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## USE OF HYDROCOLLOIDS IN MEAT SYSTEMS

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Food additives used in the meat industry serve to ensure safety and improve product quality. They perform certain functions of changing and imparting the desired properties to the feedstock and the finished product.

Food additives used in Ukraine and Europe can be combined into seven groups: food coloring (E 100 - E 199); preservatives (E 200 - E 299); antioxidants and synergists of antioxidants (E 300 - E 399); stabilizers, emulsifiers, water retaining agents, fillers (E 400 - E 499); acidity regulators, separators, carriers, hardeners, etc. (E 500 - E 599); substances that enhance the taste and aroma (E 600 - E 699); other food additives (E 900 - E 1521). The amount of additives allowed for use in the production of meat and food products is about 240 E-indices.

The approval for the use of food hydrocolloids in Europe was first granted in 1995 under the Directive 95/2/EU on food additives (excluding dyes and sweeteners) by a commission known as Miscellaneous Additives Directive. Most of them are allowed as general-purpose food additives in the quantities specified in Appendix 1 of Directive 95/2/EU. At the end of the 20th century, starches, an extensive group of gums, alginates and celluloses became officially allowed in the European Union[1-2].

It is known that meat products, like other food products, contain, in addition to meat, eggs, flour, milk powder, etc., food additives. They range from traditional flavors (table salt, sugar, spices) to special technological ones, including having E-indices. In accordance to the law they are applied only under certain conditions: they are not hazardous to health; technological necessity and validity of the use of food additives for the manufacture of a specific type of product; reliable information on the composition of the product, the presence of which should not mislead to the consumer and contribute to the creation of unfair competition between food manufacturers.

There are 54 E-indexes used in the production of meat products according to specifications (for the group of emulsifiers, stabilizers - 17). Technological significance have: E 401, E 402 - sodium and potassium alginates; E 406 - agar; E

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407 - carrageenans; E 410, E 412, E 415, E 425 - gums (carob, guar, xanthan, konjac); E 450, E 451, E 452 - food phosphates (pyro-, trip- and polyphosphates); E 460, E 461, E 466 - cellulose, methyl cellulose, carboxymethyl cellulose; E 470, E 471, E 472 - food emulsifiers based on fatty acids (salts of fatty acids, mono- and diglycerides of fatty acids, esters of glycerol, food and fatty acids)[3-4].

Hydrocolloids are an extensive group of food ingredients, that were identified in 1978 as an independent category on the basis of the commonality of the properties that they display in food systems. This group includes compounds that are added to liquid or solid foods during their manufacture in order to give the desired viscosity or consistency, as well as to stabilize food dispersed systems (emulsions, suspensions, etc.).

Hydrocolloids belong to the group of polysaccharides and are high molecular weight carbohydrates - the products of polycondensation of monosaccharides (glucose and its derivatives), linked to each other by glycosidic bonds and forming both linear and branched polymer chains. They can be of plant (land and marine plants) or microbial origin.[5]

A feature of most hydrocolloids is their ability, when they dissolved in water and form highly viscous solutions characteristic of thickened systems. It should be noted that the introduction of polysaccharides into meat systems or food emulsions leads to the formation of a plastic structure of emulsion systems and food products. Due to the properties of hydrocolloids, it became possible to create low-calorie foods that preserve the organoleptic characteristics of traditional analogues.

Despite the fact that the content of hydrocolloids in products is usually not more than 1%, they strongly influence the rheological (texture) and organoleptic properties of food products.

One of the main conditions for the effective use of hydrocolloids in a particular food system is their complete dissolution, depending on the chemical nature and on the structural features of the molecules (chain length, degree of branching, nature of monomer units and functional groups, location in the molecule, the presence of glycosidic bonds).

Modern resource-saving technologies for meat products include the use of various food additives that improve the quality of organoleptic, structural-mechanical and physico-chemical parameters of finished products.

The most effective hydrocolloids for controlling the rheological characteristics of products are gums, which have a wide range of functional properties and are used to solve various technological problems - uniform distribution and binding of moisture in the product, stabilization of the structure of protein-fat and fat emulsions in the manufacture of confectionery, meat, dairy products (including during storage), reducing moisture loss in the product during heat treatment.

Gums can be used in the manufacture of sausages for the preparation of fat emulsions, which are used to reduce the cost of production.

It is advisable to add gums to water along with dry protein components of the emulsion at the initial stage of the emulsion preparation process — mixing the components before adding fat (or oil).

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The most important ones of industrial importance and used in various branches of the food industry are as follows: locust bean gum, guar gum, tragacanth gum, konjac gum, gum arabic, karaya gum and tara gum[6].

Knowing the properties of the ingredients, their correct selection and a clear choice of the ratio of the components will help to create complex mixtures of hydrocolloids with positive technological properties that are not inherent in individual compounds. They increase the viscosity of the system, reduce the effect of syneresis, increase elasticity will solve the most complex problems of industrial food production.

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