaroni or a flat thin sheet, and drying it slowly. The best semolinas produce a translucent, golden, or amber product. The yellow colour is not known to be important nutritionally, however.

Quality in rice is evaluated according to kernel shape and uniformity, milling loss (broken kernels), and cooking characteristics. Cooking quality is judged by the water uptake, volume of cooked rice, starch and other solids in the residual liquid, degree of cohesiveness, cooking time, colour, flavour and aroma.

Professors of rice prefer different textures for different products. Those two package quick-cook rice and who produce canned products prefer the fluffy, dry whole-grain cooking types. Manufacturers of breakfast and baby foods prefer the firm, or chewy cooking types, in which the grains tend to stick together. Parboiled rice is produced by soaking rough rice, steaming or cooking it, and drying and hulling and milling.

For this rice, vitamin and mineral content are factors of quality, because 70 to 90 per cent of such nutrients in the rough rice are retained in the parboiled rice after milling.

Corn is processed by the wet milling process to make oil, starch, and syrup for food purposes. The most important quality characteristics of grain are full maturity, freedom from type of mold, spoilage, and animal or insect contamination, and if dried artificially, drying at temperatures below 135°. Yellow corn contains appreciable amount of vitamin A. White corn contains a trace.

High quality oats are matured, unweathered, free from foreign material and other grains, and of high weight per bushel. Manufacturers of rolled oats believe that grain high in protein and low in fat makes the best product. Rolled oats with a high fat content are chunky, become rancid easily, and produce party water porridge when cooked. Rye flour, generally mixed with relatively large amounts of wheat flour, is used to make specially bread. The starch liquefying enzyme must be present in the proper amount especially when relatively rye bread is baked.

Too little an amount results in a dry, brittle crumb and large hollow spaces. It is determined by measuring the thickness or viscosity of dot flour water pastes. Small scale bread-baking tests may be used to evaluate the flour. The bread is scored for general appearance, size, and crust colour of the loaf and grain and texture of the crumb.

Active Vocabulary

cereals *['sɪərɪəlz]* хлібні злаки

edible	який можна їсти
nutritious [njut'rɪʃəs]	поживний
process (n, v)	переробка, переробляти
flour ['flauq]	борошно
flavour	смак
grow	вирощувати
store	зберігати
moisture ['mɔɪstʃə]	вологість
kernel	зерно
mix	зміщувати
wheat [wiːt]	пшениця
rye	жито
rice	рис
barley	ячмінь
millet	просо, пшоно
buck wheat	гречка
oats	овес
maize (corn AE)	кукурудза
pearl barley	перлова крупа
gravy	підлива
paste	паста, здобне тісто, пастила, клейстер
cornflakes	кукурудзяні пластівці
bran	грис, висівки
gluten	клейковина
crumb of bread	крихта хліба
crust of bread	шкуринка (скоринка) хліба
viscosity	в'язкість
hull, husk	шкарлупа, шолуха, шкірка
biscuit ['bɪskqt]	(сухе) печиво
pastry	кондитерські вироби
Vienna bread	віденська булочка
roll	батон, булочка
beverage ['beverqʤ]	напій
dough ['dou]	дріжджове тісто
batter	збите тісто (без дріжджів), тістечко
cake	кекс, торт
cookies	домашнє печиво, булочка
cracker	крекер

Task 1. Fill in the gaps using the words in the box.

kernel; white; oats; rice; hull; barley; corn; grains; wheat

1. Cereals include the small _____, rice, wheat, corn or maize, and the various grain sorghums.
2. _____ supplies flour for bread, macaroni, crackers, and other foods.
3. _____ is classed as yellow, white and mixed.
4. _____ resembles wheat in appearance but has a longer and more slender head.
5. _____ are classified by colour of the _____ as white, red, black and mixed oats.
6. _____ oats are preferred for milling, but yellow and red oats also are used.
7. Quality in rice is evaluated according to _____ shape and uniformity, milling, less broken kernels and cooking characteristics.
8. _____ fresh from the combine harvester usually is high in moisture and requires prompt and careful drying.

Task 2. Match the word with its definition

1. beverage (soft and alcoholic)	1. useful in nutrition
2. cereal grains	2. maize
3. nutritious	3. prepared in the oven
4. raw food	4. a substance made of endosperm, the central part of the wheat kernel
5. baked (grain products)	5.drink made of fermented grain products (distilled or undistilled)
6. milled (grain products)	6. not processed
7. flour	7. prepared by milling
8. corn	8. edible seeds produced by certain plants of the grass family

Task 3. Give your reasons to agree or disagree with the statements below as in the following examples:
1. In addition to having milk, meat, fruits and vegetables the daily food guides recommend four or more servings of grain products each day.

- *I fully agree with it because products made of cereals contain a lot of proteins, carbohydrates, useful vitamins and minerals necessary for our organism.*
2. A person should consume a lot of sugar which gives energy to his brain and body as a whole.

- *As a matter of fact its not true because the excess of sugar consuming may do a lot of harm to the human organism and cause a dangerous disease diabetes as a result.*
3. Eating much cereal products and sweets may lead to overweighting.
4. Brown bread made of rye is much more useful than white bread made of wheat.
5. Porridge eaten as breakfast meals is as useful as fruit salads.
6. Salt is very useful for the human organism because its deficiency causes scurvy.

7. Foodstuffs containing different preservatives and additives make them much tastier and attractive.
8. If you want to lose weight, do it gradually.
9. You should eat regularly and drink five or six glasses of water per day.
10. Only that food is considered to be nourishing and palatable which is eaten with great pleasure.

Task 4. In teams use the words/phrases below to make up sentences.

eating habits, count calories, foods rich in fibre, go on a diet, put on extra weight, feel fit and strong, be slender, cereals, raw fruit and vegetables, look smart, junk food, dishes, spicy, low-caloric foods, sweets, vegetarian, juice, rolls, cakes, fatty, popcorn, porridge, chips.
Example:
Porridge. Porridge for breakfast as an English eating habit is good for us. It contains carbohydrates and vitamins B and E. We should eat it regularly.
Chips. Chips aren't very good for us. They are spicy and made with salt. We shouldn't eat much junk food.

Task 5. Fill in the gaps with the words in the box.

Eat, pizza, a glass of; worry, some; wolf; cook; idea; some; a little; much; any

Ann: I'm as hungry as a _____. Let's have something to _____.
Paul: O.K. What about _____?
Ann: Oh, It'll take a lot of time. Let's _____ an omelette.
Paul: Oh, it's a good _____!
Ann: Then bring me _____ eggs, _____ milk and _____ flour, please.
Paul: It's a pity, but I can't find _____ flour.
Ann: Don't _____. That'll be enough.
Paul: Shall we have _____ cheese and ham?
Ann: Yes, of course. And we need _____ tomatoes too.

Now using the words below roleplay similar dialogues.

Vatrushky: flour, sugar, eggs, butter, curds
Pizza "Margarita": mushrooms, cheese, onions, mayonnaise,flour, salt, eggs, chicken

Task 6. Translate into English.

1. До основних зернових культур належать типові хлібні злаки – пшениця, жито, овес, ячмінь, кукурудза. 2. Пшениця є однією з найважливіших

зернових культур. 3. Крупа являє собою цільні, дроблені зерна хлібних злаків. 4. Крохмаль є основним вуглеводом в хлібних продуктах, і кількість крохмалю в зерні різних культур коливається від 50 до 70 % ваги зерна. 5. Ячмінь використовується для виготовлення крупи, борошна, пива, солоду. 6. Вирощування рису залежить від погодних умов, і для нього необхідно багато тепла і вологості. 7. Пшеничне борошно використовують для вироблення хлібопекарських, макаронних, кондитерських і млинцевих продуктів. 8. Білки житнього борошна багаті на незамінні амінокислоти.

Task 7. Answer the questions.

1. What are the natural advantages of cereals as foods?
2. How many groups of foods are prepared from the cereal grains?
3. What products are made from the cereal grains?
4. What products are beverages made from?
5. What is the general characteristic for all cereal grains?
6. What does the food value of cereal depend on?
7. What basis is popcorn graded on?
8. Can you say anything about barley classes?
9. What is the basis for oats classification?
10. How is parboiled milled rice processed?
11. How many general meanings has grain quality?
12. What is flour made from?
13. How many classes may white flour be divided into?
14. What is bread flour used for?
15. What is pastry flour used for?
16. What are bread flours made from?
17. What are pastry flours made from?
18. By what is the strength of bread flour measured?
19. What are pastry flours characteristics?
20. By what may the strength of soft wheat flours be measured?
21. What can you say about pastry flour dough?
22. What can you say about semolina?
23. What can you say about the quality of rice?
24. What are the most important quality characteristics of grain?
25. What can you say about rye flour?
26. What kinds of tests may be used to evaluate the flour?

Task 8. Read the text with correct tense forms and discuss it.

Cereal and Cereal Products

In addition to recommending servings of milk, meat, and fruits and vegetables, the daily food guides 1_____ four or more servings of grain products each day. The major nutrients these foods contribute 2_____ calories, iron, niacin, and vitamins B1 and B2. Cereals and cereal products 3_____ all

grains served in whole grain, enriched, or fortified forms; for example, wheat, corn, oats buckwheat, rice, and rye.

The protein in grains 4_____ incomplete. For example, if two or three different cereals 5_____ consumed at the same time, amino acids missing in one 6_____ be supplied by the others. We also 7_____ to combine grains with protein – rich food – macaroni and cheese, egg noodles, buns with hamburger, rice with chicken, and milk on cereals – and thus 8_____ our amino acid intake.

Most nutritionists 9_____ eating some cereal products daily because they 10_____ a fair amount of many nutrients at low cost. However, nutritional values of many breakfast cereals are 11_____ by consumer groups. The main dispute 12_____ the practice of eating food, but cereals by themselves 13_____ limited types and amounts of essential nutrients.

1. are recommending/ recommend/ will recommend
2. were/are/ will be
3. are including/ included/ include
4. will be/ is/ are
5. is/ are/ will be
6. may/ should/ must
7. tend/ will tend/ are tending
8. increased/ will increase/ increase
9. recommend/ will recommend/ are recommending
10. provided, will provide/ provide
11. were challenged/ were being challenged/ are being challenged
12. concerns/ will concern/ concerned
13. contributed/ are contributing/ contribute

Task 9. Choose the right answer. Can you think of any Ukrainian equivalents of the English idioms given below?

1. People who have a sweet _____ like things like chocolate, ice cream, cakes, etc.

a) tooth b) brain c) hair

2. If you are feeling really sad you might cry your _____ out.

a) ear b) eyes c) lips

3. If you are in a restaurant and you want to pay your bill, you will first have to catch the waiter's _____.

a) chin b) brain c) eye

4. If someone was looking really sad or depressed, you might think they had a _____ as long as a fiddle.

a) face b) finger c) tooth

5. He's too active. He has _____!
a) sweet teeth b) his heart in his mouth c) a finger in every pie

6. My mother always goes as _____ as a beetroot whenever she's embarrassed.
a) black b) white c) red

7. Pass me a glass of water, please. I've got _____.
a) hen party b) my goat c) a frog in my throat

8. It's Kristina's _____ on Friday. You are coming, I hope?
a) stag party b) hen party c) red – letter day

9. He really made _____ of himself at the corporate party.
a) fool b) a joke c) a pig

10. As the epidemic struck, people started dropping like _____.
a) birds b) insects c) flies

JUST FOR FUN

"Now, Jack, dear, if I do all the cooking for a month, what will I get?"
"You get my life insurance and your freedom."

UNIT 6.

VEGETABLES

Food value of vegetables. Vegetables play a very important role in the human diet, supplying some of the things in which food materials are deficient. They are important in neutralizing the acid substances produced in the course of digestion of meats; cheese and other foods; they are of value as roughage which promotes digestion and helps to prevent constipation; they are important sources of the mineral elements needed by the body; being especially rich in calcium and iron, they are valuable sources of vitamins. Although vegetables, in general, are not considered of great importance in furnishing proteins, carbohydrates and fats, some of them, such as dried seeds of beans, peas, and lentils, are rich in proteins. Others, such as potatoes, sweet potatoes, parsnips, carrots, and rutabagas, are important sources of carbohydrates.

At least 10 mineral elements are needed for the proper growth and development of the body. Extensive investigations have shown that calcium, phosphorus, and iron, except in rare instances, are the only mineral elements that are not present in quantities sufficient for the needs of the body. The green vegetables are sources of the important mineral elements. Potatoes, sweet potatoes and mature onions contain appreciable quantities of phosphorus.

A certain quantity of bulky food is necessary for good health, vegetables are the main source of roughage. Most vegetables, particularly the leafy ones, as celery, cabbage, spinach, and lettuce are characterized by high water content and relatively high percentage of cellulose or fibre. Because of their succulence and relativelly large bulk, the leafy vegetables and most of the root crops probably aid in the digestion of the more concentrated foods.

The name vitamin has been given to a group of food substances other than fats, proteins, carbohydrates, and salts that occur in small quantities in natural food materials. They are essential for growth, for reproduction, and for the maintenance of health.

Green and yellow vegetables contribute about 33 per cent of the vitamin A supplied by major food groups. They supply also about 25 per cent of the ascorbic acid, while citrus fruits and tomatoes furnish about 34 per cent. The vegetables ranking highest in vitamin A are carrots, turnip greens, spinach, sweet potatoes, beet greens, mustard greens, winter squash, chard, and broccoli. It should be born in mind, however, that the number of milligrams, or International Units, of a vitamin to the pound of food does not tell the whole story.

A vegetable may be rich in vitamins, but if only a small quantity of that vegetable is eaten, the consumer will need other source of supply. A pound of green peppers contains about seven times as many milligrams of ascorbic acid as a pound of Irish potatoes, but the average consumer obtains more of his requirements from potatoes than from peppers because of greater consumption of potatoes.

There are four general methods of classification of vegetables: (1) a botanical classification; (2) a classification based on hardiness; (3) a classification based on parts used as food; (4) a classification based on essential methods of culture. A fifth method combining parts of the four mentioned may be used to advantage in grouping for discussion.

According to botanical classification plants are divided into four great groups, or "subcommunities". These are as follows:

I. Thallophyta. The thallophytes.

II. Brophyta. Mosses and liverworts.

III. Pteridophyta. Ferns and their allies.

IV.Spermatophyta. The spermatophytes, or seed plants.

Classification Based on Hardiness. Vegetables are often classified as hardy and tender. Those classed as hardy will endure ordinary frosts without injury, while those classed as tender would be killed. Some of the hardy plants will not thrive well under hot dry conditions. Others will withstand frost and also thrive during the hot weather of summer. Some tender vegetables do not thrive in cool weather even if no frost occurs. The terms cool-season and warm-season crops are used to suggest conditions under which the crops thrive best, rather than their susceptibility to frost injury.

Classification Based on Parts Used as Food. In this system of classification those crops grown for their leaves or stems are placed in one group. This group includes cabbage, kohlrabi, collards, asparagus, rhubarb, all the salad crops. A second group includes those crops grown for their fruits, as melons, tomatoes, egg-plant, beans, and peas, while a third group includes those grown for their flower parts, as cauliflower and broccoli. Those crops grown for their underground portions (roots, tubers, bulbs, and corns), as potatoes, beets, carrots, parsnips, radishes, turnips, salsify, onions, garlic and dasheen, constitute the fourth group.

Classification Based on Methods of Culture. A system of classification based on essential methods of culture is very convenient. In this system all those crops that have similar cultural requirements are grouped together. This system combines some parts of the other three methods.

According to this classification the vegetables are placed into 13 groups. The grouping is as follows:

Group 1. Perennial crops: Asparagus, rhubarb, artichoke, sea kale.

Group 2. Pot-herbs or greens: Spinach, New Zealand spinach, orach, kale, chard, mustard, collards, dandelion.

Group 3. Salad crops: Celery, lettuce, endive, chicory, cress, corn salad, parsley, salad chervil.

Group 4. Cole crops: Cabbage, cauliflower, broccoli, Brussels sprouts, kohlrabi, Chinese cabbage.

Group 5. Root crops; Beet, carrot, parsnip, turnip, ruta- bage, salsify, turnip-rooted chervil, skirret, radish, horseradish, scorzonera, or black salsify, or Spanish salsify.

Group 6. Bulb crops: Onion, leek, garlic, shallot, cibone, or Welsh onion, chive, orchive.

Group 7. The potato.
Group 8. The sweet potato.
Group 9. Peas and beans: Pea, bean, broad bean, common, or garden bean, Multiflora bean, Lima bean, tepary bean, Soybean, cowpea, or Southern pea.
Group 10. Solanaceous fruits: Tomato, egg-plant, pepper husk tomato, or physalis.
Group 11. The cucurbits: Cucumber, gherkin, muskmelon, watermelon, citron, melon, pumpkin, squash.
Group 12. Sweet corn, okra, mertynia.
Group 13. Chayote, yam, dasheen (taro), manioc.

Active Vocabulary

vegetarian [ˌveʤɪ'tɛərɪən] вегетаріанський
vegetative рослинний
calcium ['kælsɪəm] кальцій
iron ['aɪən] залізо
phosphorus ['fɔsfərəs] фосфор
leafy vegetables листові овочі
lettuce (зелений) салат –латус
bulk груба їжа
root vegetables коренеплоди
mature [mə'tjuə] дозрілий, стиглий
mustard greens рослинна гірчиця
squash [skwɔʃ] кабачок
turnip ріпа
sweet pepper солодкий перець
green pepper зелений перець
hardy vegetables тверді овочі
tender vegetables м'які овочі
greens (pot herbs) овочева зелень
salad crops салатні овочі
thrive буяти, пишно рости
susceptible to [sə'septəbl] бути сприйнятливим, вразливим до чогось
tubers бульбові культури
bulb crops цибульні овочі
peas and beans горохові і бобові
pumpkin гарбуз
parsley петрушка
dill кріп

Task 1. Fill in the gaps using the words in the box.

Pumpkins, asparagus, kale, broccoli, species, folic, acid, leafy, phosphorus, potatoes, turnips

1. Potatoes, sweet potatoes and mature onions contain appreciable quantities of _____. 2. The _____, green and yellow vegetables contribute about 33 per cent of the vitamin A supplied by the major food groups. 3. They supply also about 25 per cent of the ascorbic acid, appreciable quantities of thiamine, niacin, and _____ _____. 4. _____ and sweet potatoes supply about 16 per cent of ascorbic acid, while citrus fruits and tomatoes furnish about 34 per cent. 5. The vegetables ranking highest in vitamin A are carrots, turnip, greens, spinach, sweet potatoes, beet greens, mustard greens, winter squash, chard, and _____. 6. The only stored vegetables of much importance that do not have to complete with the fresh product are sweet potatoes, winter _____, and winter squashes. 7. Most of the root crops such as beets, carrots, parsnips, rutabages and _____ keep best in a relative cold, humid atmosphere, while sweet potatoes, pumpkins, and squashes keep best in a relative warm, dry atmosphere. 8. _____, a genus of the lily family, has at least 150 _____ native of Europe, Asia and Africa. 9. Many types of _____ are known but they all probably belong to the same species.

Task 2. Match the word with its definition.

1. bulky food	1. harvest
2. cellulose	2. vegetables of cabbage family
3. raw	3. nutrition
4. greens	4. fresh
5. crop	5. herbal vegetables
6. diet	6. tough (hardy) food
7. raw vegetables	7. fibre
8. cole crops	8. vegetables eaten without cooking
9. solonaceous fruits	9. vegetables of tomato family

Task 3. Group the words below under the following headings:

leafy vegetables
salad crops
cole crops
bulb crops
greens (pot herbs)
root crops
peas tubers and beans
solonaceous fruits
cucurbits
vegetables grown for their flower parts

pepper Brussels sprouts cabbage

pea	dill	cauliflower
bean	mustard	parsley
potato	cucumber	kale
pumpkin	tomato	carrot
squash	watermelon	parsnip
cowpea	citron	horseradish
onion	melon	Chinese cabbage
asparagus	egg-plant	celery
beet	garlic	lettuce
turnip	chive	spinach
leek	radish	collards
broccoli	Spanish salsify	chicory

Task 4. Describe the verbs used in the kitchen for cooking some vegetable dishes of your own:

fry, roast, bake, stew, boil, salt, cut, peel, pour, slice, mix, make, wash, cool, spice, grease, put, grate, chop, microwave, dress, stir, grill.

Task 5. Write your own recipe for a vegetable dish (it may be your favourite one). Concern the following items:

- ingredients
- technology of making
- food value

In teams present your recipe to other students and find out the best cook of the group.

Task 6. In teams discuss the problem: "Is a vegetarian diet becoming so ever popular nowadays?" Concern the following items:

- Protein, carbohydrate, fat contents in vegetarian foodstuffs
- Role of vitamins and minerals in a vegetarian diet
- Food values of vegetative diets in a human nutrition
- Moral aspects of vegetarians
- Ecology of vegetarian food
- Pros and cons of being a vegetarian.

Task 7. Translate into English.

1. Важлива роль у харчуванні людини належить свіжим овочам, а також різним продуктам харчування, які отримують в результаті їхньої переробки. 2. Вони є цінним джерелом вітамінів і необхідних для людини мінеральних речовин. 3. Такі овочі, як салатношпинатні, бобові, капустяні і деякі інші є продуктами рослинного походження з високим вмістом білкових речовин. 4. Капустяні та салатношпинатні овочі, а також селера і бурякова зелень багаті на солі кальцію. 5. Коренеплоди є джерелом вуглеводів, переважно цукрів, а

також вітамінів, мінеральних солей, смакових та ароматичних речовин. 6. Кріп багатий на вітамін С, отже він не тільки покращує смак їжі, а й вітамінізує її. 7. Зелені овочі багаті на азотисті речовини, з яких значне місце належить білкам. 8. Овочева зелень – важливе джерело вітамінів С, К, каротину та мінеральних речовин, особливо заліза, фосфору, йоду, кальцію, мікроелементів.

Task 8. Answer the questions.

1.Why are vegetables important in the human diet? 2. What vegetables are rich in proteins? 3. What vegetables are important sources of carbohydrates? 4. What are good sources of the important mineral elements? 5. What vegetables contribute about 33 per cent of the vitamin A? 6. What methods of classification of vegetables do you know? 7. What kinds of vegetables belong to the pot-herbs? 8. What kinds of vegetables belong to the salad crops? 9. What kinds of vegetables belong to the bulb crops?

Task 9. Read the text without a dictionary and discuss it.

The daily food guides recommend four or more servings of fruits and vegetables each day, since this group makes many nutritional contributions to the diet. Fruits and vegetables are responsible for the major intakes of iron and vitamins A and C; they are also good sources of calcium, magnesium, and folic acid. They contain small amounts of trace elements, depending on the type of soil in which they are grown, and some vegetables contribute protein. Fruits stimulate appetite, and their organic acid content helps in the absorption of iron and calcium, especially if a person does not produce enough stomach acid.

Most fruits and vegetables are nutrient dense, low in calories, low in fat, and high in cellulose. Because they provide roughage, cellulose, and bulk, the products in this group ensure a good intestinal environment. Some of them – such as celery, apples, and carrots – even help clean our teeth. Although this group as a whole is a major source of vitamin A, very few vegetables and fruits contain good amounts of this vitamin. The major ones that are high in vitamin A are dark green vegetables, orange – coloured vegetables, and orange – fleshed fruits, such as apricot, musk – melon, and mangoes.

Fruits and vegetables are our main sources of vitamin C. Citrus fruits are particularly high in vitamin C. Fruits such as cherries, strawberries, and cantaloupe also provide rich amounts of this vitamin. Vegetables such as spinach, cabbage, broccoli, and asparagus are good sources, especially when eaten raw.

The vitamin C level in many fruits and vegetables varies with the season, climate, variety of products, stage of maturity, storage period and temperature, and the plant parts utilized. Vitamin C loss after harvest, during oxidation, and discarded parts is high. Since vitamin C is a very fragile compound that is subject to destruction by heat, air, and light, food should be prepared in ways that minimize its loss.

We derive about a quarter of our daily iron need from fruits and vegetables. In general, leaves contain more iron than stems, fruits, and the parts grown in the soil.

Fruits and vegetables contribute a small amount of calcium. However, if the person's milk consumption is low or if a large amount of fruits and vegetables is eaten, the relative contribution of calcium from this food group is increased.

Although many fruits and vegetables are not high in calories by themselves, they are often consumed in combination with high – calorie foods, which increase the calorie intake. Broccoli, for instance, is often eaten with high – calorie cream sauce or butter, canned peaches usually are packed in high – calorie sugar syrup.

Task 10. Choose the right word or phrase which best completes the idiom of comparison. Think of its Ukrainian equivalent.

1. Nothing ever seems to bother Steve. No matter what happens, he always remains as cool as _____.
   a) cold feet b) a cucumber c) an Eskimo

2. It's hard to believe that Yanek and Stefan are brothers isn't it? They are as different as _____.
   a) milk and honey b) chalk and cheese c) margarine and butter

3. Brigitte was as keen as _____ to start her new bellydancing course.
   a) coffee b) mustard c) vinegar

4. My new car is so fast. It goes like _____.
   a) a bomb b) hot cakes c) a duck to water

5. No smoke without _____.
   a) sleeping b) fire c) dream

6. First _____, first served.
   a) visit b) eat c) come

7. Don't count your _____ before they're hatched.
   a) pigs b) chickens c) hens

8. Too many _____ spoil the broth.
   a) cooks b) chefs c) waiters

JUST FOR FUN

Jones came home one evening and found his young wife sobbing. "What's the matter, darling?" he asked anxiously.

Amidst the sobs, she explained that the cat had eaten all the cakes she had made that morning.

"Never mind, old dear," he said kindly: "I'll get you another cat tomorrow."

UNIT 7.

FRUITS

In order to have high quality fruit must be unspoiled by diseases, insects, mechanical injury, or contamination with foreign matter. Most fruits must be ripe. Products must be fresh or properly stored or preserved if they are to possess their respective desirable properties. It is partly because of differences in tastes or desires of consumers that gardeners grow so many different kinds of fruit.

Although fruits are numerous, the leading authorities on the subject usually reduce the classification of those grown in northern countries to four divisions: 1.cultivated, such as apples or pippin-fruit — apple, pear, medlar, quince, etc.; 2.stone-fruit - peach, nectarine, apricot, plum, cherry, damson, etc; 3.berries — grape, strawberry, raspberry, blackberry currant, etc.; 4.nuts—hazel nut, walnut, filbert, etc.

The divisions of the fruits grown in warm, temperate and tropical climates are:

1. Stone-fruit— date, olive, mango, etc.
2. Berries and berry-like fruit — banana, plantain, fig, orange, pineapple, lime, lemon, citron, grapefruit, melon, etc.
3. Nuts or shellfruit— coconut, almond, Brazil nut, chestnut, etc.

No fruit is more widely cultivated in temperate climates than the apple. Its cultivation has become so extensive due to an appreciation of its qualities.

Apples may be a moderately good source of ascorbic acid, depending on whether it is a summer apple, a fall or a winter apple, whether it is eaten soon after harvest or several month later, and whether it is unpared or pared.

Pears are a popular fruit in Great Britain, both in a fresh and a canned condition.

The pear is of the same genus as apple, and is a native of Europe and Western Asia in their temperate regions.

The peach is considered to be of Chinese origin. There are many varieties existing, but they usually pass under the classification of "white" and "yellow", which types are again divided into two classes: the "Freestones" with loose flesh, as the name implies; and the "Clingstones", with loose flesh adhering to the stone.

Nectarines are in reality a delicate variety of peach, and much richer in flavour than their relative. They have smooth skins in contrast with the hairy exterior of the peach.

There are from six to a dozen varieties grown out of doors in favourable situations, while a number of more delicate kinds are cultivated under glass.

Grapes are grown in two ways: in the open air; and hot-houses.

The standard quality grapes however, such as Frontianans, Muscats, Gros Colmar, etc., can be raised only in hot-houses. In the Eastern States hardy varieties are grown.

The four varieties best known are the Concord, Niagara, Delaware and Catamba. The first is a black grape. The second is a green grape and the third and fourth are redish.

As a nutritious and health-giving food (although it is rather a luxury in Great Britain) the pineapple is universally recognized a second to none.

It was probably first known in Europe by the Spaniards, shortly after the discovery of America.

The varieties differ from another in size, shape, colour and flavour. Only a few of the better known will be mentioned here.

They are: the Abakka, an excellent variety, the fruit being above the average size, conical in shape and of delicious flavour; Antigua (blaak), moderately prolific producer rather small oblong fruit, it is of orange yellow colour, and is of good quality; Antigua (white), a variety giving excellent yield of medium-sized fruit, round in shape and of good quality; Black Jamaica, which produces fruit of large size, oblong shape, good quality, vigorous and prolific, with fruit of rather black colour. Other varieties of plants are: the Charlotte Rothschild, Crown Prince, Lord Carrington Pernambuco, Porto Rico, Prince Albert, Queen, Red Spanish, Ripley Queen and Sugar Loaf.

Harvesting depends upon several conditions.

If the pineapples are for local consumption they are gathered when green,. or when the colour is just changing. Of course, some varieties travel better than others, so that the discretion of the grower has to be used.

The fruit is removed gently by breaking the stem, or by cutting with a knife about an inch below the stem. Should the break or cut take place too near the fruit, the latter is liable to decay.

The gathered fruit pass from the hands of the gatherers to a batch of second labourers, who place them in a basket, or on a trolly for transportation to the packing sheds, or factory.

When fruit is ready for export it is first graded according to the degree of ripeness into ripe, medium, and green, and also according to size. The ripe fruit has to be handled with great care and also disposed of quickly, or it will deteriorate; consequently, this is placed on the domestic market. The medium ripe, intended for export, are first wrapped in paper to protect them, and then they are packed in crates with spaces for ventilation. Experience, however, is teaching the packers that too free a flow of air is not good for so delicate a fruit as the pineapple.

The cherry, it is believed, was first introduced into Britain by the Romans about the beginning of the Christian era.

The most important cherry-growing districts are at present located in the countries of the South-East of England.

The varieties grown commercially include the following, some of which are raised against walls with a southern aspect, and others in orchards and gardens. The hardier varieties are, of course, those cultivated without artificial protection.

The Archduke, a deliciously flavoured cherry, with a dark red or black coat; Belle d'Orleans, a juicy and richly flavoured variety, with yellowish-white skin; Bigarrean, which has a pale yellow colour, tinged with red, and delicious flavour: Bigareande Schreken, a jet black specimen, having a rich juice; Bgarrean Napoleon, another deliciously flavoured and juicy kind, wearing a yellow coat dashed with red; Black Eagle, a popular variety on account of its colour, large size and flavour; Horence, a late cherry; Governor Wood, large and juicy; Kentish, a popular sort for jam-making; May Duke; Royal Duke and Reine Hortense.

The dates known to commerce emanate from a species of palm-tree which grows in the Canara Islands, Northern Africa, the South-East of Asia, and the North-West of India.

The oblong fruit of the palm-tree is well known to consumers. The saccharine nature of the flesh makes it very pleasant to the palate.

The finest dates are produced in the "Sunken Gardens" in Algiers, and are known by the name of Deglet Nur. In countries that experience cold and frosty nights, the young trees have to be protected with canvas or some similar covering. The planting is generally done in rows, seven or eight yards apart.

The fruit bearing capacities of the trees differ, according to the quality of species and degree of care spent upon their cultivation. One tree gives an annual crop of 60 lb. of dates; mother yields 100 lb. and the finest specimens have been known to yield 500 lb.

There exist about twenty branches of the date species. They are known as the sweet dates, originating in Tunis, Algiers and Morocco. Of the sweet dates there are several kinds; the Geglet Nur of Algiers, the Tafilat of the Morocco Sahara, and the Menakher of the Tunis Sahara.

The best kinds are large, soft, slightly wrinkled, and of a reddish brown colour with a pale sort of skin dividing the fruit from the stone. The mild sweet dates are invariably consumed in the vicinity of their production, while the dry date is pressed by the Arabs, or ground into a flour, and used by themselves as a common article of food.

Active Vocabulary

cultivate	культивувати
cultivated	культивований
species (s, pl,) /ˈspiːʃiːz/	сорт, вид, (види, сорта)
spoil	шкодити
stone-fruit	кісточковий фрукт, плід
large fruit (pippin-fruit)	насіннєвий плід
flavour	смак
delicious /dɪˈlɪʃəs/	дуже смачний
soft	м’який
juicy	соковитий
ripe	дозрілий, стиглий

ripen	дозрівати, зріти
green house	теплиця
prolific	плодючий
decay (n)	руйнування,гниття
smooth skin	гладка шкірка
pear /'peə/	груша
lemon	лимон
peach	персик
pineapple	ананас
cherries	вишня
grapes	виноград
currants	смородина
berry	ягода
lb (libra)	фунт (дорівнює 0,41 кг)

Task 1. Fill in the gaps using the words in the box.

pounds; figs; crops; stuffed; species; cultivated; grapefruit; pineapples; varieties; preserved; olives

1. The leaves of the tree _____ are large, and big white flowers are produced on the branches.
2. The fruit often weighs from ten to fourteen _____ , but the average weight for table use is about one pound.
3. The most perfect _____ grown in the open air are to be found in the Hawaiian Islands in the Pacific, some 2,000 miles from San Francisco.
4. The _____ known to commerce are grown chiefly in Asia, Syria, the Spanish Peninsula and the South of France.
5. There are about 360 _____of figs grown, the colours of which range from dark purple to yellow, white, and green.
6. The trees usually bear two _____, one in the spring and the other in the autumn.
7. Figs are _____ in several ways, in syrup, brandy, ect.
8. They are _____ also, and in that form find a ready sale.
9. In the East India a _____ of fig-tree, known as the indiarubber tree, furnishes much of the word's supply of caoutchouc.
10. The olive is an evergreen tree or shrub extensively _____ in numerous subtropical countries.
11. The green _____ destined for picking are gathered when the period of growth is at an end but before the final ripening begins.

Task 2. Match the word with its definition.

1. cultivate	1. become ripe

2. species	2. succulent
3. prolific	3. do harm
4. flavour	4. weight unit (equals to 0.41 kg)
5. juicy	5. grow, take care of crops
6. ripen	6. sort
7. lb	7. fruitful
8. spoil	8. the particular taste of a food or drink

Task 3. Group the words below under the following headings:

pippin – fruit
stone – fruit
exotic – fruit
berries
nuts (shellfruit)

apple	pear	lemon	peach	pine apple
grapes	strawberries	lime	currants	raspberries
plum	melon	fig	mango	kiwi
banana	orange	bilberries	quince	black berries
pomegranates	apricot	olives	gooseberries	grapefruit
avocado	coconut	date	walnut	hazelnut
peanut	almond	chestnut	cranberries	nectarine

Task 4. Which verbs do we use to cook any fruit dishes and preserve fruits properly?

pickle, cut, sweeten, salt, dry, cure, bake, slice, peel, wash, boil, stew, steam, pour, mix, stir, spice, put, grate, chop, microwave, freeze, squeeze, press

Task 5. Give your own recipe for the fruit dish you cooked yourself. Concern the following items:

- Ingredients
- Equipment
- Nutritional value

Task 6. Comment on the following English proverbs and sayings. Think of their Ukrainian equivalents.

An apple a day keeps the doctor away.
Trees are known by fruits.
First come, first served.
Hope is a good breakfast, but a bad supper.

Pick the plums out of the pudding.
Stew in one's own juice.

Task 7. Translate into English.

1. Яблука – унікальні плоди, тому що в них містяться майже всі вітаміни і мінеральні елементи.
2. Сорти груш відрізняються за формою, величиною плодів, кольором шкірки і будови.
3. Мушмула вживається у свіжому вигляді, а також використовується для приготування варення, вина та інших продуктів.
4. Поживна цінність абрикосів визначається високою цукристістю, значним вмістом вітаміна А, наявністю органічних кислот, мінеральних речовин.
5. Сорти персиків можна класифікувати за двома групами: пухнасті та гладкі.
6. Виноград вирощують на відкритій площі і в теплицях.
7. Серед сортів мигдалю розрізняють солодкі і гіркі.
8. Мигдаль багатий на білки, жири і вуглеводи.
9. Фундук є культивованою формою лісного горіха.
10. Банани є плодами трав'яної рослини із родини бананових.
11. Ананаси вживають у свіжому і переробленому вигляді.

Task 8. Answer the questions.

1. What is the classification of the fruits grown in northern countries?
2. What are the divisions of the fruits grown in warm, temperate and tropical climates?
3. What classes of peaches do you know?
4. What are the nectarines?
5. In what ways are grapes grown?
6. Where was the pineapple first known?
7. What varieties of the pineapple do you know and how do they differ from one another?
8. When was the cherry first introduced?
9. What varieties of the cherry do you know?
10. When do the dates grow?

Task 9. Kiwifruit growers hope to strike gold with new product.

Zespri is risking millions of dollars on the launch of an entirely new product – the bald, gold kiwifruit. The effort, Zespri says, has been a great success. But with Zespri Gold making up only percent of total New Zealand kiwifruit production, the company must be careful to continue to promote the traditional

hairy green variety, which has annual sales of NZ $ 500 m (US $ 224m) and is New Zealand's single most important fruit export.

In Japan Zespri managers decided to emphasize the fruit's health-giving, energy-enhancing qualities. The new variety is sweeter and more attractive to Asian tastes. Yu Jan Chen, regional manager for Zespri in Japan and Asia, says, "It is ideal for the Asian markets." He says it is selling "very well" in Japan, and is also being marketed in South Korea and Taiwan. The export season began slowly because the traditional green fruit was unusually small and difficult to sell. However, sales picked up when the gold fruit became available.

The successful launch of the gold fruit is expected to increase profits in the long term. The Kiwifruit Marketing Board has retained all marketing and selling rights for Europe and overseas for the trademarked variety. This will protect revenue as the gold variety is planted worldwide.

The board has already signed contracts with the four largest kiwifruit cooperatives in Italy, and planting has begun. The area for planting is expected to grow steadily, eventually producing millions of trays.

As Guus Van Der Kleij, regional manager for Europe, says, "It is an excellent product: after 25 years selling traditional green kiwifruit, you don't know how exciting it is to sell something different."

Scan the text and find words or phrases in the text which mean the following:

1. introduction
2. to try hard to sell a product by advertising or other activities
3. each year
4. to say that something is particularly important
5. person in charge of a particular area
6. improved
7. money received from selling goods
8. firms that are owned and run by all the employees

Task 10. Answer these questions.

1. What are the most important qualities of the new kiwifruit?
2. What methods can companies use to promote new food products?
3. The article says "… sales picked up when the gold fruit became available."

At what time of the year do sales of the following pick up in your country?

a) toys b) ice cream c) cars d) greeting cards

JUST FOR FUN

A customer sat down at a smart restaurant and tied a napkin around his neck. The scandalized manager called a waiter and instructed him. "Try to make him understand, as tactfully as possible, that that's not done." Said the thoughtful waiter to the customer , "Pardon me, sir. Shave or haircut, sir?"

UNIT 8.

MILK AND DAIRY PRODUCTS

The great importance of milk in the diet is due to that fact that it contains most of the essential food constituents in easily digestible form. It represents the best source of calcium, a good source of vitamins A, B complex and C, and contains fat, sugar, proteins, and, in smaller amounts, all the other essential minerals. To improve the vitamin content of milk, many dairies add vitamin D either by special food given to the cows or by direct addition to the milk.

Composition of milk. The amounts of various constituents in milk vary, from season to season, with the food of the cow and the breed.

The average percentage of water is 87. The carbohydrates present is lactose, which is held in solution along with the minerals as soluble salts, such as sodium and potassium chlorides and citrates, magnesium citrate, and calcium phosphate, and insoluble salt, is held in suspension. The fat (butter fat) is emulsified, part of the protein of the milk acting as emulsifying agent. The yellow colour of milk is due to the colour pigment of the fat, which, in turn, is derived from the green food eaten by the cow.

The principal proteins present are casein and albumin. Casein is probably a mixture of compound proteins, the phospho- proteins, and is in part associated with calcium as calcium caseinate. The mixture of casein and calcium.caseinate is often called coseinogen.

Cream. The cream of milk is best separated by a centrifuge, which may be so regulated that cream of any desired fat- content may be obtained. Cream contains the same constituents as milk, but in a very different proportion. It resembles milk in many of its properties. Heat affects it in a similar fashion, and lactic acid bacteria develop in it, producing acidity. Cream intended for retailing is usually of two grades — heavy or whipping cream and coffee cream.

Cream, without any qualification, is usually understood to mean coffee cream. The difference in the two grades is solely difference in fat content. Whipping cream must contain not less than 30 per cent of fat and coffee cream not less than 18 per cent. The selection of cream by the private consumer can be based only on its flavour and cost.

Cheeses. “The curd of milk which has undergone changes in its composition through the growth of microorganisms" is a fair definition of cheese. Most cheeses are made from the acid curds.

Cottage cheese represents the casein of milk separated by acid coagulation, along with a high percentage of calcium salts and fats. The water is not very thoroughly pressed out of this cheese so it contains many of the soluble salts of the

milk. The curd produced by either rennet or acid constitutes a green cheese, which must be allowed to "ripen", undergoing marked changes in the constituents of the curd. The course of ripening depends upon the microorganisms present in the green cheese. The use of different kinds of milk rennet from the gastric secretions of different animals, and the place of ripening, all have a pronounced effect on the flavour and other characteristics of the cheese. It is, therefore, not surprising to learn that there are approximately 400 known varieties of cheese.

All cheeses may be considered as rich sources of protein and protein decomposition products, and of minerals, especially calcium. The composition of each cheese will vary according to its preparation. Some contain more of the whey of the milk, or more of the fat of the milk, and these influence the percentage of other constituents.

The composition of cheese determines its use in cookery. While it does not require cooking, it is often desirable to include it with other foods which are to be cooked. Heat softens cheese as the fat melts. Long heating causes the already coagulated protein to shrink, and this sets free the melted fat, leaving protein to appear in the cooked dish in a stringly form, a state of affairs which can be avoided only by shorter cooking. Dry heat evaporates the water and hardens the cheese.

Butter. If cream is whipped or churned for a long time, the fat globules combine, and fat separates out in lumps which include some of the proteins, milk sugar and salts with a considerable quantity of water adhering. This mass is essentially butter. Most of the butter on the market is made from pasteurized cream to which a starter (a culture of bacteria) has been added. The main purpose of pasteurization is to reduce the number of microorganisms which might be pathogenic or produce undesirable flavour in the butter.

Milk with known content of lactic acid bacteria is added to start the “ripening” of the pasteurized cream. During the ripening process compounds are produced which give butters their characteristic flavours. At the same time, the lactic acid produced aids in the more complete separation of fat from the other constituents of cream (butter-milk). After the ripening process, the cream is churned to separate the fat. The amount of colouring matter to be added depends upon the amount of natural colour in the cream, and this varies according to breed of cow and the amount of green food consumed by her. The separated fat is washed to remove the adhering buttermilk, but carefully, as too much washing produces a flat-tasting butter. Salt is now added for three reasons: it helps in the removal of buttermilk, it enhances the flavour of the butter, and it improves its keeping qualities. The amount of salt added varies with the amount of water left in the butter; the more water the more salt. The legal amount of water in butter is less than 16 per cent. The appearance of the butter is some indication of water content.

All butters contain a high percentage of vitamin A, the amount varying with the breed of cattle and the season of the year.

Ice cream is made from milk, milk solids, cream, flavourings, and sweeteners. Nuts and fruits are sometimes added. Ice cream is higher in calories than milk.

Yogurt is made by fermenting milk (whole, skim, or low – fat milk or milk solids) with different strains of bacteria. Most commercial yogurts are low in fat and high (20%) in galactose. But more than half the weight of some yogurts consists of added sugar and fruits. Dairy or related products also include filled and +imitation dairy products (for example, filled cheese). Most filled products contain milk solid and non – butter fat; they come in forms such as cheese and canned milk. An imitation dairy product is one that resembles real milk products, especially in flavour and cooking characteristics, but does not contain any milk solids. Instead, it contains nondairy ingredients.

In the last few years, the consumption of dairy products has declined for various reasons. Technology has created a large number of nutritious beverages other than milk that cater to the taste and preference some consumers. The thereat of high blood cholesterol and obesity has also played a role; many consumers use dairy substitutes instead. In addition, many people are still ignorant about the value of milk.

