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Developing procedures and recipes of dietary wafers with stevioside

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Abstract
The analysis of the existing assortment of wafers with fatty fillings enabled us to ascertain that their physiological value is low. They have high fat and carbohydrate content, low protein content, high energy capacity, and low number of vitamins, microelements, and food fibers. We have investigated the possibility of producing wafers of dietary function using stevioside, beet food fibers, and dry milk whey. The object of this research work is to develop the assortment of flour confectionery goods for functional nutrition. The investigations that we had carried out showed that in producing wafers entire replacement of sugar by stevioside was possible with incorporating dry milk whey and beet food fibers. The optimal dosage of stevioside incorporation in the proportion of 0.30%, and the ratio of dry milk whey and beet food fibers is 3:1, respectively.

Keywords: Dietary; assortment; wafers; stevioside; food fibers; dry milk.

Introduction

Nutrition is one of the most important factors influencing the population's health. In Russia like in many other countries of the world the first places among the diseases which cause mortality are occupied by cardiovascular and ontological diseases.

Prolongation of the length of human life may be the result from the substitution of full-value foodstuffs for some nonbalanced ones on the basis of vegetable raw material [1].

At present in Russia as well as in other developed countries considerable changes take place in people's attitude especially in socially active layers of population toward their health. The old notion that "health is worth nothing", i.e., that expenses on it do not give any effect and that it can be ignored is disappearing. It is becoming clearer that health itself is the most valuable property of man, because his capacity for work in the modern society and, correspondingly, his standard of living and well-being depend on his health [2].

During the last decade, due to the growth of the number of chronic diseases and thanks to the establishing their connection with nonbalanced nutrition, people began to treat foodstuffs as an effective means of supporting physical and psychological health as well as reducing the risk of arising of many diseases.

Foodstuffs possess a certain food value; they also regulate numerous functions and biochemical reactions in the organism.

The specific part of nutrition in the development of atherosclerosis, sugar diabetes, gout, and obesity is not less than 50-75%. More than a half of oncological diseases, according to the opinion of many scientists, arise as a result of abnormal nutrition. The widespread problems of diseases are brought about by the violation of metabolism and also depend on nutrition in some ways [3].

Sweetmeats are a product without which Russians cannot imagine their life. Confectionery products have always beer and will be the products which are acknowledged to please people. Their assortment is various, that is why every consumer may find a sweetmeat to his taste. Truly Russian dainty, wafers are very popular [4].

Water products belong to the most favorite foodstuffs of Russia, especially among small children and teenagers.

Regular abundant consumption of digested carbohydrates accompanying the growing hypodynamy of population results in over satiating the blood with glucose, which in such cases is transformed info lipids promoting the

obesity of the organism and as a result it brings about cardiovascular diseases. In this connection, there is a great need of substituting intensive sweeteners for sucrose in traditional foodstuffs. Developing products having reducer energy value is an inalienable tendency in the development of food technology. The most promising sweeteners in this respect are the sweeteners of natural origin.

Lately food additives having various principles of action find wide application in producing confectionery products from flour. The necessity of using these additives is caused by unstable flour quality, by the variety of functional properties of the processed raw material, and by the increase of the assortment of the time of storing the product freshness.

Very important trend in the development of confectionery industry is focused on solving the problem of introducing new procedures enabling to ensure the manufacture of competitive confectionery products including the products of specific function, i.e., the products having special properties. Confectionery products of specific function, first of all, are intended for dietary and functional nutrition [5].

The wide spreading of functional products in the world is due to the fact that hypodynamic way of life has brought about the amount of food which an individual consumes during a day. It is a general tendency in the world. It becomes necessary for this small amount to contain as many useful substances as possible that the daily ration may contain all the necessary nutrients. That is, the individual is to consume specially enriched products, i.e., functional ones.

In the world practice during the last years, the products of processing stevia are employed to add functional properties to the foodstuffs. One of these products is stevioside. It is a natural sweetener of intensive type having the sweetness coefficient which is 300 times higher than glucose sweetness. It contains few calories, has a nice taste, therefore it may replace carbohydrates in the dietary nutrition. It does not contain substances that might do harm to the human body [5].

