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Food Science for Well-being
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The congress addressed the following topics:

FOOD EXPERTISE, SAFETY AND TECHNOLOGIES

- **Food Expertise and Safety**
- **Food Technologies**

ENERGY SYSTEMS FOR FOOD CHAIN

- **Energy Efficiency**
- **Machine Building for Food Chain**
- **Intelligent Control Systems**

NATURAL BIOACTIVE COMPOUNDS, FUNCTIONAL AND NATURAL FOOD PRODUCTS, PACKING, STORING AND PROCESSING

- **Natural Bioactive Compounds, Functional and Local Food Products**
- **Packaging, Storing and Processing**
- **Food Processing**

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CONTENT

Oral Presentations

Section 1. FOOD EXPERTISE, SAFETY AND TECHNOLOGIES

Subsection 1A Food Expertise and Safety

<i>Conrado CARRASCOSA, Rafael MILLÁN, Catarina FARIA, Esther SANJUÁN, Pedro SAAVEDRA, José RADUÁN JABER, António RAPOSO</i> INFLUENCE OF THE PRODUCTION FACTORS OF CHEESE FARMS ON MICROBIOLOGICAL CONTAMINATION OF CHEESES	26
<i>Yuliia SLYVA, Yuliia HOLOMYHINA, Galina GUMENYUK</i> COMPARISON OF REQUIREMENTS FOR FOOD AND AGRICULTURAL PRODUCTS FOR EXPORT TO EUROPEAN UNION AND THE EURASIAN ECONOMIC UNION	26
<i>António RAPOSO, Esteban PÉREZ, Catarina FARIA, María Antonia FERRÚS, Conrado CARRASCOSA</i> FOOD SPOILAGE BY PSEUDOMONAS SPP. IN SPECIFIC FOOD GROUPS AND EMERGING DETECTION AND CONFIRMATION TECHNIQUES IMPLICATED	27
<i>Yuriy OHLASHENYY, Yuliia SLYVA, Inna POPOVA</i> IMPROVEMENT OF FOOD SAFETY CONTROL SYSTEM IN UKRAINE	27
<i>Oksana LUGOVSKA, Vasyl SYDOR</i> HYDROCOLLOIDS IN THE FORMATION OF A STABLE EMULSION SYSTEM	28
<i>Asya KALINICHENKO, Larysa ARSENYEVA</i> COMPARISON OF CLASSIFICATION ALGORITHMS FOR THE MULTICLASS DISCRIMINATION OF SAUSAGES USING ELECTRONIC NOSE DATA	28
<i>Anatoliy SAMCHUK, Tetyana PETRENKO, Oleksandr PEREPELYTSYA</i> RESEARCH OF CHEMICAL COMPOSITION OF BISHOFITE	29
<i>Anastasia CHERNAYA, Oksana SHULGA, Larisa ARSENYEVA, Olena PETRENKO</i> EDIBLE FILM ENRICHED BY ELAMIN	29
<i>Larisa ARSENEIEVA, Katerina KURPILIANSKA</i> THE RANGE OF FOOD PRODUCTS EXPANDING WITH PROBIOTIC PROPERTIES FOR PUBLIC CATERING	30
<i>Maxim GORBAN, Mikhail MILYUKIN</i> MONITORING AND DISPERSE-PHASE DISTRIBUTION OF ORGANOCHLORINE PESTICIDES AND POLYCHLORINATED BIPHENYLS IN NATURAL WATER FROM DNEPER RIVER	30
<i>Mariia IANCHYK, Olexandra NIEMIRICH, Olena IANCHYK, Oksana DRANENKO</i> DEFINITION INDICATORS OF QUALITY OF THE CONFECTIONERY SEMI-FINISHED PRODUCT WITH POWDER FROM CARROT	31
<i>Oksana PETRUSHA, Nadia USATYUK</i> ASSESSMENT OF COLOR TEA BY INNOVATIVE METHOD	31
<i>Olga FEDORENKO, Kseniya NAUMENKO</i> IDENTIFICATION OF SWEETENERS IN NONALCOHOLIC DRINKS	32

Subsection 1B Food Technologies

<i>Aslihan DEMIRDÖVEN, Taner BAYSAL</i> INACTIVATION EFFECT OF MICROWAVE HEATING ON PECTIN METHYLESTERASE IN ORANGE JUICE	33
<i>Natalia CHEPEL</i> ADSORPTION PROPERTIES OF SERUM ALBUMIN AND CHITOSAN AS WALL MATERIALS FOR A FLAVOR MICROENCAPSULATION	33
<i>Iryna SOKOLOVSKA, Jula KAMBULOVA</i> FREEZING OF EGG-WHITE CREAMS AS THE WAY OF STORAGE TERM PROLONGATION	34
<i>Olena HRABOVSKA, Hanna PASTUH</i> RESEARCH OF THE HYDROLYSIS-EXTRACTION OF PECTIN SUBSTANCES FROM THE POTATO RAW MATERIALS	34