Vocabulary

composition of milk	склад молока
dairy products *['dɛqrɪ]*	молочні продукти
contain	містити
constituents	складові
digestible *[daɪ'ʤestɪbl]*	легкотравний
digestive	травний
digestion	травлення
calcium *['kælsɪqm]*	кальцій
vary	змінюватись
soluble salts *['sɔljubl sɔːlz]*	розчинні солі
sodium chloride	сода, хлористий натрій
potassium chloride	хлористий калій
insoluble	нерозчинний
emulsifying agent *[ɪ'mʌlsɪfaɪɪŋ]*	речовина, що утворює емульсію
mixture *['mɪkstʃq]*	суміш
cream (sing)	вершки
fat content	склад жиру
separate	відділяти(ся)
acidity	кислотність
churn	збивати масло
whipping cream	збиті вершки
whole milk *[həul mɪlk]*	незбиране молоко
dry milk	сухе молоко

condensed milk	згущене молоко
sour cream *['sauq kr_Jm]*	сметана
butter milk	маслянка, сколотини
curd (s), cheese	сир
determine *[dJ'tW°mJn]*	визначати, зумовлювати
coagulated	коагульований
pastereurized *['pxstqraJzd]*	пастеризований
lactic acid	молочна кислота
whey *[weJ]*	сироватка
milk rennet	згортання молока
yogurt	йогурт
skimmed milk	збиране молоко
margarine	маргарин
ice cream	морозиво
flavouring *['fleJvqrJN]*	ароматизатор
sweetener	наповнювач (підсолоджувач)
kefir	кефір
fermenting milk	ферментуюче молоко
canned	консервований
cultured milk foods	кисломолочні продукти

Task 1. Fill in the gaps using the words in the box.

foam, aged, milk, fluid, coagulates, homogenization, whipping, evaporated, nutritive, viscosity.

1. The optimum amount of fat for a _____ cream is 30 to 35 per cent.
2. A cream which is warm or which is not sufficiently aged will whip to butter, as the fat is not sufficiently firm to form a stabilized _____.
3. A 20 per cent cream may be made to pour like 40 per cent cream by _____, a process in which the fat clusters are greatly reduced in size and greatly increased in number.
4. A high fat cream which has _____ and is cold whips faster.
5. Milk and _____ products are available in many forms.
6. Fresh _____ milk is almost always pasteurized.
7. _____, dry, frozen, condensed, and fermented milk (butter milk and yoghurt) are used in preparation of food.
8. Long cooking at high temperatures _____ some protein, causes an off-flavour in the milk, and caramelizes the lactose that is, it decomposes or breaks it down into simpler compounds. 9. You can use dry milk in addition to fluid milk to increase the _____ value. 10. Higher _____ increases the whipping properties of cream.

Task 2. Math the word with its definition.

1. ice cream	1.dairy product made by fermenting milk with different strains of bacteria.
2. cheese	2. partial sterilization by heating
3. pasteurization	3. mixture of casein and calcium caseinate
4. yogurt	4. principal proteins found in milk
5. caseinogen	5. milk product made from acid curds (on the basis of changes of its composition caused by microorganisms)
6. casein and albumin	6. mixture of milk, milk solids cream, flavourings and sweeteners
7. butter	7. manufactured substitude for butter, consisting of a blend of vegetable oils or meat fats mixed with milk and salt
8. margarine	8. cultured dairy product obtained by fermenting of cream with its later ripening (aging)
9.sour cream	9. dairy product obtained by churning the fat from milk until it reaches a solidified form

Task 3. Group the words below under the following headings.

Dairy products
Cereals
Fruit
Herbs
Vegetables

blackberry	maize	peanut	fig
beans	mint	sour cream	wheat
cream	onions	rye	ice cream
flour	quince	pineapple	lettuce
gooseberry	filbert	turnip	parsley

grape dill nectarine pumpkin

Task 4. In teams express your (your friends`) likes and dislikes about dairy products (dishes) according to the chart:

She	like	eating	yoghurt	now
I	hates	having	milk shake	for breakfast
He	enjoys	drinking	syrnyky	every morning
My friend	feel like	cooking	semolina	before going to bed
	am fond of	ordering	cheese	himself
	can't stand	recommending	ice cream	at the restaurant
	is fed up with	helping	milk	for lunch
			sour cream	with my friends
			milk desserts	in the snack bar
			coffee glace	myself
			curd pudding	

Task 5. Comment upon the proverb "Tastes differ."

Task 6. What sort of shop are they in? Roleplay the dialogues.

1. **Ann.** Good morning.
   Ben. Hello. A large wholemeal loaf, please.
   Ann. Here you are. 60 p, please.
   Ben. And a half a dozen soft white rolls.
   Ann. Would you like the ones with sesame seeds?
   Ben. Yes.
   Ann. Anything else?
   Ben. No, thanks.
2. **Rose.** Can I help you?
   Cora. Yes, I'd like some Cheddar.
   Rose. Is it for cooking?
   Cora. No, it's to have with biscuits.
   Rose. Then I recommend this one. It's mature and quite strong.
   Cora. Could I try a little, please?
   Rose. Yes, sure.
   Cora. Mmm, very nice. I'll have half a pound, please.
   Rose. Anything else, madam?
   Cora. No, that'll be all, I think.
   Thank you.

Task 7. Translate into English.

1. Молоко містить всі необхідні для підтримки життя речовини, що добре засвоюються організмом.
2. Білки молока містять всі незамінні амінокислоти.
3. Більш ніж 50 % мінеральних речовин у молоці складають солі кальцію і фосфору.
4. В молоці містяться вітаміни A, D, E, C, B1, B2, B6.
5. За способом обробки молоко випускають пастеризоване, стерилізоване, вітамінізоване, іонітне, обезжирене.
6. Вершки – це молочний продукт, що містить підвищений відсоток жиру.
7. Кефір – це один із найрозповсюджених харчових продуктів.
8. Кефір готують із незбираного і знежиреного молока.
9. Сир – це молочнокислий продукт, що має високу поживну та енергетичну цінність.
10. Сметана – це молочнокислий продукт, який отримують при ферментизації вершків і наступному їх дозріванні.

Task 8. Answer the questions.

1. What does milk contain? 2. What can you say about the composition of milk? 3. What milk products do you know? 4. How may the cream of milk be obtained? 5. How are coffee and whipping creams differentiated from each other? 6. What percentage of fat is desirable for a whipping cream? 7. What properties and conditions are essential to whipping cream? 8. What does cottage cheese represent? 9. What determines the use of cheeses in cooking? 10. What is most of the butter on the market made from?

Task 9. Read the text without a dictionary and discuss it.

Milk Products and Alternates

Products derived from fluid whole milk or products that imitate milk's flavour and nutrient content may be consumed in addition to or instead of fluid whole milk. Some people cannot digest fluid whole milk. However, many of them can tolerate fermented products such as cheese, yogurt, or buttermilk, in which the lactose has been converted to lactic acid. Some of them can also drink a small amount of milk. Many children are actually allergic to milk, although some can become accustomed to the product if they drink gradually increasing amounts over a period of time.

When some dairy products are used in place of fluid whole milk, there are important nutritional considerations. If low —fat, skim, or non — fat milk is used, the intake of vitamins A and D and essential fatty acids may be low. If available, products fortified with these two vitamins are preferred. Also, chocolate milk has more calories than an equivalent amount of regular fluid milk.

Task 10. Fill in the gaps with the words in the box to complete the idioms. The meaning of the idiom is given in brackets after each sentence.

grapes, picnic, cauliflower, apple, jam, butter, pie, egg, butter, cake

1. She is so clumsy and is always dropping things. She's a real _____ **fingers!** (A very clumsy person).
2. Patrice tells me my new laptop isn't that good. But I'm sure it's only **sour** _____ as I know he'd like one but can't afford it. (He is only pretending not to like it because he can't have it himself).
3. Your father's going to **go** _____ when he finds out what you've done to the car! (He is going to be really angry).
4. **It's no** _____ finding a job these days-especially, with the high unemployment rates. (It's not a very easy job).
5. She really loved her grandson. He was **the** _____ **of her eye**. (He was someone she really loved, her favourite relative).
6. To some people, learning a foreign language is **as easy as** _____. To others it is really difficult. (It is very easy).
7. You can usually tell a boxer from his _____ **ears.** (Ears that have been hit so much they are permanently swollen and a strange shape).
8. If you ask me, babysitting is **money for** _____. You get to watch TV, eat sandwiches and drink Coke and paid for it! (It is a very easy way to make money).
9. I'm not surprised he ended up in prison. (I always thought he was **a bad** _____. (He was a completely worthless person).
10. The exam was so easy. It was **a piece of** _____! (It was really easy).

JUST FOR FUN

Mother (to small son who is going to a party) – "Now, dear, what are you going to do when you've had enough to eat?"
Little Tommy – "Come home."

UNIT 9.

MEAT

"Meat is the flesh of animals used for food"— Webster's International Dictionary. In the sense used here, meat consists of the muscular tissues or lean internal fat, and the fat which is deposited between the tendons and tissues. Strictly speaking, meat means the flesh of any animal used for food, but ordinarily it applies only to the animals raised for food, the wild animals are called "game". The meats found in the market are beef (cattle), veal (calf), pork (swine), lamb and mutton (sheep).

Meat, as it is purchased in the market, consists of muscular tissue connective tissue, bones, glands and edible organs. All meats contain fat in the connective and adipose tissue, between the fibres and muscles, between the cells or in the muscle cells. Some of it is stored in quantities large enough to be seen as in internal covering, and in deposits around the heart and kidney, and some of it is distributed throughout the muscular tissue in very minute particles. The fat of cattle and sheep is called tallow; that from hogs after rendering is called lard. Fat adds weight to the carcass, increases palatability, and helps to retain the moisture of the muscles.

Meats contain proteins, fats, water, inorganic salts, nitrogenous extractives, non-nitrogenous extractives, carbohydrate, enzymes, and pigments. Meat is one of the most important sources of protein. The proportion of protein in meat varies somewhat with the kind and cut in beef, lamb and veal and comprises between 14 and 26 per cent in a given weight unit. The protein of meat may be classified under simple proteins which when digested are broken down into groups called "building stones" or "amino acids". The chief proteins found in meat are myosin which is the basis of muscular tissue, serum albumin or blood, the albuminoids which are the proteins found in the skin, the skeleton and its connections.

Elastin and collagen in the tendons and in the connective tissue and ossein of the bones when boiled in water yield gelatin.

Gelatin is an incomplete protein which has some food value when the red colour of meat is due chiefly to the hemoglobin of the blood which is still present. Hemolgobin is made up of the protein molecule and the pigment hematin. Meat contains enzymes which bring about ripening or aging.

Vitamins are nutritional factors which are essential to growth and health in the young and the maintenance of health in the adult. According to present knowledge there are six recognized vitamins namely: fat-soluble A, the antiophthalmic vitamin; water-soluble B, the antineuritic vitamin; water- soluble C, the

antiscorbunic vitamin; fat-soluble D, the antirachitic vitamin; water-soluble G, pelagra symptom preventing; and fat-soluble A, the antistability vitamin. Vitamin A is found in fat meats, with liver being an excellent source. Vitamin B is present in lean meat especially in lean pork. Lean meat is an excellent source of vitamin C. The glandular tissues, liver, kidneys, sweetbreads, etc. are valued especially for the vitamins they contain.

Meat combined with extractives combined with some cereal grains, gelatin may build muscle. Meat contains carbohydrate in the form of glycogen which is found in the muscles and is stored chiefly in the liver.

Mineral salts are essential for the well-being of the body. Meats are rich sources of iron and phosphorus, however, they are low in calcium and must be served with foods rich in calcium salts.

These are the minerals which are not widely distributed in our foodstuffs. A high percentage of phosphorus in both organic and inorganic form is found in meat. Meat also contains copper which functions with iron in hemoglobin formation. Meat contains small amounts of extractives which, although they have little food value, are extremely important because they give flavour to meat and act as a stimulant to the flow of the digestive juices. The essential extractives found in meat are creatine and purins. They are called extractives because they may be extracted by boiling water. The extractives also contribute to the satiety value (feeling of satisfaction after having taken of food) which is one of the characteristics of meat. The satiety value of an article of diet can be measured in two ways: I) by the length of time the food remains in the stomach; and 2) by the amount of gastric activity which it calls forth.

There are several important factors which determine the quality and palatabilily of meat. Grade of meat is based on the three factors: conformation, finish and quality. The term conformation covers the general build, form, shape, contour or outline of the carcass, side or cut. The term finish refers to the thickness colour, character and distribution of fat. Quality is a characteristic of the flesh and the fat included therein.

It is related primarily to the thickness, firmness, and strength of both the muscle fibre and connective tissue. It also involves the amount, consistency and character of the juices or extractives. Colour does not determine quality, but it is an excellent index of quality. The best finish in beef implies a smooth covering of brittle, flaky, white fat over most of the interior and a much thinner covering over the interior surface of the ribs; there also will be liberal deposits of fat between the larger muscles and generous distribution along the connective tissues and between the muscle fibres. Best quality in beef is indicated by a lean of a bright cherry red colour, good marbling, firm, fine grain, a cut surface which is smooth and velvety to sight and touch. Red porous bones indicate a young animal as contrasted to the white, flinty bones of the older animal.

Meat may be preserved for future in several ways:

1) canning is one way. Fresh meats and some of the sundry parts are canned;

2)curing is a very important method of preservation.

Common salt is the basis for all curing and is the only really essential ingredient. Smoking aids in preserving meats and it lives a pleasant flavour. Sugar and saltpetre are other ingredients of the curing formulae. Examples of cured meats are: corned beef, dried beef, ham, bacon, salt pork and some types of sausages; 3) meat may be held in cold storage to preserve it; 4) freezing quickly at a very low temperature is a new development in meat preservation and merchandising.

Active Vocabulary

flesh	м’ясо
muscular tissue [ˈmʌskjulq ˈtɪsju]	м’язова тканина
connective tissue	сполучна тканина
tendons	сухожилля
lean meat	пісне м’ясо
food value	поживна цінність
satiety [sqˈtaɪqtɪ]	насичення
palatable	смачний, приємний на смак
cattle	велика рогата худоба
beef	яловичина
veal	телятина
pork	свинина
lamb	ягня
mutton	баранина
bones	кістки
gland(s)	залоза (и)
edible organs	їстівні органи (у тварин)
carcass	туша
fibre	волокно
cell	клітина (біологічна)
extractives	екстракти
texture [ˈtekstʃq]	тканина
digest [daɪˈdʒest]	перетравлювати, засвоювати (про їжу)
skin	шкіра
albumin	альбумін (білок)
gelatin [ˈˈdʒelq ˈtɪn]	желатин
blood [blʌd]	кров
liver	печінка
kidneys	нирки
glandular tissues	залозні тканини
sweetbread	солодке м’ясо
glycogen	глікоген (тваринний крохмаль)
preservation	зберігання, консервування
canning	консервування
curing	засолювання

cooling	охолодження
drying	сушіння
freezing	заморожування

Task 1. Fill in the gaps using the words in the box.

connective tissue, fibres, cells, sources, tissue, solutions, structure, muscle, pigments, tenderness

1. Meats represent one of the most popular _____ of protein. 2. An examination of meat _____ enables us to form a picture of the parts. 3. The muscle _____ are tubelike in structure and tapering at each end. 4. These are held together by the so called _____. 5. Fat _____ may be found held within the meshes of the connective tissue. 6. Bundles of muscles fibres are held to the bony _____ of the animal by dense strands of connective tissues called tendons. 7. Within the muscle fibres are _____ of salts, vitamins A and B complex and others in small quantities, enzymes and certain proteins — myosin (globulin), myogen (albumin) and derived proteins. 8. The muscle fibres of red meat contain more hemoglobin and muscle _____ than the light or colourless meat. 9. Glycogen and dextrose are present in greater or lesser amount in all _____ fibre. 10. The location and distribution of the fat greatly affect the _____ of the meat.

Task 2. Math the word with its definition.

1. aging	1. the fat from hogs after rendering
2. myosin	2. albumin
3. meat	3. bony collagen
4. tissue	4. connection of the protein and the pigment hematin
5. myogen	5. ripening
6. hemoglobin	6. texture
7. glycogen	7. flesh
8. lard	8. carbohydrate
9. ossein	9. globulin
10. carcass	10. a body of a slaughtered animal

Task 3. In teams give your arguments on the following, using the prompts in brackets:

- pros and cons of a vegetarian diet (healthy and useful meals; protest against animal abuse; preventing from gaining an extra weight)
- advantages and disadvantages of ultrafashionable low-caloric diets

(the role of proteins and vitamins in daily human diet; widely spread anti-obesity compaign in Europe and the USA; junk food and its harmful effect on our lifestyle;

starvation (absolute) diets and their pernicious effects; nutritional additives: arguments for and against).

Task 4. Do you find cooking methods of meat dishes adequate? Correct the mistakes.

Meat dish	Method of Cooking
fried steaks boiled sausages roast beef baked chicken grilled pork stewed lamb	in the pot on the grill in the frying pan in the saucepan on the open fire in the oven

Task 5. Write your own recipe for a meat dish. Mind the following items:

ingredients
equipment
instructions of cooking

In groups discuss your recipes and choose the best ones.

Task 6. React to the given statements, expressing surprise, content, delight, unsatisfaction, irritation.

1. "Help yourself to this meat salad, please."
   ……..
2. "The beefsteak is delicious! You've got a light hand with this sort of food!"
   ……..
3. "Again you've crushed too much garlic in the cutlets!"
   ……..
4. "John, what's the trouble with you? You're just pretending of eating."
   ……..
5. "I could not even imagine that you knew so many recipes of meat dishes!"
   ……..
6. "How could you manage to find out that ancient recipe?"
   …….

Task 7. Translate into English.

1. Поживна цінність м’яса визначається його хімічним складом, калорійністю, смаковими якостями та травленням.
2. До складу м’яса входять вода, білки, жири, вуглеводи, екстрактивні речовини, мінеральні солі, вітаміни.
3. Хімічний склад м’яса залежить від виду і угодованості тварини, її породи, статі, віку, від кормового раціону.
4. М’ясо різних частин однієї і тієї ж туші дуже відрізняється за своїм хімічним складом.
5. Білки є найважливішою складовою м’яса.
6. М’ясними напівфабрикатами називаються вироби, що завчасно підготовлені для теплової обробки.
7. Еластин міститься в еластичних волокнах.
8. Колаген є найбільш розповсюдженим білком в усіх різновидах сполучної тканини.
9. Альбуміни та глобуліни відносяться до білків сполучної тканини.
10. Кісткова тканина в цілому складається із мінеральних та органічних речовин.
11. Жир не тільки підвищує калорійність м’яса, але й впливає на його колір, смак, аромат, соковитість.

Task 8. Answer the questions.

1. What is meat? 2. What kinds of meat do we find in the market? 3. What does meat, as it is purchased in the market consist of? 4. What is tallow? 5. What is lard? 6. What does meat contain? 7. What are the chief proteins in meat? 8. Does meat contain carbohydrates? 9. What gives flavour to meat and acts as a stimulant to the flow of the digestive juices? 10. What are the essential extractives in meat? 11. How can we measure the satiety value? 12. What factors determine the quality and palatability of meat? 13. What can you say about the preservation of meat for future?

Task 9. Read the text without a dictionary and discuss it, regarding the following questions.

1. What different countries does the hamburger come from?
2. Which hamburgers do you prefer eating best of all? Have you ever tried to invent your special recipe of a hamburger?
3. What do you need to make your favourite sandwich, snack, fruit salad?

The Hamburger

The hamburger has no connection to ham. It got its name from the German town of Hamburg, which was famous for its ground steak. German immigrants to the United States introduced the "hamburger steak". At the St. Louis World's Fair

in 1904, hamburger steaks were served on buns for the first time. Hamburgers on buns were convenient and tasted good. This become the usual way of eating hamburgers.

How did the hamburger become the most popular, most typical American food? The introduction of the bun is an important part of the answer. Another important part is McDonald's, the fast —food restaurant.

The first McDonald's was opened in San Bernadino, California, in 1949. Hamburgers were the main item on its menu. People liked the restaurant's fast service. By the 1960s there were many McDonald's restaurants. McDonald's was a part of nearly every community in the United States. There were also other fast — food restaurants that sold hamburgers. McDonald's alone sold millions of hamburgers a year.

Today, of course, there are McDonald's restaurants around the world. The food they serve is considered typically American. Americans often have a hamburger for a quick lunch or snack. But do you know that the favourite American "fast food" actually comes from many different countries?

Task 10. Fill in the gaps using the correct idiom.

1. I woudn't want to move away from Switzerland – not for all the _____ in China.

a) cake b) money c) tea

2. The accountant was arrested for _____ the books.

a) cooking b) stealing c) reading

3. Most of the beaches in Spain in August are _____ with tourists.

a) tightly squeezed b) well-oiled c) jam-packed

4. We've missed the last train. Let's try and _____ home.

a) thumb a lift b) well-oiled c) jump on the bandwagon

5. It's getting late. I think we'd better _____ if we want to catch the last bus back to our boarding house.

a) make tracks b) hit the bottle c) fly off the handle

6. We are going to visit the Tower of London tomorrow. Would you like to _____?

a) tag along b) hang about c) crop up

7. - Do you ever play the National Lottery, Jack?
   - No, it's _____ ! You don't have a ghost of a chance of winning!

   a) no way b) the more the merrier c) a mug's game

8. - Why is a dentist always unhappy?

- Because he _____!

a) puts on the shortlist b) looks down in the mouth c) pulls himself together

JUST FOR FUN

- Pardon me, will my hamburger be long?
- No, sir it'll be round.

UNIT 10.

FISH

Fish is about 26 per cent protein, which is complete, well balanced and not easily affected by the usual cooking method. It is 85 per cent to 95 per cent digestible. Fish supply 5 per cent to 10 per cent of the National's supply of animal proteins for human food requirement. The amount of fat in fish is less than 1 per cent in cod, haddock, whiting, rockfish and sole; to 20 per cent in salmon, mackerel, lake trout and butter- fish. The fat is easily digested and is used readily by the body tissues.

Continuing research has established the nutritive value of some of the unsaturated fatty acids peculiar to some fish.

The vitamin content of fish varies an average serving of 3—5 ounces of cooked salmon and mackerel, which are fat fish, provides about 10 per cent of the daily requirement of vitamins A and D. The mineral content of the edible part of most includes satisfactory sources of magnesium, phosphorus, iron, copper and iodine.

Shellfish, clams, crabs, lobsters, oysters, scallops, and shrimp has an abundance of these minerals — about as much as milk. The softened bones in canned fish, which are good to eat, are good sources of calcium and phosphorus. An average serving of six oysters supplies more than the daily need of iron and copper.

There are about 200 commercial species of fish, but most people are familiar with fewer than 20 and recognize even fewer than that on a dinner plate.

The two major groups of fish — the finfish and shellfish (oysters, clams, blue crabs, lobsters) — have enough variety to suit every taste and meet every need. Among the shellfishes are frog legs, turtle steaks, octopus and squid. They are the less common foods; urchin, a spiny brittle shelled organism, is usually eaten raw. Sea cucumbers are better known as the dried and smoked «trepang» or beche-de-mer of the South Seas. Fresh and frozen fish are marketed in various forms for different uses.

Knowing these forms of «cuts» is important in buying fish. The best known are:

1. Whole. As they come from the water. Before cooking must be scaled, and the insides removed, and usually the head, tail and fins removed.
2. Drawn. Whole fish with insides removed. Generally scaled before cooking, and usually the head, tail and fins removed.
3. Dressed or pan-dressed. Whole fish with scales and insides removed, usually with head, tail and fins removed. Ready to cook as purchased.

4. Steaks. Cross-section slices from large dressed fish. Ready to cook as purchased.

5. Fillets. Sides of the fish, cut lengthwise away from the back bone. Ready to cook as purchased. Practically boneless.

6. Sticks. Pieces of fish cut from the blocks of frozen fillets into portions of uniform dimentions, usually about one half inch deep, and weigh approximately 1 ounce.

7. Canned fish. Ready for use and includes many varieties of both fish and shellfish.

How to know good fish? In selecting whole fresh fish, look for bright, clear, bulging eyes, gills reddish, free from slime or odour; firm elastic flesh-springing back when pressed.

Amounts to buy. A serving of fish is generally one third to one half pound of edible flesh.

Therefore, for whole fish allow about one pound per person. For dressed fish allow one-half pound per person or three pounds for six people. For steaks, fillets or sticks, allow one third pound per person or two pounds for six people.

Active Vocabulary

balanced	збалансований
supply (n, v)	постачання, постачати
cod	тріска
haddock	пікша (вид тріски)
mackerel	макрель, скумбрія
whiting	мерланг (риба)
rock – fish	морський окунь
salmon	лосось
trout	форель
herring	оселедець
butterfish	маслюк (риба)
peculiar to /pʃkjHʃq/	характерний (властивий) для
provide	забезпечувати
iodine /'aʃqdaʃn/	йод
finfish	плавникова риба
shellfish	молюск
clam	молюск
crab	краб
lobster	омар
oyster /'Oʃstq/	устриця
shrimp	креветка (маленька)
scallop	гребінець (молюск)
squid /skwʃd/	кальмар
an average serving	середня порція (їжі)

species [ˈspiːʃiːz]	вид (и) (рослин, тварин)
remove insides	видалити нутрощі (тельбухи) у риби
fin	плавник
dressed fish	розділена риба (напівфабрикат)
drawn fish	вительбушена риба
boneless	без кісток
fillets [ˈfɪlɪts]	філе
scale fish	чистити рибу від луски, лускати рибу
caviar	ікра

Task 1. Fill in the gaps using the words in the box.

shellfish; nutrition; liver oil; caviar; amount; extractive substances; canned; prevention; herring; fin-fish

1. Fish takes an important place in food _____. 2. A specific taste and aroma of fish meat are due to the _____ _____. 3. Salt-water fish generally contain large _____ of vitamin D. 4. Vitamin D is effective in _____ and cure of rickets. 5. It is present in cod _____ and other fish liver oils. 6. _____, mackerel, canned salmon and sardines are good sources of this vitamin. 7. The softened bones in _____ fish, which are good to eat, are good sources of calcium and phosphorus. 8. The two groups of _____ and shellfish have enough variety to suit every taste. 9. There are some kinds of caviar. 10. _____ supply satisfactory sources of magnesium, iron, copper.

Task 2. Match the word with its definition.

1. digest	1. number of
2. edible	2. portion
3. body tissue	3. the substance that human body cells are made of
4. amount	4. change easily food in one's stomach into the substances one's body needs
5. serving (food)	5. that can be eaten without any harm
6. shellfish	6. with fins (fish)
7. drawn fish	7. remove scale (of fish)
8. fin-fish	8. with insides removed
9. dressed fish	9. clams
10. scale fish	10. prepared (fish) in such a way (cleaned, taken out non-edible parts) that it can be cooked

Task 3. Choose the right answer.

1. I enjoyed this fish salad. Would you mind letting me have the _____ for it?
   a) menu b) receipt c) recipe

2. A food blender is very useful _____ to have in the kitchen.
   a) gadget b) equipment c) tool

3. The fridge was _____ with food.
   a) affluent b) crammed c) full

4. We buy a month's supply of fish and keep it in the _____.
   a) freezer b) container c) cabinet

5. Would you put the water on, please, ready to _____ the potatoes.
   a) brown b) bake c) boil

6. The recipe is a secret, it has been _____ from father to son for generations.
   a) made up b) spoken of c) put off

7. How do you like your eggs _____?
   a) ready b) done c) made

8. Frozen food should always be _____ before it is cooked.
   a) defrosted b) softened c) melted

9. Chocolate _____ if you keep it in your pocket.
   a) flows b) ripens c) melts

10. Can you give me a teaspoon to _____ my tea?
    a) spin b) turn c) stir

Task 4. You and your partner are in the fish restaurant.
What is going to be on the menu today?

Menu

Fish pie
Tuna salad
Soup of the day
(salmon soup)
Ice cream
Cod liver pate

Sea bass
Served with spicy mango-salsa
Rock – fish fillet steak
with choice of pepper or red wine sauce
Fried trout with vegetables
Prawn salad
Seasonal fruit compote

Look at the menu and discuss what you want to eat, using the prompts below:

Asking for information
What would you like?
What do you recommend?
What exactly is that?

Giving advice

I suggest ….
It's a local dish
It's made of …..
It's very spicy.

Ordering
To start …./ As a starter …
As a main course ….
For dessert ….

Complaining
Excuse me …..
Think this bill is wrong.
That's not what I ordered
Can you change it?

Paying

Do you take (Visa cards)?
Shall we split the bill?
I'm paying.
Is service included?
Can I have a receipt, please?

Task 5. Complete the following:

Where can I buy …?
Will you help me to choose …?
What's the price of …?
Where can I get …?
I've run out of …
Where is the nearest …?
They sell a lot of delicious things at the …
Have you got …?

Task 6. Give Ukrainian equivalents to the following proverbs and sayings. Comment upon some of them.

It is caviar to the general.
Better to be a big fish in a small pond than a minnow in the ocean.
Hope is a good breakfast, but a bad supper.
First come, first served.
Better an egg today than a hen tomorrow.

Task 7. Translate into English.

1. Рибні продукти посідають важливе місце в харчуванні людини.
2. М’ясо риб має специфічний смак і аромат, обумовлений своєрідним складом екстрактивних речовин і ліпідів.
3. М’ясо риб характеризується значним коливанням вмісту білків від 0,5 до 26%.
4. М’ясо різних видів риб містить від 1,5 до 5,5% колагену.
5. В процесі зберігання риби колаген та еластин не зазнають значних змін.
6. Проте білки м’язових волокон підлягають ферментативному гідролізу з утворюванням вільних амінокислот і пектидів.
7. Особливий специфічний смак риби пояснюється не тільки підвищеним вмістом в ній азотистих екстрактивних речовин, а й своєрідним їх складом.
8. Жир риб характеризується низькою температурою плавлення (12-28 С) і високим вмістом ненасичених жирокислот.
9. Серед молюсків високим вмістом холестерину відзначається м’ясо кальмара.
10. На заклади громадського харчування рибу привозять, як правило, замороженою, вительбушеною, без голови.

Task 8. Answer the questions.

1. What is the protein content of fish? 2. What can you say about animal protein in fish? 3. What do you know about the shellfish? 4. What is the good source of calcium and phosphorus? 5. How many species of fish do you know? 6. What groups of fish do you know? 7. How can you tell good fish? 8. What can you say about vitamin and mineral content of fish?

Task 9. Read the text without a dictionary and discuss it.

DO YOU KNOW THAT...

FISH "N" CHIPS

A British institution is under threat. No, it's not the Royal Family, not the BBC, not red buses — it's more important than that: it's the fish and chip shops.

For over a hundred years, fish and chip shops up and down the country have supplied the less well — off with a cheap and nutritious meal. But now many people in Britain can't afford even this simple pleasure. Newspapers report that customers in many pooper areas are cutting back on their fish and chips. Many chip shops have already shut, with more closures to come.

If the fish and chip shops dies, it will be a sad day for a British popular culture. No one quite knows when fried potatoes were first united with fish, but fried fish was on sale in the streets of London in the 1830s. Fried chipped potatoes are thought to have been introduced into Britain from France in the 1870s.

However they started, fish and chip shops spread rapidly. By the end of the 19th century, there was on every second or third street corner in industrial towns. They soon became a very important part of working - class life — a social focus, as well as a source of cheap hot food.

But even if the traditional shops die out, fish and chips are now part of British culture — and even a tourist attraction — and they won't disappear. Restaurants chains all over London and other cities advertise "the great British dish" against a background of a Union Jack — and wrap their chips in imitation newspaper. It's not quite a real thing, but at least it's still there.

Task 10. Fill in the gaps using the correct words or word combination to form the idiom.

couch potato; cup of tea; bee; lump; pigs; tea; pinch of salt; road hog; sour; bottleneck

1. "Do you think I'll be a famous rock star one day?"
   "_____ might fly! You can't even sing."

2. "She hasn't congratulated you on getting your book published because hers was turned down."
   It's only _____ grapes on her part.

3. "I wouldn't be married to Louis-not for all the _____ in China!" Kim told her best friend.
4. I don't like opera. It's not really my _____.
5. He looks puzzled. He might have a _____ in his bonnet.
6. Mother was treating her as a small child and she had a _____ in her throat.
7. Nimah tends to exaggerate a lot. If I were you I'd take everything he says with a _____.
8. Try to avoid driving along the High Street in the mornings as it's a bit of a _____ during the rush hour.
9. "People like you shouldn't be allowed on the road because you're a real _____!"
10. "You should spend more time in the open or you might turn into a _____."

JUST FOR FUN

My mother never eats beef. She has a bee in her bonnet about it causing the human form of “mad cow disease.”

PART II

TECHNOLOGY OF COOKING AND FOOD PRESERVATION

UNIT 11.

COOKING FOODS

You can prepare better food if you know what goes on in the food you are preparing and why things happen as they do. Foods change physically and chemically during cooking. If you know their composition and structure you can control these changes and have superior products from your efforts. Protein, fats, and carbohydrates are your major allies (and may be problems) in cooking. Protein in egg white, for example, serves as a stabilizer for foams and makes possible such products as meringues, angelfood cakes, souffles, and so on. Proteins help emulsify, thicken, and bind together other food materials.

Fats give flavour and richness to foods, in which they occur naturally, as in milk, eggs, and meat, and the foods to which they are added, as in vegetables, baked products, and *salad dressings.* They are used to fry or to cook foods and to add tenderness to "breads, cakes and pastry.

Carbohydrates have a part in thickening, tenderizing, or sweeting cakes, breads, candies, ice cream, and other foods.

Each group of foods has its own chemical and physical properties that determine the best method of preparing or cooking it. Eggs are highly useful in cooking. They give colour and flavour and hold other ingredients together.

The proteins in the white and yolk coagulate on heating and thicken the liquids they are mixed with, as in custards. The proteins can encase air, and so provide *leavening power,* or lightness, as in cakes. Eggs bind ingredients together, as liquids in mayonnaise and solids in croquettes, as in cream puffs, and popovers.

Milk and milk products are available in many forms. Fresh fluid milk is almost always pasteurized. It may be homogenized — treated under pressure to reduce the size and increase the number of tiny fat globules so they will not rize to the top as cream. Evaporated, dry, frozen, condensed and fermented milk (buttermilk and yoghurt) are used in the preparation of food.

Low cooking temperatures are recommended when milk is a main ingredient of recipe. Long cooking at high temperatures coagulates some protein, causes an off-flavour in the milk, and caramelizes the lactose that is, it decomposes or breaks it down into simpler compounds. The milk gets a brown colour.

Milk soups and sauces therefore are cooked usually in a double boiler, and custards are cooked in a baking dish set in a pan of hot water. You can use most forms of milk in place of fresh, whole milk in a recipe. Exceptions are buttermilk and yoghurt, which might give an unwanted flavour, and

sweetened condensed milk, which contains such a high percentage of added sugar that it is used almost entirely in making candy, cookies, and desserts.

Homogenized milk may be used interchangeably with non- homogenized milk in a number of dishes. Cornstarch puddings made with homogenized milk are more granular. Homogenized milk tends to curdle more readily than nonhomogenized milk in soups, gravies, scalloped potatoes, cooked cereals, and custards.

Evaporated skim milk, one of the newer forms of milk, may be diluted with an equal amount of water and used like fresh skim milk. Cereal products are cooked to absorb water, soften the texture, modify the starch and protein, and develop full flavour.

Proper preparation depends on an understanding of type and form of the product to be cooked. Some are relatively unprocessed whole kernels. Others are processed so that they require little or no cooking. Modern packaged whole-kernel cereals, such as rice, need no washing before use. Indeed washing the riched rice removes some of nutrients. When you boil rice, you should use the smallest possible amount of water so that none is left over when the rice is tender. Proportions of 1 cup of rice and 2 cups of boiling water are used for regular white rice.

Fruits and vegetables are made up chiefly of cellulose, hemicellulose, and peptic substances that give them texture and form. Starch, sugar, acids, minerals, and vitamins are present in varying amounts. Many changes take place when a fruit or vegetable is cooked. The flesh is softened by alteration of the cell structure. In *starchy vegetables*, like potatoes, the starch gelatinizes during cooking; pectins, proteins and hemieollulose also change. In frying potatoes and other vegetables, some of the sugar is caramelized. Colouring pigments also undergo chemical change when heat is applied.

Fruits tend to keep their shape better in a sugar syrup because the syrup attracts water from cells through osmotic pressure and leaves a more dehydrated cell structure. Sugar is absorbed into the fruit only after the tissues are softened by cooking. Many fruits, like apples, plums, peaches, and apricots, can be cooked directly in a sugar syrup. For making purees, the fruit is cooked in water to soften it, and then the sugar is added to the fruit puree.

Vegetables are more vulnerable to mistreatment in cooking than many other foods. For the best in colour, texture, and flavour, one should cook all vegetables the shortest time possible because they are less palatable when they are overcooked.

The most common method of cooking fresh or frozen vegetables is in a small amount of water in a tightly covered saucepan. For many leafy vegetables, like spinach and shredded cabbage, the cooking time is less than 5 minutes.

Other methods of cooking vegetables include baking, braising, steaming, and frying.

Baking whole in the skin is commonly used for potatoes, sweet potatoes, and squash. Carrots, onions, turnips, young beets, parsnips, and cucumbers can also be baked successfully in covered casserole.

The colour of fresh and frozen broccoli is similar when cooked by microwave and by the conventional method of boiling on top of the range.

Frozen vegetables usually require a shorter cooking time than do fresh ones, because they have been blanched before freezing.

Canned vegetables are quick and easy to prepare for serving because they are already cooked. To serve canned vegetables with the most flavour and food value, the liquid in which they are packed should not be discarded.

Active Vocabulary

ally	1) союзник; 2) з'єднувач
foam	піна
meringue [mq'rxN]	меренга
emulsify	робити емульсію
occur	траплятися, відбуватися
salad dressing	приправа до салату
yolk	жовток
tenderness	ніжність
pastry	кондитерські вироби; вироби з тіста
leaven ['levn]	дріжджі, закваска
leavening power	здатність підніматися (про тісто)
coagulate	згущати (ся), згортати (ся)
custard	солодкий крем
buttermilk	сколотини, маслянка
puff	слойка
gravy	підлива, соус
homogenized milk [hO'mOGInaIzd]	гомогенізоване молоко
cornstarch	кукурудзяний крохмаль
evaporated skim milk	сухе знежирене молоко
kernel	серцевина, ядро, зерно
peptic	травний, пепсиновий
starchy vegetables	овочі, які містять крохмаль
osmotic	осмотичний
vulnerable	уразливий
braising	тушкування
casserole	каструля
nutrient	поживна речовина
blanch	бланшувати, обварювати
canned vegetables	консервовані овочі
discard	викидати

Task 1. Fill in the gaps using the words in the box.

pastry, tenderness, exposure, curdle, milk, coagulation, protein, cooked, starches

1. In the preparation of _____, fat is worked into flour and water added in amounts sufficient to hold all together.
2. _____ results from separation of most of the flour particles by fat.
3. When ordinary egg white is heated, _____ of the protein takes place because the egg white has the ions necessary to precipitate thee denatured protein.
4. The thickening power of eggs is due to the case with which the _____ coagulates.
5. It has been definitely proved that raw and _____ _____ are equally well digested.
6. When _____ is heated to a very high temperature, the milk sugar is caramelized and acids formed in the decomposition start the coagulation of the protein.
7. Milk which is not perfectly fresh may _____ when it is scalded.
8. Raw apples and other light - coloured fruits often darken from _____ to air when they are cut.

Task 2. Choose the correct form in bold.

1. Fats **is/are** used to fry or to cook foods and to add tenderness to breads, cakes and pastry.
2. Each group of foods has its properties that determine the best method of **cook/cooking** it.
3. Eggs is/are widely used in cooking.
4. Fresh fluid milk **are/is** almost always pasteurized.
5. Low cooking temperatures **were/are** recommended when milk is a main ingredients of recipe.
6. Sugar is used almost entirely in **make/making** candy, cookies and desserts.
7. Proper preparation depends on an **understand/understanding** of type and form of the product to be cooked.
8. Many changes take place when a fruit or vegetable **are/is** cooked.
9. Carrots, onions, turnips, young beets, parsnips and cucumbers can also be **baked/baking** successfully in covered casserole.
10. Canned vegetables are quick and easy **preparing/to prepare** for serving.

Task 3. Transcribe and pronounce correctly the following words.

protein, carbohydrates, palatable, tenderness, leavening power, gravy, homogenized milk, evaporated skim milk, braising, nutrient

Task 4. Match the word or words with the definition.

1. salad dressing	a. tinned greens
2. leaven	b. meal or powder from ground wheat
3. canned vegetables	c. spices for salad
4. cream	d. sweet food served after the main part of the meal
5. egg	e. sweet sticky yellowish fluid made by bees from nectar
6. flour	f. substance causing dough to ferment and rise
7. dessert	g. a body produced by females of birds
8. honey	h. a thick yellow – white liquid that rises to the top of the milk

Task 5. Translate into English.

1. Важливою функцією жирів у приготуванні їжі є збільшення м'якості продукту, до якого вони додаються.
2. Також жир впливає на смак їжі, тому смажена цибуля на смак відрізняється від цибулі, звареної у воді.
3. У підігрітому молоці білка і кальцію менше ніж у не підігрітому.
4. Овочі змінюють свій колір залежно від тривалості варіння.
5. Якщо вода, в якій варяться овочі, містить соду, то вітамін С руйнуватиметься.
6. Добрий бульйон виходить із м'яса і кісток.
7. Якщо м'ясо готувати при низькій температурі тривалий час, то воно буде соковитим і м'яким.
8. Для приготування їжі, основним компонентом якої є молоко, рекомендується низька температура.
9. Червоні овочі, такі як буряк, червона капуста, зберігають свій колір, якщо у воду, в якій вони варяться, додати небагато оцту або будь-якої іншої кислоти.

Task 6. Answer the questions:

1. When can you control physical and chemical changes in foods during cooking?
2. What are major allies in cooking?
3. What do proteins help to do during cooking?
4. What do fats give to foods?
5. What are carbohydrates functions in foods?
6. What occurs in the milk during long cooking?
7. What kinds of milk may be used in place of fresh whole milk in recipe?
8. What changes take place when a fruit or vegetable is cooked?
9. Why do frozen vegetables require a shorter cooking time?
10. Why are canned vegetables quick and easy to prepare for serving?

Task 7. Read the text and mark these sentences true (T) or false (F).

Don't spend lots of money on top quality cooking; just make sure you like the place where you have it. A new report says that enjoyment of a meal doesn't depend on what you eat, but where you eat it. A new report says that enjoyment of meal doesn't depend on what you eat, but where you eat it. Researchers prepared the same meal in ten different locations and asked the people eating it to give it marks out of ten for the taste, texture and appearance of the food. When they served "chicken a la king" in a residential home for the elderly, it got low marks. However, when they served it to customers in a four-star restaurant, the reaction was very different. The customers said it tasted delicious.

The results show that in many cases the location is actually much more important than the food; said Professor John Edwards of Bournemouth University. Edwards and his team took great care to make sure that all meals would be as similar as possible. They used exactly the same kind of chicken, they stored the dishes in the same kind of plastic bags and served them all with the same type of rice. The meat got the highest marks in every category – taste, texture, appearance – at the restaurant. Interestingly, bottom marks went to the dish when they served it in an army training camp. As one of the soldiers said, "It tastes awful and smells disgusting!"

1. Researches asked the people to give it marks out of ten for the taste.
2. People in the residential home for the elderly liked the food.
3. Customers in the restaurant liked the food.
4. The place is always more important than the food.
5. The food was exactly the same in all the different places.
6. The food got the highest marks in the army training camp.

Task 8. Do you know any Ukrainian equivalents of the following English idioms? Can you make up any situations to illustrate some of them?