Its main advantages are sweet taste, practically zero energy value, and resistance in heating, prolonged storage, resistance to acid and alcali action, nondigestibility by microorganisms, good solubility in water, small dosage, and the possibility of its adding to the product at any stage of production, harmlessness during prolonged use. It promotes normalizing glucose concentration in human blood and rehabilitating the violation of the metabolism process.

According to literature data, stevioside improves the functioning of cardiovascular and immune systems; it also improves the functioning of thyroid gland, liver, kidneys, and spleen. It normalizes blood pressure possesses anti-oxidative, adaptogenic anti-inflammatory, anti-allergic, and moderate bile expelling action; it also removes allergic diatheses in children, improves sleep, increases physical and mental capacity for work.

Combining various additives (food fibers) with natural sweetener of stevioside type makes it possible to obtain products with assigned properties able to meet any needs of the body. Therefore, developing various types of confectionery goods aimed at composite introduction of these ingredients makes it possible to obtain both tasty and useful goods.

Methods

Viscosity was determined by rheological method at 20°C using an Ostwald viscometer; structural and mechanical properties of model systems were measured by reotest and CT-1 structure meter.

We have investigated the possibility of producing wafers of dietary function using stevioside, beet food fibers, and dry milk whey.

The object of this research work is developing the assortment of flour confectionery goods for functional nutrition.

Results and Discussion

Lately the food enriched with food fibers has become a fashion. Why? Because, on the one hand, advertising such products does not contradict truth, and, on the other hand, in this country prophylactic medicine is rapidly developed in parallel with the growth of the population's interest in their own health. Food fibers are contained in vegetables, fruit, brown and mixed bread as well as in bran.

Current medical investigations have shown that lack of food fibers in food causes violation of dynamic balance in the inner part of the human being, it has become the risk factor of many diseases, including gastroenteric ones.

Food fibers are inalienable and necessary components of food for both healthy and unhealthy people. The problem is to determine their necessary amount and to choose optimal food fiber sources for each individual, i.e., to determine which products are preferable for everyone.

The objects of our investigation in this research work are stevioside [6,7], beet food fibers, and dry milk whey, as well as wafers with fatty filling and the filling itself containing stevioside.

As stevioside possesses high degree of sweetness when using it in food products where sugar is the major raw constituent, it is necessary to select the products that are filling materials [8]. We have selected beet food fibers and dry milk whey as such products.

To achieve the stated object, it was necessary to investigate the effect of the additives used on consumer properties of finished waters and theological properties of semiproducts.

As a result of developing wafers with stevioside, we have made three samples having stevioside content of 0.25%, 0.30%, and 0.35% to the filling mass. We carried out the determination of organoleptic indexes of wafer quality for every investigated sample and control [9].

In their taste quality and organoleptic indexes, the wafers having the dosage of 0.30% stevioside to the filling mass are the optimal sample. The wafers having the dosage of 0.25% stevioside to the filling mass are not sweet, and the wafers having the dosage of 0.35% stevioside to the filling mass have strong aftertaste and they are bitter.

To determine the adequacy of the developed wafer samples with substituting stevioside for sugar, we have carried out sensory evaluation of test samples compared to reference using profile-range method.

As a result of handling the shuts of tasting, we compiled the petal diagram of the wafers taste profile on which we give the comparative analysis of three wafer samples with stevioside.

