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## DETERMINATION OF CARBOHYDRATE COMPOSITION OF AROMATIC RAW MATERIALS

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The use of aromatic raw materials in the formulas of dairy products is a promising direction to expand their assortment. Spices give products not only variety of taste qualities, but also favor better digestion, have preventive and curative properties. Diverse taste and aromatic properties which spices give to products depend on the content of different groups of organic and inorganic matters - essential oils (terpenes and their oxygenates derivatives - aldehydes, cetones, acids, alcohols and their esters), carbohydrates, organic acids, minerals etc. A large role in the forming of food gustatory qualities belongs to carbohydrates, which somehow cause compatibility of spices in the compositions and determine the direction of their future use.

As the research objects anise, star anise, cloves, sweet pepper, ginger, cardamom, cinnamon, turmeric, nutmeg, fenugreek seeds, sumac and black pepper were used. The carbohydrate composition of these spices subject to the content of sucrose, fructose and glucose was investigated using the method of liquid chromatography (see Table).

Table

Carbohydrate composition of spices

Title of spices	Mass fraction, %			
	total sugar	fructose	glucose	sucrose
Nutmeg	12,94	3,06	9,06	0,82
Anise	10,19	2,14	3,21	4,84
Sumac	8,54	2,23	5,45	0,86
Ginger	8,39	1,70	5,38	1,32
Cardamom	8,34	0,88	6,46	1,01
Star anise	7,20	3,76	2,92	0,52
Fenugreek	4,54	0,001	3,51	1,03
Sweet pepper	3,10	1,18	1,12	0,80
Black Pepper	3,04	0,13	0,83	2,08
Cloves	2,99	1,06	1,21	0,73
Turmeric	2,90	0,67	1,64	0,59
Cinnamon	2,55	1,09	1,08	0,38

It was found that the largest carbohydrate content was characteristic of nutmeg (12.94%) and anise (10.19%). Moreover it was defined a relatively high content of sucrose (4.84%) in anise, which provides sweet flavor while used. In nutmeg there prevails glucose, which is less sweet than sucrose, therefore the sweet aftertaste is hardly noticeable. Rather high carbohydrate content was found in the spice of sumac - 8.54%. But this spice is characterized by a relatively high content of organic acids, which mask sweet flavor. Such spices like cloves, turmeric and cinnamon are characterized by a relatively low carbohydrate content. That is they give a pronounced nutty flavor and aroma and can be used in foods adding both salt and sugar, and mix well with other spices.

The results obtained can be used to create compositions based on the spices above mentioned and to develop the technology of products with their usage.

**KEY WORDS:** aromatic raw materials, carbohydrate composition.

## IMPROVING RECIPE COMPOSITION AND TECHNOLOGY OF BREAD STICKS

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It is possible to improve usefulness of bread sticks due to the making in their recipes the alternative for baking natural ingredients with high nutritional and biological value. We can offer such functional ingredients as basidiomycetes, in particular *Pleurotus ostreatus* mushrooms that contain significant amount of nutrients.

To enrich recipe composition with more protein was decided to add alimentary casein, which proteins by amino acid composition blend well with flour proteins and *Pleurotus ostreatus* mushrooms.

With the help of software «Optima» and experimental laboratory baking a new recipe of bread sticks with a balanced chemical composition was designed. The products, which recipe contained *Pleurotus ostreatus* mushrooms and casein in the amount of 25 % and 7 % to their weight of flour respectively, had high organoleptic, physical and chemical properties. The investigations have shown that in the finished enriched sticks proteins content increases by 50,5...52,5 %, protein's quality index rises from 0,71 in traditional products to 0,81.

The production of bread sticks requires a complex of specialized equipment (dough sheeting machine, plaits cutting forming machine, etc.). It is offered to improve the technological process of enriched bread sticks production due to the introduction of fermenting-forming aggregate (extruder) that was developed by scientists of our university. In the aggregate cold extrusion processing of the dough at higher pressure, namely its ripening, standing and forming, take place. By the method of mathematical planning of multifactor experiment it was determined that dough with *Pleurotus ostreatus* mushrooms and casein should knead for 10...11 min. The optimal pressure in the vessel of the fermenting-forming aggregate is 0,2 MPa, the duration of dough ripening under the pressure is 10 min. It was received a mathematical model that adequately describes the influence of technological parameters on the quality of finished products.

**KEY WORDS:** bread sticks, *Pleurotus ostreatus* mushrooms, alimentary casein, fermenting-forming aggregate