1. apple – pie order
2. as close as an oyster
3. the apple of someone's eye
4. the best fish swim near the bottom
5. better egg today then a hen tomorrow
6. to believe that the moon is made of green cheese

JUST FOR FUN

Woman: Poor child! What a swollen cheek you have! Is it a tooth?
Boy (with difficulty): No, it is a sweet.

UNIT 12.

BEVERAGES: COFFEE, TEA, COCOA, CHOCOLATE

Coffee is one of the most popular beverages of the world. It is made from a berry grown in tropical climates and shipped to this country green, that is unroasted. All coffee trees are alike, but the berries produced vary in composition with variation in the rate of growth and the treatment after picking. For this reason, Mocha, Java, and South American coffees are quite distinct from each other.

Constituents of coffee. A cup of coffee will contain the ua- *far-soluble products* of the berry, the most important of these being tannin, caffeine, caffeol, *caramelized carbohydrates,* and carbon dioxide. Tannin dissolves slowly in hot water, the amount present in a brew depending upon how long the water and coffee are left in contact with each other. The bitterness of some coffee is due to the extraction of too much tannin. Tannin is more soluble **in** boiling than **in** very hot water. Coffee brew made with water at 95 °C is, therefore, much less bitter than at 100 °C.

Caffeine is the alkaloid which may act as a stimulant. Every cup of coffee contains caffeine unless this has been removed from the berry before brewing.

Caffeine's physiological effects have been the subject of considerable research, and it is generally conceded that these are negligible, except possibly in rare instances. It has an unquestionably psychological effect on many people, however, and for this reason coffee is treated in various ways to eliminate the largest part of the caffeine, the product being sold under various trade names.

Caramelized carbohydrates and other *decomposition products.* formed in the roasting process are brown coloured and account for the colour of the brew.

They contribute,to the flavour somewhat, but the characteristic taste of coffee is due to another substance or most probably a combination of substances known as caffeol. Caffeol is very soluble in hot water, but because of its volatility the amount of it in coffee varies greatly. It escapes readily from the berry during roasting, from the pot during brewing, and from the coffee cup after it is prepared. The amount of caffeol, its flavour, and aroma are largely due to the method of roasting.

Carbon dioxide is present dissolved or as an absorbed film in the roasted berry. Large amounts of it are released when the coffee is wetted.

Coffee making. There are, in general, three methods of preparing coffee — boiling, percolating, and the drip method. Each differs from the other **in** the mode of extraction, and as a result, each extracts the water-soluble constituents in varying amount. The boiling method consists **in** the, steeping, not the boiling, of the coffee. Convention **is** often stronger than reason, however, and we continue to talk about boiled coffee, since that **is** the term which to the average person implies steeped. There are several possible variations of this method. In general, the ground coffee is treated with either cold or hot water, brought slowly to boiling point or held just below this, and then allowed to stand in order to settle out the grounds. Whatever the variation, the coffee is kept in contact with the grounds a considerable time, and, as a result, considerable tannin is extracted. Caffeol, caffeine and the coloured compounds are leached out and carbon dioxide is set free.

If the coffee is actually allowed to boil, the steam carries away still more of the caffeol. Boiled coffee made by holding the ground coffee at a temperature of between 85° and 95 °C contains less tannin, the same amount of caffeine, and more caffeol than coffee made at 100 ~C. These lower temperatures are recommended to those who prefer the boiling method. The time of Jnfusion should be limited to low minutes, in order to decrease the amount of dissolved tannin and the loss of caffeol. A well-covered coffee pot helps to retain the caffeol.

The *percolation* of coffee allows for the extraction of the water soluble constituents at a temperature below boiling. The heated water is carried up and deposited on the *coffee grounds* which are held in a sieve. In this way the water- soluble constituents are slowly extracted, but at no time is there a large amount of water in contact with the coffee grounds. As the percolation continues, the liquid, carried up becomes a stronger and hotter brew. No settling of grounds is necessary, and percolated coffee is usually clear and sparkling. Probably less tannin but equal amounts of other constituents are extracted in the percolation method as compared with the boiling method.

The drip method is one old French method. Boiling water is poured upon the coffee grounds held in a suitable sievelike container. The liquid which drips through is used, as it is never poured back over the grounds, and the largest amount of caffeol will be present in the first extraction. The drip method produces a coffee with the maximum caffeol content. Tannin is likely to be present in largest amounts in coffee made by the boiling method and the amount of caffeine and of coloured and caramelized products extracted will be approximately the same by all three methods.

Probably one of the greatest essentials in making of good coffee is a clean pot. The coffee should not stand long before serving or caffeol will be lost through evaporation.

Tea. The desirable features of tea are less standardized than those of coffee. Some like it black, some like green, some with cream, and others with lemon.

Tea is made from the leaves of a tea bush which is indigenous to the Orient. There are many factors which influence the quality of the tea as purchased. The younger the leaves the better the tea. Some of the poorer teas are made from the older leaves or even stems. The grade and flavour of tea are influenced by the treatment after picking. Black tea is made from leaves which are fermented before drying. The fermentation darkens the product and softens the flavour. Green tea is not fermented; the leaves are steamed and dried. Its flavour is more astringent than that of black tea, as fermentation affects tannin compounds in the leaf.

Tea infusion is a water solution of the soluble products in the tea leaf, of these the most important are caffeine and tannin. It is these soluble coloured substances and the essential oils that impart the aromas and flavour. The amount of any of these products will depend upon the method of brewing. The percentage of caffeine in tea is actually greater than in coffee but the amount present in cup of tea is usually less, as most people prefer a very weak brew. The tannin extracted may be considerable if the tea is left in contact with the hot water for a long time. Large amounts cause a markedly bitter taste. The soluble coloured substances vary with the kind of tea. Black tea contains more than green. Like the caffeol of coffee the essential oils of tea are volatile and contain oxidizable fats.

Tea itself loses its aroma slowly on exposure to air, fresh imports of tea making by far the best quality of infusion. Tannin is very much less soluble in cold water than in hot water. This may be overcome by diluting the tea infusion before chilling. When lemon juice or lemon is added to tea, whether cold or hot the colour fades.

Cocoa and Chocolate. Cocoa and chocolate in themselves contain fats, proteins, carbohydrates and minerals. As beverages made from them are generally made with milk they are much more nutritious than the other beverages.

Cocoa and chocolate are made from the bean or seed of a tree which grows in tropical countries. "Cocoa beans vary in quality, according to the place where they are grown. Some excel inrich flavour, others in colour, and others in the body which they give to beverages made from them. In the manufacture of cocoa or *chocolate products,* the roasting and mending of the different varieties are important factors.

Roasting reduces the *astringency* by modifying the tannin; it develops flavour and colour, some of the starches are caramelized. After the roasting is completed., the shells and germs are removed. The shells are often used for beverages. When boiled in water they impart a pleasing flavour not unlike cocoa but less sweet. The germ of the seed is a valuable *by-product* sold for the manufacture of cocoa butter. The remainder *(cocoa nibs)* is used for the manufacture of cocoa or chocolate. The nibs finely ground and pressed into cakes for plain or bitter chocolate.

Active Vocabulary

beverage	напій
constituent	складова
water-soluble products	розчинні у воді продукти
caramelized carbohydrates /ˈkɛrəməlaɪzd/	карамелізованні вуглеводи
brew	1)напій; вариво 2)заварювати
extraction	витяг; екстракція
decomposition products	продукти розпаду
contribute	сприяти
taste	смак
soluble	розчинний
volatility	леткість
roast	смажити
carbon dioxide /ˈkɑːbən daɪˈɒksaɪd/	вуглекислота, двоокис вуглецю
film	плівка; легкий шар
drip method	метод капання;
steep	замочувати; занурювати (у рідину)
convention	звичай; умовність
ground coffee	мелена кава
leach	вилуговувати
infusion /ɪnˈfjʊ(ə)n/	настій; настоювання
percolation	фільтрування, проціджування
coffee grounds	кавовий осад
sieve	решето, сито
indigenous /ɪnˈdɪdʒɪnəs/	природний, уроджений
purchase	купувати
astringent	в'язкий
astringency /əsˈtrɪndʒənsɪ/	в'язка властивість
impart	давати, додавати
dilute	розбавляти; розріджувати
chill	прохолоджувати; студити
beans	боби
excel	видаватися; виділятися
chocolate	шоколадні продукти
blend	змішувати
shell	шкарлупа; лушпайка
germ	зародок
by-product	побічний продукт
cocoa nibs	дроблені боби какао, какао-крупка

Task1. Fill in the gaps using the words in the box.

Pressing out, coffee, quality, brew, caffeine, drip method, starch, infusion, better, younger, influence

1. The _____ of a cup of coffee depends partly upon the kind of _____ and partly upon how it is made.
2. _____ is so soluble that 80 per cent of it is removed in the first two minutes in the preparation of coffee _____.
3. The _____ _____ produces a coffee with the maximum caffeol content.
4. There are many factors which _____ the quality of tea.
5. The _____ the leaves are the _____ the tea is.
6. _____ strong tea _____ is used in the preparation of iced tea.
7. The _____ present in cocoa and chocolate must be taken into consideration in the cookery of these products.
8. All kinds of cocoa are made from chocolate by _____ _____ varying amounts of the fat.

Task2. Choose the correct form in bold.

1. Coffee is one of the **more/most** popular beverages of the world.
2. A cup of coffee will contain the water-soluble products of the berry, the **more/most** important of these being tanning, caffeol, carbon dioxide.
3. Tannin is **more/most** soluble in boiling than in vary hot water.
4. Coffee brew made with water at 95°C is, much less **bittest/bitter** than at 100°C.
5. Coffeeis treated in various ways to eliminate the **large/largest** part of the caffeine.
6. Convention is often **strong/stronger** than reason.
7. If the coffee is actually allowed to boil, the steam carries away still **more/much** of the caffeol.
8. Boiled coffee made by holding the ground coffee at a temperature of between 85°C and 95°C contains **less/little** tannin.
9. The drip method is one of the **old/oldest** methods.
10. Probably one of the **greater/greatest** essentials in making of good coffee is a clean pot.

Task 3. Transcribe and pronounce correctly the following words.

beverage,	brew,	caramelized carbohydrates,
volatility,	infusion,	percolation,
indigenous,	astringency,	carbon dioxide

Task 4. Match the words with the definition.

1. volatility — a. soak or bathe in liquid

2. soluble	b. a way of filtration
3. steep	c. liquid extract obtained thus
4. nibs	d. mix together as required
5. percolation	e. incidental product made in the manufacture of something else
6. infusion	f. shelled and crushed coffee or cocoa beans
7. blend	g. evaporating rapidly
8. by-product	h. that can be dessolved

Task 5. Translate into English.

1. Посуд, в якому готують каву, повинен бути не металевий та чистий, оскільки жирна плівка, яка залишається на стінках, придає напою небажаний смак.
2. Кафеоль має властивість швидкої леткості.
3. Велика кількість танніну отриманого під час тривалого настоювання, надає чаю гіркий смак.
4. Шоколад і какао мають у своєму складі жири, білки, вуглеводи і мінеральні солі.
5. Колір шоколадної плитки контролюється кількістю соди, яка додається до шоколадної маси.
6. Чим більше соди додається до шоколадної маси, тим темнішим стає колір плитки.
7. На смак і сорт чаю впливають обробка його після збору.

Task 6. Answer the question:

1. What is one of the most popular beverages of the world?
2. What constituents of coffee do you know?
3. How many methods are there of preparing coffee?
4. What kinds of tea do you know?
5. How does the treatment of tea after picking influence its grade and flavour?
6. Does tea itself lose its aroma?
7. What are cocoa and chocolate made of?
8. What do chocolate and cocoa contain in themselves?
9. What must be taken into consideration in the manufacture of cocoa and chocolate products?
10. What does roasting do in the manufacture of cocoa and chocolate products?

Task 7. Read the text without a dictionary and discuss it.

CHOCOLATE

Chocolate, preparation made from the bean of the cacao tree and used to make drinks and various kinds of confectionery.

The Olmec civilization in what is now Mexico first domesticated *Theobroma* cacao and the Maya uses chocolate for centuries. They used beans as money and they also ground them to make a drink flavoured with chilli, cinnamon, maize meal and water. It was considered "the drink of the dogs" and women couldn't have it. When the Spanish conqueror Cortes arrived in Mexico in 1519, he and his men were served this drink – it was called *xocolatl*.

The drink was taken to Spain, where they added sugar and vanilla. After a century of keeping it a secret, the Spaniards introduced it to France and Italy, then in 1657 to England, where its taste was improved by adding milk. In the 19th century, when the Dutchman Van Houten invented a press to extract cocoa butter from the cocoa liquor, he created the technology to produce the first chocolate bars.

Task 8. Do you know any Ukrainian equivalents of the following English idioms. Can you make up any situations to illustrate some of them?

1. wedding breakfast
2. home sweet home
3. useful as a chocolate teapot
4. working breakfast
5. intellectual food
6. a coffee-table book

JUST FOR FUN

Mother: Look at the holes in your new suit, Harry. Isn't it revolting?
Harry: I know, I know, mother. You see, we played a food-store and I was the Swiss cheese.

UNIT 13.

VEGETABLE COOKERY

The composition of vegetables varies greatly. Some are good sources of proteins, others are largely starch. Unlike most of our foods, vegetables contain many valuable minerals and vitamins, along with considerable quantities of cellulose While the vegetarian is interested chiefly in the protein content of this vegetables and the overweight person in their carbohydrate content, the average person values vegetables for their minerals, vitamins and cellulose. These constituents must, there fore, be our first consideration in vegetable cookery. While it is well known that the *palatability* (including flavour, texture, and colour) of foods does not effect digestion, it is equally well known that the palatability does effect our selection of food. In the cookery of vegetables, then, we must consider both the *nutritive value* and the palatability of the cooked vegetable.

Generall effect of cooking on vegetables. Why do we cook vegetables? To answer that question let us first see what happens during the cookery process. The flavour is altered, sometimes it is lessened, other times it is increased, but in both cases it is usually changed in character as well. The colour also may be altered. The constituents which give flavour and colour to vegetables are unstable compounds sensitive to changes in acidity and heat. Many of the flavouring substances decompose, and many escape with steam as volatile products during the cookery process. As the hemicellulose is hydrolyzed, the texture is softened. Leafy vegetables lose *moisture* from the plant cells, shrink, and then become softer. The starch granules of all vegetables swell. Some of the starch may be hydrolyzed, some may be dissolved out. Some of the soluble proteins, dissolve out and coagulate, others coagulate in vegetable. Some of the soluble minerals dissolve out, others are held within the vegetable by coagulated protein cellular walls. Vitamin C is partly destroyed during the cooking process and a large amount dissolved out. Vitamin B complex is made up of several vitamins of which now, called vitamin B (B,) and G (B_2), are differentiated. Both are soluble and therefore are dissolved in cooking of vegetables in proportion to the amount of water and the length of cooking. One vitamin B (B,) is largely destroyed by heat. Vitamin A will be effected by any cooking process.

Effect of different methods of cookery on nutritive value.

There are various methods of cooking vegetables. They may be classified according to the *medium* in which the vegetable is cooked, in boiling water, in steam (steamer, pressure cooker, waterless cooker, etc), in hot fat (fry), in hot air (bake).

We shall discuss the effect of these various media on the nutritive value and palatability of the product.

Carbohydrate and protein. Little need be said concerning the loss of carbohydrate and protein in vegetable cookery. The longer the cooking the greater the losses, but these are slight in any case and represent but a small percentage of the *daily requirement.*

Celluloses. Although the celluloses of vegetables have **no** fuel value because they are not digested by man, they represent **a** valuable factor in nutrition.

As *roughage*, they help to prevent constipation. For those who are overweight, they act as a filler, giving a feeling of *satiation* without the possibility of adding weight. The amount of roughage desirable varies with the individual. Too much is as harmful as too little, but the free use of vegetables as a source of roughage is unquestionably safe for every normal person. There is no method of cooking which causes loss of roughage. The greatest loss is encountered in the removal of skins, etc., in preparing the vegetables for cooking. If vegetables are cooked a considerable time, the cellulose which is softened to a greater extent is not too irritating to a sensitive *digestive tract.*

Vitamins. The popular demand for vitamins is encouraging to nutrition experts. They have become talking points for food salesmen. Much good has been accomplished, but caution must be observed in the evaluation of the popular statements concerning vitamins.

As already stated, the loss of vitamin A is insignificant. Vitamin B complex is partly destroyed and may be leached out; so that the loss may be considerable unless the cooking water is utilized.

Vitamin C, present in more or less amounts in all vegetables, is the most easily destroyed of the three important vitamins, especially in the presence of heat and oxygen. As there is air dissolved in the plant juices, it follows that during the cooking of vegetables considerable loss of vitamin C will take place. Tests show losses as high as 95 per cent. If the original amount of vitamin C is low, the amount remaining in the cooked vegetables may be insignificant with those vegetables which contain a large amount of vitamin C in the raw state, the amount left in the cooked product may be of great nutritional value. Certain cooked fruits, notably pineapples and tomatoes, contain nearly as much vitamin C as the raw fruit. In the presence of alkali, however, the loss of vitamin C on heating is complete. Those vegetables which are cooked fop a time in slightly alkaline tap water, or those cooked in water to which "a *pinch of soda"* is added, will be without vitamin C. Like the vitamin B complex, the loss of vitamin C is increased by its solubility

unless the cooking water is utilized. While it might appear logical to conclude that the loss of vitamins during vegetable cooker is so great that it would be better to disregard cooked vegetables as a source of vitamins, this idea is erroneous. It has been found that there may be more vitamin C in cooking water from spinach than in raw carrots.

Minerals. Vegetables are one of our best sources of minerals. Efforts should therefore be made to conserve these constituents in the cookery processes, and, where loss is inevitable, the facts should be well understood. It has been shown that some vegetables cooked in very *hard water* contain even more calcium than the raw vegetables.

Cooking in hot air (baking) or in hot fat (frying) does not affect the mineral content. The minerals are lost only through their solubility in water. Unfortunately not all vegetables can be cooked in hot air or fat.

All authorities agree that the greatest loss of minerals results when vegetables are cooked in water for a long time, the larger the amount of water the greater the loss. Authorities also agree that there is the least loss of minerals when vegetables are cooked in a steamer or *pressure cooker,* the losses in the latter being usually somewhat greater than that in a steamer. As the flavour and appearance of vegetables cooked in the pressure cooker are not usually so pleasing as those cooked in a steamer, the use of the pressure cooker for vegetables is debatable. In both methods the vegetables are in contact with only a small amount of water at any time and this explains the slight loss of minerals. The loss in minerals will be nil in all methods of cooking vegetables if the liquid in which the vegetables is cooked is utilized in one way or another. Vegetable water may be used in making soups, cream sauces, meat loaf, gravies, and innumerable other dishes. It is also possible that the water in which the vegetables are cooked may be completely evaporated off. Certain vegetables are more palatable if cooked in a comparatively large amount of water. This is true of such vegetables as cabbage, brussels sprouts, and turnips.

The addition of salt to the cooking water of vegetables is a common practice as it improves the flavour of the cooked product. Recently it has been shown that its presence does not
In any way affect the loss of mineral element at least, calcium.

Palatability. Palatability is greatly affected by cookery processes. People select food because of its nutritive value, its palatability, that is, the texture, flavour, and colour. By texture is meant softness or tenderness, *mealiness*, and so on.

During the cooking of all vegetables, there are ch a nges in texture which are due to the same general causes. The protein coagulates. There is a partial gelatinization of starch, softening of cellulose and, with the solubility of the pectic substances which hold the cellulose together, a general disintegration of the plant tissue.

Only those vegetables which contain and retain enough moisture in which to cook can be cooked in hot air or hot fat. A potato baked in an oven cooks

in its own water content. Cabbage and other vegetables containing a large amount of water cannot be cooked in the oven because they evaporate off their water too rapidly.

When vegetables are cooked in either steam or water, the texture is affected primarily by the length of time cooking.

Flavour. Flavour is greatly affected by method of cooking. In general, fried and baked vegetables taste more like the *raw products* than those cooked in water, as many constituents which are leached by water or boiled out with steam are held within vegetable when it is baked or fried.

Colour. The colour of cooked vegetables is greatly affected by the mode of preparation. It is sufficient to say at this point that retention of the colour of green vegetables is favoured by cooking in as lightly alkaline medium. The discolouration of potatoes is quite different. Every housewife knows that old potatoes become dark during the cooking process. This blackening is due primarily to the hydrolysis of proteins of the potato during storage.

As the hydrolytic products are soluble in cold water, the best remedy is to soak the *pared potatoe*s in cold water an hour or more before cooking. As this *treatment* greatly reduces the mineral content, it is only recommended for the old potatoes which become unsighty when cooked.

Storage. The keeping of vegetables in an average home is only for a short time. The changes which take place in vegetables in this time are due to drying out or to natural chemical changes taking place in the vegetables themselves. Drying out can be controlled by keeping the vegetable cool and in the case of leafy vegetables covered. The chemical changes are due to the fact that many of the life processes of the vegetables continue, as for example the change of sugar in corn and de-struct ion of sugar in peas. These changes become less rapid when the vegetables are kept cold. The chemical changes in winter vegetables are less undesirable. The starch of squash changes to sugar during storage and parsnips are sweet only after they have remained in the frozen ground. The sugar of carrots hydrolyzes to dextrose.

Active Vocabulary

cookery	готування
considerable	значний
quantity [ˈkwɔntɪtɪ]	кількість
overweight [ˈəuvəweɪt]	надмірна вага
constituent	складова частина
palatability	смакові якості, смак
texture [ˈtekstʃə]	структура, тканина
nutritive value	харчова цінність
alter	змінювати (ся)
lessen	зменшувати (ся)
increase	зростати, збільшувати (ся)

decompose	розкладатися, розчинятися
volatile	летючий, той, що швидко випаровується
moisture [ˈmɔɪstʃə]	вологість
shrink	усихання
cellular wall	стінка клітини
alkali [ˈælkəlaɪ]	луг
medium	середовище
steamer	пароварка
pressure cooker [ˈpreʃə ˈkukə]	варильний автоклав
waterless cooker	посуд для готування без води
daily requirement [ˈdeɪlɪ rɪˈkwaɪəmənt]	денна потреба
roughage [ˈrʌfɪdʒ]	груба їжа
satiation	насичення, наситність
digestive tract [dɪˈdʒestɪv ˈtræktˌ]	травний тракт
pinch of coda	дрібка соди
hard water	жорстка вода
maleness	борошнистість
raw products	сировинні продукти
pared potatoes	очищена картопля
treatment	обробка

Task 1. Fill in the gaps using the words in the box.

evaporate, digestible, raw, cooking, acidity, nutritive value, hydrolysis, length

1.We prefer the changed flavour, even though it means less _____ .
2.The raw potato starch is less _____ than the cooked potato starch.
3.Some cooked fruits contain nearly as much vitamin C as the _____ fruit.
4.The less of minerals depends upon the water which leaves the vegetables during the _____ process.
5.Vegetables containing a large a mount of water cannot be cooked in the oven because they _____ off their water too rapidly.
6.The preservation of the natural flavour of vegetables may be controlled by the _____ of the cookery period.
7.The blackening is due primarily to the _____ of proteins of the potatoes.
8.It varies with the size and age of the vegetable and the _____ of water.

Task 2. Choose the correct form in bold.

1. The vegetarian is interested **chief/chiefly** in the protein content of the vegetables.

2. It is **equal/equally** well known that the palatability does effect our selection of food.
3. The flavour is **usual/usually** changed in character as well.
4. Vitamin C is **partly/part** destroyed during the cooking process.
5. Vitamin B1 is **large/largely** destroyed by heat.
6. Vitamin A occurs **wide/widely** in foods of animal origin.
7. The water in which the vegetables are cooked may be **complete/completely** evaporated off.
8.Certain vegetables are more palatable if cooked in a **comparative/comparatively** large amount of water.

Task 3. Transcribe and pronounce correctly the following words.

valuable, quantity, overweight, constituent, alter, moisture, hydrolyzed, pressure cooker, alkali, texture

Task 4. Match the word or words with the definition.

1. palatability	a. small amounts of water in or on something
2. roughage	b. not cooked foods
3. moisture	c. kitchen equipment
4. raw products	d. art or skill of preparing food
5. pressure cooker	f. quite pleasant taste of food
6. cookery	g. drying out
7. solvent	h. a substance than is used to dissolve another substance
8. shrink	i. a substance in some foods that helps your bowels to work

Task 5. Translate into English.

1. Смак овочів під час варіння змінюється: інколи він стає кращим, інколи – гіршим.
2. Овочі містять велику кількість мінеральних солей.
3. Вміст мінеральних солей в овочах не змінюється під час їх запікання або смаження.
4. Додавання невеликої кількості солі у воду, в якій варяться овочі, покращує їх смак.
5. Зменшення поживної цінності овочів відбувається через руйнування вітамінів і розчинення мінеральних солей.
6. Збереження природного смаку овочів і запобігання розвитку неприємного смаку можна контролювати тривалістю їх готування.
7. На колір овочів під час варіння впливає тривалість їх приготування.
8. Для приготування смачних і приємних на вигляд страв з овочів, варто обирати свіжі, міцні овочі.

9. Овочі слід зберігати в прохолодному місці протягом нетривалого часу.
10. Для того щоб картопля не темніла, перед приготуванням її слід потримати годину в холодній воді.

Task 6. Answer the questions:

1. What is the composition of vegetables?
2. What happens during the cooking process?
3. In what way do we classify methods of cooking vegetables ?
4. What is the function of the celluloses of vegetables in nutrition?
5. What vitamin is the most easily destroyed in the presence of heat and oxygen?
6. What is the best source of minerals?
7. When does the greatest loss of minerals in vegetables result?
8. Is palatability greatly affected by cookery processes?
9. What affects the color of cooked vegetables?
10. What changes take place in vegetables during storage?

Task 7. Read the text and mark these sentences true (T) or false (F).

VITAMIN A

Among vitamins soluble in fats vitamin A is of great importance. It is necessary for normal growth of epithelial tissues. This vitamin is involved in the work of the enzymes in the formation of the visual pigment rhodopsin, through which we can see in the twilight. Vitamin A is called the "vitamin of growth", it is simply necessary for the children.

Lack of vitamin leads to depression and poor concentration, disturbances of visual function and reduce the stability of epithelial tissues. In general, vitamin A is found in animal products, especially in liver, egg yolk, butter, and dairy products.

Carotene, called provitamin A is found in all green, yellow and orange fruits and vegetables. A lot of carotene is absorbed along with fats. Therefore vegetables that contain it must be used in a salad with vegetable oil. The daily need of vitamin A is from 0,9 to 2,7 milligrams or 25 milligrams of carotene. This may be equal to 1 liter of milk, 1 cup of carrot juice, three tomatoes or 150 grams of spinach.

1. Vitamin A is water soluble.
2. This vitamin is necessary for vision.
3. It occurs only in vegetables.
4. Carotene is provitamin A .
5. Carotene is found only in foods of animal origin.
6. The daily requirement of vitamin A is 2,7 milligrams.

Task 8. Do you know any Ukrainian equivalents of the following English idioms? Can you make up any situations to illustrate some of them?

1. a carrot and stick policy
2. put on airs
3. kick up a row
4. cry for the moon
5. make a fuss
6. beat about the bush

JUST FOR FUN

“What’s the matter with you, darling? – Lily asked her husband.
- Monday you liked beans, Tuesday you liked beans, Wednesday you liked beans, Thursday all of a sudden you don’t like beans.”

UNIT 14.

EGGS IN HUMAN DIET

Eggs are indispensable in the average diet. They contain in colloidal form many of the more important but less abundant food materials, vitamins and minerals, along with fat and protein, and are an easily digestible, easily prepared, nutritious, and concentrated food in themselves, as well as being most important in the preparation of many other foods because of their colloidal nature.

There are great differences in eggs which may be attributed to many causes: the feeding and care of the hens, the kind of hen, and the care of the eggs after they are laid.

The consumer has little or no way to judge the quality of an egg from its external appearance. Difference in size does not indicate difference in quality. The colour of the shell is of little significance. The investigation has proved brown-shelled and white eggs alike in composition and in every property. A clean-shelled egg indicates a clean hennery and, therefore, an egg of better keeping qualities and flavour than those with dirty shells. An egg shell with a chalky appearance is usually fairly fresh. A shiny smooth shell indicates an old egg. The price is usually the indication of grade, although large eggs usually command a higher price per dozen than average or small sizes.

Changes in eggs on keeping.— The shell of *freshly laid egg* is completely filled, the yolk spherical in shape, and the white thick and gelatinous. The *new-laid egg* contains no bacteria which promote spoilage. It may contain drops of blood or bits of extraneous matter. This occurs very seldom, but even when the hens have the best care it is not entirely eliminated. Soon after the egg is laid, evaporation of the water with the dissolved carbon dioxide takes place through the porous shell. As these gases leave the shell, air containing microorganisms enter. At the same time, some of the water passes from the white to the voik, and the whites begin to lose their gelatinous consistency "and become thinner. The exact cause of this *liquefaction* of gelatinous egg white is not known.

The change may be physical or chemical. It is well known that eggs with thin white do not poach well, as the thin white spreads before coagulation starts. It has been proved that thin whites may be used satisfactorily in cakes, omelets, and souffles. In other words, the *whipping qualities* of the egg

whites has not been appreciably Impaired by the physical change of gelatinous to watery egg whites.

Other changes in the egg occur as the egg ages. The membrane which surrounds the yolk becomes stretched and weakened by increasing amount of water. The yolk no longer appears spherical but flattens out when the egg is broken into a dish; sometimes the stretched membrane around the yolk will be broken on cracking the egg. It is always difficult to separate the yolk and white of an old egg without breaking the yolk.

The change in the location of the water appears to be due to the changing hydrogen-ion concentration of the egg through loss of carbon dioxide.

The pH of the egg white increases from about 7.6 when the egg is freshly laid to 9.7 after keeping, an increase in alkalinity of about 100 per cent.

The hydrogen-ion content of the yolk also decreases but to a less extent. The *standing-up quality* of the yolk and the gelatinous quality of the white vary with this increased alkalinity. Freshly laid eggs put in storage in an atmosphere of carbon dioxide in a concentration sufficient to prevent this change in the carbon dioxide content of the egg do not show these changes so markedly. As the yolk and white lose carbon dioxide and become more basic, they are more subject to spoilage through the growth of microorganisms.

The enlargement of the air space is due to the evaporation of moisture from the egg, but as the loss of water depends on the relative humidity of the storage space the size of the air
space is not positive indication of either the age of the egg or its quality.

Composition of eggs. The composition of an egg is roughly 75 per cent water, 12 per cent protein, 12 per cent fat and 1 per cent minerals and vitamins. The fat is all contained in the yolk, where it is present with the protein in highly emulsified form. A large percentage of it is in the form of a phosphorus- containing compound known as lecithin. The yolk protein differs in nature and properties from the protein in the white. It is called ovovitellin and is a phospho-protein similar in composition to the casein of milk. Most of the minerals of the egg are found in the yolk. Of these the iron is the most important, being present in sufficient amount to make eggs of the most *valuable sources* of this necessary dietary constituent. When we learn that most of. the vitamins also are located in the yolk we might conclude that the white is of comparatively little *food value* but this is not quite true.

The whites are a 12 per cent colloidal solution of the proteins, albumin, mucin and globulin, with few, if any, vitamins and no fat. It is thought that mucin, a compound protein, is largely responsible for the gelatinous consistency of the whites. The value of egg whites depends on the fact that they represent the most easily digestible proteins, and from the point of view of the cook they are indispensable.

The colour, the flavour, and the vitamin content of the yolk are all dependent upon the food which the hen eats. Foods containing chlorophyll

increase the depth of the yellow colour. The vitamin A and B complex are always present, the former in abundance. Vitamin D may or may not be present, being apparently dependent on the content of the hen's diet and her exposure to sunlight. The food which the hen eats, the condition of the hennery, and the care of the eggs after they are laid all seem to play a part in the flavours which develop during storage.

For most cookery processes the value of the eggs lies in the protein present in colloidal form. The *thickening power* of eggs is due to the ease with which the protein coagulates. One egg will thicken one cup of milk to jellied consistency, as in custards. The tendency to foam makes them good leavening agents.

One beaten egg will leaven as well as one-half tea-spoon of *baking powder*, while if the white alone is used, the leavening power may be twice as great. The actual leavening and thickening accomplished by the use of eggs depend upon 1 he technique of mixing and baking. The emulsifying property of eggs is well illustrated in mayonnaise and cakes. A cake made without eggs is never of so fine a texture, and although, as we know, we can make mayonnaise without eggs, the oil is much more easily emulsified with their use.

Coagulation of egg protein. Many factors, including the rate of heating and the presence of such foods as sugar, and acid, influence the temperature of coagulation of egg, but in every case the temperature of coagulation is well bellow 90 ^{C}C. If the egg is heated slowly it begins to thicken at about 65 °C and sets to a jelly at a temperature around 70 to 75 ^{C}'C. If heated longer, the coagulated protein, which now holds within its mashwork the solution of other constituents, continues to coagulate and to shrink until it no longer can hold all of the solution. The jelly first formed begins to whey or to exude liquid. If the egg is heated rapidly, however, it is quite possible that the jelly stage will not be reached until a higher temperature but will then be so quickly formed that it will immediately shrink. In the preparation of custards, sauces, and other dishes thickened with egg, the directions call for a low cooking temperature because its ability to hold liquid in jelly form.

In the preparation of stirred egg dishes, overcooked egg gives the dish a curdled appearance. The presence of other foods influences the rate of coagulation and the firmness of the resultant jelly. Acids or acid foods as tomato, brown sugar, or fruits decrease the temperature of coagulation and make the custard firmer. The more milk in proportion to egg has the opposite effect, and, while the less firm custards are more palatable, they are more difficult to make, because if these tender jellies are cooked too long or to rapidly they appear to shrink or curdle more rapidly than the firmer ones. The addition of sugar retards the coagulation of egg that is, it raises the temperature of coagulation. This is great help as it is very difficult to heat egg dishes slowly enough in a home to avoid overheating.

When any dish is cooked in the oven, the outer part cooks more rapidly than the centre. If an egg dish, such as a custard, is baked at a high temperature, the outer portions reach the final stage of coagulation before the centre has reached a temperature high enough for this first stage. An egg *poached* or cooked in the shell in

hot water behaves similary. If put into boiling water, the outer portions become hard and tough before the centre has set, but if held at the temperature of coagulation, the outer portions will still be tender when the centre is sufficiently done. *Scrambled eggs* become harder as they are cooked. If much liquid is added before heating, they will become watery after long cooking. Even a baked or stirred custard which contains normal amounts of sugar will become watery or curdled unless extreme care is taken to keep a low cooking temperature.

Leavening with **eggs**. The *leavening power* of eggs depends on the amount of air which has been incorporated during the beating, as well as the amount of air which is allowed to remain in the batter or dough during the mixing and baking. Because of the colloidal nature of the protein, large amounts of air may be incorporated into egg whites. During the beating, the air bubbles, which are at first large but finally become small, are coated with a coagulated protein film. As the air bubbles become smaller the foam becomes whiter and finally appears to be dry. Recent experiments have shown that egg whites beaten until dry have not only less volume but are also less stable. It is for this reason that many recipes may call for eggs beaten stiff but not dry. Thin egg whites will whip to a larger volume but the foam is less stable than that from gelatinous whites. Acids arid acid salts increase the stability of foams also, and one of the best acid salts is *cream of tartar.* A cake leavened with egg whites beaten to a stable foam will be lighter in texture. If the foam is unstable, a cake of smaller volume will result. It is partly for this reason and partly because the presence of cream of tartar makes a whiter cake that all *angel- food cake* recipes call for the addition of cream of tartar.

Egg yolks will also incorporate air, but the amount appears to be considerably less and the foam very much finer.

The effect of the yolk on the leavening power of the white is a matter of speculation. The fat of the yolk is unquestionably the chief factor, although at the present it is thought that other ingredients in the egg yolk also decrease foam stability. Since it is well known that the fat can be emulsified in protein and protein in fat, it is possible that the foaming power of the protein is cut down by the fat emulsified with it. When eggs are used as a *leavening agent* they should be well beaten. The blending of the other ingredients into either beaten yolk or whole egg without loss of the incorporated air offers little difficulty, as in both cases the air is held in a very fine state of division and surrounded with quantities of blending material. With whites the case is quite different. The blending of these is best done under a blanket, as it were, of the other ingredients. In making a soufflé and angelfood cake, or any other product which is leavened with egg whites only, the quality of the products depends largely upon the blending of the ingredients. In a soufflé, a white-sauce mixture is baked in a slow oven. In mixing the beaten whites with the sauce, an effort should be made to cover the beaten whites with the sauce, before cutting through them, otherwise much of the incorporated air will escape. Air will also escape

through too long or too much mixing on the other hand, unless the whites are completely blended, much of the leavening action will be lost, as the proteins of the egg whites are in themselves not sufficiently strong or elastic to hold in the air as it expands in the oven. In products containing many eggs, such as angelfood cake or *sponge cake,* the region of unblended egg white appears in the baked cake, as a large whole which is produced by the exploded bubbles.

Baking of egg-leavened products. Care must be exercised in the baking also. A hot oven will set the protein along the sides, top and bottom, before the centre is heated. As the incorporated air expands in this soft centre, the top surface will crack to allow escape of the gas held under pressure. Before the baked product is done throughout, the outer portions will shrink and become tough. An oven which is too low, on the other hand, will cause great expansion of gas throughout, and the resulting product will be large in volume but generally dry, through loss of considerable moisture due to the longer baking period. It is needless to say that any product leavened mostly with eggs should be baked as soon after mixing as possible. Unless completely baked, that is, unless at least the first stage of coagulation of protein is reached, the product will fall when taken from the oven, as the gas contracts on cooking.

Meringues are beaten egg whites containing varying amount of sugar. These may be baked in the oven to slightly brown.

Those meringues containing a large amount of sugar (3 or 4 tb sp. per egg white) brown readily in the oven, but are apt to form a hard crust. Beaten egg whites containing no sugar cannot be baked without considerable protein *shrinkage, coalescence* of gas bubbles, and loss of incorporated air. Meringues containing a moderate amount of sugar are more easily baked and represent the more typical meringue of today. The formation of small drops of sugar syrup on the top of meringues which have been kept a short while is due to the evaporation of water from the pudding or pie through the meringue forming a concentrated sugar syrup at the surface.

Active Vocabulary

indispensable /ɪndɪ'spensqbl/	необхідний
abundant	рясний, багатий
freshly laid egg, new-laid	свіжознесене яйце
liquefaction /lɪkwɪ'fækʃn/	зрідження, розрідження
whipping qualities	якість збитих білків
standing-up quality	збережена якість
humidity	вогкість, вологість, волога
valuable source	цінне джерело
food value	харчова цінність
thickening power	здатність згущувати(ся)

custard	заварний крем
baking powder	пекарний порошок
to shrink	давати усадку, усушку
egg poached	варене яйце
scrambled eggs	яєчня
leavening power	здатність розпушування
cream of tartar	винний камінь
angel food cake	рід бісквіту
leavening agent	розпушувач
otherwise	інакше, або ж
sponge cake [ˈspʌnʤ ˈkeɪk]	бісквіт, бісквітний торт, тістечко
meringue [mɪˈræŋ]	меренга (тістечко зі збитих білків з цукром)
shrinkage	усадка, усушка
coalescence	з'єднання, злипання
poach	варити яйця без шкарлупи в окропі
batter	збите тісто
dough [dəʊ]	тісто, густа масса

Task1. Fill in the gaps using the words in the box.

Shrinkage, odour and flavour, well beaten, dipped, quality of eggs, processing, cookery processes, leavening agents.

1. There are some factors which affect the _____ and they can be discovered only after the egg is broken.
2. For the consumer, the _____ of the egg are very important.
3. Eggs are preserved on the commercial scale by freezing, by dryings and by _____.
4. Processed eggs are _____ in a suitable oil which fills the pores of the shell and then they are placed in storage.
5. The size of eggs varies greatly but this variation is neglected in making recipes for _____ when small amounts are used.
6. The tendency of eggs to foam makes them good _____ .
7. When eggs are used as a leavening agent, they should be _____.
8. Beaten egg whites containing no sugar cannot be baked without considerable protein _____ and loss of incorporated air.

Task2. Choose the correct form in bold.

1.Eggs **are/is** easily prepared/prepare.
2.The shell of freshly laid egg **is/are** completely **fill/filled**.
3.The exact cause of this liquefaction of gelatinous egg white **is/are** not **know/known**.

4.It **has/have** been **prove/proved** that thin whites may be used satisfactorily in cakes, omelets and soufflés.
5.Most of the minerals of the egg **is/are find/found** in the yolk.
6.Most of the vitamins also **are/is locate/located** in yolk.
7.When any dish **are/is cook/cooked** in the oven, the outer part cooks more rapidly than the centre..
8.In a soufflé, a white-sauce mixture **are/is baked/bake** in a slow oven.

Task 3. Transcribe and pronounce correctly the following words.

Indispensable, nutritious, yolk, liquefaction, humidity, coagulation, custard, dough, mixture, shrink.

Task 4. Match the word or words with the definition.

1. shrinkage	a. pudding or sweet sauce of eggs and milk
2. coalescence	b. thick mixture of flour and liquid forbaking
3. custard	c. light sponge cake
4. dough	d. substance causing dough to ferment and rise
5. angel cake	e. white part round the yolk of an egg
6. leaven	f. yellow inner part of an egg
7. egg-white	g. drying out
8. yolk	h. coming together and forming a whole

Task 5. Translate into English.

1. Яйця є необхідним компонентом в раціоні харчування людини.
2. Вони містять вітаміни, мінерали, жири та білок.
3. Білок яйця широко використовується для приготування тістечок, омлетів, суфле.
4. Яйця, які зберігалися в сприятливих умовах впродовж кількох місяців, не втрачають своєї харчової цінності.
5. Колір, смак і склад вітамінів у жовтку залежить від корму, який давали курям.
6. Заварні креми варто готувати при низькій температурі, інакше вони будуть водянистими.
7. Для того, щоб тісто при випіканні добре «піднялось», яйця необхідно добре збити.
8. Для отримання тістечок певного розміру, до рецепту яких входять білки, необхідно збити білки в стійку піну.

9. Коагуляція яєць залежить від багатьох факторів: ступеня підігріву, наявності цукру, кислоти та ін.
10. Кислота зменшує температуру коагуляції.

Task 6. Answer the questions:

1. What do eggs contain?
2. What does a shiny smooth egg shell indicate?
3. What changes can you observe in eggs?
4. What is the composition of an egg?
5. What are the colour, the flavour and vitamin content of the yolk dependent upon?
6. What does the leavening power of eggs depend on?
7. What factors influence the temperature of coagulation of egg?
8. Why eggs should be well beaten when they are used as a leavening agent?
9. What care must be exercised in the baking of egg-leavened products?
10. Why are eggs indispensable in the average diet?

Task 7. Read the text and discuss it.

EASTER EGGS GAMES

The kids are looking forward to Sunday when they wake up and see that the Easter Bunny left for them baskets of candy and hidden Easter eggs. Children all over the house and garden look for eggs. Even is held a special event – search of eggs. A child who collects the most gets a prize. These festivals are held in parks and restaurants, but you can arrange a hunt for eggs and home to the delight of the kids, think of some rhyming clues, little poems, which will help to find them.

Easter egg rolling is carried out in the open air, on a slope covered with grass. The goal is not to break the egg. Egg, rolling from the mountain, symbolizes the stone rolled away from Holy Sepulchre.

Holy Sepulchre *[ˈhqɯʃʃˈsɐpqʃkq]* Священна Гробниця

Task 8. Do you know any Ukrainian equivalents of the following English idioms? Make up sentences with them.

1. home bird
2. walls have ears
3. home sweet home
4. be in apple-pie order
5. an early bird
6. regular as clockwork

JUST FOR FUN

Boy: I want a bundle of hay.
Farmer: For your father?
Boy: No, for the horse. Father doesn't eat hay.

UNIT 15.

BATTERS AND DOUGHS

We must begin our study with the properties of the classes of foods and then proceed to the reactions of those foods with each other, applying the known theories as we go. Just as the chemist, after his preliminary study of elements, compounds, and their properties, is able to devise new methods of preparing well-known chemicals, to synthesize new substances, and to develop new theories, so it is possible for the students of food preparation to devise better methods preparing standard dishes, to originate new combinations, and to explain familiar facts by new theories.