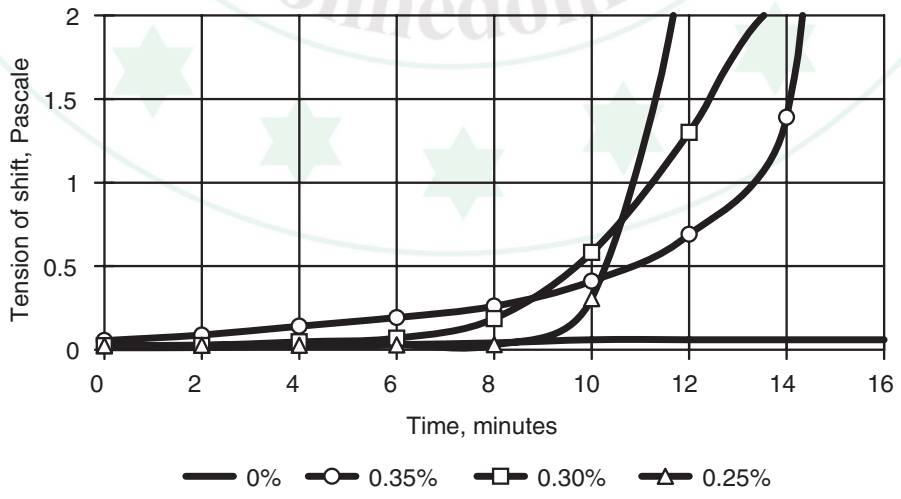
In studying the effect of the introduced stevioside on physicochemical indexes of the semiproducts and finished products, we have found that the investigated wafer samples correspond to the requirements indicated in the State Standard 14031-68 for wafer goods. The moisture share in this respect practically does not change. The mass share of ash somehow changes compared to the reference using sugar.

To determine the optimal amount of food fibers and dry milk whey in the filling, we introduced them in the amounts – 1:1, 1:2, 1:3, respectively. As a result of organoleptic analysis, we have found out that the optimal ratio of food fibers and dry milk whey is 1:3; therefore, we carried out our further research in this ration.

On the basis of our research, we have worked out the recipe of the wafers “Zabava”.

An important factor for successful production of wafers is the process of filling stabilizing during the product aging. In this connection we found out and presented in the graph (Figure 1) the dependence of limiting filling shift stress on the aging time. From the graph it is seen that the reference is stabilized much slower than the samples

Figure 1: The dependence of limiting filling shift stress on the aging time.



and it acquires necessary hardness only in 16 min. Stabilizing the investigated samples with stevioside takes place much sooner than in 6-8 min.

The adhesive properties of the samples of filling and reference were investigated applicably to the process of its spreading on the wafer sheet. The change of adhesion of the samples in relation to the reference depending on the percent stevioside content in the filling is represented in the diagram from which it is seen that with increasing the percent stevioside content in the wafer filling the value of adhesive stress also increases: at the stevioside dosage of 0.25% it is 26% higher compared to the reference, and when the stevioside content is 0.30% and 0.35% it is 13% higher. The increase of adhesion has positive meaning for preventing the stratification increase testifier to more solid connection between the wafer sheet and the filling as after aging the strength of tearing increases and this makes it possible to preserve the connection of sheets and wafer filling during storage and consumption.

Three samples of filling and the reference were also investigated to determine the temperature of setting [10]. For the reference, the temperature setting is 36°C. Hence, in producing low-calorie wafers lower temperature is necessary for stabilizing goods as distinct from standard goods.

Conclusion

Thus, the investigations that we carried out showed that in producing wafers entire replacement of sugar by stevioside is possible with incorporating dry milk whey and beet food fibers. The optimal dosage is stevioside incorporation in the proportion of 0.30%, and the ratio of dry milk whey and beet food fibers is 3:1, respectively.

Deduction

Our research has shown that the replacement of sugar by stevioside with simultaneous incorporation of beet food fibers and dry milk whey makes it possible to produce wafers of high consumer quality in their sweetness which is not worse than the reference in any way.

In our opinion, this direction has prospects in producing confectionery produce with balanced composition because utilizing this raw material in wafer manufacture makes it possible to reduce their calorie content, to improve their taste, and considerably to increase their biology and food value.

Healthy way of life including proper nutrition is the cheapest and rational way of strengthening people's health, and their opportunity not to spend money on treatment in future.

Just for this reason producing foodstuffs having reduced energy value has received intensive development lately taking into account the requirements of science of nutrition.

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