Anatoliy SAMCHUK¹, Tetyana PETRENKO², Oleksandr PEREPELYTSYA²
chitanya@ukr.net

¹National Academy of Sciences of Ukraine, Kyiv

²National University of Food Technologies, Kyiv

UKRAINE

RESEARCH OF CHEMICAL COMPOSITION OF BISHOFITE

Bishofite is a natural mineral. There haven't been studied yet detailed chemical composition of natural bishofite solution of various origins and its interaction with the phosphoric acid solution in the presence of ammonia in a wide range of specified ratios of reacting components. So the purpose of this study was to clarify these issues. The content of the alkali metals, calcium and magnesium in the bishofite was determined at atomic absorption spectrophotometer C-115-M-1, and the remaining elements, including selenium was defined with the mass spectral method by using IPC-MS-Element-2 analyzer (Germany) with an accuracy of <3%. Magnesium was also determined trilonometrically in prepared working solutions. To study the interaction of bishofite with phosphoric acid solution there was used the solution of bishofite (c. Pryluky). The phosphate acid and the ammonia solution were qualified as «A. R. Purity», the concentration of phosphoric acid to explore a series of experiments was determined by the gravimetric method.

A series of experiments was prepared by the following method. The series of different flasks with the bishofite solution of constant volume (0,003 l, $c = 1,86 \cdot 10^3 \text{ mol/m}^3$) were filled up with variable amounts of phosphoric acid solution with a concentration of $2,09 \cdot 10^3 \text{ mol/m}^3$ to ensure that the given ratio $[\text{PO}_4^{3-}] : [\text{Mg}^{2+}]$ was changing from 0,19 to 5,25. Since the sediment didn't drop, to each sample of clear solution mixtures of substances was filled up with water to a total volume of 0,05 l and then with ammonia solution of 0,0078 l, $c = 2,18 \cdot 10^3 \text{ mol/m}^3$. After that the precipitate fell in the samples. After the mixture retention for 14 days, the precipitate was filtered and pH in the solutions was measured (instrument pH-150 MY). To calibrate the pH meter there were used the buffer solutions with pH 1,68; 6,86 and 9,18.

According to chemical analysis of the mineral bishofite contains, %: magnesium — 11, 12; manganese — <0,001; calcium — <0,05; sodium — 1,01; potassium — 0,75; water in the form of OH groups — 3,38; chloride ion — 33,47; sulfate ion — 1,76. The ratio $[\text{Mg}^{2+}] : [\text{Cl}^-]$ in the mineral is 1,00 : 1,96 that corresponds to the formula MgCl_2 . Mineral contain admixtures of potassium (0,75%) and manganese (<0,01%), that are component elements of many micronutrients and medications. The results of bishofite analytical studies from Poltava deposit corresponds to TU U 24.1-33346498-004:2008. The data received by the method of pH measurement showed various kinds of interactions: at pH $\approx 6,0$ —9,0 and the given ratio $[\text{PO}_4^{3-}] : [\text{Mg}^{2+}]$ from 1 : 1 to 1 : 2 phosphate a precipitate is formed, and at pH <5 and the predetermined ratio $[\text{PO}_4^{3-}] : [\text{Mg}^{2+}] > 3$ the system is homogeneous. It was established the chemical composition of natural bishofite from different wells by pH measurement, the determined intervals pH and specified ratios of Mg^{2+} ions and PO_4^{3-} at which phosphate precipitate is formed. The obtained results were used for the preparation of biologically compound, which improves the growth of wheat.

KEY WORDS: bishofite, composition, phosphoric acid, ammonia, interaction

Anastasia CHERNAYA, Oksana SHULGA, Larisa ARSENYEVA, Olena PETRENKO
anastasia_chernaya@ukr.net

National University of Food Technologies, Kyiv

UKRAINE

EDIBLE FILM ENRICHED BY ELAMIN

Bakery products are difficult to enrich because iodine easily evaporates during baking that's why iodine is added on that stage when the temperature is low. The most appropriate way is to use edible film which is applied on a bakery product after baking. Elamin manufacturer regulates that 1 tablet contains 972.9485 mg/kg of iodine, the daily adult dose for iodine is 150 micrograms.

Tests on iodine were performed on the «Ecotest-BA» voltamperometry analyzer by the method of inverse voltammetry direct current on three-electrode scheme. A principle of determining iodine by this method is based on electrochemical oxidation of iodine ions into molecular iodine, sediment of poorly soluble complex compounds comprised of iodine molecule, followed by its electrochemical dissolution on the surface of the electrode at linear scanning of potential. The initial concentration of iodine in solution is calculated by measuring the value of the cathode current which flows during sediment dissolving.

The analysis of results shows that it is sufficient to use 1.5% of elamin in edible films to enrich bakery products in iodine. The indicated concentration allows to enrich a product with iodine in the amount that fully meets the iodine daily requirements.

Elamin does not completely dissolve in water, so it is possible to bring extract of elamin into the film in order the film will not contain particles of little green pills of elamin. The results show that the product covered by a coating of edible extract of elamin, provides the daily requirement of iodine from 37 to 52 % depending on the type of film, because film components affect the retention of iodine in the film. Consequently, the use of elamin in edible films for bakery products is efficient because it allows to increase the nutritional value of products significantly.

KEY WORDS: biorozkladalni film elamin, bakery products

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