Inasmuch as even the simplest food is complex in nature, the properties of the component substances cannot be so well defined, as in chemical reactions, but a few general statements may be made regarding some of them.

Flour and gluten. The main *cooking value* of flour lies in the fact that it holds all ingredients together. The starch in flour is capable of absorbing large quantities of water when heated. The proteins, gliadin and glutenin, unite physically to form gluten, an elastic mass of varying degrees of toughness. Like starch, gluten absorbs a large quantity of water and assists in giving form to a cooked product as it coagulates, when heated.

As the amounts of starch and gluten vary in different kinds and *brands of flour*, so the water-absorbing power of flours varies. A cup of flour mixed with one-third of a cup of milk may give a soft dough with one flour and a stiff dough with another. For this reason, many recipes call for "flour to make a stiff dough" rather than state the exact ratio of flour to liquid. The so-called "*kitchen tested flours*" of the same brand should have the same absorption power, so that once the proper ratio of flour to liquid is determined with one of these flours, recipes with exact amounts of flour and liquid can be followed with assurance of success.

The amount of water which a flour can absorb is particularly important in stiff doughs, as baking-powder biscuits, rolled cookies, rolls, pastry and bread, but in all batters and doughs the amount and development of gluten are extremely

important because the lightness, toughness, and palatability depend upon it. We think of gluten as *strands* of sticky elastic protein made by mixing the flour with water. The longer the flour fs mixed with the water the thicker or tougher the strands become. Overmixed flour makes overdeveloped gluten, and, as it is more difficult for the bearing gas to stretch the strong elastic strands, one of main results of overdeveloped gluten in heavier, compact, baked product. Often sufficient pressure is exerted by steam in a baked product to bore its way through the overdeveloped gluten, but this has little *leavening effect.* Steam forcing its way through the softer centre of the baked product makes tunnels. Another effect of the overdevelopment of gluten is that of toughening due mainly to the fact that the fat which ordinarily surrounds and separates the particles of a cake or cookie is absorbed by the thick strands of gluten.

While the development of gluten can be controlled by the amount of mixing, it is interesting to know other factors which are also influential, it is natural that the ratio of water to flour would be significant as the strands of gluten are made thicker and thicker by rubbing the sticky strands together. Consequently when the amount of water is great, as in such thin batters as *popovers,* it is difficult to overdevelop gluten. In most batters and doughs, the ratio of water to flour is almost ideal for gluten development, consequently, care has to be exercised, both to make enough gluten to give structure and elasticity to the baked product as well as to avoid its overdevelopment. The acidity or basicity of the dough affects the character of the gluten. Both excess acid and hydroxide soften gluten, making it appear more sticky, as a cake with too much acid or hydroxide has less volume and is more compact, chewy and moist. The residues of baking powders vary as to acidity and must be taken into consideration.

Sugar. It goes without saying that sugar increases the sweetness of a dish. Curious as it may seen, the addition of a small amount of sugar counteracts the effect of salt. Many a cook has escaped harsh criticism by adding *"a dash of sugar"* to a soup or gravy which has been made too salty. Sugar has another effect on flavour which seems less strange only because it is more familiar, it offsets an acid flavour, and, when, added to an underripe or excessively acid fruit or vegetable, brings out the natural flavour which was formerly masked by the acid. There are no explanations for the effect of sugar on flavour. In fact, the subject of flavour in general has long been an unsolved problem in the hands of chemists, physiologists, and psychologists.

In a cooked dish, the presence of sugar increases the tendency to brown (caramel ization) and to become crisp or "*chewy"*

The addition of a large amount of sugar to a cake batter gives a product which will be well browned and crisp; in fact, it might well pass under the disguise of cookie if baked in suitable shapes.

As the development of gluten is hindered by the presence of sugar, the texture of flour mixtures is affected by varying the amounts of sugar. *Muffins* which are tough and compact from the overdevelopment of gluten

would have been light and tender had the amount of sugar in the recipe been increased. The sugar prevents the overdevelopment of gluten, and, consequently, the gluten gives to the gentle pressure of expanding gas ($C0_2$ from baking powder or baking soda), making light fine-grained muffins without steam tunnels. The steam collects in the holes made by the carbon dioxide.

If a large amount of sugar is added to a batter or dough, the development of gluten may be hindered to the point, that the baked product has insufficient structural material. A cake which falls during the baking is often due to the use of too much sugar which is not compensated by extra mixing. Sugar will hinder the gelatinization of starch also.

Eggs. Thanks to eggs' colloidal nature they can be used as an emulsifying agent, a leavening agent, and a binding material. Because of the difference in composition of whites and yolks, the effect of a product will also vary. The white binds and leavens well. The yolk binds and leavens less well, but increases the tenderness and fineness of texture of the product to which it is added. The whole egg will naturally show the characteristics of both white and yolk.

When many eggs are used, a large volume is obtained but the greater amount of coagulated protein toughens and dries the product. Like sugar, eggs prevent the normal development of gluten but the results are less disastrous as the coagulated egg protein helps to keep the cake from falling.

Fat. The most important function of fat in food preparation is that of increasing the tenderness of a product to which it is added. This effect is brought about by the separation of the particles of a food by *enveloping fat.* In the preparation of any tender food-pastry, cake, or biscuits the efficiency of the fat is increased when care is taken that the fat surrounds, but is not absorbed by, the other substances present in the food. Since developed gluten absorbs fat, the greatest care is necessary in preparation of tender foods in which gluten is present.

Increasing amounts of fat in a leavened batter cause increasing difficulty in the baking of that batter, as the fat melts and, in so doing, softens the product. This allows the escape of a great deal of gas before the batter has set, which may cause the product to fall. In most recipes the amount of fat is taken together with the amount of milk, water or other fluid constituent as making up the total quantity of liquid in determining the proper ratio of flour or other *binding material*. For example, if the amount of fat is decreased in a recipe, the amount of milk or water is usually increased.

A cake batter takes less liquid than a muffin batter, because the former has much more fat. Fat affects flavour also. Most fats contribute a flavour of their own and dissolve many of the flavour — some organic substances which are insoluble in water. It is for this reason that the onions fried in fat have a different flavour from those cooked in water.

Because of the great solubility of most substances of delicate but pronounced flavour in fat, this is used to blend the flavours of stews, casseroles.

Milk. In spite of the fact that milk is 88 per cent water its effect on a cooked product is different from that of water. Because of its emulsified fat and its colloidal protein, milk helps to make a finer colloid of any batter in which it is present. For example, a cake made with water has a coarser texture, dries out more quickly, and has a slightly different flavour from one made with milk.

A fruit sherbet made with milk in place of water has finer crystals, more body, and richer flavour.

Active Vocabulary

batter	без дріжджове, збите тісто
dough [dqu]	тісто, густа маса, паста
flour	борошно
inasmuch as [Jnqz'mAt Sxz]	тому що; через те, що
gluten	клейковина
pastry	кондитерські вироби
cooking value	якість приготування їжі
brands of flour	ґатунок, якість борошна
kitchen tested flours	борошно, перевірене в приготуванні в домашніх умовах
lightness	легкість
toughness ['tAfnJs]	в'язкість
strand	пучок, смужка
leavening effect	ефект розпушування (тіста)
popovers	вироби з борошна, яєць, молока по типу вафельних виробів
basicity	основність
a dash of sugar	дрібка цукру
chewy	тануч ий
residue ['rezJdjH]	залишок, осад
gravy	підлива, соус
muffin	гаряча здоба, оладки
crisp	хрусткий
enveloping fat	огортаючий жир
binding material	зв'язуючий матеріал
casserole	запіканка

Task1. Fill in the gaps using the words in the box.

Melts and softens, Gluten, finer colloid, coarser texture, consideration, colloidal nature, basicity, cooking value

1. The main _____ of flour lies in the fact that it holds all ingredients together.
2. _____ absorbs a large quantity of water and assists in giving from to a cooked product as it coagulates when heated.
3. The acidity or _____ of the dough affects the character of the gluten.
4. Eggs can be used as an emulsifying agent, a leavening agent, and binding material, thanks to their _____.
5. We must take into _____ that if the amount of the fat is decreased in a recipe, the amount of milk water is usually increased.
6. A cake made with water has a _____ , dries out more quickly.
7. Milk helps to make a _____ of any batter in which it is present.
8. Increasing amounts of fat in a leavened batter cause increasing difficulty in the baking of that batter, as the fat _____ the product.

Task2. Choose the correct form in bold.

1.We must **begin/must to begin** our study with the properties of the classes of food and then proceed to the reactions of those foods with each other.
2.The main **cooked value/cooking** value of flour lies in the fact that it holds all ingredients together.
3. It goes without saying that sugar increases the **sweet/sweetness** of a dish.
4. A cake which falls during the baking is often due to the use of too **little/much** sugar which is not compensated by extra mixing.
5. When many eggs **are/is used**, a large volume is obtained but the greater amount of coagulated protein toughens and dries the product.
6.This effect **is/are brought** about by the separation of particles of food by enveloping fat.
7.If the amount of fat **is/are decreased** in a recipe, the amount of milk or water **are/is** usually **increased**.
8.Eggs can be **use/used** as emulsifying agent, a leavening agent, and binding material, thanks to their colloidal nature.

Task 3. Transcribe and pronounce correctly the following words.

batter, dough, toughness, flour, palatability, casserole, residue, porosity, sponginess, chewy,

Task 4. Match the word or words with the definition.

1. spongy	a. evaporating rapidly
2. porous	b. sauce for food

3. volatile	c. drink of fermented apple juice
4. casserole	d. meal or powder from ground wheat
5. gravy	e. food cooked in the oven
6. cider	f. mingled sensation of smell and taste
7. flour	g. porous, elastic, absorbent
8. flavour	h. full of pores; letting through air, water etc.

Task 5. Translate into English.

1. Виготовлений з борошна крохмаль, що підігрівається, здатний абсорбувати велику кількість води.
2. В'язкість тіста залежить від кількості води в ньому.
3. На смак та структуру печеного продукту впливає склад білку та жовтку.
4. На водопоглинаючу здатність борошна впливає кількість крохмалю і глютену в борошні різного ґатунку.
5. Велика кількість яєць у тісті сприяє тому, що випечений продукт швидко черствіє.
6. При приготуванні пісочного тіста, рідини потрібно менше, ніж при приготуванні дріжджового, так як у пісочному тісті більше жиру.
7. Жир надає смак тісту і розчиняє органічні речовини, нерозчинні у воді.
8. Печиво, виготовлене із тіста на воді швидко черствіє, його смак відрізняється від смаку печива, випеченого із тіста на молоці.

Task 6. Answer the questions:

1. What is the main cooking value of flour?
2. What do lightness, toughness and palatability depend upon?
3. What makes overdeveloped gluten?
4. What affects the character of the gluten?
5. How does sugar affect the flavour?
6. What hinders the development of gluten?
7. How do eggs affect batters and doughs?
8. What is the most important function of fat in food preparation?

Task 7. Read the text without a dictionary.

HOW TO COOK UKRAINIAN VARENYKY

Ingredients for Ukrainian Varenyky with potatoes:

for making dough:	for making forcemeat:
325 g wheaten flour	560 g potato
150 g water	100 g onion
1/2 egg	40 g oil
sour cream to taste	ground black pepper to taste
salt to taste	salt to taste

Directions:

Unleavened dough. Heat up a half-portion of water to 95-98 °C. Add the water in sifted flour and mix very well. Beat up eggs with salt and remaining water at room temperature. Mix well until the mixture has a homogeneous and thick texture and put in a warm place for 30 minutes.

Stuffing. Peel and boil potatoes, dry it a little and rub hot through a sieve, season with onion, fried in oil, pepper and salt (remain some portion of braised onion for seasoning cooked varenyky.

Roll out the dough into a 1.5 mm thick layer. Place prepared stuffing, shaped into balls, through a whole width of rolled out dough layer, stepping back 3-4 cm from its ends. Cover the stuffing with dough layer, pressing it around each ball, and cut varenyky out with a special from. Use again the remaining dough for rolling out.

Immerse each varenik separately into boiling salted water, separating it carefully from bottom of a saucepan with skimmer, and cook for 6-8 minutes at moderate boiling.

Take varenyky with skimmer out of a saucepan, let the water pour down, season varenyky with onion, braised in oil, and pour cream over it.

Task 8. Give Ukrainian equivalents to the following English idioms. Make up situations to illustrate some of them.

1. to cook someone's goose
2. while away the time
3. not do a stroke of work
4. make one's mouth water
5. melt in one's mouth
6. tastes differ

JUST FOR FUN

Man: Little boy, why, how is it you are so short for your age?
Boy: I am so busy. I have no time to grow.

UNIT 16.

FOOD PRESERVATION

Food spoilage is due to the growth of microorganisms in the food. In the course of their development these produce, in some cases, harmless products, such as iectic acid in *sour milk* or carbon dioxide and alcohol in *bread dough* made with yeast; in others harmless but undersirable products, such as the flavour which mold imparts to bread; while, in still other cases, harmful toxins are produced. Food preservation has both hygienic and economic aspects. From the point of view hygiene, food is preserved in order to prevent the formation of products which are harmful to the body. Many essential but *perishable foods* are preserved for the purpose of prolonging the period of availability. Oranges or tomatoes supply vitamin C from January to January, Green vegetables as well as the more stable root vegetables can be fresh or in cans at any time. Thanks to improved methods of food preservation, it is now possible for everyone at all times to have clean, wholesome food — a well-balanced diet.

Microorganisms. For those who have studied bacteriology, the ravages of food by microorganisms make an old story. In all *living tissues* microorganisms are found which assist either in the growth of the plant or animal or in their decay. In addition the air, water, and all other substances with which food comes in contact contain microorganisms foreign to the natural food but capable of reacting the solutions present in it.

Thus any food is subject to either decay or spoilage by the growth of microorganisms. Our study of microorganisms will confine itself to a description of the different classes and the conditions which are favourable or unfavourable to their growth.

There are three classes — molds, yeast, and bacteria. All are characterized by their extremely *minute size* and their wide distribution. Microorganisms multiply more rapidly at moderate temperatures — for the most part about 40 °C and their growth is checked at very low temperatures.

Microorganisms may multiply in two ways. In one, a microorganism splits off a part of itself which resembles the original organism in appearance and method of reproduction. In the other, a rounded mass called a spore is developed, which is unlike the parent form but will develop into a similar organism, provided the conditions for growth are favourable. A spore differs from the microorganism from which it comes in being more resistant to conditions unfavourable to growth. Whereas most micro-organisms are destroyed by boiling water, many types of spores which have been held at high temperatures will later grow and multiply, when the conditions of their environment become more favourable for growth. For this reason spore-bearing organisms are more difficult to destroy than those which multiply by simple cell division.

Molds. The conditions for the growth of mold are less rigid than for any other class of microorganisms. For this reason we may find well-established settlements of molds on almost any substances: they are found on acid foods, such as lemons, oranges or tomatoes; on neutral foods, such as bread and meats; on sweets such as jellies and jams; and on salty food such as bacon or ham.

Most molds are spore bearing. Spores are clearly visible as the coloured specks which fringe the thread-like mold growth. The colour will vary with the kind of mold. The more common mold has bluish-green spores, but others with black or red spores are seen fairly often. Molds multiply most rapidly at temperatures varying from 20 to 35 °C, and in damp, dark places in which there is little circulation of air. They will multiply on any substance which contains carbon, hydrogen, and oxygen, whether acid, neutral, or slightly alkaline. Molds may be destroyed or their growth checked by unfavourable conditions.

Low temperatures retard the growth of mold, but temperatures below that of an ordinary *ice chest* (10 to 15 °C) are necessary. Molds must have some moisture. A dry food will not mold unless it is kept in a damp place. Molds will form in darkness or light, but many species cease to grow if exposed to bright sunlight. Circulating air is destructive to mold growth.

Yeasts. Yeasts, unlike molds, will grow only on foods containing sugars. The reaction called *fermentation* changes the
sugar to alcohol and carbon dioxide with minute quantities of other products. Although yeasts will grow only in the presence of sugar, they may be found widely distributed.

The mixture of various kinds of yeasts present everywhere in the air is called *wild yeast.* Yeasts multiply either by spores or by cell division. Among the essentials for the growth of yeasts are sugar, oxygen, water and certain inorganic sails such as those of calcium, nitrogen, and sulphur. They are easily destroyed by high temperatures (100 °C). The alcohol which they produce in their life processes slows down and, finally, completely checks further growth. For this reason beverages of high alcoholic content can be obtained only by distillation.

In strong sugar solution yeasts multiply slowly.

All fruit juices are subject to fermentation, unless the yeasts which they naturally contain are destroyed, which may easily be done by bringing the juices to boiling temperatures and sealing in clean containers while hot.

Apple juice which ordinarily becomes "hard" in a few days may be kept for months or years this method.

Bacteria. Although there are many properties which are characteristic of all bacteria, the differences in the behaviour of the different kinds of bacteria are greater than those of the different kinds of yeasts and molds.

Bacteria are widely distributed. Like yeasts and molds, they may be found anywhere — in the air, water, soil, and in all foods. In a less acid medium they multiply most rapidly, and, therefore, it is the less acid foods which are most subject to bacterial decomposition. The products of decomposition vary with the kind of food and the kind of bacteria. While in most cases we wish to decrease the bacteria content, certain foods are made desirable by products of bacteria growth. Sauerkraut owes its flavour and physiological effects to the lactic acid which is produced by the microorganisms in the course of its preparation. The flavours of cheeses, butter, and butter substitutes are also products of bacterial activity. On the other hand, the spoilage of *canned foods,* meats, milks and vegetables is also due to the products of bacterial growth.

Bacteria require moisture for growth. Exposure to sunlight for sufficient length of time destroys bacteria but not their spores. The temperature for optimum growth will vary (20 to 55 °C) with the kind of bacteria. Bacteria are more difficult to destroy than the other microorganisms.

The methods of food preservation may give temporary preservation by checking the growth of microorganisms or permanent preservation by destroying them.

Refrigeration or cold storage is the most common method of temporarily preserving food. Indeed, it is one of the most satisfactory of all methods of food preservation, as it does not markedly alter either the taste, appearance, or *nutritive value* of the food. Refrigeration is practised in the home and commercially. It is most successful with the foods which are least subject to bacterial decomposition, but other foods may be preserved a long time if freezing temperatures are used. Fish and animal products can be kept only by refrigeration at very low temperature. Considerable success is now being experienced in the preserving of fish and meat and of many fruits and vegetables by freezing. New methods of freezing and better storage facilities for frozen products have improved the flavour and texture of the food so treated.

The electric refrigerators are somewhat colder and contain drier air and are, therefore, more successful for the preservation of foods which are subject to bacterial growth.

Other methods of food preservation are effective over a long period of time. By these methods either the microorganisms are destroyed, or the

conditions are made unsuitable for their g: o vth. There is a variety of methods for this more permanent type of food preservation.

Drying. Drying has been a means of food preservation for centuries and is still used for many foods. It promotes preservation by removing the water essential for the growth of all microorganisms. We find in the market dried fruits, milks, meats, and vegetables, but the varieties of each are few.

The method of drying varies greatly with the food. Foods containing sugar require less drying than others. Within the last few years, intensive efforts have been made to produce dried products which are not only clean but also will resemble fresh foods in appearance and nutritive value.

Dried foods occupy less storage space and may be stored without consideration of temperature. Most dried foods require soaking before cooking in order to restore the water lost by drying. The dried foods most commonly used are prunes, raisins, currants, apples, apricots, peaches, figs, dates, beans, fish, beef, and mushrooms.

Chemical preservation. Many foods are preserved by the use of added substances, which destroy or check the growth of microorganisms. Although many chemicals are known which could be used to help in the preservation of foods, few are allowed by government authorities.

Among the legal chemicals are benzoic acid and sodium benzoate. Sulphur dioxide ($S0_2$) and sodium bisulphate ($NaHSO_s$) are used in dried fruits such as apples, because the darkening of the fruit is lessened by their presence. These sulphur compounds have also a preserving action.

Smoke contains phenols which help in the preservation of smoked products. The preserving action of *cloves* and *cinnamon* depends upon their *eugenol* or cinnamic aldehyde content.

Potassium nitrite and potassium nitrate, used in the curing *("corning")* of pork and beef, improve the taste and redden the colour. They have no preservative effect.

Salted products are usually partly dried as well as salted. Common examples are found in chipped beef and salt codfish. Less drying is necessary when salt is used, as the concentrated salt solution preserves by osmosis.

Canning. Canning is the most common form of food preservation. Preservation is insured by the use of sufficient heat to destroy all microorganisms which might develop in the canned product during storage. The temperature in the canning of food depends upon several factors, the hydrogen-ion concentration of the food, the number of microorganisms present in the uncooked food and the rate at which heat can penetrate the food to be canned.

It has already been stated that bacteria and their spores become less resistant to heat as the hydrogen-ion concentration of the media increases. Consequently, foods of high hydrogen-ion concentration may be preserved either by a low temperature for a long time or by a short heating period at a

high temperature. In canning, boiling temperature 100 °C is considered low, 115 to 119 °C high.

It may be noted that foods of high acid concentration require either less time, or lower temperature, or both, than the less acid foods.

The time allowed for processing is governed not only by the hydrogen-ion concentration but also by the rate at which the heat penetrates into the food. It is well known that metals are better heat conductors than asbestos.

Experiments have shown that the rate of heat penetration is governed by a number of factors, some of which are more predictable than others. It goes without saying that the food in the centre of a glass jar will take longer to reach sterilization temperature than that in a tin, can, that large-size containers require a longer time than small, that food which is processed at 115 °C reaches 100 °C sooner than that processed at 100 °C, and that a jar of cold food requires a longer period than one of preheated food.

Formerly it was thought that this treatment "set the colour and flavour" of the food, but now it is known that blanching has no such exalted position in the canning ritual but serves merely to reduce the bulk (spinach), or to help remove the skins (tomatoes, peaches, beets), or to set vegetable protein solution (corn).

The *cook-in-ihe-kettle method* consists in cooking the food in an open kettle until all has reached sterilization point, or longer if desired. The food is then packed and sealed in clean sterile jars. From a bacteriological point of view it is obvious that this method of canning is applicable only to foods which provide a poor medium for the growth of microorganisms, such as acid fruits or fruits in sugar syrup. It has certain advantages over the other method in that it requires less apparatus and usually less time.

The *cook-in-the-can method* describes itself. Food to be canned is washed, blanched if necessary, cut into suitable pieces, and placed in either tin cans or glass jars. Hot water, usually containing either salt or sugar, or both, is added to fill completely the can or jar, which is placed in a suitable cooker to destroy the microorganisms present. Tin-canned food is sealed before processing. All food which is commercially canned in tin cans is heated previous to sealing.

Storage of Canned Food. While every effort is made to destroy the microorganisms of the food during the processing, it should be remembered that if any spores resist the temperature of the cooker, then development will be hindered by storing the canned food at low temperatures. Low temperatures are also unfavourable to the reactions which take place between the food and the tin or iron. It has been shown that the natural colour of fruits is preserved much better by storing fruits in a warehouse at 0 °C, than at higher temperatures, no discolouration being observable after two and a half years of storage. It is recommended, therefore, that canned food which is not to be used within a very short time should be stored at a temperatures as near °C as possible.

Canned food is graded. Many labels on canned foods do show a grade for the product. Definitions of these grades are given as follows: the *fancy grades* use uniformly perfect fruit in the best state of ripeness and of the

largest size. The fruit is packed in a thick syrup. Cans of *choice grade* fruit contain nearly perfect fruit of average size in a medium syrup. Standard grade uses smaller, less uniform fruit in a thinner syrup.
In addition to these, there are two lower grades which are used largely for cooking.

Active Vocabulary

spoilage *['spOIlIG]*	псування
sour milk	кисле молоко
mold	цвіль, плісенний грибок
bread dough	хлібне тісто
perishable foods	їжа, що псується
yeast *['ji:st]*	дріжджі, закваска
decay	гниття, розпад
decomposition	розкладання; гниття
date	термін
sauerkraut *['sauqkraut]*	кисла капуста
soak	замочувати; усмоктувати; занурюватися
cure	заготовляти, консервувати
living tissues *['lIvINtIsju:z]*	живі тканини
minute size	найдрібніший розмір
ice chest	льодовик, холодильник
fermentation	бродіння, ферментація
wild yeasts	дикі дріжджі
canned foods	консервовані продукти
nutritive value	харчова цінність
clove	гвоздика (пряноші)
cinnamon	кориця
eugenol	хім. сполука евгенол
"corning"	засолювати, консервувати сіллю (м'ясо, рибу)
cook-in-the-can method	метод порційного консервування (по банках)
cook-in-the-kettle method	метод консервування в загальному котлі з подальшою розфасовкою
fancy grade	вищий ґатунок (екстра)
choice grade	кращий ґатунок (відбірний)

Task1. Fill in the gaps using the words in the box.

harmful, microorganisms, heat, hygienic, favorable, storage facilities, preserving, freezing, dried, appearance

1. Food preservation has both _____ and economic aspects.

2. From the point of view of hygiene food is preserved in order to prevent the formation of products which are _____ to the body.
3. Bacteria grow very rapidly where conditions are _____.
4. Bacteria are more difficult to destroy than the other _____.
5. Considerable success is now being experienced in the _____ of fish and meat and of many fruits and vegetables by _____ .
6. New method of freezing and better _____ for frozen products have improved the flavour and texture of the food.
7. Within the last years intensive efforts have been made to produce _____ products which are not only clean but also will resemble fresh foods in _____ and nutritive value.
8. The temperature in the canning of food depends upon several factors, the number of microorganisms present in the uncooked food the rate at which _____ can penetrate the food to be canned.

Task2. Choose the correct form in bold.

1.Any food **is/are** subject to either decay or spoilage by the growth of microorganisms.
2.Microorganisms **must be/may** multiply in two ways.
3. A spore **differ/differs** from the microorganisms from which it comes in being more sistant to conditions unfavorable to growth.
4. Spore – bearing organisms are **more/most** difficult to destroy than those which multiply by simple cell division.
5. Molds **must/can** have some moisture.
6.The mixture of various kinds of yeasts present everywhere in the air **is/are called** wild yeast.
7.Like yeasts and molds, bacteria **may/must** be found anywhere – in the air, water, soil and in all foods.
8.The method of drying **vary/varies** greatly with food.
9. Many foods **are/is preserved** by the use of added substances, which destroy or check the growth of microorganisms.
10. Canning is **the most/more** common from of food preservation.

Task 3. Transcribe and pronounce correctly the following words.

decay, spoilage, cure, vinegar, tissues, sauerkraut, nutritive value, behaviour, multiply, choice grade

Task 4. Match the word or words with the definition.

1. choice	a. the things that something in science normally does
2. behaviour	b. small amounts of water in or on something

3. mould	c. the soft part inside a fruit or vegetable
4. moisture	d. a sour-tasting liquid made from malt or wine
5. flesh	e. a substance in foods such as bread, rice and potatoes
6. vinegar	f. the wine made in a particular year
7. vintage	g. a green or black substance that grows on old food
8. starch	h. high quality

Task 5. Translate into English.

1. Як відомо, харчові продукти швидко псуються.
2. Для того, щоб довше зберегти харчові якості продуктів, їх консервують, засолюють, коптять, заморожують.
3. Псуванню харчових продуктів сприяє ріст мікроорганізмів.
4. Мікроорганізми поділяються на декілька класів: пліснява, дріжджі, бактерії.
5. Зазвичай пліснява утворюється в темряві, але іноді й на світлі. В більшості випадків пліснява припиняє рости, якщо вона піддається сонячному освітленню.
6. Смак сирів та масла змінюється під дією бактерій.
7. З іншого боку, псування консервованих продуктів – м'яса, молока, овочів – також відбувається під дією росту бактерій.
8. Найсприятливіший спосіб зберігання харчових продуктів у холодильниках; в цьому випадку, смак, вигляд і поживна цінність незначно змінюється.

Task 6. Answer the questions:

1. How are foods temporarily preserved?
2. What chemicals are allowed as preservatives?
3. What can you tell about drying as a means of food preservation?
4. What do most dried foods require before cooking?
5. What two methods are in use today for canning?
6. Where do yeasts grow?
7. What do we call fermentation?

Task 7. Read the text without a dictionary and discuss it.

METHODS OF MEAT PRESERVATION

There are different methods of preservation. They are: drying, smoking, salting, curing, refrigeration, freezing, canning, freeze-drying and irradiation.

Drying-removal of moisture from meat from its original water content to about 15%.

Smoking-process of subjecting meat to the action of smoke and heat generated by burning hard wood and or saw dust.

Salting-simple method of dehydration in the salt causes the withdrawal of water from the tissue of both meat and spoilage organisms.

Curing-application of salt, sugar, nitrite (potassium or sodium nitrite) and other preservation and adjuncts.

Refrigeration-exposure of meat to the range of 36° to 50°F [2°C-10°C] to retard mold and bacterial growth for a limited period only.

Freezing-exposure of meat to a temperature rang of 0°F to 32°F [-18°C-0°C] resulting to crystallization of the water in the tissues, thus, inactivating the enzymes and the bacteria present.

Canning-hermetic or air tight sealing of food in cans or jars and heating under pressure (pressure cooker, retort, autoclave) to reach temperature above 100°C at specific period of time.

Freeze-drying-removal of moisture from the tissues by sublimation or the transformation of the moisture content into gas without passing the liquid state.

Irradiation-transfer of extremely large amount of energy to effect very rapid and selective biological and chemical changes in meat.

Task 8. Do you know any Ukrainian equivalents of the following English idioms? Make up situations to illustrate some of them.

1. out of the pan and into the fire
2. he that would eat the fruit must climb the tree
3. man does not live by bread alone
4. neither fish nor flesh
5. never cackle till your egg is laid
6. there's no use crying over spilt milk

JUST FOR FUN

A quest: Why are dumplings cold?
Waiter: Because they are Siberian.

UNIT 17.

FRUIT PRESERVATION

Preserved fruits are now numerous, but not every kind of fruit is suitable for preservation. Some fruits, of course, are preferred in their natural state, while others are preferable and sometimes only procurable, in a *preserved condition.*

As most fruits are seasonable, it follows that those demanding them out of season must accept them in a preserved form. There are at least four different methods of preserving fruits: (1) by *desiccation* (drying); (2) by utilization of cold air; (3) by the use of chemicals; and (4) by the exclusion of air. The fourth method is that in general use by canners, as is also the third so far as vegetables are concerned, and in the case of some fruits, perhaps, when the preserves wish to maintain or to create a "colouring".

The second method is that of cold storage and refrigeration in all their ramifications. The first method is applied to such fruits as we shall now proceed to consider.

The "drying" and "evaporating" methods are practised extensively in *fruit-producing countries*. The former method is followed in such regions as are favoured with plentiful sunshine, and the latter in those countries which cannot rely upon the aid of climate.

Evaporation was unknown 100 years ago. Many inventors have introduced processes from time to time, but the machinery in general favour consisted of a slat floor with a furnace below. The heat rises through the slats and dries the spread out fruit there on. A recent system consists of steam pipes in the evaporating plants, designed to give uniformity of heat and to overcome the possibility of scorching the fluid.

Currants are the most common of all dried fruits consumed by the human family. They are the products of the vine, just as raisins, as every school

boy knows, are grapes in a dried conditions. Not all varieties of grapes, however, are suitable for drying. The grapes destined to be converted into raisins are invariably dried on the vines, after semi-cutting, or on the ground after the manner of currant-drying. The *drying process* takes some days to complete, after which the fruit is put into boxes holding about 150 lb. to be transported to the packing houses. Sorting is the next process. The choicest are packed in boxes made to hold five, ten, fifteen and twenty pounds, and other grades are stemmed, seeded and packed in cartons of one pound capacity.

Machines called "*stemmers*" are brought into use for removing the stems. Again the fruit is graded and passed to a "seeder", which flattens raisins and brings the seeds to the surface, while another piece of mechanism, a teeth-like roller, removes the seeds.

Plums destined for the *leading grades* of prunes are gathered by hand, laid in shallow utensils, and then placed in a cool and dry building to soften. Afterwards they are put into *spent ovens* for about twenty-four hours, a procedure which is repeated until the fruit is of the requisite dryness. Later comes the cooling process and the final packing into cans, jars, boxes, or whatever receptacle is considered most suitable for the various markets. The drying process naturally calls for the exercise of care and skill, so that the fruit may not be deprived of its original flavour and fruity consistency. Usually three pounds of plums are necessary to yield one pound of prunes, the exact proportion being regulated by the degree of waste during the drying processes.

Citron peel and *lemon peel* are consumed in large quantities by the people of Europe and America. There is difference in colour and thickness between the two commodities, even enough both are members of the citrus family of fruits.

The lemon peel is candied, otherwise the process of preserving is similar to that applied to the eitron.

The rind is left to pickle for a few weeks in a salt solution, afterwards being boiled until it is tender, and then it is soaked in water slightly sweetened. The first soaking removes the greater part of the salt, but a succession of solutions is necessary before the peel is ready for the final process of preserving. The final treatment is in the nature of boiling in thick syrup. From the vats it passes in specially constructed racks into a heating room, where it dries and crystallized in due course.

Crystallized fruits. *Crystallized fruits* are now a very popular dessert, or confectionary, and they are made in many European countries. The fruits are made by extracting the juice from the raw product and replacing it with sugar syrup. The hardening of the syrup preserves the fruit, and as the latter is solidified its natural form is retained.

Several methods of crystallizing are in vogue, but that in general practice is the boiling of the fruit for a certain length of time, after which it is suspended in syrup until saturated.

In due course it is removed from the syrup process and placed in drying ovens, or drying rooms, at a high temperature until crystallized. In some countries the drying is done in the open air upon trays.

Active Vocabulary

dried fruits	сухофрукти
preserved fruits	консервовані фрукти
preservation	зберігання
preserve	зберігати, консервувати
preserved condition	умова зберігання
desiccation	сушка
deterioration [dɪtɪqrɪq'reɪʃən]	погіршення
treatment	обробка
fruit producing countries	країни, що вирощують фрукти
drying process	процес висушування
"stemmer"	пристрій для відділення плодоніжок
leading grade	перший ґатунок
spent oven	сушильна піч, сушка
lemon peel	лимонна шкірка
crystallized fruits ['krɪstqlaɪzd frʉts]	зацукровані фрукти
prune	чорнослив
soaking	вимочування

Task1. Fill in the gaps using the words in the box.

preserve, soaking, fruit juices, sugar solution, consistency, food preservation, thick syrup, making, deterioration, extracting

1. To prevent _____ through the growth of any microorganisms in jams, marmalades, and jellies sufficient amounts of sugar usually are used.
2. Jams are made up largely of fruits held together by a _____ or jelly.
3. Preserves resemble jams but are usually of thinner _____.
4. Jellies are made from _____ only.
5. In the preparation of all of these products, efforts are made to _____ the natural colour and flavour of the fruit.
6. The crystallized fruits are made by _____ the juice from the raw product and replacing it with sugar syrup.
7. Any kind of fruit or combination of fruits may be used in the _____ of jams and preserves.
8. Drying has been a means of _____ for centuries and is still used.
9. Foods containing sugar require less drying than others, as drying concentrates the _____.
10. Most dried fruits require _____ before cooking.

Task2. Choose the correct form in bold.

1.Some fruits **are/is** preferred in their natural state.
2.A recent system **consisting/consists** of steam pipes in the evaporating plants.
3. Currants are the **more/most** common of all dried fruits consumed by the human family.
4. Machines called "stemmers" **are/is** brought into use for removing the stems.
5. Plums destined for the leading grades of prunes are **gathered/gathering** by hand.
6.They are **put/putting** into spent ovens for about twenty four hours.
7.Usually three pounds of plums **are/is** necessary to yield one pound of prunes.
8.The lemon peel **is candied/candied**, otherwise the process of preserving is similar to that **applying/applied** to the citron.
9. The fruits **are making/are made** extracting the juice from the raw product and replacing it with sugar syrup.
10. In due course it is removed from the syrup process and placed in drying ovens, or drying rooms, at a high temperature until **crystallizing/crystallized**.

Task 3. Transcribe and pronounce correctly the following words.

preservation, utilization, evaporation, through, procedure, crystallized fruits, drying process, syrup, drying oven, pickle

Task 4. Match the word or words with the definition.

1. storage	a. turn from solid or liquid into rapour
2. preservation	b. removing moisture from food, drying
3. desiccation	c. article of trade, product as opposed to a service
4. ramification	d. keeping safe or free from decay
5. evaporate	e. vegetables, preserved in brine, vinegar, mustard, etc.
6. raisins	f. storing of goods etc.
7. commodity	g. consequence, subdivision of a complex structure or process
8. pickles	h. dried grape.

Task 5. Translate into English.

1. На даний час існує багато методів зберігання фруктів.
2. Фрукти можна сушити, консервувати, заморожувати.
3. Можна сушити сливи, вишні, яблука, груші, абрикоси, фініки та інші фрукти.
4. Для виробництва джемів використовуються будь-які фрукти.

5. Мармелад і желе виготовляють тільки з фруктів, які містять пектин та достатню кількість кислоти.
6. Зацукровані лимонні та апельсинові шкірки дуже популярні в Європі та Америці.
7. Необхідно зберігати природний колір і смак фруктів при виробництві з них джемів і желе.
8. При приготуванні компотів потрібно слідкувати за тим, щоб фрукти не переварились і не втратили свій смак.

Task 6. Answer the questions:

1. How many methods are there of preserving fruits?
2. Are currants the most common of all dried fruits consumed by the human family?
3. How are the grapes converted into raisins?
4. What can you tell about plums' drying process?
5. Where are citron peel and lemon peel consumed in large quantities?
6. How can we obtain crystallized fruits?

Task 7. Read the text without a dictionary and discuss it.

ANTIDEPRESSANT CATERING

Black chocolate is one of the most popular anti-depressants. Bitter and extra-black chocolate with high content of cocoa beans without additives is the best choice.

Almonds are also good for fighting depression and they protect the immune system. Almonds are very rich in calories. 30-50 g of dried or roasted almonds is the daily requirement for preventing seasonal disorders and colds.

Bananas. One banana a day is better than a handful of medicines prescribed for preventing depression. Besides the well-balanced vitamin content, bananas are rich in three kinds of natural sugar – sucrose, fructose and glucose, which in combination with cellulose are capable of lifting one's spirits and soothing the central nervous system.

Oranges. Life-asserting oranges or freshly squeezed orange juice are full of vitamin C and B, rich in pectin and help to excrete cholesterol. Oranges are especially good in the morning 30 minutes before breakfast on an empty stomach or many other fruits between meals.

Pumpkin seeds contain microelements conducive to generation of serotonin, for this reason people in a bad mood are recommended to nibble pumpkin seeds as a snack. They are also used in soups, salads and sauces.

Task 8. Give Ukrainian equivalents to the following English idioms. Make up situations to illustrate some of them.

1. you are what you eat
2. eat, drink and be merry (for tomorrow we die)
3. a knockdown price
4. cheap and nasty
5. cost an arm and a leg
6. cost the earth

JUST FOR FUN

Aunt: Here's a good piece of bread and butter.
Johny: Thank you, auntie.
Aunt: That's good, Johny. I like polite children, I like to hear little boys say "thank you". Johny: If you want to hear me say it again, then put some jam on that piece of bread.

UNIT 18.

MEAT PRESERVATION

The preservation of meat may be accomplished in numerous ways including the use of refrigeration, canning, drying, and salting, pickling, and curing. The latter methods are of ancient origin and are widely used at present, both in the modern packing house as well as in rural communities.

Salting is often followed or combined with other processes, such as smoking, which improves both the flavour and *keeping qualities* of special products, including hams, and bacon. In the use of salt as a preservative, either alone or in combination with such compounds as saltpeter, nitrates of sodium or potassium, there are several objectives. It is necessary to prevent spoilage by microorganisms, but in addition the final product must have a desirable taste and flavour. The appearance must also be attractive. It has been common practice for many years to use the *pickling solution* because of increased efficiency in curing meat products. More recently the nitrites have been found even more effective. The *nitrates* serve a useful purpose in respect to the appearance of the products because when they are present, certain changes take place where the hemoglobin of the meat tissues is chemically combined to form nitrosohemoglobin.

The nitrites are more effective than nitrates in checking spoilage and also have the colour fixing ability. Sugar is also used as a constituent of pickling solutions. Many of the solutions containing sugar are called sweet pickling processes. In some instances the so-called dry sugar cures may be used, in which case the meat is packed in tight containers and sprinkled with dry mixtures of salt, sugar and small quantities of nitrate or nitrite. It is a common practice of smoke some salt- cured meat and meat products.

The *smoking process* preserves not only on account of some drying of the meat through the heat applied during smoking but also on account of the chemicals deposited on the surface. These compounds may penetrate

somewhat into the meat and to inhibit bacterial growth and action, instead of smoking meats it is possible to use a specially prepared salt meat. Such salts have a pleasant smoked flavour which may be imparted to meat by using dry-curing processes and eliminating the smoking operation. Meats may be preserved by means other than refrigeration, although chilling is the first step, and preliminary to any further treatment.

In Europe a number of different methods have been suggested to accomplish the same purpose. One depends on injecting the *brine* by pressure into the heart of the still bleeding animal. Another depends on the injection of the brine into a *blood vessel* under pressure after *rigor mortis* has set in. A third method consists in subjecting the meat to a vacuum and ihen subjecting it to a brine under pressure for several lr urs.

Pork curing. Bacon and hams. Pork is sometimes dry-cured by rubbing with salt and piling-in stocks in curing cellars, which are kept at relatively low temperature. A small percentage of *saltpeter* may be added to the salt to assist in the colouring of the tissues. If the cuts are packed by layers and other curing agents added between the layers, there will eventually be a brine formed owing to the extraction of water from the tissues. This method is commonly used for bacon which requires several weeks to cure, after which it is removed from the brine, soaked in water for short time and smoked. The soaking may be omitted if the meat is subjected to a spray of hot water followed by drying with a compressed air jet which evaporates the excess moisture on the surface.

Bacon is usually aired for a number of hours in the warm air of the *smoking chamber* before the actual smoking is started. When the smoking is completed any salt which has crystallized on the interior is brushed off and the bacon packed in boxes, barrels, or other containers for shipment.

Some bacon, sliced or unsliced, is now packed in transparent parchment to keep it clean and preserve its appearance. Bacon may also be canned. Hams, which make up one of the most valuable meat products from hogs, are the hind legs of swine from above the hock. There are many kinds of hams depending largely on the type of curing process and the methods of smoking used. The flavours are due in part to the pickle, which may contain sugar. Along with the other agents mentioned above, flavours may also be due in part to the wood used in smoking.

Most hams contain an abundance of fat, but virginia hams, which are quite noted for quality and flavour, are relatively lean. The function of the smoke is not merely to impart the characteristic flavour, but it also serves to inhibit the micro-organisms which gain access to the surface of the meat.

Lard. Lard is the fat separated from the *adipose tissues* of hogs for use as a food Three kinds of lard are manufactured on a commercial basis: prime steam, neutral, and kettle-rendered. Lard is packed and sold as smooth or grainy lard. Smooth lard is lard which is cooled quickly to prevent the separation of the oil and stearin. It is precooled to about 110 °F and further cooled by a lard roll, a metal cylinder cooled within by means of brine or by the direct expansion of amnionic.

Grainy lard is preferred by certain commerce. It derives its name from the grainlike appearance of the solid portion. Lard may be stored in tubs. Sodium silicate is sometimes used on the inside of wooden tubs and pails in order that lard may not be absorbed and thus wasted. Paraffin is employed often instead of silicate. Neutral lard is manufactured mainly from back fat and leaf fat. The material is chilled, cut up very fine, and placed in a *water-jacketed kettle.* The water in the jacket is slowly heated, causing the lard to separate from the fibrous material. Lard obtained by this process is white, but without definite flavour. It is used in the manufacture of margarine without treatment.

Kettle-rendered lard. Lard of this kind is made from the better grades of fats. The fats are basketed into steam-jacketed kettles, the fat separated from the fiber and then put up into packages while still hot.

Active Vocabulary

pickling	маринування
flavour	смак, аромат
keeping qualities	збереження якості
saltpeter *['sɔltpi:tə]*	селітра
spoilage	псування
pickling solution	маринад
nitrate *['naitreit]*	нітрат, сіль або ефір азотної кислоти
potassium	калій
smoking process	процес коптіння
preserve	зберігати
surface	поверхня
brine	розсіл, рапа
blood vessel	кровоносна судина
rigor mortis	трупне задубіння
pork	свинина
soak	вбирати, всмоктувати
smoking chamber	коптильна камера
sliced	нарізаний
parchment	пергамент
ham	шинка
merely	тільки, просто
impart	давати, додавати
lard	сало
adipose tissue *['ædʒipəus 'tiʃu:]*	жирова тканина
grainy lard	зернистий лярд, свиняче сало
tub	діжка, баддя

water-jacketed kettle	котел з водяним охолодженням
treatment	обробка
kettle-rendered lard	котельний лярд (пряжений у відкритому котлі)

Task1. Fill in the gaps using the words in the box.

low temperature, desirable, characteristic flavour, smoked, methods of smoking, curing, appearance, salted

1. The main aim of food preservation is to prevent spoilage by microorganisms, but in addition the find products must have a _____ taste and flavour.
2. Smoke contain phenols which help in the preservation of _____ products.
3. Potassium nitrite and potassium nitrate, used in the _____ of pork and beef, improve the taste and redden the colour.
4. _____ products are usually partly dried as well as salted.
5. The nitrates serve a useful purpose in respect to the _____ of the products because when they are present certain changes take place.
6. There are many kinds of hams depending on the type of curing process and the _____ used.
7. The function of the smoke is not merely to impart the _____ , but also serves to inhibit the microorganisms which gain access to the surface of the meat.
8. Pork is sometimes dry-cured by rubbing with salt and piling in stocks in curing cellars which are kept at relatively _____.

Task2. Choose the correct form in bold.

1.The preservation of meat may be **accomplish/accomplished** in numerous ways.
2.The appearance of the final product **must/may** have a desirable taste, flavour, appearance.
3. Sugar **is/are used** as a constituent of pickling solution.
4. In Europe a number of different methods **has/have been suggested** to accomplish the same purpose.
5. This method **is/are commonly used** for bacon which require/requires several weeks to cure.
6.Some bacon, sliced or unsliced, **is packed/is packing** in transparent parchment to keep it clean and preserve its appearance.
7.Lard is the fat **separating/separated** from adipose tissues of hogs for use as a food.
8.The water in the jacket is slowly heated, **causing/caused** the lard to separate from the fibrous material.

Task 3. Transcribe and pronounce correctly the following words.

slice, nitrate, flavour, surface, saltpeter, brine, treatment, spoilage, impart, manufacture

Task 4. Match the word or words with the definition.

1. pickle	a. thick white fat used in cooking
2. brine	b. to preserve food in vinegar and salt
3. treatment	c. to cook something slowly
4. solution	d. processing
5. steam	e. a liquid in which a solid or a gas has been dissolved
6. stew	f. a type of Italian food
7. lard	g. the mist that hot water produces
8. lasagna	h. salty water, often used for preserving food

Task 5. Translate into English.

1. Копчене і мариноване м'ясо зазвичай зберігають в холодильниках і погребах.
2. В розсіл для засолювання м’яса обов’язково повинні входити цукор, а також селітра, яка надає м’ясу приємного кольору.
3. Бекон і окіст після маринування піддають в’яленню.
4. Новим методом засолення м’яса є вприскування. Спеціальним шприцом розсіл вводять у кровоносні судини під тиском одразу після забою тварини.
5. Лярд буває декількох видів: чистий, м’ясний, еластичний і зернистий.
6. Деякі сорти лярду використовують у виробництві маргарину без подальшої обробки.
7. Еластин не піддається впливу тепла, тому м'ясо, яке містить значний його відсоток, важко зробити м’яким при обробці.
8. Перед коптінням, бекон провітрюють на теплому повітрі протягом декількох годин, а потім коптять.
9. Якщо після коптіння на беконі залишається сіль, її витирають і бекон складають в ящики і беконки.

Task 6. Answer the questions:

1. What methods of meat preservation do you know?
2. What does the smoking process preserve?
3. What is it possible to use instead of smoking meats?
4. What do you know about pork curing?
5. What is lard?
6. What kinds of lard do you know?
7. What lard is used in the manufacture of margarine?

Task 7. Read the text without a dictionary and discuss it.

FOOD CELEBRATES LIFE

Have you ever noticed how much of our life is centered on food? Look at all the meeting held, decisions made, and mergers consummated over a meal: power breakfasts, power lunches, dinner, banquets, receptions, and those endless toasts. Consider all the celebrations where food is all-important: weddings, birthdays, religious feast days, national holidays, etc. Food is the great icebreaker when people meet for pleasure or business. Food is at the center of many of our important activities.

Often the difference among cultures in the foods they eat related to the difference in geography and local resources. People who live near water (the sea, lakes, and rivers) tend to eat fish and crustaceans. People who live in colder climates tend to eat heavier, fatty foods. However, with the development of a global economy, food boundaries and differences are beginning to dissipate: Mcdonalds is now on every continent except Antarctica, and tofu and yogurt are served all over the world.

Task 8. Do you know any Ukrainian equivalents of the following English idioms? Can you make up any situations to illustrate some of them?

1. never buy a fish till it's caught
2. oil and water don't mix
3. packed like herrings
4. the nearer the bone, the sweeter the flesh
5. to cook a hare before catching him
6. too many cooks spoil the broth

JUST FOR FUN

A shop-assistant: What do you want, madam?
A customer: Cut me please, bit meat, so it is in harmony with blue and green flowers on my plates.

UNIT 19.

MEAT COOKERY

Meat is cooked to make it more palatable, that is, to tender it if it is tough, to improve the flavour, and to improve the colour and appearance.

The two general methods of cooking meat are by dry heat and moist heat. With dry heat, the meat is cooked in an oven, in a frying pan, or directly under a source of heat as in the broiler or directly over a flame as was done in the olden times on the hearth and is done today when meat is cooked on sticks at a picnic. By this process, the protein is coagulated, some of the fat melts always, some water evaporates, and if the temperature is high enough the meat browns.

When meat browns, the carbohydrate, protein, and fat decompose.. In the case of the carbohydrate, we say, it has caramelized. With dry heat, there is practically little change in the *connective issues* as under the conditions of dry heat, collagen does not change to gelatine. Therefore, it is important to select only the tenderest cuts to cook by the drv-heat method.

The moist-heat method is applicable to the less tender cuts, as by this method, the collagen of the connective tissue is converted into the soluble gelatin.

The elastin is unaffected, and, for this reason, meats containing a high per cent of elastin are difficult to make tender. With moist heat, the meat is either cooked in water or cooked in moist atmosphere, as for instance when a piece of meat is put in a covered pan in which there is sufficient water to supply steam during the cooking process. A cut of meat not quite tender enough to cook by dry heat when cooked in a covered roaster will have most of the desirable qualities of the more expensive cuts when served at the table, if meat is placed in cold water and then heated, much of the *myogeti* and extractives are dissolved out before the coagulation of fibers takes place. If salt is present, the *myosin* also dissolves. Meat cut up in small

pieces, placed in cold water, and then cooked until tender is usually tasteless but the cooking water is very flavour- some. The tendering process is slow one, and if much tendering is necessary the more tender parts of the meat may disintegrate, with loss of valuable soluble extractives before the whole is made tender. The myosin and tnyogen which dissolve out during the first part of the cooking are precipitated by coagulation and usually form a scum on top of the water. The water in which meat has been cooked is called stock. It is now generally agreed that a lower temperature than has been the custom produces the most satisfactory products. The advantages of a lower cooking temperature are many. Just as the protein of egg coagulates and sets to form a jelly so will the protein of meat. But if cooked at too high temperature, the coagulated protein shrinks, water leaves the jelly and the meat becomes hard and dry. This is particularly noticeable with liver. Unless liver is cooked exactly the right time and at right temperature, it becomes hard, dry, and, rubbery, which is often the reason for its unpopularity. The fat. dispersed in other cuts of meat partially disguises the same effect in them.

In addition to the *deleterious effect* on the protein a high cooking temperature increases the losts of fat from meat, fat which not only tenders it, but adds to it juiciness and flavour. With the melting away of fat, the over coagulation of protein, and excessive evaporation of water, the meat shrinks. As a result, there is less meat to serve and what is left is dryer, tougher, and with less flavour.

The use of low temperature for meat cookery has other advantages. A roast of beef, for example, which is cooked at a high temperature will be well done on the outside and centre may be underdone or raw depending on the size of the roast. With low temperature, the roast cooks more evenly. Except for the first slice which is always overcooked, the rest of the roast will be the same throughout, rare, medium, or well-done whi- ehever is prefered. Meat cooked to the well-done stage is cooked longer but not at a higher temperature, and experiments have shown that the longer cooking saves in the cost of fuel. There was a time when it was thought that all meat should be first browned with intense heat, the browning or searing, as it was called, was supposed to make an impenetrable skin through which neither water nor fat could go. Now we know that, if anything, searing increases the loss of fat and that its only advantage lies in the fact that well browned meat is more pleasing to look at, and helps to make a brown gravy.

As far as the rest of the meat is concerned searing has no advantages.

With the use of lower cooking temperatures, it takes longer to cook a piece of meat, but the increase in tenderness, juiciness, and palatabilitv justifies the change. It should be pointed out, however, that meat cooked to the well-done stage will be very much less juicy than that cooked to the rare or medium stages, not only because of a greater evaporation of water and melting away of fat.

Active Vocabulary

palatable	смачний, приємний
tender	ніжний; пом’якшити
appearance	зовнішній вигляд

evaporate	випаровувати
connective tissues	сполучні тканини
myogen	міоген
myosin	міозин
scum	піна
stock	бульйон
shrink	скорочуватись
liver	печінка
deleterious effect [dɛlɪ'tɪərɪəs ɪ'fɛkt]	шкідливий вплив
juiciness	соковитість
roast	смажити
a roast	печеня
beef	яловичина
sear	припікати, обпалювати
gravy	соус
joint	суглоб

Task1. Fill in the gaps using the words in the box.

roast, roaster, joint, stock, dry heat, methods of cooking, connective tissue, extractives

1. The water in which meat has been cooked is called _____.
2. If the meat is with _____ before placing in water, it makes a brown stock.
3. Sinc a stock contains a good deal of gelatine and favour some _____, it is used as a base for soups, gravy, and so on.
4. A jellied stock is more readily made from a meat cut containing bone, as there is more _____ in and near the bone.
5. If a _____ is used especially from a young animal, large amounts of gelatine can easily be extracted.
6. The dry-heat method is best exemplified by roasting, broiling, or panbroiling, and the tender cuts of meat are suited to these _____.
7. It has been found that the appearance and flavour are better if a _____ is cooked in an uncovered roasting pan.
8. Usually the meat is placed in the _____ with the fat layed on top.

Task2. Choose the correct form in bold.

1.Meat is cooked **to make/making** it more palatable.
2.It is important **to select/selected** only the tenderest cuts **to cook/cooking** by the dry-heat method.
3. Meats containg a high per cent of elastin **is difficult/are difficult** to make tender.
4. The water in which meat **have/has** been cooked is called stock.

5. The use of low temperature for meat cookery **have/has** some advantages.
6.Meat cooked to the well-done stage **is/are** cooked longer but not at high temperature.
7.Well browned meat is more pleasing **to look/looking** at, and helps to make a brown gravy.
8.It should be **pointed/point** out that meat cooked to well-done stage will be very much less juicy than that cooked to the rare or medium stages.

Task 3. Transcribe and pronounce correctly the following words.

juiciness, palatability, deleterious, shrink, myogen, myosin, tissue, scum, gelatine

Task 4. Match the word or words with the definition.

1. broth	a. Italian savoury rice dish cooked in stock
2. joint	b. oven, dish, apparatus for roasting
3. gelatine	c. sauce for food
4. risotto	d. thin soup of meat or fish stock
5. roaster	e. division of an animal carass as meat
6. tissue	f. transparent tasteless substance from skin, tendons, etc., used in cookery
7. gravy	g. result or consequence of an action
8. effect	h. any of the coherent collections of specialized cells of which animals or plants are made

Task 5. Translate into English.

1. Додавати воду під час смаження м’яса не слід, тому що при низькій температурі приготування погіршуються його смакові якості.
2. При певній температурі тривалість варіння завжди залежить від розміру шматка м’яса та його якостей .
3. Біфштекс спочатку підсмажують до коричневої скоринки, а потім тушкують, додаючи томатний соус, кислота якого не тільки придає смак м’ясу, а й пом’якшує сполучні тканини.
4. Якщо м'ясо кладуть спочатку в холодну воду, а потім підігрівають, велика кількість міогену розчиняється до коагуляції.
5. Вода, в якій вариться м'ясо, називається бульйоном.
6. Якщо м'ясо підсмажують перед варінням, то бульйон буде коричневого кольору.
7. Загальновідомо, що приготування м’яса за низьких температур має свої переваги.
8. Якщо шматки яловичини готуються при високій температурі, то проварюються вони лише по краях, а в середині можуть бути недоварені.

9. Кістки молодого м'яса містять велику кількість колагену, але в них менше мінеральних солей.

Task 6. Answer the questions:

1. What are the two general methods of cooking meat?
2. When are the myogen and extractives dissolved out?
3. How is water in which meat has been cooked called?
4. What do the myosin and myogen usually form on the top of the water?
5. Why does liver become hard and dry during cooking process?
6. What advantages has the use of low temperature for meat cooking?

Task 7. Read the text without a dictionary and discuss it.

ASADO

Asado is a term used both for a range of barbecue techniques, and the social event of having or attending a barbecue in Argentina, Chile, Paraguay, Brazil, and Uruguay. It is also popular in the Philippines. An asado usually consists of beef, alongside various other meats, which are cooked on a grill, called a parrilla, or open fire. Usually the asado begins by igniting the coal. The coal is often made of native trees, avoiding pines and eucalyptus as they have strong-smelling resins. An asado also includes bread, a simple mixed salad of, for instance, lettuce, tomato, and onions. Beer, wine, soda, and other beverages are common. Dessert is usually fresh fruit. Another traditional from to mainly roast the meat, used in Patagonia, is with the whole animal (especially lamb and pork) in a wood stick nailed in the ground and exposed to the heat of live coals, called asado al palo.

The meat for an asado is not marinaded, the only preparation being the application of salt before and or during the cooking period. Also, the heat and distance from the coals are controlled to provide a slow cooking; it usually takes around two hours to cook asado. Further, grease from the meat is not encouraged to fall on the coals and create smoke which would adversely flavour the meat. A sauce of tomato and onion in vinegar, are common accompaniments to an asado, where they are traditionally used on the offal, but not the steaks.

Task 8. Do you know any Ukrainian equivalents of the following English idioms? Can you make up any situations to illustrate some of them?

1. bring home the bacon
2. what's cooking?
3. cook the books
4. cook someone's goose
5. baker's dozen
6. bad cold

JUST FOR FUN

Client: Sorry, do you have fresh pies?
Waiter: No, with the meat.

UNIT 20.

BALANCED FOOD IN HUMAN DIET

No one food furnishes all the necessary food elements. A day's, or even a week's menus should be considered as a unit, rather than one meal. By varying the foods from meal to meal, and day to day, one may include all the essential foods.

A thorough knowledge of the chemical composition of foods, and of the physiology of digestion, makes possible a wiser selection of food. One must maintain a good balance of carbohydrates, fats, proteins, and the regulatory elements, i. e., minerals, cellulose, water, and vitamins. The adult person requires a certain amount of *fuel foods* for the constant functioning of the many involuntary body activities, as muscular tone, secretion of fluids, respiration, and circulation of blood.

The big factor that increases the demand for fuel is exercises or work. Therefore, the more a person exercises, the more he requires fuel foods. These fuel foods are those foods which contain carbon, hydrogen, and oxygen. These elements are found in all fuel, such as wood, coal, alcohol, kerosene.

The food that contain carbon, hydrogen, and oxygen are classified as (1) the carbohydrates, i. e., starches and sugars, (2) the fats, and (3) the proteins: meat, milk, eggs. In the body these three classes of foodstuffs produce energy and leave, as waste, carbon dioxide, and water. These end products are easily disposed of through the lungs, skin, and kidneys.

Proteins, the animal foods, have an added element of nitrogen, and sometimes phosphorus, sulphur, and iron. Since the tissues of our bodies are composed of these same elements, proteins have a special function of building new tissues and of keeping in repair old tissues. If proteins are used for fuel in the body, only the carbon, hydrogen, and oxygen are used, and the nitrogen, sulphur, phosphorus, and

iron are but *waste products* to be eliminated through the kidneys. Proteins are expensive foods, and if used as fuel, only part of the elements are really utilized in the body.

It is therefore wise to use carbohydrates and fats to furnish Hie fuel for the body, and to use just enough protein to keep the tissues in repair. Tissue building is fairly constant in the adult. It is only in case of actual body growth that extra supply of protein is necessary. Therefore children and invalids require a good supply of milk, eggs, and other simple proteins to build up new tissues.

Our bodies are so complicated in form, that starches, fats, and proteins are not sufficient to supply all our needs. Certain minerals, as iron, calcium, phosphorus, and iodine are equally important in the repair and functioning of the body. Calcium forms a large per cent of bones and teeth. Therefore no one can afford to overlook a generous amount of calcium foods, as milk, milk products, and oranges. Iron is needed in the blood, and in other body fluids. Sources of iron are eggs, fresh, *leafy green vegetables* onions, carrots, and the bran of cereals. In general we may say, the necessary minerals may be secured by using daily a variety of vegetables, fruits, whole cereals, and plenty of milk and eggs.

Another dietetic factor is cellulose, or bulk, of the food. , In recent years there has been a tendency to so refine our foods that we do not get the proper amount of bulk. The bulk is obtained from the fibrous part of fruits, and vegetables, and from the outer coats of cereals. Cellulose is neither fuel nor tissue builder, but as waste it increases the rhythmic movement of the *digestive tract* and acts as a cleanser.

Much has been said in the past few years about a new set of necessary food constituents, called vitamins. Scientists have found that without these the body ceases to function properly. Many of the common diseases attributed to *malnutrition* are now said to be caused by a lack in the diet of one, or two, or all of the vitamins.

Vitamin A is found in leafy green vegetables, eggs, yolk, butter, cream, carrots, rutabagas, spinach, cabbage, yellow corn, and sweet potatoes. It is fairly stable to heat. Lack of this constituent causes eye diseases, and forms of rickets. Vitamin B is found in plant life, as oranges, spinach, cabbage, turnips, beets, tomatoes, carrots, potatoes, onions, and the embryo of cereals. Deficiency of vitamin B causes a lack of appetite, and general lassitude. Vitamin C is easily destroyed by heat, except in acid solution.

Good sources of vitamin C are tomatoes, and uncooked greens, orange and lemon juice, fresh fruit, raw cabbage, and raw beets. Its absence is shown in skin diseases.

We may say that to avoid any dangers due to shortage of these protective foods, the diet must contain milk, fresh vegetables, leafy greens, eggs, butter fat, and whole cereals. Canned vegetables may lose much of their value as sources of vitamins, due to high pressure cooking, especially if one does not use the liquid in are canned.

For the growing child one must provide a goodly supply of foods rich in mineral and vitamins. In the delicate and intricate weaving of new body cells it is of the utmost importance that not one of the vital constituents be omitted. There is no one perfect food. No vegetable or fruit, can be used to the exclusion of all others. A variety of all the many fruits and vegetables is essential, not only for appetite's sake, but for the actual needs of the body.

A good balance between fat, sugar, and protein is to be desired. Excessive.sugar ferments in the stomach cause distress from gas. FaT retards stomach digestion. Therefore, in a meal rich in fat and sugar, the action of the stomach is delayed until fermentation takes place. This is apt to happen after a holiday dinner.

Excessive use of meat tends to intestinal disorders, due to increased bacterial action. Meat is of such pleasing flavour that one must guard against the excessive use of meat to the exclusion of all essential vegetables, fruits, and dark breads.

It is not expected that every тел! of the day will contain all the desired *foodstuff* in the proper amounts, but the day's meals, or the week's meals, can be considered as a unit. Surely in the course of a week the meals can have a good balance of starch, sugar, whole cereals, fat, milk products, eggs, meat, and variety of vegetables and fruits.

Active Vocabulary

meal	їжа
digestion [dI'GestSqn]	травлення
fuel foods	їжа як джерело енергії
respiration	дихання
lungs	легені
skin	шкіра
kidneys	нирки
iron	залізо
waste products	відходи
leafy grean vegetables	листові овочі
cereals	хлібні злаки
digestive tract	травний тракт
malnutrition ['mxlnjH'trISSqn]	недоїдання
rutabaga	бруква
shortage	нестача, брак
fluid	рідина
eliminate	виділяти, видаляти з організму
intricate	заплутаний, складний
excessive	надмірний
foodstuffs	продукти харчування
deficiency	відсутність, дефіцит
intestinal disorder	кишковий розлад

involuntary [ɪn'vɔləntərɪ] мимовільний, ненавмисний
almond мигдаль

Task1. Fill in the gaps using the words in the box.

desirable, sufficient, body fluids, minerals, decomposition products, skim milk, tissue builder, needs

1. The human bodies are so complicated in from, that starches, fats and proteins are not _____ to supply all our needs.
2. In the repair and functioning of the body certain _____ as iron, calcium, phosphorus are very important.
3. Iron is needed in the blood and in other _____.
4. Cellulose in neither fuel nor _____, but it increases the rhythmic movement of the digestive tract.
5. A variety of all the many fruits and vegetables is essential for the atual _____ of the body.
6. Dried _____ is a very economical source of milk proteins and minerals.
7. All cheeses may be considered as rich sources of protein and protein _____ and minerals, especially calcium.
8. The use of white bread is less _____ from nutrition point of view.

Task2. Choose the correct form in bold.

1. The big factor that **increase/increases** the demand for fuel is exercises and work.
2.The **more/most** a person exercises, the more/most he requires fuel foods.
3. Proteins **have/had** a special function of building new tissues and of keeping in repair old tissues.
4. Calcium **form/forms** a large per cent of boo and teeth.
5. In recent years there **has/had** been a tendency to refine our foods.
6.Cellulose **increases/increasing** the rhythmic movement of the digestive tract and **acting/acts** as a cleanser.
7.Excessive use of meat **tend/tends** to intestinal disorders, due to increased bacterial action.
8.It is not **expected/expecting** that every meal of the day will contain all the desired foodstuffs in the proper amounts, but the day's meals can be considered as a unit.

Task 3. Transcribe and pronounce correctly the following words.

digestion, respiration, fuel, phosphorus, shortage, malnutrition, kidney, foodstuffs, rhythmic, desirable

Task 4. Match the word or words with the definition.

1. digest	a. liquid or secretion
2. malnutrition	b. too much or too great
3. fuel	c. breathing
4. respiration	d. assimilate (food) in the stomach and bowels
5. full-blooded	e. grain used for food
6. fluid	f. food as a source of energy
7. gravy	g. vigorous, hearty, sensual
8. effect	h. condition resulting from the lack of foods necessary for health

Task 5. Translate into English.

1. Їжа є джерелом енергії для живого організму.
2. Молоко і молочні продукти мають важливе значення в щоденному раціоні людини.
3. Харчові продукти повинні містити білки і вітаміни.
4. В щоденний раціон харчування обов'язково повинні входити вітаміни оскільки їх нестача призводить до різних захворювань.
5. Фрукти і овочі є джерелом вітамінів і мінеральних солей.
6. Житнє борошно містить більше мінеральних солей, жирів, вітамінів, ніж біле і тому більш поживне.
7. Необхідно стежити за тим, щоб в тижневий раціон харчування людини входили всі необхідні для життєдіяльності організму речовини.

Task 6. Answer the questions:

1. What are the main principles of menu making?
2. What is required for the body activity of the adult person?
3. What do the fuel foods contain?
4. What special function have proteins as animal foods?
5. What is the reason of the common diseases?
6. What are the iron sources?
7. What is the role of cellulose in human diet?
8. What tends to intestinal disorders?

Task 7. Read the text and mark these sentence true (T) or false (F).

UKRAINIAN FOOD

Ukrainian cuisine is very varied, and Ukrainians are known for their hospitality. Though more and more cafes, bars and restaurants are opened offering excellent food at reasonable prices, Ukrainians will never miss a chance to invite you to a family gathering. Women gladly spend a lot of time and energy in the

kitchen cooking for family and guests. Usually a traditional festive meal begins with a huge number of starters followed by the main course. The aim is to ensure that a guest's plate is never empty!

Borshch is a soup based on beetroot with meat and vegetables: served with sour cream.

Varenyky are ravioli-like pasta stuffed with mushrooms, meat, cottage cheese, potato, cabbage or cherries (as a dessert).

Holoobtsee – cabbage leaves stuffed with rice and vegetable, or with spicy minced meat.

Mlyntsee – pancakes, often made with sour milk.

At the risk of offending vegetarians, a description of the Ukrainian cuisine would be incomplete without salo – pork lard. Spices are rubbed into the skin and the lard then allowed to stand in cold place. It is eaten in salted thin slices with bread. The smoked version is especially delicious.

Ukrainians are very fond of milk and kefeer (sour version of yoghurt). They also like refreshing non-alcoholic kvas made from fermented brown bread. Uzvar is another summer favourite made from stewed fruit and very similar to iced fruit tea.

Ukraine has a tradition of drinking spirits. Horilka is a popular spirit for adults, mostly men. Women enjoy wine, nalyvka (infusion of fruit and horilka) or vyshnivka (especially tasty variety made from cherries).

1. Ukrainians will never miss a chance to invite you to a family gathering
2. Borshch is usually served with sour cream
3. At the risk of offending vegetarians, a description of Ukrainian cuisine would be incomplete without pork steak
4. Ukraine has a tradition of drinking wines
5. Coca-cola is a favourite spirit for adults
6. Nalyvka is an infusion of fruit and horilka

Task 8. Do you know the following Ukrainian equivalents of the following English idioms? Can you make up any situations to illustrate some of them?

1. it is raining cats and dogs
2. like water off a duck's back
3. be as busy as a bee
4. elbow grease gives the best polish
5. no pains, no gains
6. back-talk

JUST FOR FUN

A young man who was a sports man went into a snack-bar for lunch and took off his overcoat. He knew the kind of people who went to that snack-bar so he took a piece of paper and wrote on it:
“This overcoat belongs to Bill Basher, the famous athlete, he will be back in ten minutes”, and fixed this on the coat.

When he came back, the overcoat wasn’t there, but on the paper someone had written:
“Overcoat taken by famous runner. He won’t be back at all.”

PART III

TEXTS FOR HOME READING

Text 1.

Starfish non-stick drugs

Defence

Starfish have arms, spines and a mouth on the underside of its body. But what scientists are finding really interesting is the sticky goo which is secreted when the Starfish feels threatened. The slime contains properties which may prove invaluable in treating certain kinds of inflammatory illnesses. Dr Charlie Bavington is Managing Director of Glycomar, a marine biotechnology company based at the Scottish Association for Marine Science in Oban. With access to the slimy starfish, he is working with Clive Page, professor of pharmacology at King's College London.

Non-stick

The project, he explains, came out of a chance encounter at a wedding. Scientists from different disciplines were chatting and the idea emerged of 'taking the non-stick properties of starfish and trying to apply it in a medical situation, and asthma was the application'. Because Clive Page is a Respiratory Pharmacologist, they got funding. Dr Bavington got involved early on, having switched from marine biology to clinical biochemistry. 'I was studying the same sort of molecules in starfish as I'd been studying in man, so it wasn't a totally nonsensical connection.'

Inflammatory cells

Bavington left to work elsewhere but when he returned to the project it inspired him to set up a company which connects together the medical application with the

marine source. 'We looked at a wide range of applications not just of the slime but also of the actual skin surface. Obviously they are bathed not only in seawater, but in all sorts of bacteria, larvae and barnacles, looking for somewhere to live and settle. Starfish need to have an effective defence and part of that is a kind of non-stick property, including the slime.' He explains that it is similar to where there 'is inflammatory cells circulating around in the blood system and when there is inflammation they stick to the blood vessel wall.' When the cells migrate into the blood vessel wall, into the tissue, they are responsible for the inflammation. If Dr Bavington, Professor Page and the other scientists can regulate the sticking and migrating process then they may have a new class of treatment.

Text 2.

Mineral salts

Mineral salt is name for the complete family of salts that are obtained by mining. Natural mineral salts are mined from below the ground surface, at a depth of almost thousands of feet, in areas where there is a layer of mineral salts. Mineral salts can also be harvested by pumping water deep underground in areas where layer of salt is discovered. Mineral salts are added as nutritional additives though they may have other properties like antioxidant or a preservative etc. Many of them are essentials that need to be included in our daily diets, as they are the source of important nutrients required for the body. The important natural mineral salts that should be consumed are sodium, phosphorus, potassium, chlorine, sulphur and calcium. While the above mentioned happen to be the macro elements of the natural mineral salts, the micro elements are the ones that are essential nutrients for the human body. The micro elements in the minerals salts consist of iodine, iron, fluoride and zinc.

Need For Natural Mineral Salts In Human Body

Natural mineral salts are important for the human body because the deficiency of these salts leads to a number of health problems ranging for mild to serious ones. The noticeable health problems related to the deficiency of important minerals salts are insomnia, weakness, fatigue, anemia, osteoporosis, anxiety, depression goiter and a lot of minor problems on a daily basis.

Important mineral salts are found in fruits and vegetables and therefore it is important to include these fruits in out staple diets. Sea food is also rich in a few of these natural mineral salts. To maintain a decent level of mineral salts in the body, a balanced diet is advised.

Applications of Natural Mineral Salts In Food

Table salt or the iodized salt is also important to fill up for the iodine deficiency in certain humans. This prevents goiter and other problems related to the thyroid gland. A minimum quantity of salt should be consumed by men and women on a daily basis. Any more than that, however, can also have adverse effects on human health. Table salt otherwise is used for daily cooking around the world and also as a table condiment.
Some mineral salts are also used as anti-caking agents in food products. They help improve the texture of certain foods as well, especially the meats. They are used in food products like beer, soft drinks, fizzy drinks, confectionery items, ice cream, baked goods, jelly, cheese, breads and canned foods. Mineral salts are also used as preservatives for canned foods and beverages and frozen fish and meat products. Mineral salts might also be used for purifying water.

Text 3.

The Carbon Planet

Heat signature

Planets such as Earth have more oxygen than carbon, but what if the composition was reversed? This is a question opened up by a recent discovery of a 'diamond planet' by US and UK scientists, led by Nikku Madhusudhan of the Massachusetts Institute of Technology, and including researchers from Belfast's Queens University and the University of Warwick. The planet is 1200 light years away from earth and was observed using Nasa's Spitzer Space Telescope. Dr Marek Kukula of the Royal Greenwich Observatory in London, whose role is to interpret and comment on astronomical discoveries made by British scientists, explained that researchers initially used the SuperWASP (Wide Angle Search for Planets) robotic observatories operating continuously, all year around. They detected the planet, then it was observed with the Spitzer Space telescope, which according to Dr Kukula 'detected the heat coming from the planet, and from that heat signature they can tell what this planet is made from.

Giant planet

The planet is very different to Earth. 'It's a giant planet,' explains Dr Kukula, 'a gas planet, a bit like Jupiter in our solar system. But the interesting thing that they've discovered is that it has a very different composition to the planets in our solar system. So where our planets have a half fraction of oxygen then carbon, this planet has it the other way around, it has more carbon than oxygen.' This suggests that there is more than one way to make a solar system and the range of planets in the Universe could be much wider than previously thought.

Diamonds and graphite

Dr Kukula says that if there are smaller planets in the same solar system with a similar composition, rich in carbon, their rocks could be rich in minerals such as carbon and diamonds, unlike earth which has silica, the sand that rocks on earth are made from. 'This is where this diamond planet idea comes from, they haven't actually detected a diamond planet yet,' explains Dr Kukula, it's hypothetical, 'but you can imagine bizarre landscapes with black graphite rocks lying around and the surface could be covered with tarry liquids rather than water.'

Text 4.

Transgenic or Genetically Modified (GM) Plants.

Genetic improvement of plants by traditional methods is a long history but recombinant DNA technology has led to revolutionary changes. An effective approach to achieve transgene expression and stability is to transfer the gene directly, into plant genome. It is possible to use genetic engineering to modify plant DNA and then transform plant cells with the DNA by either electroporation or particle gun methods. Alternatively, we can use vectors from the bacterium *Agrobacterium Tumefaciens,* which can transfer DNA directly into certain plants. It is possible to use plant tissue culture techniques to select clones of plant cells that have been genetically altered using *in vitro* techniques; then, with proper treatments, induce these cell cultures to make whole plants that can be propagated vegetables lively or by seeds.

In contrast to plants whose properties have been improved by traditional plant genetics, genetically engineered plants are *transgenic* or *genetically modified* (GM) *plants.* Although the techniques to generate transgenic plants or transgenic animals are virtually identical to those used to generate microorganisms expressing foreign genes, the use of the term *transgenic* is confined to multicellular organisms.

With the use of *Agrobacterium tumefaciens,* a number of transgenic plants have been produced. Most successes have come with broadleaf crop plants (dicots) such as tomato, potato, tobacco, soybean, alfalfa, and cotton. *A. tumefaciens* has also been used to produce transgenic trees, such as walnut and apple. Transgenic crop plants from the grass family (monocots) have been more difficult to generate using *A. tumefaciens,* but other methods of introducing DNA are used.

Herbicide resistance is genetically engineered into a crop plant so that it will not be killed by the toxic chemical. A gene encoding a resistant enzyme from *Agrobacterium* has been cloned, modified for expression in plants, and' transferred

into important crop plants, such as soybeans. Genetic engineering has also been used to protect plants from virus infection; expressing the coat protein gene of a virus, interfering with the uncoating of viral particles, and thus interrupting the virus replication cycle. *Insect resistance* has also been genetically introduced in plants.

Text 5.

Nanotechnology – a miracle of 21-st century?

The term 'nanotechnology' encompasses a huge range of activities. 'Nano' is used in the world of science to mean one billionth. E.g. a nanometer is a billionth of a metre. A nanometer is only ten atoms across! So generally nanotechnology is used to mean technology at the nanometer level. Nanotechnology attempts to achieve something useful through the manipulation of matter at this level.

To put it more formally, you can use the following definition: "Nanotechnologies are the design, characterization, production and application of structures, devices and systems by controlling shape and size at nanometer scale." At such scales, the ordinary rules of physics and chemistry no longer apply. For instance, materials' characteristics, such as their colour, strength, conductivity and reactivity, can differ substantially between the nanoscale and the macro. Carbon 'nanotubes' are 100 times stronger than steel but six times lighter.

History. Physicist Richard Feynman gave a lecture to the American Physical Society in 1959 which foresaw advantages from manufacturing on a very small scale - e.g. in integrated circuits for computers, for sequencing genes by reading DNA molecules and using machines to make other machines with increasing precision. However, the term 'nanotechnology' was first used by Norio Taniguchi in 1974, in a talk about how the accuracy of manufacturing had improved over time. He referred to 'nanotechnology' as that which achieved greater dimensional accuracy than lOOnm.

Feynman also envisaged machines that could pick up and place individual atoms. This development of this idea was later assisted by the invention of the scanning probe electron microscope (SPM) which allowed scientists to'see'and manipulate the individual atoms in a surface. In 1989 one of the defining moments in nanotechnology occurred when Don Eigler used a SPM to spell out the letters IBM in xenon atoms. For the first time scientists could put atoms exactly where they wanted them.

Molecular building blocks - Another great leap forward occurred in the shape of a new form of carbon. Harry Kroto from the University of Sussex, together with Richard Smalley and Robert Curl, discovered the carbon 60 molecule, which is shaped like a soccer ball. They named the molecular structure after the similarly shaped geodesic dome structure pioneered by the architect Buckminster Fuller. Unfortunately 'Buckminsterfullerene' is too long a name for most people and so they are often called 'Buckyballs'!

There are two fundamentally different approaches to nanotechnology, termed 'top *down'* and *'bottom up'*. 'Top-down' nanotechnology features the use of micro- and nano-lithography and etching. Here, small features are made by starting with larger
materials (e.g. semi-conductors) and patterning and "carving down" to make nanoscale structures io precise patterns. Complex structures including microprocessors containing hundreds of millions of precisely positioned nanostructures can be fabricated. Of all forms of nanotechnology, this is the most well established.

'Bottom-up', or molecular nanotechnology (MNT), applies to building organic and inorganic structures atom-by-atom, or molecule-by-molecule. Here we are using the forces of nature to assemble nanostructures - the term "self assembly" is often used. The self assembling properties of biological systems, such as DNA molecules, can be used to control the organization of species such as carbon nanotubes, which may ultimately lead to the ability to 'grow' parts of an integrated circuit, rather than having to rely upon expensive 'top-down' techniques. Nanotechnologies are widely seen as having huge potential in areas as diverse as healthcare, IT and energy storage. Governments and businesses across the world have started to invest substantially in their development. However there are also concerns regarding the safety of nanotechnology. These range from the more fanciful (such as Eric Drexler's imagined scenario of a world reduced to "grey goo", caused by self-replicating nano-robots) to the more realistic (such as the possible dangers of foreign nano-particles entering human organs and the bloodstream).

SOME SHORT-TERM NANO USES: Medical diagnostic tools and sensors. Solar energy collection (photovoltaics). Direct hydrogen production. Flexible display technologies and e-paper. Composites containing nanotubes. Glues, paints and lubricants. New forms of computer memory. Printable electronic circuits. Various optical components.

SOME LONGER-TERM NANO USES: Miniaturised data storage systems with capacities comparable to whole libraries' stocks. PCs with the power of today's computer centres. Chips that contain movies with more than 1,000 hours of playing time. Replacements for human tissues and organs. Cheap hydrogen storage possibilities for a regenerative energy economy. Lightweight plastic windows with hard transparent protective layers.

Ever since John Dalton convinced the world of the existence of atoms in 1803, scientists have wanted to do things with them. Nanotechnology takes that ability on to a new plane and opens up all kinds of futuristic imaginings. Essentially, nanotech is manipulation at the molecular scale - distances that may cover just a few millionths of a millimetre. But its potential is not just about being able to miniaturise things. Indeed, scientists and engineers recognise that there are fundamental limits to pure miniaturisation. Working at a scale a million times smaller than a pinhead allows researchers to "tune" material properties, making them behave in different ways to normal, large- scale solids. This behaviour can be exploited in quite ground-breaking ways.

Nature has been doing nanotechnology for a long time, and it has become expert in it. Consider the super-fine hairs on a gecko's feet which allow it to stick to walls and even hang upside down on a glass sheet. Learning from nature, nanotechnology promises humans ways of making systems that are smaller, lighter, stronger, more efficient, but cheaper to produce. "Nanotechnology is not a technology in its own right," explained Professor Mark Welland, head of the University of Cambridge Nanoscale Science Laboratory. "It is an enabling technology, so it will appear in many different products. It is already appearing in flash memory, computer chips, and it will increasingly be an enabling technology in other products like coatings, new types of sensors, especially in the medical area."

It is expected to transform the performance of materials, like polymers, electronics, paints, batteries, sensors, fuel cells, solar cells, coatings, computers and display systems. In five years'time, batteries that only last three days will be laughable, said Professor Welland. Similarly, in 10 years' time, the way medical testing is done now will be considered crude. To say that in five years, an iPod will have 10 times its current storage capacity will be conservative, he said. In the not-so-distant future, a terabit of data - equivalent to 10 hours of fine quality uncompressed video - will be stored on an area the size of a postage stamp. Clearly, the devices themselves will not be nano-sized. But nanotechnology will play its part in shrinking components! and making them work together a lot more efficiently. Although nano-devices can be built atom by atom, it is not realistic as a manufacturing option because it is slow and expensive, thinks Professor John Ryan, head of the Bionanotechnology Centre at Oxford University. "One of the major scientific challenges in the years ahead is to understand the fundamental biological principles and apply them to produce new types of nanotechnology," he said. "Armed with these design rules it may then be possible to make new types of nano- device using materials that are more robust than bio-materials."

The Royal Society and the Royal Academy of Engineering has looked at current and future developments in nanotechnology and has reported on whether it will require new controls. It is hoped that the report grounds some unrealistic scenarios, while recognising that real concerns need to be addressed with regulation. "The one fantastical idea that has dogged nartotechnology is the self-replicating machine, the 'grey goo', scenario," said Professor Welland. "That is simply too far off. The complexity of designing a molecular machine is bad enough, but if you try to imbue that with self-replication, you could not even put a toe in the water to design it." The scenario sees swarms of self-replicating robots, smaller than viruses, multiplying uncontrollably and devouring Earth. Eric Drexler, who many consider to be a "father of nanotechnology", has distanced himself from the idea, saying such self- replicating nanomachines are unlikely to be widespread. Similarly, fears over "green goo", the concern that self-replicating, nano-sized biological particles will move into human bodies and do unpredictable things, is scaremongering, thinks Professor Welland.

Professor Ryan agrees: “These science fiction scenarios have not only diverted attention away from the real advantages of nanotechnology, but also from issues

that do raise concern". Inhaled nanoparticles found in the bloodstream which have dispersed throughout the brain is a concern, he says. Whether this poses a health risk is not known. "If you look around at the moment in a big city, a significant proportion of material that you breathe in is already particulates - and a proportion of that is nano-sized, like diesel emissions," said Professor Welland.

Nano-materials exploit unusual electrical, optical and other properties because of the very precise way in which their atoms are arranged. This means fabrics could change colour electronically. Exposing an army uniform to ultra-violet light could activate changes without undressing. But it is in medicine that nanotechnology offers the most remarkable advances, according to Professor Ryan. "Nanomedicine will provide earlier and better diagnostics and treatment will combine earlier and more precisely targeted drug delivery," he said. The possibility of individualised therapy is also on the horizon. Nanotechnology in the form of flexible films containing miniaturised electrodes is expected to improve the performance of retinal, cochlear and neural implants. And it could lead to the miniaturisation of medical diagnostic and sensing tools which could drive down costs of such kits for developing countries. In this respect, nanotechnology could enable developing nations to leapfrog older technologies, in the way that copper wire and optical fibre telephony were superseded by mobile phones.

Industrial giants like GE are heavily involved in developing nanotechnology, 'We think that the biggest breakthroughs in nanotechnology are going to be in the new materials that are developed," said Troy Kirkpatrick at GE Global Research. These include corrosion-resistant coatings to make hydro-electric turbines more efficient in heavily-silted waters, and nano- membrane water filters to make for faster filtration. GE is also studying the properties of nano-ceramics, which can offer extreme strength, while still being lightweight. Because of the molecular structure of such materials, nano-ceramic coatings on aircraft could make them 10% more efficient, so less energy is used, producing fewer emissions.

GE Global Research is also looking to the electronics industry. "If you look at the chip makers of the world, the challenge they have is not to figure out how tb make them faster. The problem is they run so fast* the chips generate too much heat and melt. They need better materials for heat management," said Mr Kirkpatrick. Using materials which exploit properties of nanoparticles, GE has developed chip adhesives that can transfer heat out of the processor system more efficiently. "It is a start, and it is to show nanotechnology is finding its way into production and is changing the way we are doing science," said Mr Kirkpatrick.

Whatever nanotechnology does for the future, it will be an evolutionary process. One certainty is that there remains a plethora of uncertainties in the emerging field of nanotechnology. "Medical sensing is very attractive to everybody, but there could be a downside," explained Professor Welland. "If medical sensors become ubiquitous, our physical state could be monitored 24 hours a day, and if someone hacked into that data, there could be concerns". "Which is indeed why regulation has to be addressed, but must not stifle nanotechnology's potential. One of the important things for me is that it ultimately means the most efficient use of materials and processes, which means it does not have to benefit just the G8

nations" argued Professor Welland. "These sorts of materials, if they are able to do their job using less energy, should be available to everybody."

Text 6.

Food supplements in the USA

In the United States, a dietary supplement is defined under the Dietary Supplement Health and Education Act of 1994[10] (DSHEA) as a product that is intended to supplement the diet and contains any of the following dietary ingredients: *a vitamin, a mineral, a herb or other botanical (excluding tobacco), an amino acid a concentrate, metabolite, constituent, extract, or combination of any of the above.*
Furthermore, it must also conform to the following criteria: *intended for ingestion in pill, capsule, tablet, powder or liquid form not represented for use as a conventional food or as the sole item of a meal or dietlabeled as a "dietary supplement".*
The hormones DHEA (a steroid), pregnenolone (also a steroid) and the pineal hormone melatonin are marketed as dietary supplements in the US.

Regulation

The Food and Drug Administration (FDA) regulates dietary supplements as a category of foods, and not as drugs. While pharmaceutical companies are required to obtain FDA approval which involves assessing the risks and benefits prior to their entry into the market, dietary supplements do not need to be pre-approved by FDA before they can enter the market. Instead, manufacturers and distributors who wish to market dietary supplements that contain a "new dietary ingredient" (defined as "a vitamin; a mineral; a herb or other botanical; an amino acid; a dietary substance for use by man to supplement the diet by increasing total dietary intake; or a concentrate, metabolite, constituent, extract, or combination of any of the above dietary ingredients" not marketed before October 15, 1994) must notify the FDA beforehand. The notification requires information indicating the ingredient is safe, and the ingredient can not be marketed (sold or delivered for sale) for seventy-five days following filing the information. During this time the agency reviews the information for adequacy and safety concerns; fifteen days after the this period (ninety days after the information was filed) the FDA posts nonproprietary information on their website. Listing the information means the ingredient can be marketed, but does not mean it is necessarily safe. [14] On September 24, 2007 the FDA has implemented a "current good manufacturing practices" policy to ensure dietary supplements "are produced in a quality manner, do not contain contaminants or impurities, and are accurately labeled" and covers the manufacturing, packaging, labelling and storing of supplements, with requirements for quality control, design and construction of manufacturing plants, testing of ingredients and final products, record keeping and complaints processes.

The DSHEA, passed in 1994, was the subject of lobbying efforts by the manufacturers of dietary supplements and restricted the ability of the FDA to exert authority over supplements so long as manufacturers made no claims about their products treating, preventing or curing diseases. According to Consumer Reports, "The law has left consumers without the protections surrounding the manufacture and marketing of over-the-counter or prescription medications" and it became the FDA's responsibility to prove that a supplement wasn't safe. While pharmaceutical manufacturers must demonstrate their products are effective as well as being safe, supplement manufacturers are not required to demonstrate efficacy. The FDA has only ever found one dietary supplement to be unsafe, the weight loss/energy supplement ephedra. Discussing the legislation, Time referred to the DSHEA as "ill- conceived and reprehensible", that "gives the industry virtually free reign [sic] to market products defined as dietary supplements, while severely limiting the FDA's ability to regulate them".The DSHEA was heavily lobbied for by the supplement industry, and was criticized for exposing the public to worthless compounds that bilked consumers out of money to no benefit. Because of the requirements put into place by the DSFIEA, the FDA must demonstrate that individual supplements are unsafe using their adverse events reporting system, which it is estimated captures only 1% of all adverse events linked to supplements, [citation needed] The FDA has also lacked the funding to undertake the rigorous tests to meet the standards for a supplement to be considered "hazardous" and thus removed from the market; in the one situation where this standard was reached (ephedra), the agency faced significant opposition from the supplement industry and the United States Congress, instead limiting themselves to making announcements about problematic supplement safety records on their website.
A 2001 study, published in Archives of Internal Medicine, found broad public support for greater governmental regulation of dietary supplements than was currently permitted by DSHEA. The researchers found that a majority of Americans supported pre-marketing approval by the FDA, increased oversight of harmful supplements, and greater scrutiny of the truthfulness of supplement label claims.

Text 7.

Food additives

Food additives can be divided into several groups, although there is some overlap between them.

Acids

Food acids are added to make flavors "sharper", and also act as preservatives and antioxidants. Common food acids include vinegar, citric acid, tartaric acid, malic acid, fumaric acid, and lactic acid.

Acidity regulators

Acidity regulators are used to change or otherwise control the acidity and alkalinity of foods.

Anticaking agents

Anticaking agents keep powders such as milk powder from caking or sticking.

Antifoaming agents

Antifoaming agents reduce or prevent foaming in foods.

Antioxidants

Antioxidants such as vitamin C act as preservatives by inhibiting the effects of oxygen on food, and can be beneficial to health.

Bulking agents

Bulking agents such as starch are additives that increase the bulk of a food without affecting its nutritional value.

Food coloring

Colorings are added to food to replace colors lost during preparation, or to make food look more attractive.

Color retention agents

In contrast to colorings, color retention agents are used to preserve a food's existing color.

Emulsifiers

Emulsifiers allow water and oils to remain mixed together in an emulsion, as in mayonnaise, ice cream, and homogenized milk.

Flavors

Flavors are additives that give food a particular taste or smell, and may be derived from natural ingredients or created artificially.

Flavor enhancers

Flavor enhancers enhance a food's existing flavors. They may be extracted from natural sources (through distillation, solvent extraction, maceration, among other methods) or created artificially.

Flour treatment agents

Flour treatment agents are added to flour to improve its color or its use in baking.

Glazing agents

Glazing agents provide a shiny appearance or protective coating to foods.

Humectants

Humectants prevent foods from drying out.

Tracer gas

Tracer gas allows for package integrity testing to prevent foods from being exposed to atmosphere, thus guaranteeing shelf life.

Preservatives

Preservatives prevent or inhibit spoilage of food due to fungi, bacteria and other microorganisms.

Stabilizers

Stabilizers, thickeners and gelling agents, like agar or pectin (used in jam for example) give foods a firmer texture. While they are not true emulsifiers, they help to stabilize emulsions.

Sweeteners

Sweeteners are added to foods for flavoring. Sweeteners other than sugar are added to keep the food energy (calories) low, or because they have beneficial effects for diabetes mellitus and tooth decay and diarrhea.

Thickeners

Thickeners are substances which, when added to the mixture, increase its viscosity without substantially modifying its other properties.

Safety

With the increasing use of processed foods since the 19th century, there has been a great increase in the use of food additives of varying levels of safety. This has led to legislation in many countries regulating their use. For example, boric acid was widely used as a food preservative from the 1870s to the 1920s, but was banned after World War I due to its toxicity, as demonstrated in animal and human studies. During World War II the urgent need for cheap, available food preservatives led to it being used again, but it was finally banned in the 1950s. Such cases led to a general mistrust of food additives, and an application of the precautionary principle led to the conclusion that only additives that are known to be safe should be used in foods. In the USA, this led to the adoption of the Delaney clause, an amendment to the Federal Food, Drug, and Cosmetic Act of 1938, stating that no carcinogenic substances may be used as food additives. However, after the banning of cyclamates in the USA and Britain in 1969, saccharin, the only remaining legal artificial sweetener at the time, was found to cause cancer in rats. Widespread public outcry in the USA, partly communicated to Congress by postage-paid postcards supplied in the packaging of sweetened soft drinks, led to the retention of saccharin despite its violation of the Delaney clause.

In September 2007, research financed by Britain's Food Standards Agency and published online by the British medical journal The Lancet, presented evidence that a mix of additives commonly found in children's foods increases the mean level of hyperactivity. The team of researchers concluded that "the finding lends strong support for the case that food additives exacerbate hyperactive behaviors (inattention, impulsivity and overactivity) at least into middle childhood." That study examined the effect of artificial colors and a sodium benzoate preservative, and found both to be problematic for some children. Further studies are needed to find out whether there are other additives that could have a similar effect, and it is unclear whether some disturbances can also occur in mood and concentration in some adults. In the February 2008 issue of its publication, AAP Grand Rounds, the American Academy of Pediatrics concluded that a low-additive diet is a valid intervention for children with ADHD:

"Although quite complicated, this was a carefully conducted study in which the investigators went to great lengths to eliminate bias and to rigorously measure outcomes. The results are hard to follow and somewhat inconsistent. For many of the assessments there were small but statistically significant differences of measured behaviors in children who consumed the food additives compared with those who did not. In each case increased hyperactive behaviors were associated

with consuming the additives. For those comparisons in which no statistically significant differences were found, there was a trend for more hyperactive behaviors associated with the food additive drink in virtually every assessment. Thus, the overall findings of the study are clear and require that even we skeptics, who have long doubted parental claims of the effects of various foods on the behavior of their children, admit we might have been wrong."

In 2007, Food Standards Australia New Zealand published an official shoppers' guidance with which the concerns of food additives and their labeling are mediated.

There has been significant controversy associated with the risks and benefits of food additives. Some artificial food additives have been linked with cancer, digestive problems, neurological conditions, ADHD, heart disease or obesity. Natural additives may be similarly harmful or be the cause of allergic reactions in certain individuals. For example, safrole was used to flavor root beer until it was shown to be carcinogenic. Due to the application of the Delaney clause, it may not be added to fo Red 3, and Yellow 6 are among the food colorings that have been linked to various health risks. Blue 1 is used to color candy, soft drinks, and pastries and there has been some evidence that it may cause cancer. Blue 2 can be found in pet food, soft drinks, and pastries, and has shown to cause brain tumors in mice. Red 3, mainly used in cherries for cocktails has been correlated with thyroid tumors in rats and humans as well. Yellow 6, used in sausages, gelatin, and candy can lead to the attribution of gland and kidney tumors and contains carcinogens, but in minimal amounts.

Text 8.

Food preservation

Preservation processes include:

Heating to kill or denature micro-organisms (e.g. boiling).

Oxidation (e.g. use of sulfur dioxide).

Toxic inhibition (e.g. smoking, use of carbon dioxide, vinegar, alcohol etc.).

Dehydration (drying).

Osmotic inhibition (e.g. use of syrups).

Low temperature inactivation (e.g. freezing).

Ultra high water pressure (e.g. fresherized, a kind of "cold" pasteurization, the pressure kills naturally occurring pathogens, which cause food deterioration and affect food safety).

Combinations of these methods.

Drying

Main article: Drying (food).

One of the oldest methods of food preservation is by drying, which reduces water activity sufficiently to prevent or delay bacterial growth.

Refrigeration

Refrigeration preserves food by slowing down the growth and reproduction of microorganisms and the action of enzymes which cause food to rot. The introduction of commercial and domestic refrigerators drastically improved the diets of many in the Western world by allowing foods such as fresh fruit, salads and dairy products to be stored safely for longer periods, particularly during warm weather.

Main article: Frozen food

Freezing is also one of the most commonly used processes commercially and domestically for preserving a very wide range of food including prepared food stuffs which would not have required freezing in their unprepared state. For example, potato waffles are stored in the freezer, but potatoes themselves require only a cool dark place to ensure many months' storage. Cold stores provide large volume, long- term storage for strategic food stocks held in case of national emergency in many countries.

Heat treating

Main articles: Thermization, Pasteurization, and Sterilization (microbiology). This section requires expansion.

Vacuum packing

Vacuum-packing stores food in a vacuum environment, usually in an air-tight bag or bottle. The vacuum environment strips bacteria of oxygen needed for survival, slowing spoiling. Vacuum-packing is commonly used for storing nuts to reduce loss of flavor from oxidation.

Salt

Salting or curing draws moisture from the meat through a process of osmosis. Meat is cured with salt or sugar, or a combination of the two. Nitrates and nitrites are also often used to cure meat and contribute the characteristic pink color, as well as inhibition of Clostridium botulinum.

Sugar

Sugar is used to preserve fruits, either in syrup with fruit such as apples, pears, peaches, apricots, plums or in crystallized form where the preserved material is cooked in sugar to the point of crystallisation and the resultant product is then stored dry. This method is used for the skins of citrus fruit (candied peel), angelica and ginger. A modification of this process produces glacй fruit such as glacй cherries where the fruit is preserved in sugar but is then extracted from the syrup and sold, the preservation being maintained by the sugar content of the fruit and the superficial coating of syrup. The use of sugar is often combined with alcohol for preservation of luxury products such as fruit in brandy or other spirits. These should not be confused with fruit flavored spirits such as cherry brandy or Sloe gin.

Artificial food additives

Preservative food additives can be antimicrobial; which inhibit the growth of bacteria or fungi, including mold, or antioxidant; such as oxygen absorbers, which inhibit the oxidation of food constituents.

Freezing

Common antimicrobial preservatives include calcium propionate, sodium nitrate, sodium nitrite, sulfites (sulfur dioxide, sodium bisulfite, potassium hydrogen sulfite, etc.) and disodium EDTA. Antioxidants include BHA and BHT. Other preservatives include formaldehyde (usually in solution), glutaraldehyde (kills insects), ethanol and methylchloroisothiazolinone.

Pickling

Pickling is a method of preserving food in an edible anti-microbial liquid. Pickling can be broadly categorized as chemical pickling for example, In chemical pickling, the food is placed in an edible liquid that inhibits or kills bacteria and other micro-organisms. Typical pickling agents include brine (high in salt), vinegar, alcohol, and vegetable oil, especially olive oil but also many other oils. Many chemical pickling processes also involve heating or boiling so that the food being preserved becomes saturated with the pickling agent. Common chemically pickled foods include cucumbers, peppers, corned beef, herring, and eggs, as well mixed vegetables such as piccalilli.

In fermentation pickling, the food itself produces the preservation agent, typically by a process that produces lactic acid. Fermented pickles include sauerkraut, nukazuke, kimchi, surstromming, and curtido. Some pickled cucumbers are also fermented.

In commercial pickles, a preservative like sodium benzoate or EDTA may also be added to enhance shelf life.

Lye

Sodium hydroxide (lye) makes food too alkaline for bacterial growth. Lye will saponify fats in the food, which will change its flavor and texture. Lutefisk uses lye in its preparation, as do some olive recipes. Modern recipes for century eggs also call for lye. Masa harina and hominy use agricultural lime in their preparation and this is often misheard as 'lye'.

Canning and bottling preserved food

Canning involves cooking food, sealing it in sterile cans or jars, and boiling the containers to kill or weaken any remaining bacteria as a form of sterilization. It was invented by Nicolas Appert. Foods have varying degrees of natural protection against spoilage and may require that the final step occur in a pressure cooker. High-acid fruits like strawberries require no preservatives to can and only a short boiling cycle, whereas marginal fruits such as tomatoes require longer boiling and addition of other acidic elements. Low acid foods, such as vegetables and meats require pressure canning. Food preserved by canning or bottling is at immediate risk of spoilage once the can or bottle has been opened.

Spam is a canned and preserved meat product.

Lack of quality control in the canning process may allow ingress of water or microorganisms. Most such failures are rapidly detected as decomposition within the can causes gas production and the can will swell or burst. However, there have been examples of poor manufacture (underprocessing) and poor hygiene allowing contamination of canned food by the obligate anaerobe Clostridium botulinum, which produces an acute toxin within the food, leading to severe illness or death.

This organism produces no gas or obvious taste and remains undetected by taste or smell. Its toxin is denatured by cooking, though. Cooked mushrooms, handled poorly and then canned, can support the growth of Staphylococcus aureus, which produces a toxin that is not destroyed by canning or subsequent reheating.

Jellying

Food may be preserved by cooking in a material that solidifies to form a gel. Such materials include gelatine, agar, maize flour and arrowroot flour. Some foods naturally form a protein gel when cooked such as eels and elvers, and sipunculid worms which are a delicacy in the town of Xiamen in Fujian province of the People's Republic of China. Jellied eels are a delicacy in the East End of London where they are eaten with mashed potatoes. Potted meats in aspic, (a gel made from gelatine and clarified meat broth) were a common way of serving meat off-cuts in the UK until the 1950s. Many jugged meats are also jellied.

Potting

A traditional British way of preserving meat (particularly shrimp) is by setting it in a pot and sealing it with a layer of fat. Also common is potted chicken liver.

Jugging

Meat can be preserved by jugging, the process of stewing the meat (commonly game or fish) in a covered earthenware jug or casserole. The animal to be jugged is usually cut into pieces, placed into a tightly-sealed jug with brine or gravy, and stewed. Red wine and/or the animal's own blood is sometimes added to the cooking liquid. Jugging was a popular method of preserving meat up until the middle of the 20th century.

Irradiation

Irradiation of food is the exposure of food to ionizing radiation; either high-energy electrons or X-rays from accelerators, or by gamma rays (emitted from radioactive sources as Cobalt-60 or Caesium-13 7). The treatment has a range of effects, including killing bacteria, molds and insect pests, reducing the ripening and spoiling of fruits, and at higher doses inducing sterility. The technology may be compared to pasteurization; it is sometimes called 'cold pasteurization', as the product is not heated. Irradiation is not effective against viruses or prions, it cannot eliminate toxins already formed by microorganisms, and is only useful for food of high initial quality.Nitrogen gas (N2) at concentrations of 98% or higher is also used effectively to kill insects in grain through hypoxia. However, carbon dioxide has an advantage in this respect as it kills organisms through hypercarbia and depending on concentration hypoxia and, requiring concentrations of above 35%, or so. This makes carbon dioxide preferable for fumigation in situations where a hermetic seal cannot be maintained.

Burial of in the ground

Burial of food can preserve it due to a variety of factors: lack of light, lack of oxygen, cool temperatures, pH level, or desiccants in the soil. Burial may be combined with other methods such as salting or fermentation.Many root vegetables are very resistant to spoilage and require no other preservation than storage in cool

dark conditions, for example by burial in the ground, such as in a storage clamp.Century eggs are created by placing eggs in alkaline mud (or other alkaline substance) resulting in their "inorganic" fermentation through raised pH instead of spoiling. The fermentation preserves them and breaks down some of the complex, less flavorful proteins and fats into simpler more flavorful ones.

Most foods can be preserved in soil that is very dry and salty (thus a desiccant), or soil that is frozen.

Cabbage was traditionally buried in the fall in northern farms in the USA for preservation. Some methods keep it crispy while other methods produce sauerkraut [citation needed]. A similar process is used in the traditional production of kimchi.

Sometimes meat is buried under conditions which cause preservation. If buried on hot coals or ashes, the heat can kill pathogens, the dry ash can desiccate, and the earth can block oxygen and further contamination. If buried where the earth is very cold, the earth acts like a refrigerator.

Controlled use of micro-organism

Some foods, such as many cheeses, wines, and beers will keep for a long time because their production uses specific micro-organisms that combat spoilage from other less benign organisms. These micro-organisms keep pathogens in check by creating an environment toxic for themselves and other micro-organisms by producing acid or alcohol. Starter micro-organisms, salt, hops, controlled (usually cool) temperatures, controlled (usually low) levels of oxygen and/or other methods are used to create the specific controlled conditions that will support the desirable organisms that produce food fit for human consumption.

High pressure food preservation

High pressure food preservation refers to high pressure used for food preservation. "Pressed inside a vessel exerting 70,000 pounds per square inch (480 MPa) or more, food can be processed so that it retains its fresh appearance, flavour, texture and nutrients while disabling harmful microorganisms and slowing spoilage." By 2001, adequate commercial equipment was developed so that by 2005 the process was being used for products ranging from orange juice to guacamole to deli meats and widely sold.

Text 9.

Food drying

Many different foods are prepared by dehydration. Good examples are meat such as prosciutto (a.k.a. Parma ham), bresaola, and beef jerky. Dried and salted reindeer meat is a traditional Sami food. First the meat is soaked / pickled in saltwater for a couple of days to guarantee the conservation of the meat. Then the meat is dried in the sun in spring when the air temperature is below zero. The dried meat can be further processed to make soup.

Fruits change character completely when dried: the plum becomes a prune, the grape a raisin; figs and dates are also transformed in new, different products, that can be eaten as they are or else after rehydration.

Home drying of vegetables, fruit and even meat (to produce jerky) may be carried out by a do-it-yourself practice, employing electrical dehydrators (household appliance). If the user does not like to use additives as potassium metabisulphite, or BHA, BHT for meats, dried products may be hermetically shelf stored if it is to be consumed soon, or else in the refrigerator or even freezer if a long storage is to be expected. Freeze dried vegetables are often found in backpackers food, hunters, military, etc. The exception to this rule are bulbs, such as garlic and onion, which are often dried. Also chilis are frequently dried. Edible and psilocybin mushrooms, as well as other fungi, are also sometimes dried for preservation purposes, to affect the potency of chemical components, or so they can be used as seasonings.

For centuries, much of the European diet depended on dried cod, known as salt cod or bacalhau (with salt) or stockfish (without). It formed the main protein source for the slaves on the West Indian plantations, and was a major economic force within the triangular trade. Dried shark meat, known as Hakarl, is a delicacy in Iceland.

Grain drying This section does not cite any references or sources.

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Hundreds of millions of tonnes of wheat, corn, soybean, rice and other grains as sorghum, sunflower seeds, rapeseed/canola, barley, oats, etc., are dried in grain dryers. In the main agricultural countries, drying comprises the reduction of moisture from about 17-30%w/w to values between 8 and 15%w/w, depending on the grain.

The final moisture content for drying must be adequate for storage. The more oil the grain has, the lower its storage moisture content will be (though its initial moisture for drying will also be lower). Cereals are often dried to 14% w/w, while oilseeds, to 12.5% (soybeans), 8% (sunflower) and *9%* (peanuts). Drying is carried out as a requisite for safe storage, in order to inhibit microbial growth. However, low temperatures in storage are also highly recommended to avoid degradative reactions and, especially, the growth of insects and mites. A good maximum storage temperature is about 18°C. The largest dryers are normally used "Off-farm", in elevators, and are of the continuous type: Mixed-flow dryers are preferred in Europe, while Cross-flow dryers in the USA. In Argentina, both types are usually found. Continuous flow dryers may produce up to 100 metric tonnes of dried grain per hour. The depth of grain the air must traverse in continuous dryers range from some 0.15m in Mixed flow dryers to some 0.30 m in Cross-Flow. Batch dryers are mainly used "On-Farm", particularly in the USA and Europe. They normally consist of a bin, with heated air flowing horizontally from an internal cylinder through an inner perforated metal sheet, then through a annular grain bed, some 0.50 m thick (coaxial with the internal cylinder) in radial direction, and finally across the outer perforated metal sheet, before being discharged to the atmosphere. The usual drying times range from 1 h to 4 h depending on how much water must be removed, type of grain, air temperature and the grain depth. In the USA, continuous counterflow dryers may be found on-farm, adapting a bin to slowly drying grain fed at the top and removed at the bottom of the bin by a sweeping auger. Grain drying is an active area of manufacturing and research.

Now it is possible to simulate the performance of a dryer with computer programs based on equations (mathematical models) that represent the phenomena involved in drying: physics, physical chemistry, thermodynamics and heat and mass transfer. Most recently the evolution of quality indices is beginning to be predicted with some confidence, in order to add an essential performance parameter with which to establish a compromise of reasonably fast drying rate, limited energy consumption, and satisfactory grain quality. A typical quality parameter in wheat drying is the breadmaking quality and germination percentage whose reductions in drying are somewhat related.

Methods

There are many different methods for drying, each with their own advantages for particular applications; these include:

Bed dryers.
Drum drying.
Freeze Drying.
Shelf dryers.
Spray drying.
Sunlight.
Commercial food dehydrators.
Household oven.

Text 10.

Food freezing

Freezing food preserves food from the time it is prepared to the time it is eaten. Since early times, farmers, fishermen, and trappers have preserved their game in unheated buildings during the winter season. Freezing food slows down decomposition by turning water to ice, making it unavailable for most bacterial growth. In the food commodity industry, the process is called IQF or Individually Quick Frozen.

Clarence Birdseye, an American inventor, developed the quick-freezing system. He discovered that the combination of ice, wind, and low temperatures in the Arctic froze anything that was exposed to it almost instantly. Birdseye's soon realized that the quick freezing effectively prevented large ice crystals from forming. Other attempts had resulted in the formation of large crystals, which destroyed the delicate cellular structure of the food. With only an electric fan, a few buckets of brine, and cakes of ice, Clarence Birdseye perfected his system of packing fresh food into waxed cardboard boxes and flash-freezing it under high pressure. He sold the patent to the Goldman-Sachs Trading Corporation (a subsidiary of Goldman Sachs & Company) and the Postum Company. In 1929 the first quick-frozen vegetables were sold to the public.

Modern Techniques

Manufacturers freeze foods by immersing them in very cold liquids, liquid nitrogen being the preferred medium. Nitrogen liquefies at about -320 °F (-195.5 °C), making it useful for quickly freezing foods. When food is submerged in liquid nitrogen, it rapidly freezes. The faster food freezes, the smaller the crystals that form within it. High-Pressure Shift Freezing is another method used to manufacture frozen food. It uses the principles of water's phase diagram. At a very high pressure, 900MPa, ice may be formed at room temperature. This is not an efficient way to create frozen foods, but it is being researched for future use.
Dehydrofreezing is a commercial method used to reduce the cost of shipping, handling, and storage of fruits and vegetables. During dehydrofreezing, food is first dehydrated to the desired moisture level and then frozen. Fruits and vegetables have a higher water content than meats, which makes them more susceptible to the formation of large ice crystals. Dehydrofreezing gives the manufacturer peace of mind and keeps produce fresher.

Preservatives

Frozen foods don't require many preservatives because the process of preparing the food for freezing kills much of the bacteria living on the food. Carboxymethylcellulose (CMC) is used as a stabilizer in frozen foods because of its tasteless and odorless properties.

Packaging

Frozen food packaging must maintain its integrity throughout machine filling, sealing, freezing, storage, transportation, thawing, and often cooking. [8] Most frozen foods are cooked in a microwave oven. To make it easier for the consumer, manufacturers have developed packaging that can go straight from freezer to microwave.
In 1974, the first differential heating container (DHC) was sold to the public. A DHC is a sleeve of metal designed to allow frozen foods to receive the correct amount of heat. Various sized apertures were positioned around the sleeve. The consumer would put the frozen dinner into the sleeve according to what needed the most heat. This ensured proper cooking.
Today there are multiple options for packaging frozen foods. Boxes, cartons, bags, pouches, heat-in-bag pouches, lidded trays and pans, crystallized PET trays, and composite and plastic cans.
Scientists are continually researching new aspects of frozen food packaging. Active packaging offers a host of new technologies that can actively sense and then neutralize the presence of bacteria or other harmful species. Active packaging can extend shelf-life, maintain product safety, and help preserve the food over a longer period of time. Several functions of active packaging are being researched:
Oxygen scavengers.

Time.
Temperature indicators.
Digital temperature dataloggers.
Antimicrobials Carbon Dioxide controllers.
Microwave susceptors.
Moisture control.
Water activity.
Moisture vapor transmission rate.
Flavor enhancers.
Oder generators.
Oxygen-permeable films.
Oxygen generators.
Validation of cold chain.
With these new technologies, food may last longer and our knowledge about its safety will increase.

Effects on Nutrients.Vitamin Content of Frozen Foods

-Vitamin C: Usually lost in a higher concentration than any other vitamin.A study was performed on peas to determine the cause of Vitamin C loss. A vitamin loss often percent occurred during the blanching phase with the rest of the loss occurring during the cooling and washing stages.The vitamin loss was not actually accredited to the freezing process. Another experiment was performed involving peas and frozen vegetable were stored at -10 °F and the canned vegetables were stored at room temperature (75 °F). After 0, 3, 6, and 12 months of storage, the vegetables were analyzed with and without cooking. O'Hara, the scientist performing the experiment said, "From the view point of the vitamin content of the two vegetables when they were ready for the plate of the consumer, there did not appear to be any marked advantages attributable to method of preservation, frozen storage, processed in a tin, or processed in glass."
-Vitamin B1 (Thiamin): A vitamin loss of 25 percent is normal. Thiamin is easily soluble in water and is destroyed by heat.
-Vitamin B2 (Riboflavin): Not much research has been done to see how much freezing affects Riboflavin levels. One study found an 18 percent vitamin loss in green vegetables while another found a 4 percent loss. It is commonly accepted that the loss of Riboflavin has to do with the preparation for freezing rather than the actual freezing process itself.
-Vitamin A (Carotene): There is little loss of Carotene during preparation for freezing and freezing of most vegetables. However, there is a danger of losing the vitamin during a long-continued storage period.

Efficiency

Freezing is an effective form of food preservation because the pathogens that cause food spoilage are killed or do not grow very rapidly at reduced temperatures. The process is less effective in food preservation than are thermal techniques, such as boiling, because pathogens are more likely to be able to survive cold temperatures rather than hot temperatures. One of the problems surrounding the use of freezing as a method of food preservation is the danger that pathogens deactivated (but not killed) by the process will once again become active when the frozen food thaws.
Foods may be preserved for several months by freezing. Long-term frozen storage requires a constant temperature of -18 °C (0 °F) or less. Some freezers cannot achieve such a low temperature. The time food can be kept in the freezer is reduced considerably if the temperature in a freezer fluctuates; small ice crystals thaw as the temperature moves up, and re freeze onto larger crystals as the temperature declines. Fluctuations can occur by a small gap in the freezer door or adding a large amount of unfrozen food.

Text 11.

Sterilization (microbiology)

Sterilization is a term referring to any process that eliminates or kills all forms of life, including transmissible agents present on a surface, contained in a fluid, in medication, or in a compound such as biological culture media. Sterilization can be achieved by applying the proper combinations of heat, chemicals, irradiation, high pressure, and filtration.
The term has evolved to include the disabling or destruction of infectious proteins such as Prions related to Transmissible Spongiform Encephalopathies (TSE).

Foods

One of the first steps toward sterilization was made by Nicolas Appert.
He learned that thorough cooking (applying a suitable amount of heat over a suitable period of time) slowed the decay of foods and various liquids, preserving them for safe consumption for a longer time than was typical. Canning of foods is an extension of the same principle, and has helped to reduce food borne illness ("food poisoning"). Other methods of sterilizing foods include food irradiation and pascalization (the use of high pressure to kill microorganisms).

Medicine and Surgery

In general, surgical instruments and medications that enter an already aseptic part of the body (such as the bloodstream, or penetrating the skin) must be sterilized to a high sterility assurance level or SAL. Examples of such instruments include scalnels hypodermic needles and artificial pacemakers. This is also essential in the manufacture of parenteral pharmaceuticals.

Heat (flame) sterilization of medical instruments is known to have been used in Ancient Rome, but it mostly disappeared throughout the Middle Ages resulting in significant increases in disability and death following surgical procedures.

Preparation of injectable medications and intravenous solutions for fluid replacement therapy requires not only a high sterility assurance level, but also well-designed containers to prevent entry of adventitious agents after initial product sterilization.

Sterilization as a definition terminates all life; whereas sanitization and disinfection terminates selectively and partially. Both sanitization and disinfection reduce the number of targeted [pathogenic] organisms to what are considered "acceptable" levels - levels that a reasonably healthy, intact, body can deal with. An example of this class of process is Pasteurization.

Heat sterilization

Steam sterilization utensils

A widely-used method for heat sterilization is the autoclave, sometimes called a converter. Autoclaves commonly use steam heated to 121-134 °C (250-273 °F). To achieve sterility, a holding time of at least 15 minutes at 121 °C (250 °F) or 3 minutes at 134 °C (273 °F) is required. Additional sterilizing time is usually required for liquids and instruments packed in layers of cloth, as they may take longer to reach the required temperature (unnecessary in machines that grind the contents prior to sterilization). Following sterilization, liquids in a pressurized autoclave must be cooled slowly to avoid boiling over when the pressure is released. Modern converters operate around this problem by gradually depressing the sterilization chamber and allowing liquids to evaporate under a negative pressure, while cooling the contents. Some example of uses in the UK market can be found on Astell Scientifics website, although there are varying applications in both the size of the autoclave required and the media being sterilized.

Proper autoclave treatment will inactivate all fungi, bacteria, viruses and also bacterial spores, which can be quite resistant. It will not necessarily eliminate all prions.

For prion elimination, various recommendations state 121-132 °C (250-270 °F) for 60 minutes or 134 °C (273 °F) for at least 18 minutes. The prion that causes the disease scrapie (strain 263K) is inactivated relatively quickly by such sterilization procedures; however, other strains of scrapie, as well as strains of CJD and BSE are more resistant. Using mice as test animals, one experiment showed that heating BSE positive brain tissue at 134-138 °C (273-280 °F) for 18 minutes resulted in only a 2.5 log decrease in prion infectivity. (The initial BSE concentration in the tissue was relatively low). For a significant margin of safety, cleaning should reduce infectivity by 4 logs, and the sterilization method should reduce it a further 5 logs.

To ensure the autoclaving process was able to cause sterilization, most autoclaves have meters and charts that record or display pertinent information such as temperature and pressure as a function of time. Indicator tape is often placed on packages of products prior to autoclaving. A chemical in the tape will change color

when the appropriate conditions have been met. Some types of packaging have built- in indicators on them.

Biological indicators ("bioindicators") can also be used to independently confirm autoclave performance. Simple bioindicator devices are commercially available based on microbial spores. Most contain spores of the heat resistant microbe Geobacillus stearothermophilus (formerly Bacillus stearothermophilus), among the toughest organisms for an autoclave to destroy. Typically these devices have a self-contained liquid growth medium and a growth indicator. After autoclaving an internal glass ampule is shattered, releasing the spores into the growth medium. The vial is then incubated (typically at 56 °C (133 °F)) for 24 hours. If the autoclave destroyed the spores, the medium will retain its original color. If autoclaving was unsuccessful the B. sterothermophilus will metabolize during incubation, causing a color change during the incubation.

For effective sterilization, steam needs to penetrate the autoclave load uniformly, so an autoclave must not be overcrowded, and the lids of bottles and containers must be left ajar. Alternatively steam penetration can be achieved by shredding the waste in some autoclave models that also render the end product.

Indicators should be placed in the most difficult places for the steam to reach to ensure that steam actually penetrates there.

For autoclaving, as for all disinfection or sterilization methods, cleaning is critical. Extraneous biological matter or grime may shield organisms from the property intended to kill them, whether it physical or chemical. Cleaning can also remove a large number of organisms. Proper cleaning can be achieved by physical scrubbing. This should be done with detergent and warm water to get the best results. Cleaning instruments or utensils with organic matter, cool water must be used because warm or hot water may cause organic debris to coagulate. Treatment with ultrasound or pulsed air can also be used to remove debris.

Food

Although imperfect, cooking and canning are the most common applications of heat sterilization. Boiling water kills the vegetative stage of all common microbes. Roasting meat until it is well done typically completely sterilizes the surface. Since the surface is also the part of food most likely to be contaminated by microbes, roasting usually prevents food poisoning. Note that the common methods of cooking food do not sterilize food - they simply reduce the number of disease-causing microorganisms to a level that is not dangerous for people with normal digestive and immune systems.

Pressure cooking is analogous to autoclaving and when performed correctly renders food sterile. However, some foods are notoriously difficult to sterilize with home canning equipment, so expert recommendations should be followed for home processing to avoid food poisoning.

Other methods

Other heat methods include flaming, incineration, boiling, tindalization, and using dry heat.

Flaming is done to loops and straight-wires in microbiology labs. Leaving the loop in the flame of a Bunsen burner or alcohol lamp until it glows red ensures that any

infectious agent gets inactivated. This is commonly used for small metal or glass objects, but not for large objects (see Incineration below). However, during the initial heating infectious material may be "sprayed" from the wire surface before it is killed, contaminating nearby surfaces and objects. Therefore, special heaters have been developed that surround the inoculating loop with a heated cage, ensuring that such sprayed material does not further contaminate the area. Another problem is that gas flames may leave residues on the object, e.g. carbon, if the object is not heated enough.

A variation on flaming is to dip the object in 70% ethanol (or a higher concentration) and merely touch the object briefly to the Bunsen burner flame, but not hold it in the gas flame. The ethanol will ignite and burn off in a few seconds. 70% ethanol kills many, but not all, bacteria and viruses, and has the advantage that it leaves less residue than a gas flame. This method works well for the glass "hockey stick"-shaped bacteria spreaders.

Incineration will also burn any organism to ash. It is used to sanitize medical and other biohazardous waste before it is discarded with non-hazardous waste.

During the initial heating of the chamber, boiling in water for fifteen minutes will kill most vegetative bacteria and inactivate viruses, but boiling is ineffective against prions and many bacterial and fungal spores; therefore boiling is unsuitable for sterilization. However, since boiling does kill most vegetative microbes and viruses, it is useful for reducing viable levels if no better method is available. Boiling is a simple process, and is an option available to most people, requiring only water, enough heat, and a container that can withstand the heat; however, boiling can be hazardous and cumbersome.

Tindalization/Tyndallization named after John Tyndall is a lengthy process designed to reduce the level of activity of sporulating bacteria that are left by a simple boiling water method. The process involves boiling for a period (typically 20 minutes) at atmospheric pressure, cooling, incubating for a day, boiling, cooling, incubating for a day, boiling, cooling, incubating for a day, and finally boiling again. The three incubation periods are to allow heat-resistant spores surviving the previous boiling period to germinate to form the heat-sensitive vegetative (growing) stage, which can be killed by the next boiling step. This is effective because many spores are stimulated to grow by the heat shock. The procedure only works for media that can support bacterial growth - it will not sterilize plain water. Tindalization/tyndallization is ineffective against prions.

Dry heat sterilisator

Dry heat can be used to sterilize items, but as the heat takes much longer to be transferred to the organism, both the time and the temperature must usually be increased, unless forced ventilation of the hot air is used. The standard setting for a hot air oven is at least two hours at 160 °C (320 °F). A rapid method heats air to 190 °C (374 °F) for 6 minutes for unwrapped objects and 12 minutes for wrapped objects. Dry heat has the advantage that it can be used on powders and other heat-stable items that are adversely affected by steam (for instance, it does not cause rusting of steel objects).

Prions can be inactivated by immersion in sodium hydroxide (NaOH 0.09N) for two hours plus one hour autoclaving (121 °C/250 °F). Several investigators have shown complete (>7.4 logs) inactivation with this combined treatment. However, sodium hydroxide may corrode surgical instruments, especially at the elevated temperatures of the autoclave.

Glass bead sterilizer, once a common sterilization method employed in dental offices as well as biologic laboratories, is not approved by the U.S. Food and Drug Administration (FDA) and Centers for Disease Control and Prevention (CDC) to be used as inter-patients sterilizer since 1997. Still it is popular in European as well as Israeli dental practice although there are no current evidence-based guidelines for using this sterilizer.

Chemical sterilization

Chemicals are also used for sterilization. Although heating provides the most reliable way to rid objects of all transmissible agents, it is not always appropriate, because it will damage heat-sensitive materials such as biological materials, fiber optics, electronics, and many plastics. Low temperature gas sterilizers function by exposing the articles to be sterilized to high concentrations (typically 5 - 10% v/v) of very reactive gases (alkylating agents such as ethylene oxide, and oxidizing agents such as hydrogen peroxide and ozone). Liquid sterilants and high disinfectants typically include oxidizing agents such as hydrogen peroxide and peracetic acid and aldehydes such as glutaraldehyde and more recently o-phthalaldehyde. While the use of gas and liquid chemical sterilants/high level disinfectants avoids the problem of heat damage, users must ensure that article to be sterilized is chemically compatible with the sterilant being used. The manufacturer of the article can provide specific information regarding compatible sterilants. In addition, the use of chemical sterilants poses new challenges for workplace safety. The chemicals used as sterilants are designed to destroy a wide range of pathogens and typically the same properties that make them good sterilants makes them harmful to humans. Employers have a duty to ensure a safe work environment (Occupational Safety and Health Act of 1970, section 5 for United States) and work practices, engineering controls and monitoring should be employed appropriately.

Ethylene Oxide

Ethylene oxide (EO or EtO) gas is commonly used to sterilize objects sensitive to temperatures greater than 60 °C and / or radiation such as plastics, optics and electrics. Ethylene oxide treatment is generally carried out between 30 °C and 60 °C with relative humidity above 30% and a gas concentration between 200 and 800 mg/1, and typically lasts for at least three hours. Ethylene oxide penetrates well, moving through paper, cloth, and some plastic films and is highly effective. EtO can kill all known viruses, bacteria and fungi, including bacterial spores and is compatible with most materials (e.g. of medical devices), even when repeatedly applied. However, it is highly flammable, toxic and carcinogenic.

A typical process consists of a preconditioning phase, the actual sterilization run and a period of post-sterilization aeration to remove toxic residues, such as ethylene oxide residues and by-products such ethylene glycol (formed out of EtO

and ambient humidity) and ethylene chlorohydrine (formed out of EtO and materials containing chlorine, such as PVC). Besides moist heat and irradiation, ethylene oxide is the most common sterilization method, used for over 70% of total sterilizations, and for 50% of all disposable medical devices.

The two most important ethylene oxide sterilization methods are: (1) the gas chamber method and (2) the micro-dose method. To benefit from economies of scale, EtO has traditionally been delivered by flooding a large chamber with a combination of EtO and other gases used as dilutants (usually CFCs or carbon dioxide). This method has drawbacks inherent to the use of large amounts of sterilant being released into a large space, including air contamination produced by CFCs and/or large amounts of EtO residuals, flammability and storage issues calling for special handling and storage, operator exposure risk and training costs.

Ethylene oxide is still widely used by medical device manufacturers for larger scale sterilization (e.g. by the pallet), but while still used, EtO is becoming less popular in hospitals. Since EtO is explosive from its lower explosive limit of 3% all the way to 100%, EtO was traditionally supplied with an inert carrier gas such as a CFC or halogenated hydrocarbon. The use of CFCs as the carrier gas was banned because of concerns of ozone depletion and halogenated hydrocarbons are being replaced by so- called 100% EtO systems because of the much greater cost of the blends. In hospitals, most EtO sterilizers use single use cartridges (e.g. 3M's Steri-Vac line, or Steris Corporation's Stericert sterilizers) because of the convenience and ease of use compared to the former plumbed gas cylinders of EtO blends. Another 100%) method is the so-called micro-dose sterilization method, developed in the late 1950s, using a specially designed bag to eliminate the need to flood a larger chamber with EtO. This method is also known as gas diffusion sterilization, or bag sterilization. This method minimizes the use of gas.

Another reason for the decrease in use of EtO are the well known health effects. In addition to being a primary irritant, EtO is now classified by the IARC as a known human carcinogen. The US OSHA has set the permissible exposure limit (PEL) at 1 ppm calculated as an eight hour time weighted average (TWA) [29 CFR 1910.1047] and 5 ppm as a 15 minute TWA. The NIOSH Immediately dangerous to life and health limit for EtO is 800 ppm. The odor threshold is around 500 ppm and so EtO is imperceptible until concentrations well above the OSHA PEL. Therefore, OSHA recommends that some kind of continuous gas monitoring system be used to protect workers using EtO for sterilization. While the hazards of EtO are generally well known, it should be noted that all chemical sterilants are designed to kill a broad spectrum of organisms, by exposing them to high concentrations of reactive chemicals. Therefore, it is no surprise that all the common chemical gas sterilants are toxic and adequate protective measures must be taken to protect workers using these materials.

Ozone

Ozone is used in industrial settings to sterilize water and air, as well as a disinfectant for surfaces. It has the benefit of being able to oxidize most organic matter. On the other hand, it is a toxic and unstable gas that must be produced on-site, so it is not practical to use in many settings.

Ozone offers many advantages as a sterilant gas; ozone is a very efficient sterilant because of its strong oxidizing properties (E = 2.076 vs SHE, CRC Handbook of Chemistry and Physics, 76th Ed, 1995-1996) capable of destroying a wide range of pathogens, including prions without the need for handling hazardous chemicals since the ozone is generated within the sterilizer from medical grade oxygen. In 2005 a Canadian company called TS03 Inc received FDA clearance to sell an ozone sterilizer for use in healthcare. The high reactivity of ozone means that waste ozone can be destroyed by passing over a simple catalyst that reverts it back to oxygen and also means that the cycle time is relatively short (about 4.5 hours for TS03's model 125L). The downside of using ozone is that the gas is very reactive and very hazardous. The NIOSH immediately dangerous to life and health limit for ozone is 5 ppm, much 160 times smaller than the 800 ppm IDLH for ethylene oxide.Documentation for Immediately Dangerous to Life or Health Concentrations (IDLH): NIOSH Chemical Listing and Documentation of Revised IDLH Values (as of 3/1/95) and OSHA has set the PEL for ozone at 0.1 ppm calculated as an eight hour time weighted average (29 CFR 1910.1000, Table Z-l). The Canadian Center for Occupation Health and Safety provides an excellent summary of the health effects of exposure to ozone. The sterilant gas manufacturers include many safety features in their products but prudent practice is to provide continuous monitoring to below the OSHA PEL to provide a rapid warning in the event of a leak and monitors for determining workplace exposure to ozone are commercially available.

Bleach

Chlorine bleach is another accepted liquid sterilizing agent. Household bleach consists of 5.25% sodium hypochlorite. It is usually diluted to 1/10 immediately before use; however to kill Mycobacterium tuberculosis it should be diluted only 1/5, and 1/2.5 (1 part bleach and 1.5 parts water) to inactivate prions. The dilution factor must take into account the volume of any liquid waste that it is being used to sterilize. Bleach will kill many organisms immediately, but for full sterilization it should be allowed to react for 20 minutes. Bleach will kill many, but not all spores. It is also highly corrosive.
Bleach decomposes over time when exposed to air, so fresh solutions should be made daily.

Glutaraldehyde and Formaldehyde

Glutaraldehyde and formaldehyde solutions (also used as fixatives) are accepted liquid sterilizing agents, provided that the immersion time is sufficiently long. To kill all spores in a clear liquid can take up to 22 hours with glutaraldehyde and even longer with formaldehyde. The presence of solid particles may lengthen the required period or render the treatment ineffective. Sterilization of blocks of tissue can take much longer, due to the time required for the fixative to penetrate. Glutaraldehyde and formaldehyde are volatile, and toxic by both skin contact and inhalation. Glutaraldehyde has a short shelf life (<2 weeks), and is expensive.

Formaldehyde is less expensive and has a much longer shelf life if some methanol is added to inhibit polymerization to paraformaldehyde, but is much more volatile. Formaldehyde is also used as a gaseous sterilizing agent; in this case, it is prepared on-site by depolymerization of solid paraformaldehyde. Many vaccines, such as the original Salk polio vaccine, are sterilized with formaldehyde.

Phthalaldehyde

Ortho-phthalaldehyde (OPA) is a chemical sterilizing agent that received Food and Drug Administration (FDA) clearance in late 1999. Typically used in a 0.55% solution, OPA shows better myco-bactericidal activity than glutaraldehyde. It also is effective against glutaraldehyde-resistant spores. OPA has superior stability, is less volatile, and does not irritate skin or eyes, and it acts more quickly than glutaraldehyde. On the other hand, it is more expensive, and will stain proteins (including skin) gray in color. Some side effects from equipment sterilized using this reagent have been reported.

Hydrogen Peroxide

Hydrogen peroxide is another chemical sterilizing agent. It is relatively non-toxic when diluted to low concentrations, such as the familiar 3% retail solutions although hydrogen peroxide is a dangerous oxidizer at high concentrations (> 10% w/w). Hydrogen peroxide is strong oxidant and these oxidizing properties allow it to destroy a wide range of pathogens and it is used to sterilize heat or temperature sensitive articles such as rigid endoscopes. In medical sterilization hydrogen peroxide is used at higher concentrations, ranging from around 35% up to 90%. The biggest advantage of hydrogen peroxide as a sterilant is the short cycle time. Whereas the cycle time for ethylene oxide (discussed above) may be 10 to 15 hours, the use of very high concentrations of hydrogen peroxide allows much shorter cycle times. Some hydrogen peroxide modern sterilizers, such as the Sterrad NX have a cycle time as short as 28 minutes.

Hydrogen peroxide sterilizers have their drawbacks. Since hydrogen peroxide is a strong oxidant, there are material compatibility issues and users should consult the manufacturer of the article to be sterilized to ensure that it is compatible with this method of sterilization. Paper products cannot be sterilized in the Sterrad system because of a process called cellulostics, in which the hydrogen peroxide would be completely absorbed by the paper product. The penetrating ability of hydrogen peroxide is not as good as ethylene oxide and so there are limitations on the length and diameter of lumens that can be effectively sterilized and guidance is available from the sterilizer manufacturers.

While hydrogen peroxide offers significant advantages in terms of throughput, as with all sterilant gases, sterility is achieved through the use of high concentrations of reactive gases. Hydrogen peroxide is primary irritant and the contact of the liquid solution with skin will cause bleaching or ulceration depending on the concentration and contact time. The vapor is also hazardous with the target organs

being the eyes and respiratory system. Even short term exposures can be hazardous and NIOSH has set the Immediately Dangerous to Life and Health Level (IDLH) at 75 ppm. less than one tenth the IDLH for ethylene oxide (800 ppm). Prolonged exposure to even low ppm concentrations can cause permanent lung damage and consequently OSHA has set the permissible exposure limit to 1.0 ppm, calculated as an 8 hour time weighted average (29 CFR 1910.1000 Table Z-l). Employers thus have a legal duty to ensure that their personnel are not exposed to concentrations exceeding this PEL. Even though the sterilizer manufacturers go to great lengths to make their products safe through careful design and incorporation of many safety features, workplace exposures of hydrogen peroxide from gas sterilizers are documented in the FDA MAUDE database. When using any type of gas sterilizer, prudent work practices will include good ventilation (10 air exchanges per hour), a continuous gas monitor for hydrogen peroxide as well as good work practices and training. Further information about the health effects of hydrogen peroxide and good work practices is available from OSHA and the ATSDR. Hydrogen peroxide can also be mixed with formic acid as needed in the Endoclens device for sterilization of endoscopes. This device has two independent asynchronous bays, and cleans (in warm detergent with pulsed air), sterilizes and dries endoscopes automatically in 30 minutes. Studies with synthetic soil with bacterial spores showed the effectiveness of this device.

Dry sterilization process

Dry sterilization process (DSP) uses hydrogen peroxide at a concentration of 30-35% under low pressure conditions. This process achieves bacterial reduction of 10-6... 10-8. The complete process cycle time is just 6 seconds, and the surface temperature is increased only 10-15 °C (18 to 27 °F). Originally designed for the sterilization of plastic bottles in the beverage industry, because of the high germ reduction and the slight temperature increase the dry sterilization process is also useful for medical and pharmaceutical applications.

Peracetic acid

Peracetic acid (0.2%) is used to sterilize instruments in the Steris system.

Prions

Prions are highly resistant to chemical sterilization. Treatment with aldehydes (e.g., formaldehyde) have actually been shown to increase prion resistance. Hydrogen peroxide (3%) for one hour was shown to be ineffective, providing less than 3 logs (10-3) reduction in contamination. Iodine, formaldehyde, glutaraldehyde and peracetic acid also fail this test (one hour treatment). Only chlorine, a phenolic compound, guanidinium thiocyanate, and sodium hydroxide (NaOH) reduce prion levels by more than 4 logs. Chlorine and NaOH are the most

consistent agents for prions. Chlorine is too corrosive to use on certain objects. Sodium hydroxide has had many studies showing its effectiveness.

Silver

Silver ions and silver compounds show a toxic effect on some bacteria, viruses, algae and fungi, typical of heavy metals like lead or mercury, but without the high toxicity to humans that is normally associated with these other metals. Its germicidal effects kill many microbial organisms in vitro, but testing and standardization of silver products is yet difficult.

Hippocrates, the father of modern medicine, wrote that silver had beneficial healing and anti-disease properties, and the Phoenicians used to store water, wine, and vinegar in silver bottles to prevent spoiling. In the early 1900s people would put silver dollars in milk bottles to prolong the milk's freshness. The exact process of silver's germicidal effect is still not well understood. One of the explanations is the oligodynamic effect, which accounts for the effect on microorganisms but not on viruses.

Silver compounds were used to prevent infection in World War I before the advent of antibiotics. Silver nitrate solution was a standard of care but was largely replaced by silver sulfadiazine cream (SSD Cream), which was generally the "standard of care" for the antibacterial and antibiotic treatment of serious burns until the late 1990s. Now, other options, such as silver-coated dressings (activated silver dressings), are used in addition to SSD cream. However, the evidence for the use of such silver- treated dressings is mixed and although the evidence on if they are effective is promising, it is marred by the poor quality of the trials used to assess these products.Consequently a major systematic review by the Cochrane Collaboration found insufficient evidence to recommend the use of silver-treated dressings to treat infected wounds.

The widespread use of silver went out of fashion with the development of antibiotics. However, recently there has been renewed interest in silver as a broad-spectrum antimicrobial. In particular, silver is being used with alginate, a naturally occurring biopolymer derived from seaweed, in a range of products designed to prevent infections as part of wound management procedures, particularly applicable to burn victims. In 2007, AGC Flat Glass Europe introduced the first antibacterial glass to fight hospital-caught infection: it is covered with a thin layer of silver. In addition, Samsung has introduced washing machines with a final rinse containing silver ions to provide several days of antibacterial protection in the clothes. Kohler has introduced a line of toilet seats that have silver ions embedded to kill germs. A company called Thomson Research Associates has begun treating products with Ultra Fresh, an antimicrobial technology involving "proprietary nano-technology to produce the ultra- fine silver particles essential to ease of application and long-term protection.' ' The U.S. Food and Drug Administration (FDA) has recently approved an endotracheal breathing tube with a fine coat of silver for use in mechanical ventilation, after studies found it reduced the risk of ventilator-associated pneumonia.

It has long been known that antibacterial action of silver is enhanced by the presence of an electric field. Applying a few volts of electricity across silver electrodes drastically enhances the rate that bacteria in solution are killed. It was found recently that the antibacterial action of silver electrodes is greatly improved if the electrodes are covered with silver nanorods. Note that enhanced antibacterial properties of nanoparticles compared to bulk material is not limited to silver, but has also been demonstrated on other materials such as ZnO.

Radiation sterilization

Methods of sterilization exist using radiation such as electron beams, X-rays, gamma rays, or subatomic particles.

Gamma rays are very penetrating and are commonly used for sterilization of disposable medical equipment, such as syringes, needles, cannulas and IV sets. Gamma radiation requires bulky shielding for the safety of the operators; they also require storage of a radioisotope (usually Cobalt-60), which continuously emits gamma rays (it cannot be turned off, and therefore always presents a hazard in the area of the facility).

Electron beam processing is also commonly used for medical device sterilization. Electron beams use an on-off technology and provide a much higher dosing rate than gamma or x-rays. Due to the higher dose rate, less exposure time is needed and thereby any potential degradation to polymers is reduced. A limitation is that electron beams are less penetrating than either gamma or X-rays.

X-rays, High-energy X-rays (bremsstrahlung) are a form of ionizing energy allowing to irradiate large packages and pallet loads of medical devices. Their penetration is sufficient to treat multiple pallet loads of low-density packages with very good dose uniformity ratios. X-ray sterilization is an electricity based process not requiring chemical nor radio-active material. High energy and high power X-rays are generated by an X-ray machine that can be turned off for servicing and when not in use.

Ultraviolet light irradiation (UV, from a germicidal lamp) is useful only for sterilization of surfaces and some transparent objects. Many objects that are transparent to visible light absorb UV. UV irradiation is routinely used to sterilize the interiors of biological safety cabinets between uses, but is ineffective in shaded areas, including areas under dirt (which may become polymerized after prolonged irradiation, so that it is very difficult to remove). It also damages some plastics, such as polystyrene foam if exposed for prolonged periods of time.

Further information: Ultraviolet germicidal irradiation.

Subatomic particles may be more or less penetrating, and may be generated by a radioisotope or a device, depending upon the type of particle.

Irradiation with X-rays or gamma rays does not make materials radioactive. Irradiation with particles may make materials radioactive, depending upon the type of particles and their energy, and the type of target material: neutrons and very high- energy particles can make materials radioactive, but have good penetration,

whereas lower energy particles (other than neutrons) cannot make materials radioactive, but have poorer penetration.
Sterlization by irradiation with gamma rays may however in some cases affect material properties.
Irradiation is used by the United States Postal Service to sterilize mail in the Washington, DC area. Some foods (e.g. spices, ground meats) are irradiated for sterilization.

Sterile filtration

Clear liquids that would be damaged by heat, irradiation or chemical sterilization can be sterilized by mechanical filtration. This method is commonly used for sensitive pharmaceuticals and protein solutions in biological research. A filter with pore size 0.2 jum will effectively remove bacteria. If viruses must also be removed, a much smaller pore size around 20 nm is needed. Solutions filter slowly through membranes with smaller pore diameters. Prions are not removed by filtration.
Filters can be made of several different materials such as nitrocellulose or polyethersulfone (PES). The filtration equipment and the filters themselves may be purchased as pre-sterilized disposable units in sealed packaging, or must be sterilized by the user, generally by autoclaving at a temperature that does not damage the fragile filter membranes. To ensure sterility, the filter membranes need testing for punctures made during or prior to use. For best results, pharmaceutical sterile filtration is performed in a room with highly filtered air.
Cleaning methods that do not achieve sterilization:
This is a brief list of cleaning methods that may be thought to "kill germs" but do not achieve sterilization.
Washing in a dishwasher: Dishwashers often only use hot tap water or heat the water to between 49 and 60 °C (120 and 140 °F), which is not hot enough to kill some bacteria on cooking or eating utensils.
Bathing can not sterilize skin, even using antibacterial soap.
Disinfectants (for non-living objects) or antiseptics (for living objects such as skin) can kill or remove bacteria and viruses, but not all.
Pasteurization of food also kills some bacteria and viruses, but not all.

Text 12.

Vacuum packing

Vacuum packing is a method of storing food and presenting it for sale. Appropriate types of food are stored in an airless environment, usually in an air-tight pack or bottle to prevent the growth of microorganisms. The vacuum environment removes atmospheric oxygen, protecting the food from spoiling by limiting the growth of aerobic bacteria or fungi, and preventing the evaporation of volatile components. Vacuum packing is commonly used for long-term storage of dry foods such as cereals, nuts, cured meats, cheese, smoked fish, coffee, and potato chips (crisps). It

is also for storage of fresh foods such as vegetables, meats, and liquids such as soups in a shorter term because vacuum condition cannot stop bacteria from getting water which can promote their growth. Vacuum packaging food can extend its life by up to 3-5 times.

Vacuum packing is also used to reduce greatly the bulk of non-food items. For example, clothing and bedding can be stored in bags evacuated with a domestic vacuum cleaner or a dedicated vacuum sealer. This technique is sometimes used to compact household waste, for example where a charge is made for each full bag collected. Vacuum packing can be used to reduce bulk of .inflatable items as well.

Vacuum packaging products using plastic bags, canisters, bottles, or mason jars are available for home use.

Vacuum packaging delicate food items can be done by using an inert gas kit, typically available on chamber vacuum sealers. After air has been removed, an inert gas (such as nitrogen) is added to maintain the preservation of packaged food while preventing damage. An example of inert gas for packaging delicate foods is potato chips.

External Sealers

External vacuum sealers involve a bag being attached to the vacuum-sealing machine externally. The machine will remove the air and seal the bag, which is all done outside the machine.

Chamber Sealers

Chamber sealers require the entire product to be placed within the machine. Like external sealers, a plastic bag is typically used for packaging. Once the product is placed in the machine, the lid is closed and air is removed. Once the air is removed, the bag is sealed and the atmosphere within the chamber is returned back to normal. The lid is then opened and the product removed. Chamber sealers are typically used for higher-volume packaging.

Manufacturers of chamber type vacuum packing machines include: Cryovac, Multivac, Sammic, VC999, Sevana and several others.

Preventing Freezer Burn

When foods are frozen without preparation, freezer burn can occur. It happens when the surface of the food is dehydrated, and this leads to a dried and leathery appearance. Freezer burn also ruins the flavor and texture of foods. Vacuum packing prevents freezer burn by preventing the food from exposure to the cold, dry air.

Sous-vide Cooking

Vacuum packaging also allows for a special cooking method, Sous-vide. Sous-vide, meaning "under vacuum" in French, involves poaching food that is vacuum sealed in a plastic bag.

Security

Due to an oxygen-poor environment, anaerobic microorganism can proliferate, so vacuum packing is often used in combination with other treatment.

Text 13.

Freeze-drying

Freeze-drying (also known as lyophilisation, lyophilization or cryodesiccation) is a dehydration process typically used to preserve a perishable material or make the material more convenient for transport. Freeze-drying works by freezing the material and then reducing the surrounding pressure and adding enough heat to allow the frozen water in the material to sublime directly from the solid phase to the gas phase. The origins of freeze drying.

Freeze-drying was first actively developed during WWII. Serum being sent to Europe for medical treatment of the wounded required refrigeration. Due to the lack of available refrigeration, many serum supplies were spoiling before reaching the intended recipients. The freeze-drying process was developed as a commercial technique that enabled serum to be rendered chemically stable and viable without having to be refrigerated. Shortly thereafter, the freeze dry process was applied to penicillin and bone, and lyophilization became recognized as an important technique for preservation of biologicals. Since that time, freeze-drying has been used as a preservation or processing technique for a wide variety of products. Some of the applications include the processing of pharmaceuticals, diagnostic kits, restoration of water damaged documents, river bottom sludge prepared for hydrocarbon analysis, ceramics used in the semiconductor industry, viral or bacterial cultures, tissues prepared for analysis, the production of synthetic skins and restoration of historic/reclaimed boat hulls.

The freeze-drying process

There are four stages in the complete drying process: pretreatment, freezing, primary drying, and secondary drying.

Pretreatment

Pretreatment includes any method of treating the product prior to freezing. This may include concentrating the product, formulation revision (i.e., addition of components to increase stability and/or improve processing), decreasing a high vapor pressure solvent or increasing the surface area. In many instances the decision to pretreat a product is based on theoretical knowledge of freeze-drying and its requirements, or is demanded by cycle time or product quality considerations. Methods of pretreatment include: Freeze concentration, Solution phase concentration, Formulation to Preserve Product Appearance, Formulation to

Stabilize Reactive Products, Formulation to Increase the Surface Area, and Decreasing High Vapor Pressure Solvents.

Freezing

In a lab, this is often done by placing the material in a freeze-drying flask and rotating the flask in a bath, called a shell freezer, which is cooled by mechanical refrigeration, dry ice and methanol, or liquid nitrogen. On a larger scale, freezing is usually done using a freeze-drying machine. In this step, it is important to cool the material below its triple point, the lowest temperature at which the solid and liquid phases of the material can coexist. This ensures that sublimation rather than melting will occur in the following steps. Larger crystals are easier to freeze-dry. To produce larger crystals, the product should be frozen slowly or can be cycled up and down in temperature. This cycling process is called annealing. However, in the case of food, or objects with formerly-living cells, large ice crystals will break the cell walls (a problem discovered, and solved, by Clarence Birdseye), resulting in the destruction of more cells, which can result in increasingly poor texture and nutritive content. In this case, the freezing is done rapidly, in order to lower the material to below its eutectic point quickly, thus avoiding the formation of ice crystals. Usually, the freezing temperatures are between -50 °C and -80 °C. The freezing phase is the most critical in the whole freeze-drying process, because the product can be spoiled if badly done.
Amorphous materials do not have a eutectic point, but they do have a critical point, below which the product must be maintained to prevent melt-back or collapse during primary and secondary drying.

Primary drying

During the primary drying phase, the pressure is lowered (to the range of a few millibars), and enough heat is supplied to the material for the water to sublimate. The amount of heat necessary can be calculated using the sublimating molecules' latent heat of sublimation. In this initial drying phase, about 95% of the water in the material is sublimated. This phase may be slow (can be several days in the industry), because, if too much heat is added, the material's structure could be altered.
In this phase, pressure is control led through the application of partial vacuum. The vacuum speeds sublimation, making it useful as a deliberate drying process. Furthermore, a cold condenser chamber and/or condenser plates provide a surface(s) for the water vapour to re-solidify on. This condenser plays no role in keeping the material frozen; rather, it prevents water vapor from reaching the vacuum pump, which could degrade the pump's performance. Condenser temperatures are typically below -50 °C (-60 °F).
It is important to note that, in this range of pressure, the heat is brought mainly by conduction or radiation; the convection effect is considered to be inefficient.

Secondary drying

The secondary drying phase aims to remove unfrozen water molecules, since the ice was removed in the primary drying phase. This part of the freeze-drying process is governed by the material's adsorption isotherms. In this phase, the temperature is raised higher than in the primary drying phase, and can even be above 0 °C, to break any physico-chemical interactions that have formed between the water molecules and the frozen material. Usually the pressure is also lowered in this stage to encourage desorption (typically in the range of microbars, or fractions of a pascal). However, there are products that benefit from increased pressure as well.
After the freeze-drying process is complete, the vacuum is usually broken with an inert gas, such as nitrogen, before the material is sealed.
At the end of the operation, the final residual water content in the product is extremely low, around 1% to 4%.

Properties of freeze-dried products

If a freeze-dried substance is sealed to prevent the reabsorption of moisture, the substance may be stored at room temperature without refrigeration, and be protected against spoilage for many years. Preservation is possible because the greatly reduced water content inhibits the action of microorganisms and enzymes that would normally spoil or degrade the substance.
Freeze-drying also causes less damage to the substance than other dehydration methods using higher temperatures. Freeze-drying does not usually cause shrinkage or toughening of the material being dried. In addition, flavours, smells and nutritional content generally remain unchanged, making the process popular for preserving food. However, water is not the only chemical capable of sublimation, and the loss of other volatile compounds such as acetic acid (vinegar) and alcohols can yield undesirable results.
Freeze-dried products can be rehydrated (reconstituted) much more quickly and easily because the process leaves microscopic pores. The pores are created by the ice crystals that sublimate, leaving gaps or pores in their place. This is especially important when it comes to pharmaceutical uses. Freeze-drying can also be used to increase the shelf life of some pharmaceuticals for many years.

Freeze-drying protectants

Similar to cryoprotectants, some molecules protect freeze-dried material. Known as lyoprotectants, these molecules are typically polyhydroxy compounds such as sugars (mono-, di-, and polysaccharides), polyalcohols, and their derivatives. Trehalose and sucrose are natural lyoprotectants. Trehalose is produced by a variety of plant, fungi, and invertebrate animals that remain in a state of suspended animation during periods of drought (also known as anhydrobiosis).

Applications of freeze-drying
Pharmaceutical and biotechnology

Pharmaceutical companies often use freeze-drying to increase the shelf life of products, such as vaccines and other injectables. By removing the water from the material and sealing the material in a vial, the material can be easily stored, shipped, and later reconstituted to its original form for injection. Another example from the pharmaceutical industry is the use of freeze drying to produce tablets or wafers. The advantage of which is less excipient and a rapidly absorbed and easily administered dosage form.

Food industry
Freeze-dried coffee, a form of instant coffee.

Freeze-drying is used to preserve food and make it very lightweight. The process has been popularized in the forms of freeze-dried ice cream, an example of astronaut food. It is also popular and convenient for hikers because the reduced weight allows them to carry more food and reconstitute it with available water. Instant coffee issometimes freeze-dried, despite the high costs of the freeze-driers used. The coffee is often dried by vaporization in a hot air flow, or by projection on hot metallic plates. Freeze-dried fruit is used in some breakfast cereal. Culinary herbs are also freeze- dried, although air-dried herbs are far more common and less expensive. However, the freeze-drying process is used more commonly in the pharmaceutical industry.

Text 14.

Fermentation

Fermentation in food processing typically is the conversion of carbohydrates to alcohols and carbon dioxide or organic acids using yeasts, bacteria, or a combination thereof, under anaerobic conditions. A more restricted definition of fermentation is the chemical conversion of sugars into ethanol. The science of fermentation is known as zymurgy.

Fermentation usually implies that the action of microorganisms is desirable, and the process is used to produce alcoholic beverages such as wine, beer, and cider. Fermentation is also employed in the leavening of bread, and for preservation techniques to create lactic acid in sour foods such as sauerkraut, dry sausages, kimchi and yogurt, or vinegar (acetic acid) for use in pickling foods.

Natural fermentation precedes human history. Since ancient times, however, humans have been controlling the fermentation process. The earliest evidence of winemaking dates from eight thousand years ago, in Georgia, in the Caucasus area. Seven- thousand-year-old jars containing the remains of wine have been excavated in the Zagros Mountains in Iran, which are now on display at the University of Pennsylvania.There is strong evidence that people were fermenting beverages in

Babylon circa 5000 BC, ancient Egypt circa 3150 BC, pre-Hispanic Mexico circa 2000 BC, and Sudan circa 1500 BC. There is also evidence of leavened bread in ancient Egypt circa 1500 BC and of milk fermentation in Babylon circa 3000 BC.
French chemist Louis Pasteur was the first known zymologist, when in 1854 he connected yeast to fermentation. Pasteur originally defined fermentation as "respiration without air". Pasteur performed careful research and concluded;
"I am of the opinion that alcoholic fermentation never occurs without simultaneous organization, development and multiplication of cells.... If asked, in what consists the chemical act whereby the sugar is decomposed ... I am completely ignorant of it." When studying the fermentation of sugar to alcohol by yeast, Louis Pasteur concluded that the fermentation was catalyzed by a vital force, called "ferments," within the yeast cells. The "ferments" were thought to function only within living organisms. "Alcoholic fermentation is an act correlated with the life and organization of the yeast cells, not with the death or putrefaction of the cells," he wrote. Nevertheless, it was known that yeast extracts ferment sugar even in the absence of living yeast cells. While studying this process in 1897, Eduard Buchner of Humboldt University of Berlin, Germany, found that sugar was fermented even when there were no living yeast cells in the mixture, by a yeast secretion that he termed zymase. In 1907 he received the Nobel Prize in Chemistry for his research and discovery of "cell-free fermentation." One year prior, in 1906, ethanol fermentation studies led to the early discovery of NAD+.

Uses

The primary benefit of fermentation is the conversion of sugars and other carbohydrates, e.g., converting juice into wine, grains into beer, carbohydrates into carbon dioxide to leaven bread, and sugars in vegetables into preservative organic acids.
Food fermentation has been said to serve five main purposes:
Enrichment of the diet through development of a diversity of flavors, aromas, and textures in food substrates;
Preservation of substantial amounts of food through lactic acid, alcohol, acetic acid and alkaline fermentations;
Biological enrichment of food substrates with protein, essential amino acids, essential fatty acids, and vitamins;
Elimination of antinutrients;
A decrease in cooking times and fuel requirements;
Some fermentation products (e.g., fusel alcohol) are deleterious.

Text 15.

Curing

Curing refers to various food preservation and flavoring processes, especially of meat or fish, by the addition of a combination of salt, sugar, nitrates or nitrite. Many curing processes also involve smoking.
Food curing dates back to ancient times, both in the form of smoked meat and as salt- cured meat. Although the ancient people curing the meat did not know this, it was actually nitrates present in the salt that helped the curing process. The Native Americans used to hang their meat at the top of their teepees to increase the amount of smoke coming into contact with the food.

Chemical actions of salt

According to the Oklahoma Cooperative Extension Service, salt (sodium chloride; chemical formula: NaCl) is the "primary ingredient used in meat curing". Salt works by dehydrating the meat, thus preventing the growth of bacteria, and it creates an inhospitable osmotic pressure through the cell wall of the bacterium. This triggers the beneficial bacteria, including lactobacillus acidophilus, to grow in the new environment and lower the pH to approximately 4.5. Doing this requires a concentration of salt of nearly 20%. In addition, salt causes the soluble meat proteins to come to the surface of the meat cut and then solidify, which is what gives sausage its characteristic skin. Finally, salt slows the oxidation process, effectively preventing the meat from going rancid.
The sugar added to meat for the purpose of curing it comes in many forms, including honey, corn syrup solids, and maple syrup. However, with the exception of bacon, it does not contribute much to the flavor, but it does alleviate the harsh flavor of the salt. Sugar also contributes to the growth of beneficial bacteria like Lactobacillus by feeding them.

Nitrates and nitrites

Nitrates and nitrites not only help kill bacteria, but also produce a characteristic flavor and give meat a pink or red colour.

Intestine for sausage making

Fresh sausages are simply seasoned ground meats that are cooked before serving. Fresh sausages normally do not use cure (Prague powder # 1) although cure can be used if desired. In addition fresh sausages typically do not use smoke flavors, although liquid smoke can be used. Fresh sausages are never smoked in a cold smoker because of the danger of botulism.
The primary seasoning agents in fresh sausages are salt and sugar along with various savory herbs and spices, and often vegetables, including onion and garlic.
A British fresh sausage typically contains around 10% butcher's rusk, 10% water, 2.5% seasoning, and 77.5% meat. At point of sale British sausages will often be labelled as "actual meat content X%". As meat can be fatty or lean, the X% is

calculated using reference tables with the intention to give a fairer representation of the "visual lean" meat content.

Cured dry sausages

Cured dry sausages are prepared in a fashion similar to cured cooked sausages. The major difference is that Prague powder #2 will be used in place of Prague powder #1. In addition, certified meats must be used. Since these products are never heated to a temperature that can kill trichinosis, it is necessary to accomplish this by other methods. The usual method is via freezing. Pork may be rendered acceptable for use in dry sausages by freezing it using the following guidelines:5 °F (-15 °C) 20-30 days —10 °F (-23 °C) 10-20 days -20 °F (-29 °C) 6-12 days.
The specific regulations are quite complex and are beyond the scope of this article. They depend on the thickness of the cuts of meat, the packaging method, and other factors. In addition there are very specific requirements as to the times in the drying rooms and the temperatures in the smoke rooms.
While it is quite feasible for the small sausage kitchen or hobbyist to produce excellent cured dry sausages, a great deal of technical information is required. Alternatively, certified pork can be simply purchased.

Text 16.

Aspic

An aspic with chicken and eggs.

Aspic is a dish in which ingredients are set into a gelatin made from a meat stock.. Similar dishes, made with commercial gelatin mixes instead of stock, are usually called gelatin salads. When cooled, stock that is made from meat congeals because of the natural gelatin found in the meat. The stock can be clarified with egg whites, and then filled and flavored just before the aspic sets. Almost any type of food can be set into aspics. Most common are meat pieces, fruits, or vegetables. Aspics are usually served on cold plates so that the gel will not melt before being eaten. A meat jelly that includes cream is called a chaud-froid.
Nearly any type of meat can be used to make the gelatin: pork, beef, veal, chicken, turkey, or fish. Gelatin is also found in cartilage. The aspic may need additional gelatin in order to set properly. Veal stock provides a great deal of gelatin; in making stock, veal is often included with other meat for that reason. Fish consommйs usually have too little natural gelatin, so the fish stock may be double-cooked or supplemented. Since fish gelatin melts at a lower temperature than gelatins of other meats, fish aspic is more delicate and melts more readily in the mouth.
Vegetables and fish stocks need gelatin to create a mold.

Historically, meat jellies were made before fruit and vegetable jellies. By the Middle Ages at the latest, cooks had discovered that a thickened meat broth could be made into a jelly. A detailed recipe for aspic is found in Le Viandier, written in around 1375.

In the 18th century, Marie-Antoine Carкme created chaud froid in France. Chaud froid means "hot cold" in French, referring to foods that were prepared hot and served cold. Aspic was used an chaud froid sauce in many cold fish and poultry meals. The sauce added moisture and flavor to the food. Carкme invented various types of aspic and ways of preparing it.

Aspic, when used to hold meats, prevents them from becoming spoiled. The gelatin keeps out air and bacteria, keeping the cooked meat fresh.

Aspic came into prominence in America in the early 20th century. By the 1950s, meat aspic was a popular dinner staple throughout the United States as were other gelatin-based dishes such as tomato aspic. Cooks used to show off aesthetic skills by creating inventive aspics.

Uses

Aspic can also be referred as aspic jelly. Aspic jelly may be colorless (white aspic) or contain various shades of amber. Aspic can be used to protect food from the air, give food more flavor, or as a decoration.

There are three types of aspic textures: delicate, sliceable, and inedible. The delicate aspic is soft. The sliceable aspic must be made in a terrine or in a aspic mold. It is more firm than the delicate aspic. The inedible aspic is never for consumption. It is usually for decoration. Aspic is often used to glaze food pieces in food competitions to make the food glisten and make it more appealing to the eye. Foods dipped in aspic have a lacquered finish for a fancy presentation. Aspic can be cut into various shapes and be used as a garnish for deli meats.

Outside of the U.S.

In Poland (known as "galareta"), in Ukraine (known as "studinets"), Latvia (similarly known as "galerts"), in Russia (known as "kholodets"), in Serbia (known as "pihtije"), in Croatia (known as "hladetina"), in Hungary (known as "kocsonya") and in Romania (known as "piftie" or "racituri") aspic often takes the form of pork jelly, and it is popular around the Christmas and Easter Holidays. In Asia, among the Newars of Kathmandu Valley, Nepal, buffalo meat jelly is a major component of the winter festivity gourmet. It is eaten in combination with fish aspic, which is made from dried fish and buffalo meat stock, soured, and contains a heavy mix of spices and condiments.

In popular culture

"Life is a bitter aspic." - Wallace Stevens.

"Well, if it doesn't jell, it isn't aspic, and this ain't jellin'!" - Milton Arbogast in the film Psycho.
Larks' Tongues in Aspic, King Crimson album title, and the name of four songs on this and other King Crimson albums.
A Dandy in Aspic, the final film by director Anthony Mann.
Julie and Julia - A scene deals with Julie's failed attempt to make an aspic from Julia Child's Mastering the Art of French Cooking.
Dinner at Eight - In this 1933 George Cukor social comedy film, Millicent Jordan (Billie Burke) ventures a considerable emotional investment in the lion-shaped aspic she has had prepared for the eponymous meal.
Coronation Street - Hilda Ogden prepares dishes for her 'posh' house party and reads that 'eggs in aspic' is the perfect party dish. However she isn't quite sure what 'aspic' is and uses lemon flavoured jelly.
Delicacies (album), first song on the album of Simian Mobile Disco is titled "Aspic".

Text 17.

Potted meat

A potted meat food product or potted meat is a food made using a method of food preservation -canning, consisting of cooked meat product, seasoned, often creamed, minced, or ground, which is filled into cans, sealed and heat processed in a retort to commercial sterility.
Various meats such as beef, pork, chicken, turkey and variety (nonskeletal) meats are used. It is produced internationally as a source of affordable meat. Its long shelf life and precooking makes it suitable for emergency food supplies, and for military and camping uses, although the high content of fat, protein, and/or preservatives may make it unsuitable for frequent consumption. The final product typically has a spreadable consistency, and typically contains high amounts of salt, as a preservative.

Reputation

Canned meats have a mixed reputation on account of the taste, texture, ingredients, preparation and nutrition. The canning process produces a product with a generally homogeneous texture and flavor. The low-cost ingredients used also affect the quality. For example, mechanically separated chicken or turkey is a paste-like product made by forcing crushed bone and tissue through a sieve to separate bone from tissue. In the United States, mechanically separated poultry has been used in poultry products since 1969, after the National Academy of Sciences found it safe for use. On November 3, 1995, the Food Safety and Inspection Service (FSIS) of the U.S. Department of Agriculture (USDA) published a final rule in the Federal Register (see 60 FR 55962) on mechanically separated poultry, stating that it was safe to use without restrictions 1] However, it must be labeled as "mechanically

separated chicken or turkey" in the ingredient statement. The final rule became effective on November 4, 1996.

Ingredients

Armour Star: Mechanically separated chicken, beef tripe, partially defatted cooked beef fatty tissue, beef hearts, water, partially defatted cooked pork fatty tissue, salt, and less than 2 percent: mustard, natural flavorings, dried garlic, dextrose, sodium erythorbate, and sodium nitrite.
Hormel: Beef tripe, mechanically separated chicken, beef hearts, partially defatted cooked beef fatty tissue, meat broth, vinegar, salt, flavoring, sugar, and sodium nitrite.
Libby's: Mechanically separated chicken, pork skin, partially defatted cooked pork fatty tissue, partially defatted cooked beef fatty tissue, vinegar, less than 2% of: salt, spices, sugar, flavorings, sodium erythorbate and sodium nitrite.

Text 18.

Food irradiation

Processing of food by ionizing radiation

By irradiating food, depending on the dose, some or all of the harmful bacteria and other pathogens present are killed. This prolongs the shelf-life of the food in cases where microbial spoilage is the limiting factor. Some foods, e.g., herbs and spices, are irradiated at sufficient doses (five kilograys or more) to reduce the microbial counts by several orders of magnitude; such ingredients do not carry over spoilage or pathogen microorganisms into the final product. It has also been shown that irradiation can delay the ripening of fruits or the sprouting of vegetables.
Furthermore, insect pests can be sterilized (be made incapable of proliferation) using irradiation at relatively low doses. In consequence, the United States Department of Agriculture (USDA) has approved the use of low-level irradiation as an alternative treatment to pesticides for fruits and vegetables that are considered hosts to a number of insect pests, including fruit flies and seed weevils; the U.S. Food and Drug Administration (FDA) has cleared among a number of other applications the treatment of hamburger patties to eliminate the residual risk of a contamination by a virulent E. coli. The United Nations Food and Agricultural Organization (FAO) has passed a motion to commit member states to implement irradiation technology for their national phytosanitary programs; the General

assembly of the International Atomic Energy Agency (IAEA) has urged to make wider use of the irradiation technology. Additionally, the USDA has made a number of bi-lateral agreements with developing countries to facilitate the imports of exotic fruits and to simplify the quarantine procedures.

The European Union has regulated processing of food by ionizing radiation in specific directives since 1999; the relevant documents and reports are accessible online. The "implementing" directive contains a "positive list" permitting irradiation of only dried aromatic herbs, spices, and vegetable seasonings. However, any Member State is permitted to maintain previously granted clearances or to add new clearance as granted in other Member States, in the case the EC's Scientific Committee on Food (SCF) has given a positive vote for the respective application. Presently, six Member States (Belgium, France, Italy, Netherlands, Poland, United Kingdom) have adopted such provisions.

Because of the "Single Market" of the EC, any food — even if irradiated — must be allowed to be marketed in any other Member State even if a general ban of food irradiation prevails, under the condition that the food has been irradiated legally in the state of origin. Furthermore, imports into the EC are possible from third countries if the irradiation facility had been inspected and licensed by the EC and the treatment is legal within the EC or some Member state.

The Scientific Committee on Food (SCF) of the EC has given a positive vote on eight categories of food to be irradiated. However, in a compromise between the European Parliament and the European Commission, only dried aromatic herbs, spices, and vegetable seasonings can be found in the positive list. The European Commission was due to provide a final draft for the positive list by the end of 2000; however, this failed because of a veto from Germany and a few other Member States. In 1992, and in 1998 the SCF voted "positive" on a number of irradiation applications that had been allowed in some member states before the EC Directives came into force, to enable those member states to maintain their national authorizations.

In 2003, when Codex Alimentarius was about to remove any upper dose limit for food irradiation, the SCF adopted a "revised opinion", which, in fact, was a reconfirmation and endorsement of the 1986 opinion. The opinion denied cancellation of the upper dose limit, and required that before the actual list of individual items or food classes (as in the opinions expressed in 1986, 1992 and 1998) can be expanded, new individual studies into the toxicology of each of such food and for each of the proposed dose ranges are requested. The SCF has subsequently been replaced by the new European Food Safety Authority (EFSA), which has not yet ruled on the processing of food by ionizing radiation.

Other countries, including New Zealand, Australia, Thailand, India, and Mexico, have permitted the irradiation of fresh fruits for fruit fly quarantine purposes, amongst others. Such countries as Pakistan and Brazil have adopted the Codex Alimentarius Standard on Irradiated Food without any reservation or restriction: i.e., any food may be irradiated to any dose.

Technologies

Electron irradiation

Electron irradiation uses electrons accelerated in an electric field to a velocity close to the speed of light. Electrons are particulate radiation and, hence, have cross section many times larger than photons, so that they do not penetrate the product beyond a few inches, depending on product density. Electron facilities rely on substantial concrete shields to protect workers and the environment from radiation exposure.

Gamma irradiation

Gamma radiation is radiation of photons in the gamma part of the electromagnetic spectrum. The radiation is obtained through the use of radioisotopes, generally cobalt-60 or, in theory, caesium-137. Cobalt-60 is bred from cobalt-59 using neutron irradiation in specifically designed nuclear reactors. Caesium-137 is recovered during the processing of spent nuclear fuel. Because this technology — except for military applications — is not commercially available, insufficient quantities of it are available on the global isotope markets for use in large scale, commercial irradiators. Presently, caesium-137 is used only in small hospital units to treat blood before transfusion to prevent Graft-versus-host disease.

Food irradiation using Cobalt-60 is the preferred method by most processors, because the deeper penetration enables administering treatment to entire industrial pallets or totes, reducing the need for material handling. A pallet or tote is typically exposed for several minutes to hours depending on dose. Radioactive material must be monitored and carefully stored to shield workers and the environment from its gamma rays. During operation this is achieved by substantial concrete shields. With most designs the radioisotope can be lowered into a water-filled source storage pool to allow maintenance personnel to enter the radiation shield. In this mode the water in the pool absorbs the radiation. Other uncommonly used designs feature dry storage by providing movable shields that reduce radiation levels in areas of the irradiation chamber.The radiation process is unrelated to nuclear energy, but it may use the radiation emitted from radioactive nuclides produced in nuclear reactors. Ionizing radiation is hazardous to life (hence its usefulness in sterilisation); for this reason irradiation facilities have a heavily shielded irradiation room where the process takes place. Radiation safety procedures ensure that neither the workers in such facility nor the environment receive any radiation dose from the facility. Irradiated food does not become radioactive, and national and international expert bodies have declared food irradiation as wholesome. However, the wholesomeness of consuming such food is disputed by opponents and consumer organizations. National and international expert bodies have declared food irradiation as 'wholesome'; UN-organizations as WHO and FAO are endorsing to use food irradiation. International legislation on whether food may be irradiated or not varies worldwide from no regulation to full banning. Irradiation may allow lower quality or contaminated foodstuffs to be rendered marketable.

It is estimated that about 500,000 tons of food items are irradiated per year worldwide in over 40 countries. These are mainly spices and condiments with an increasing segment of fresh fruit irradiated for fruit fly quarantine.

Pulsed electric field processing

Pulsed electric field (PEF) processing is a method for processing cells by means of brief pulses of a strong electric field. PEF holds potential as a type of low temperature alternative pasteurization process for sterilizing food products. In PEF processing, a substance is placed between two electrodes, then the pulsed electric field is applied. The electric field enlarges the pores of the cell membranes which kills the cells and releases their contents. PEF for food processing is a developing technology still being researched. There have been limited industrial applications of PEF processing for the pasteurization of fruit juices.

Modified atmosphere

Modifying atmosphere is a way to preserve food by operating on the atmosphere around it. Salad crops which are notoriously difficult to preserve are now being packaged in sealed bags with an atmosphere modified to reduce the oxygen (02) concentration and increase the carbon dioxide (C02) concentration. There is concern that although salad vegetables retain their appearance and texture in such conditions, this method of preservation may not retain nutrients, especially vitamins. Grains may be preserved using carbon dioxide by one of two methods; either using a block of dry ice placed in the bottom and the can is filled with grain or the container can be purged from the bottom by gaseous carbon dioxide from a cylinder or bulk supply vessel.
Carbon dioxide prevents insects, and depending on concentration, mold, and oxidation from damaging the grain. Grain stored in this way can remain edible for fiv One variant of gamma irradiators keeps the Cobalt-60 under water at all times and lowers the product to be irradiated under water in hermetic bells. No further shielding is required for such designs.

X-ray irradiation

Similar to gamma radiation, X-rays are photon radiation of a wide energy spectrum and an alternative to isotope based irradiation systems. X-rays are generated by colliding accelerated electrons with a dense material (target) such as tantalum or tungsten in a process known as bremsstrahlung-conversion. X-ray irradiators are scalable and have deep penetration comparable to Co-60, with the added effect of using an electronic source that stops radiating when switched off. They also permit dose uniformity. However, these systems generally have low energetic efficiency during the conversion of electron energy to photon radiation requiring much more electrical energy than other systems. Like most other types of facilities, X-ray

systems rely on concrete shields to protect the environment and workers from radiation.

Nominal X-ray energy is usually limited to 5 MeV; however, USA has provisions for up to 7.5 MeV, which increases conversion efficiency. Another development is the availability of electron accelerators with extremely high power output, up to 1,000 kW beam. At a conversion efficiency of up to 12%, the X-ray power may reach (including filtering and other losses) 100 kW; This power would be equivalent to a gamma facility with Co-60 of about 6.5 MCi.

Text 19.

Food rheology

Food rheology is the study of the rheological properties of food, that is, the consistency and flow of food under tightly specified conditions. The consistency, degree of fluidity, and other mechanical properties are important in understanding how long food can be stored, how stable it will remain, and in determining food texture. The acceptability of food products to the consumer is often determined by food texture, such as how spreadable and creamy a food product is. Food rheology is important in quality control during food manufacture and processing. Food rheology terms have been noted since ancient times. In ancient Egypt bakers judged the consistency of dough by rolling it in their hands.

There is a large body of literature on food rheology because the study of food rheology entails unique factors beyond an understanding of the basic rheological dynamics of the flow and deformation of matter. Food can be classified according to its rheological state, such as a solid, gel, liquid, emulsion with associated rheological behaviors, and its rheological properties can be measured. These properties will affect the design of food processing plants, as well as shelf life and other important factors, including sensory properties that appeal to consumers. Because foods are structurally complex, often a mixture of fluid and solids with varying properties within a single mass, the study of food rheology is more complicated than study in fields such as the rheology of polymers.

The most important factor in food rheology is consumer perception of the product. This perception is affected by how the food looks on the plate as well as how it feels in the mouth, or "mouthfeel". Mouthfeel is influenced by how food moves or flows once it is in a person's mouth and determines how desirable the food is seen to be.

Text 20.

Nutraceutical

Nutraceutical, a term combining the words "nutrition" and "pharmaceutical", is a food or food product that provides health and medical benefits, including the prevention and treatment of disease [citation needed]. Such products may range

from isolated nutrients, dietary supplements and specific diets to genetically engineered foods, herbal products, and processed foods such as cereals, soups, and beverages. With recent developments in cellular-level nutraceutical agents, researchers, and medical practitioners are developing templates for integrating and assessing information from clinical studies on complimentary and alternative therapies into responsible medical practice. The term nutraceutical was originally defined by Dr. Stephen L. DeFelice, founder and chairman of the Foundation of Innovation Medicine (FIM), Crawford, New Jersey. Since the term was coined by Dr. DeFelice, its meaning has been modified by Health Canada which defines nutraceutical as: a product isolated or purified from foods, and generally sold in medicinal forms not usually associated with food and demonstrated to have a physiological benefit or provide protection against chronic disease. Examples: beta-carotene, lycopene The definition of nutraceutical that appears in the latest edition of the Merriam-Webster Dictionary is as follows: A food stuff (as a fortified food or a dietary supplement)that provides health benefits. Nutraceutical foods are not subject to the same testing and regulations as pharmaceutical drugs.The American Nutraceutical Association works with the Food & Drug Administration in consumer education, developing industry and scientific standards for products and manufacturers, and other related consumer protection roles. The FDA provides a list of dietary supplement companies receiving warning letters about their products.

Market and demand

Nearly two-thirds of the American population takes at least one type of nutraceutical health product. The use of nutraceuticals, as an attempt to accomplish desirable therapeutic outcomes with reduced side effects, as compared with other therapeutic agents has met with great monetary success. The preference for the discovery and production of nutraceuticals over pharmaceuticals is well seen in pharmaceutical and biotech companies. Some of the pharmaceutical and biotech companies, which commit major resources to the discovery of nutraceuticals include Monsanto, American Home Products, Dupont, Abbott Laboratories, Warner-Lambert, Johnson & Johnson, Novartis, Metabolex, Genzyme Transgenic, PPL Therapeutics and Interneuron.The nutraceutical industry in the US is about $86 billion. This figure is slightly higher in Europe and, in Japan, represents approximately a quarter of the $6 billion total annual food sales. 47% of the Japanese population consume nutraceuticals. Even without specific financial figures, business reports continually suggest that the market is consistently growing.

One possible explanation for the growth of nutraceuticals in the United States is the aging baby-boomer population. As the average age of the citizens continues to rise, the population increases its focus on health and wellness. By halfway through the 21st century, there could be almost 142 million Americans over the age of 50, based on a projected population of nearly 400 million citizens.

Although the price of some nutraceuticals may drop as generic products make their way into the market, people's dependence on these products and their increasing availability suggests that the growth of the market shall remain stable.

Food as medicine

Considered a father of Western medicine, Hippocrates advocated the healing effects of food.
The Indians, Egyptians, Chinese, and Sumerians are just a few civilizations that have provided evidence suggesting that foods can be effectively used as medicine to treat and prevent disease. Ayurveda,the 5 thousand year old ancient indian health science have mentioned benefits of food for therapautic purpose.Documents hint that the medicinal benefits of food have been explored for thousands of years. Hippocrates, considered by some to be the father of Western medicine, said that people should "Let food be thy medicine."
The modern nutraceutical market began to develop in Japan during the 1980s. In contrast to the natural herbs and spices used as folk medicine for centuries throughout Asia, the nutraceutical industry has grown alongside the expansion and exploration of modern technology.
New research conducted among food scientists show that there is more to food science than what was understood just a couple decades ago. Until just recently, analysis of food was limited to the flavor of food (sensory taste and texture) and its nutritional value (composition of carbohydrates, fats, proteins, water, vitamins and minerals). However, there is growing evidence that other components of food may play an integral role in the link between food and health.
These chemical components are derived from plant, food, and microbial sources, and provide medicinal benefits valuable to long-term health. Examples of these nutraceutical chemicals include probiotics, antioxidants, and phytochemicals.
Nutraceutical products were considered alternative medicine for many years. Nutraceuticals have become a more mainstream supplement to the diet, now that research has begun to show evidence that these chemicals found in food are often effective when processed effectively and marketed correctly.

Text 21.

Pasteurization

Pasteurization is a process of heating a food, usually liquid, to a specific temperature for a definite length of time, and then cooling it immediately. This process slows microbial growth in food. The process of heating wine to preserve it longer was known in China since AD.l 117, and is documented in Japan in 1568 in the diary Tamonin-nikki, but the modern version was created by the French chemist and microbiologist Louis Pasteur, after whom it is named. The first pasteurization test was completed by Louis Pasteur and Claude Bernard on April

20, 1864. The process was originally conceived as a way of preventing wine and beer from souring.

Pasteurization aims to reduce the number of viable pathogens so they are unlikely to cause disease (assuming the pasteurized product is stored as indicated and consumed before its expiration date). Commercial-scale sterilization of food is not common because it adversely affects the taste and quality of the product. Certain food products, like dairy products, are superheated to ensure pathogenic microbes are destroyed.

Products that can be pasteurized: Almonds, Apple cider, Beer, Bread, Canned food, Cheese, Cornbread, Crabs, Cream, Eggs, Grapefruit juice, Honey (not necessary unless it is diluted), Juice, Maple syrup, Milk, Chocolate milk, Orange juice, Palm wine, Pomegranate juice, Ready Meal, Soy sauce, Sports drinks, Tobacco, Vinegar, Vitamin water, Water, Wine.

Pasteurization of milk

Pasteurization is typically associated with milk; pasteurization of milk was first suggested by Franz von Soxhlet in 1886. It is the main reason for milk's extended shelf life. High Temperature Short Time (HTST) pasteurised milk typically has a refrigerated shelf life of two to three weeks, whereas ultra pasteurised milk can last much longer, sometimes two to three months. When ultra heat treatment (UHT) is combined with sterile handling and container technology (such as aseptic packaging), it can even be stored unrefrigerated for 6-9 months, although superheated milk's flavor is impaired, and it may lose some nutritional value.

Pasteurization typically uses temperatures below boiling since at very high temperatures casein micelles will irreversibly aggregate, or "curdle." There are two main types of pasteurization used today: High Temperature/Short Time (HTST) and "Extended Shelf Life (ESL)" treatment. Ultra-high temperature (UHT or ultra-heat treated) is also used for milk treatment. In the HTST process, milk is forced between metal plates or through pipes heated on the outside by hot water, and is heated to 71.7 °C (161 °F) for 15-20 seconds. UHT processing holds the milk at a temperature of 135 °C (275 °F) for a minimum of one second. ESL milk has a microbial filtration step and lower temperatures than UHT. Milk simply labeled "pasteurised" is usually treated with the HTST method, whereas milk labeled "ultra-pasteurised" or simply "UHT" has been treated with the UHT method.

Pasteurization methods are usually standardized and controlled by national food safety agencies (such as the USDA in the United States and the Food Standards Agency in the United Kingdom). These agencies require milk to be HTST pasteurized in order to qualify for the "pasteurization" label. There are different standards for different dairy products, depending on the fat content and the intended usage. For example, the pasteurization standards for cream differ from the standards for fluid milk, and the standards for pasteurizing cheese are designed to preserve the phosphatase enzyme, which aids in cutting.

In Canada, all milk produced at a processor and intended for consumption must be pasteurized, legally requiring it to be heated to at least 72 degrees Celsius for at

least 16 seconds and then cooling it to 4 degrees Celsius. This ensures that any harmful bacteria are destroyed.
The HTST pasteurization standard was designed to achieve a 5-log reduction, killing 99.999% of the number of viable micro-organisms in milk. This is considered adequate for destroying almost all yeasts, mold, and common spoilage bacteria and also to ensure adequate destruction of common pathogenic heat-resistant organisms (including Mycobacterium tuberculosis, which causes tuberculosis but not Coxiella burnetii, which causes Q fever). HTST pasteurization processes must be designed so that the milk is heated evenly, and no part of the milk is subject to a shorter time or a lower temperature.
A process similar to pasteurization is thermization, which uses lower temperatures to kill bacteria in milk. It allows a milk product, such as cheese, to retain more of the original taste, but thermized foods are not considered pasteurized by food regulators.

Effectiveness of pasteurization

Milk pasteurization has been subject to increasing scrutiny in recent years, due to the discovery of pathogens that are both widespread and heat resistant (able to survive pasteurization in significant numbers). One of these pathogens, Mycobacterium avium subsp. paratuberculosis (MAP), is linked to Crohn's Disease. Researchers have developed more sensitive diagnostics, such as real-time PCR and improved culture methods that have enabled them to identify pathogens in pasteurised milk.
Some of the diseases that pasteurization can prevent are diphtheria, salmonellosis, strep throat, scarlet fever, listeriosis, brucellosis and typhoid fever.

Text 22.

Flash pasteurization

Flash pasteurization, also called "High Temperature Short Time" processing, is a method of heat pasteurization of perishable beverages like fruit and vegetable juices, beer, and some dairy products. Compared to other pasteurization processes, it maintains color and flavor better, but some cheeses were found to have varying responses to the process.
It is done prior to filling into containers in order to kill spoilage microorganisms, to make the products safer and extend their shelf life. Flash pasteurization must be used in conjunction with sterile fill technology (similar to aseptic processing) and therefore has the risk of post-pasteurization contamination if hygiene standards are not rigorously enforced. Flash pasteurization is often used for the pasteurization of bulk products such as keg beer, milk, and kosher wines.
The liquid moves in a controlled, continuous flow while subjected to temperatures of 71.5 °C (160 °F) to 74 °C (165 °F), for about 15 to 30 seconds.
The process is more prevalent in Europe and Asia than in North America.

Flash pasteurization is widely used for fruit juices. Tropicana Products has used flash pasteurization since the 1950s. The juice company Odwalla switched from non- pasteurized to flash-pasteurized juices in 1996 after tainted unpasteurized apple juice containing E. coli 0157:H7 sickened many children and killed one.

Text 23.

Pascalization

Pascalization, bridgmanization, or high pressure processing (HPP), is a method of preserving and sterilizing food, in which a product is processed under very high pressure, leading to the inactivation of certain microorganisms and enzymes in the food. The technique was named after Blaise Pascal, a French scientist of the 17th century whose work included detailing the effects of pressure on fluids. During pascalization, more than 50,000 pounds per square inch (340,000,000 Pa) may be applied for around fifteen minutes, leading to the inactivation of yeast, mold, and bacteria. Pascalization is also known as bridgmanization, named for physicist Percy Williams Bridgman.

Uses

Pascalization stops chemical activity caused by microorganisms that play a role in the deterioration of foods. The treatment occurs at low temperatures and does not include the use of food additives. From 1990, some juices, jellies, and jams have been preserved using pascalization in Japan. The technique is now used there to preserve fish and meats, salad dressing, rice cakes, and yogurts. An early use of pascalization in the United States was to treat guacamole. It did not change the guacamole's taste, texture, or color, but the shelf life of the product increased to thirty days, from three days without the treatment. However, some treated foods still require cold storage because pascalization does not stop all enzyme activity caused by proteins, some of which affects shelf life.

Process

In pascalization, food products are sealed and placed into a steel compartment containing a liquid, often water, and pumps are used to create pressure. The pumps may apply pressure constantly or intermittently .The application of high hydrostatic pressures (HHP) on a food product will kill many microorganisms, but the spores of some bacteria may need to be separately treated with acid to prevent their reproduction. Pascalization works especially well on acidic foods, such as yogurts and fruits, because pressure-tolerant spores are not able to live in environments with low pH levels. The treatment works equally well for both solid and liquid products.

During pascalization, the food's proteins are denatured, hydrogen bonds are fortified, and noncovalent bonds in the food are disrupted, while the product's main

structure remains intact. Because pascalization is not heat-based, covalent bonds are not affected, causing no change in the food's taste. High hydrostatic pressure can affect muscle tissues by increasing the rate of lipid oxidation, which in turn leads to poor flavor and decreased health benefits.

Because hydrostatic pressure is able to act quickly and evenly on food, neither the size of a product's container nor its thickness play a role in the effectiveness of pascalization. There are several side effects of the process, including a slight increase in a product's sweetness, but pascalization does not greatly affect the nutritional value, taste, texture, and appearance. As a result, high pressure treatment of foods is regarded as a "natural" preservation method, as it does not use chemical preservatives.

Text 24.

Grain drying

Hundreds of millions of tonnes of wheat, corn, soybean, rice and other grains as sorghum, sunflower seeds, rapeseed/canola, barley, oats, etc., are dried in grain dryers. In the main agricultural countries, drying comprises the reduction of moisture from about 17-30%w/w to values between 8 and 15%w/w, depending on the grain. The final moisture content for drying must be adequate for storage. The more oil the grain has, the lower its storage moisture content will be (though its initial moisture for drying will also be lower). Cereals are often dried to 14% w/w, while oilseeds, to 12.5% (soybeans), 8% (sunflower) and 9% (peanuts). Drying is carried out as a requisite for safe storage, in order to inhibit microbial growth. However, low temperatures in storage are also highly recommended to avoid degradative reactions and, especially, the growth of insects and mites. A good maximum storage temperature is about 18°C. The largest dryers are normally used "Off-farm", in elevators, and are of the continuous type: Mixed-flow dryers are preferred in Europe, while Cross-flow dryers in the USA. In Argentina, both types are usually found. Continuous flow dryers may produce up to 100 metric tonnes of dried grain per hour. The depth of grain the air must traverse in continuous dryers range from some 0.15 m in Mixed flow dryers to some 0.30 m in Cross-Flow. Batch dryers are mainly used "On-Farm", particularly in the USA and Europe. They normally consist of a bin, with heated air flowing horizontally from an internal cylinder through an inner perforated metal sheet, then through a annular grain bed, some 0.50 m thick (coaxial with the internal cylinder) in radial direction, and finally across the outer perforated metal sheet, before being discharged to the atmosphere. The usual drying times range from 1 h to 4 h depending on how much water must be removed, type of grain, air temperature and the grain depth. In the USA, continuous counterflow dryers may be found on-farm, adapting a bin to slowly drying grain fed at the top and removed at the bottom of the bin by a sweeping auger. Grain drying is an active area of manufacturing and research. Now it is possible to simulate the performance of a dryer with computer programs based on equations (mathematical models) that represent the phenomena.

VOCABULARY

A

abacterial – безмікробний
absorb – поглинати, всмоктувати
absorbent – поглинач
absorption – поглинання, всмоктування
according (to) – відповідно до, згідно з …
acid – кислота
acidic – кислий
acidity – кислотність
amino acid – амінокислота
fatty acid –жирна кислота
action – дія
adapt – пристосувати
additive – добавка (харчова)
adequate – відповідний, адекватний
adult – доросла людина, дорослий
advantage – перевага
affect – впливати на
affluent – у великій кількості

afford (to do smth) – дозволяти (щось робити)
agent – речовина
aging – старіння
albumen – яєчний білок
alkali – луг
allergy – алергія
(be) allergic (to) – спричиняти алергію (на)
almond – мигдаль
amount of – кількість
anaemia – анемія, недокрів'я
analise – аналізувати
analysis – аналіз
anchovy – анчоус
annually – щорічно
antioxidant – антиоксидант
appetizer – закуска (перед обідом)
appetizing – апетитний
application – застосування
apply – вживати, застосовувати
approach – підхід
apricot – абрикоса
aroma – аромат
arrange – домовлятися
arteriosclerosis – артеріосклероз
artery – артерія
artificial – штучний
arthritis – артрит
artichoke – артішок (бот.)
ascorbic acid – аскорбинова кислота
asparagus – спаржа
assume – вважати, припускати
attempt – робити спробу
attractive – привабливий
available – наявний
average – середнє (число)
avoid – уникати

B

bacon – бекон
bacterium – бактерія (pl. –ria)
bake – пекти(ся)
bakery – пекарня
balance (n, v) – баланс; зрівноважувати

bar – плитка (шоколаду); бар, буфет
barley – ячмінь
    pearl barley – перлова крупа
batter – збите тісто (без дріжджів)
be keen on smth – розм. дуже любити щось
be rich in smth – багатий на (щось)
beans – боби (бобові)
beat – бити, збивати
beef – яловичина
beefsteak – бифштекс
beer – пиво
beet – буряк
    sugar beet – цукровий буряк
benefit – користь
beneficial – корисний
berry – ягода
    bilberries – чорниці
    blackberries – ожина
    blueberries – голубика
    cranberries – журавлина
    goosebarries – аґрус
    raspberries – малина
    strawberries – полуниця
beverage – напій
bill – рахунок
bind – зв'язувати
bioemulsifier – біоемульгатор
biomass – біомаса
biosurfactints – поверхнево-активні речовини (біосурфактанти)
biscuit – сухе печиво
bitter – гіркий
blackcurrant – чорна смородина
blanch – бланшувати
blend (n, v) – суміш, поєднання; змішувати
    (food) blender – міксер
blood – кров
    blood pressure – кров`яний тиск
boast – пишатися
body – тіло, організм
boil – варити, кап`ятити(ся)
bone – кістка
boneless – безкістковий
bother – турбуватися
bottle (n, v) – пляшка; розливати в пляшки
botulism – ботулізм

bowl – келих, миска, чаша
braise – тушкувати (м'ясо)
bran – грис, висівки
bread – хліб
    brown bread – чорний хліб
    a loaf of bread – хлібина
breakdown – розвал, розруха
    nervous breakdown – нервовий розлад
breakfast – сніданок
breast – молочна залоза
breathing – дихання
brew – варити (пиво); заварювати (чай)
brewery – броварня
breeding – розведення
brine – розсіл
broil – смажити(ся) на вогні
broth – бульйон
buckwheat – гречана крупа
bulk – груба їжа
bun – здобна булочка
butter – масло, намазувати маслом
butterfat – молочний жир
butter milk – маслянка, сколотини
by-product – побічний продукт

C

cabbage – капуста
    a head of cabbage – головка капусти, капустина
café – кафе, кав’ярня
caffeine – кофеїн
cake – кекс, торт, тістечко
calcium – кальцій
calorie – калорія
cancer rate – рівень захворюваності на рак
candy – цукерка, льодяник
canned – консервований
canning – консервування
canteen – їдальня
capacity – потужність, продуктивність
caramelize – затвердіти
carbohydrate – вуглевод
carbon – вуглець

carcass – туша (тварини)
cardboard – картон
carotene (-in) – каротин
carrot – морква
carry on – продовжувати
carry out – проводити (захід,процес тощо)
cater for – догоджати
catering – громадське харчування
cattle – велика рогата худоба
cauliflower – кольорова капуста
cause (n;v) – причина; спричиняти
caviar – ікра
celery – селера (бот.)
cell – клітина (біол.)
cellulose – клітковина, целюлоза
cereal – хлібний злак
cheese – сир
cherry – вишня
chestnut – каштан
chewing gum – жувальна гумка
chicory – цикорій (бот.)
chill – охолоджувати
chilly – червоний стручковий перець
cholesterol – холестерин
chop (n; v) – відбивна котлета; мілко різати, кришити
churn – збивати масло
cinnamon – кориця
citrate – цитрат
citron – цитрон, солодкий лимон
clarification – очищення
clog – закупорювати
cloning – клонування (генів)
clove – зубок
clove of garlic – зубок часнику
coagulate – коагулювати
coat (n;v) – шар; покривати шаром
cob – качан кукурудзи
cocoa-butter – масло какао
cocoanut – кокосовий горіх
cod – тріска
cod-liver oil – риб`ячий жир
Coke – кока-кола (розм.)
colourants, colourings – барвники (харчові)
complaint – скарга
complexion – колір обличчя

component – компонент, складова
composition – склад, сполука
concern – непокоїти, торкатись (теми)
condensed – згущений
    condensed milk – згущене молоко
confectionery – кондитерські вироби
connective tissue – сполучна тканина (біол.)
consequence – наслідок
considerable – значний, суттєвий
consist (of) – складатися (з)
consistency –консистенція
constituent – складова
consume – споживати
consumer – споживач
consumption – споживання
contain – містити в собі, вміщати
contaminate – псувати, забруднювати, заражати
content – об’єм, обсяг, вміст,кількість
contribution – внесок, вклад
    make contribution (to) – зробити внесок
cook (n;v) – кухар; варити, готувати страву
cookery – кулінарія
cookies – печиво, булочка
cool – модний (сл.)
cooling – охолодження
cork – корок (з коркового дуба)
corn (n;v) – кукурудза, маїс; солити м'ясо
corned beef – солонина
cornflakes – кукурудзяні пластівці
course – страва
    for the 1-st (2-nd, 3-d) course – на першу (другу, третю) страву
cover – охоплювати, покривати
covering – оболонка
cracked – розбитий
cranberry – журавлина
crash – падати
cream (sing.) – вершки
    sour cream – сметана
creamery – маслоробня
cream soup – суп-пюре
crisps – хрустка картопля
crop – культура (сільськогосподарська), врожай
crumb (of bread) – крихта (хліба)
crust (of bread) – шкуринка (скоринка) хліба
crusty – покритий скоринкою

cuisine – кухня (кулінарна традиція)
cultivated – культивований
cultured milk foods – кисломолочні продукти
curd(s) – сир
cure – засолювати
curing – засолювання
curry – страва, присмачена карі
cut – різати
cut out – не вживати, відмовитись (від)
cutlery – ножі, виделки
cutlet – відбивна котлета

D

dairy – молочний
damage – ушкодження
date – фінік, дактиль
decay (n; v) – руйнування, гниття; псуватися
decrease – зменшуватися
deep-fried – смажений у фритюрі
deficiency – недостатність, дефіцит
defrost – розморожувати
degrading – принизливий
dehydration – обезводнення
delicacy – ласощі, делікатес
delicious – дуже смачний
denaturation – денатурація
derive – походити (від), отримувати
deserve – заслуговувати
dessert – десерт, солодке
for dessert – на десерт
destroy – руйнувати
destruction – руйнування, знищення
detergent – моючий засіб
deteriorate – псуватися
detox (n; v) – очищення організму, звільнення від зайвої ваги; забирати
detriment – шкода
diabetic – діабетик, діабетичний
diarrhoea – діарея, пронос
diet – дієта, раціон, їжа, харч
dietary – дієтичний
go on diet – сісти на дієту
digest – перетравлювати, засвоювати (про їжу)
digestible – легкотравний

digestive – травний
digestion – травлення (їжі), засвоєння
digestibility – легкотравність
dill – кріп
dilute – розчиняти
diluted – розведений, розбавлений
dine – обідати
dinner – обід
disease-causing – що викликає хворобу
dirty – брудний
dish – страва, блюдо
disorder – розлад (мед.)
dispersion – дисперсія, розкидання
displacement – зміщення, усунення
dissolve – розчинятися
diverse – різноманітний
doze – доза
dough – тісто (дріжджове)
dozen – дюжина
dramatic – вражаючий
drawn (fish) – вительбушена (риба)
dress – заправляти (страви)
dressed fish – розділена риба (напівфабрикат)
dressing – приправа
dried - сухий, сушений
drink (n; v) – напій; пити
soft drinks – безалкогольні напої
drinking water – питна вода
drip – капати
dripping – топлений жир
drop – крапля
drugs – ліки, наркотики
drying – сушіння
dry milk – сухе молоко

E

eatable – їстівний
edible – їстівний ; той, що їдять
effect – дія
effective – ефективний
efficient – раціональний
eliminate – усувати, виключати
emerge – з’являтися

emulsification – утворення емульсії
emulsifier – емульгатор
emulsion – емульсія
endorse – схвалювати
enhance – підсилювати
enlarge – збільшувати(ся)
ensure – забезпечувати
enormous – величезний
entertainment – розвага
environment – середовище
enzyme – ензим, фермент
equipment – обладнання, устаткування
escape – вивітрюватися, випаровуватися
essential – необхідний, значний, суттєвий
ethanol – етанол
evaporated – випарений
evaporation – випарювання
evenly – рівно, рівномірно
evidence – доказ, свідчення
evident – очевидний
exaggerate – перебільшувати
except – крім, за винятком
excess – надлишок
excessive – надмірний
exclude – виключати, не допускати
exhausted – виснажений, знесилений
exotic – екзотичний
expect – очікувати, розраховувати, сподіватись
expel – викидати, виштовхувати
expend – витрачати
expenditure(s) – витрати
expensive – дорогий (за витратами)
expert – спеціаліст, фахівець, експерт
extent – ступінь, міра
to some extent – до певної міри
extra – додатковий

F

faeces – осадок, осад
fancy – любити
fat – жир
fatty – жирний
favourable – сприятливий

ferment – бродити (хім.)
fermenting – ферментуючий
fertiliser – добриво
fibre – волокно, фібра
    fibre foods – груба їжа
fig – інжир, фіга
figure – цифра, малюнок
figure out – вираховувати
filbert – лісовий горіх, ліщина
fillet – філе
fill in – заповнювати (таблицю, анкету тощо)
filling – начинка, наповнювач
fin – плавник
    fin-fish – плавникова риба
flavour – аромат, приємний запах чи смак
flavouring – ароматизатор
flesh – м'ясо
flour – борошно
floury – борошнистий
fluid – рідкий
foam – піна
folic acid – фолієва кислота
fondant – льодяник
food – їжа
fortify – підкріплювати
fragrant – духмяний
fresh – свіжий
fridge – холодильник
freeze – заморожувати
fruitful – плідний
fry – смажити
fuel (n;v) – паливо; живити, годувати
fungal – грибковий
fungus (pl. fungi) – плісень, цвіль, грибок / гриби (біол.)
furnish – постачати

G

gain – досягати, вигравати, заробляти
    gain an extra weight – набрати зайву вагу
galactose – галактоза
gap – прогалина, дефіцит
garlic – часник
garnish – гарнір

gel – гель
gelling agent – гелеутворювач
gelatin – желатин
gelatinize – перетворюватись на холодець
gene – ген
generate – виробляти
genetically modified – генетично модифікований
GMO – генетично модифіковані організми
germ – зародок, мікроб
ginger – імбир
glacier – льодовик
gland – залоза
glaze – глазур
glucerol – гліцерин
glucogen – глікоген
glucose – глюкоза
gluten – клейковина
goat – цап, коза
goods – товари
gooseberry – аґрус
grab – схопити
grade – якість, сорт, ґатунок, оцінка
gradually – поступово
grain(s) – зерно, зернові (культури)
grape – виноград
grapefruit – грейпфрут
grate – терти (на тертушці)
gravy – підлива
grease – мазати жиром, змащувати (жарівку)
green (organic) foods – екологічно чисті харчові продукти
greengrocer – продавець овочів і фруктів
green house – теплиця
greens (herbals) – зелені(салатні) культури
grill – смажити на рашпері (решітці)
ground coffee – мелена кава
group (n;v) – група; групувати, класифікувати
grow – вирощувати, рости
gum – ясна

H

haddock – пікша (вид тріски)
half (-ves) – половина (половини)
ham – шинка

hardened – стійкий
harm – шкода
do harm – шкодити
harmful – шкідливий, побічний
hazel nut – фундук (лісовий горіх)
head – голова
a head of cabbage – головка (качан) капусти
healthy – корисний (для здоров'я)
heat (n;v) – тепло; нагрівати
helping – порція, частування
help yourself – пригощайтесь
herbal – трав'яний
herring – оселедець
hemoglobin – гемоглобін
hexane – гексан
hexose – гексоза
hold on – дотримуватися
homogenization – гомогенізація
homogenized milk – гомогенізоване молоко
honey –мед
hormone – гормон
horse-radish – хрін
host – господар
huge – величезний
hull – шкарлупа, шолуха
humectant – зволожувач
humidity – вологість
hunger – голод
be hungry – бути голодним
husk – шкірка (рослинних культур)
hygiene – гігієна
hygienic – гігієнічний
hydrogen – водень (гідроген)
hydrolysis – гідроліз
hydrophilic – гідрофільний
hydrophobic – гідрофобний

I

icing – глазурь
icy – льодяний холодний, як лід
identified – ідентифікований
immune system – імунна система
include – включати

increase (v; v) – зростання, збільшення, збільшувати
inedible – неїстівний
in excess – надміру
ingredient – інгредієнт, складова частина
injure – шкодити, руйнувати
inorganic – неорганічний
insoluble – нерозчинний
intake – споживання
intensity – інтенсивність
interaction – взаємодія
interchange – обмін
intoxication – інтоксикація
intra cellular – внутрішньоклітинний
investigation – дослідження
invite – запрошувати
iodine – йод
ion – іон
iron – залізо
irregular – нерегулярний, неправильний, непостійний
isolated – ізольований

J

jam – варення, джем
jar – банка
jelly – желе
job – робота, праця
join – приєднуватися, вступати
juice – сік
juicy – соковитий
junk food – нездорова (жирна) їжа

K

kale – листова капуста
keen (on) – дуже бажати чогось
keep – зберігати
kernel – зерно
kidney – нирка
kitchen – кухня
kiwi – ківі
knock – стукати

know – знати

L

lack of – відсутність, нестача, брак
lactose – лактоза (молочний цукор)
lamb – м'ясо молодого баранчика
lard – сало, смалець
large – великий
layer – шар
lb (libra) – фунт (дорівнює 0,41 кг)
leafy – листковий
lean – пісний
leisure – дозвілля
lemon – лимон
lettuce – салат
lid – кришка
life expectancy – тривалість життя
lifestyle – спосіб життя
light – легкий
lime – лайм (різновид лимона)
linked with – з'єднаний, сполучений (з)
linoleic – лінолева (кислота)
linolenic – ліноленова (кислота)
lipoid – ліпоїд
liquid – рідина
litter – сміття
liver – печінка
liver oil – риб'ячий жир
lobster – омар
longevity – довготривалість
loose – порожній
loose leaf tea – листковий чай
loosely – вільно
loss of – втрата
low – calories –низькокалорійний
lump – грудка (цукру)
lungs – легені

M

macaroni – макарони
mackerel – макрель, скумбрія

main – головний
maintain – підтримувати
maize – кукурудза, маіс
major – головний
malnutrition – недоїдання
manage – керувати
mango – манго
manufacture – виробництво
margarine – маргарин
marmalade – варення, повидло, мармелад
marshmallow – зефір
massage – масажувати
mature – дозрілий
maturity – зрілість, стиглість
mayonnaise – майонез
meal – їжа, вживання їжі
means – засіб
measure – виміряти
medium – середовище
mellow – м'який, соковитий, достиглий, приємний на смак
melon – диня
melt – танути
mental – розумовий, ментальний
mess – бруд, безлад
metabolism – обмін речовин
methods of cooking – технології приготування їжі
microbial – мікробний
microelement – мікроелемент
microorganism – мікроорганізм
milk – молоко
millet – просо, пшоно
milling – помел
mineral salts – мінеральні солі
mint – м'ята
mix – змішувати
mixture – суміш
moisture – волога
molasses – патока
molecule – молекула
molecular – молекулярний
monosaccharide – моносахарид
muscular – м'язовий
mushroom – гриб
mustard – гірчиця
mutton – баранина

N

natural – природний, натуральний
NB (nota bene) – зверни особливу увагу
neat – акуратний, чистий
nectarine – нектарин
need (n;v) – потреба; потребувати
nitrate – нітрат
nitrogen – азот (нітроген)
nourishing – поживний
nourishment – годування; їжа, харчі
numerous – численний
nut – горіх
nutrient – поживна речовина
nutrition – харчування
nutritional, nutritive – поживний
nutritional value – харчова цінність

O

oat – овес
obese – товстий, гладкий
obesity – ожиріння
obtain – одержувати, отримувати
oil – олія
olive – маслина, олива
olive oil – маслинова олія
on the average – у середньому
onion – цибуля
on sale – у продажу
order (n;v) – замовлення; замовляти
ordinary – звичайний, простий
origin – походження
overall – загальний
overdo – пересмажити, переварити (про їжу) тощо
overdoze – передозувати
overeating – переїдання
oxidation – окислення
oxidize – окисляти(ся)
oyster – устриця

P

pack – пакувати
package – пачка
palatable – смачний, приємний на смак
palm – пальма
palmitic – пальмітинова (кислота)
pan – каструля
parsley – петрушка
pasta – паста, здобне тісто, пастила, клейстер
pasteurization – пастеризація
pasteurized milk – пастеризоване молоко
pastry – кондитерські вироби
pea – горох
peach – персик
peanut – земляний горіх, арахіс
pear – груша
pearl barley –перлова крупа
peculiar to – характерний (властивий) для
peel – чистити, лущити, знімати шкірку
pepper – перець
per capita – на людину, на душу населення
perforated – пористий
permanent – постійний
pharmaceutical – фармацевтичний
phosphorus – фосфор
pickle – маринувати, солити
picnic – пікнік
pie – пиріг
pig – свиня
pigment – пігмент
pineapple – ананас
pizza – піца
plain – простий
plant – рослина
plum – слива
poison – отрута
poisonous – отруйний
polysaccharide – полісахарид
pomegranate – гранат
pork – свинина
porridge – (вівсяна) каша
pot – казанок, кухоль

potassium – калій
potato – картопля
poultry – свійська птиця
pound – фунт (=0,41 кг)
pour – лити(ся), полити
pour out – витікати
praise – хвалити
prawn cocktail – салат з креветками
precipitate (n;v) – осад; осаджувати
prepare – готувати, приготувати
preservation – зберігання, консервування
preserve – зберігати
press – давити, пресувати
prevent (from) – запобігати
process (n;v) – процес, обробка; піддавати обробці
processed products – перероблені продукти
processing – переробка, обробка
produce – виробляти
profitable – сприятливий
prolific – плодючий
property – властивість
protective – захисний
protein – протеїн, білок
provide smth (with) – забезпечувати
prune – чорнослив
public – громадський
pulp – м’якость
pumpkin – гарбуз
pure – чистий
purify – очищати(ся)
put – покласти

Q

quality – якість
quantity – кількість
quarter – чверть
quiet – спокійний
quince – айва
quite – цілком
quit – кидати

R

radish – редиска
raise – розводити, вирощувати
raisin – родзинка
rancid – згірклий (молоко)
rancidity – згірклість
raspberry – малина
rare – рідкісний
ratio – співвідношення
raw – сирий
    raw material(s) – сировина
reach – досягати
real – дійсний, реальний
recipe – рецепт (кулінарний)
recommend – рекомендувати
record – реєструвати
recover – одужати
reduce – зменшувати
refined – очищений, рафінований
refreshment – закуска і напої
refrigerator – холодильник
refuse – відмовляти(ся)
related (to) – відносний (до), той що стосується, пов'язаний з
release – вивільняти, випускати
relief – полегшення
relieve – полегшувати, заспокоювати
relish (n;v) – насолода; мати задоволення від чогось
reluctant – неохочий
remedy – ліки
removal – усунення
remove – усувати
    remove insides – видалити нутрощі (тельбухи) у риби
require – вимагати
requirement – потреба
    meet requirements – відповідати потребам
rescue – рятувати
residue – залишок
restaurant – ресторан
restore – відновляти
restriction – обмеження
retain – зберігати
rib – ребро
rice – рис
rich in – багатий на
rickets – рахіт

rigid – жорсткий, твердий
ripe – стиглий
ripen – визрівати, дозрівати
roasted – смажений
rock-fish – морський окунь
roll – булочка
room – кімната, простір
root – корінь, коренеплід
rotate – обертатися
round – круглий
run – керувати
rye – жито

S

saccharide – сахарид
salad – салат
    salad crops – салатні овочі
salami – салямі
sale – продаж
salmon – лосось
salt – сіль
sardine – сардина
satiety – насичення
saturated – насичений (хім.)
        degree of saturation – ступінь насиченості
sauce (n;v) – соус; приправляти соусом
saucepan – каструля
saucer – блюдце
sausage – ковбаса, сосиска
save – берегти
savoury flavour – духмяний, пікантний аромат, смак
scalded cream – заварний крем
scalding – заварювання
scale fish – чистити рибу від луски, лускати рибу
scallop – гребінець (молюск)
scampi – великі креветки
scramble – переміщувати
        scrambled eggs – яєчня
seafood – морські продукти
seasoning – присмака, приправа
seed – насіння
separate – виділяти(ся)
serve – подавати, обслуговувати, серверувати (їжу)

serving – порція
sesame – кунжут
setting – згущення,загустіння
shake – шейк (коктейль безалкогольний)
sheep – вівця
shell (n;v) – шкарлупа; очищати від шкарлупи;
    shellfish – молюск
    shellfruit – горіхові
shrimp – креветка маленька
sieve – решето
simmer – варити на малому (повільному) вогні
site – місце, ділянка
skim – збирати (піну, вершки)
    skimmed milk – збиране молоко
slice (n;v) – скибка, кусень; різати тоненькими шматочками
slim – стрункий
smart – розумний, ефектний
smell (n;v) – нюх, запах; відчувати запах, нюхати, пахнути
smoke – коптити
smoked – копчений
smooth – гладкий
snack (n;v) – закуска, перекусити
soak – вбирати, всмоктувати
soap – мило
sodium – натрій
soft – м’який
    soft drinks – безалкогольні напої
solid – твердий; тверда речовина
soluble – розчинний
solubility – розчинність
solution – розчинник
solvent – розчин
soup – суп
sour – кислий
    sour cream – сметана
source – джерело
spare – нежирний
sparkling – іскристий
species (sing; plur) – сорт, вид (види, сорта)
specific – особливий, специфічний
specimen – зразок
spice (n;v) – спеція; додавати спеції
spicy – гострий, пряний
spinach – шпинат
split (n;v) – солодка страва; розділити, розподілити

spoil – псувати(ся)
spoilage – псування
spoon – ложка
spread – поширювати(ся)
spring – джерело (води)
sprinkle – посипати
sprouts – брюссельська капуста
squash – кабачок
squeeze – чавити, давити
squid – кальмар
st = stone (1st = 6,36 кг)
stain – пляма
starch – крохмаль
starvation – голод
steak – стейк, шматок м'яса чи риби для смаження
steam – варити на парі
steam away – википати
stearic – стеаринова (кислота)
sterilize – стерилізувати
sterilized milk – стерилізоване молоко
stew – тушкувати (м'ясо, овочі, фрукти тощо)
sticky – липкий
stir – розмішувати
stomach – шлунок
stoppered – закупорений
storage – зберігання
store – зберігати, запасати
stove – піч
strain – штам (біол.)
strawberry – полуниця
stroke – удар, параліч
structure – структура
stuff – начиняти
stuffed fish – фарширована риба
stunning – приголомшливий
substance – речовина, субстанція
substitute (n;v) – замінник; заміняти
sucrose – цукроза
sugar-beet – цукровий буряк
sugar-cane – цукровий тростник (очерет)
sugar-free – без цукру, що не містить цукру
suitable – придатний, підхожий
sunflower – соняшник
sunflower oil – соняшникова олія
supersaturated – перенасичений

supper – вечеря
supplement – добавка (харчова)
supply (n;v) – постачання; постачати, поставляти
surfactant – сурфактант (хім.)
survey – обстеження
susceptible to – бути сприйнятливим, вразливим до чогось
sweet – солодкий
sweetener – підсоложувач
sweets – солодощі, цукерки
sweet thooth – ласун, ласуня
swell – напухати, набрякати
swig – випивати залпом
symptom – симптом
synthesis – синтез
synthesize – синтезувати
synthetic – синтетичний
syrup – сироп

T

take away – ресторан, де беруть їжу додому
tangerine – мандарин
taste (n; v) – смак; дегустувати, куштувати
tasteless – несмачний
taster – дегустатор
tasty – смачний
tea – чай
tea – pot – чайник (для зварки)
tender – ніжний, м'який
tenderness – ніжність
texture – тканина (біол.)
threat – загроза
thrive – буяти, пишно рости
tinned – консервований
tip – порада
tissue – тканина (біол.)
toffee – іриска
tough – твердий, жорсткий
toxic – токсичний
toxicity – токсичність
trainee – практикант, стажист
trash – сміття
tray – таця
ash – tray – попільничка

treat – приготування, частування
treatment – обробка, ставлення, поводження
trial – випробування
trickle – текти, капати
trim – обрізати
trimming – обрізка, дочистка, трімінг
tropical – тропічний
trout – форель
try – намагатися
try on – примірювати
tubers – бульбові культури
tumour – пухлина
tuna – тунець
turkey – індичатина
turn – обертатися, повертатися
one's turn – чиясь черга
turnip – ріпа

U

unconscious – що не усвідомлює
undergo – зазнавати
undermine health – руйнувати здоров'я
undernutrition – недоїдання
understand – розуміти
unique – унікальний
unnatural – неприродній
unreal – нереальний
unusual – незвичний
urgent – нагальний
urn – електричний самовар
use (n; v) – застосування; застосовувати, вживати
useful – корисний
kitchen utensils – кухонні приладдя
utilize – використовувати

V

vacuum – вакуум
valuable – цінний
valuate – оцінювати
value (n; v) – цінність; оцінювати
nutritional value – харчова цінність

vanilla – ваніль, ванільний
variety – різноманітність
various – різноманітний, різний
vary – різнитися, змінюватись
veal – телятина
vegetable – овоч
vegetarian – вегетаріанець; рослинний, овочевий
vigorous – енергійний
vinegar – оцет
vintage – марочне вино, вино найвищого ґатунку
visitor – відвідувач
vital – насущний, суттєвий
vitamin – вітамін
vs = versus – лат. проти
volatile – леткий, той що швидко випаровується (хім.)
volume – об'єм
vomit – блювати
vulnerable – вразливий

W

wafers – вафлі
waiter – офіціант
waitress – офіціантка
walnut – волоський горіх
waste (n: v) – відходи, витрата; марнувати (час, гроші тощо)
water – вода
    water – soluble – водорозчинний
weak – слабкий
weakness – слабкість
wet – сирий; зволожувати, змочувати
weight – вага
    gain an extra weigh – набрати зайву вагу
wheat – пшениця
whey – сироватка
whip – збивати (вершки)
    whipping cream – збиті вершки
whisky – віскі
white – білий; білок (яйця)
whole – цілий, весь, здоровий, корисний
    whole milk – незбиране молоко
wide - pread – широко розповсюджений

wild game – дичина
wine – вино
wipe – витирати
wonderful – чудовий
workshop – цех
wrap – загортати
wrapper – обгортка

X

xenobiotic – ксенобіотик (хім.)
X-ray – рентгенівський промінь

Y

yeast – дріжджі
yield (n; v) – урожай, збір плодів, виробіток, вихід (продукції); виробляти, давати (врожай)
yogurt – йогурт
yolk – жовток (яйця)

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Навчальне видання

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Юрчук Людмила Володимирівна

Англійська мова

для студентів технологічних спеціальностей
та сфери обслуговування харчової
промисловості

Навчально-методичний посібник