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PROSPECTS OF ENTERPRISES DEVELOPMENT BY IMPLEMENTATION OF NEW HEALTHCARE PRODUCTS TECHNOLOGIES

ABSTRACT:

In the article the development and dynamic growth of small, medium and large enterprises of different forms of ownership of the food industry is considered. It is established that this can be promote by implementation of new innovative technologies for the production of developed products containing natural components. These ingredients, in a unique combination, will have a health-enhancing character when daily consumed in the diet of people suffering from cardiovascular disease, diabetes and overweight. Technological schemes of halva production with oilcake of oilseed flax and pumpkin candy are given. Generally, the proposed products are characterized by balanced fatty acid composition and high content of vitamins and minerals. They have a positive effect on the gastrointestinal tract and cardiovascular system. Recipes for the production of wellness candies "Nastochka" and canned "Deary" and "Riddle of the Steppe" from pumpkin, as well as halva with oilcake of oilseed flax, are offered. The pumpkin varieties of large-fruited breeding of the Southern State Agricultural Research Station of the Institute of Water Problems and Land Reclamation of the National Academy of Agrarian Sciences (Kherson region, Ukraine) were used, namely Bilynka, Universal, Gray Ukrainian and promising Stepovy variety. In addition, the issue of the reuse of multi-ton waste oil and fat complex, which is the oilseed flax meal, is solved. Thus, attached to the production of the proposed products, manufactures receive new sales channels to trading networks with specialty wellness products, restaurants and hotel complexes as a tasty alternative to harmful to the human body products, compliments to tea or coffee and prevention of the aforementioned diseases.

INTRODUCTION.

Tendencies to accelerate the rhythm of life and reduce the onset of illnesses prompt more than ever to take care of health through the use of various methods, one of which is a rational and health food, which is advisable to offer in catering establishments and introduce in the production of Ukrainian enterprises. Thus, according to the Ministry of Health of Ukraine there are about 1.3 million patients with diabetes, of which about 200 thousand patients require daily insulin. Just last year, nearly 104,000 Ukrainians heard this diagnosis for the first time in their lives. The number of cases is increasing from year to year, however almost half of patients have not been diagnosed with diabetes for today [1].

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Also disappointing predictions are observed in the direction of cardiovascular diseases, because every year around 9.4 million people die in the world. Among them, 51% die from stroke and 45% die from coronary heart disease. Diseases of the cardiovascular system in the modern world, including in Ukraine, are considered one of the most acute problems of our time. These statistics indicate a low culture of prevention, diagnosis and treatment of cardiovascular disease among Ukrainians.

One way to improve body's performance is to replace classic confectionery and other sweet products in your daily life with those that are wellness. They are usually designed based on the raw materials available in a particular region and the preventive effect on the human body. This raw material can be pumpkin. In recent publications, domestic scientists have equally explored the possibility of creating salty [2,3] and sweet assortments [4] from pumpkin. In the EU, the distribution of canned organic pumpkin under the trademarks "Tone's", "Farmer's market", "Libbys" [5] and others is widespread. The creation of a new type of produce from these vegetables and its safety was investigated by N. Orlova, S. Kazachenko, I. Kuzmenko [6]. Abroad Martha Filippik studied the range of functional products from the above-mentioned fruits and determined the positive impact of the main components on the human body [7].

It is clear that the current trend of functional products production is getting implemented in small and medium-sized enterprises, workshops, restaurants and hospitality establishments. The above businesses often position the business development by expanding the range of such products. Therefore, the introduction of new technologies and formulations will give impetus to the stable expansion and development of modern enterprises of different levels and forms of ownership.

Research on the development of new types of healthy food products was conducted on the basis of the Department of Food Production Engineering of Kherson State Agrarian University. As a result, confectionery products were developed in particular "Nastochka" candies, which contain ingredients in their composition that are allowed for diabetic patients, namely pumpkin.

Large-fruited pumpkin (Cucurbita maxima Duch.) - in 2016 there are seven varieties, of which three varieties are selected by the Southern State Agricultural Experimental Station of the Institute for Growing in the Southern Steppe (Bylinka, Gray Ukrainian, Universal). In 2015, a new promising variety of the Steppe pumpkin, suitable for cultivation in the steppe zone and for use in the processing industry, was submitted to the State Variety Testing [8].

Table 1

Comparative characteristics of rayon varieties and hybrids of large-fruited pumpkin in southern Ukraine

Variety	Yield, t / ha	Average weight of marketable fruit, kg	Content in fruits			
			Dry soluble substances	Vitamin C, mg /%	Carotene, mg /%	Pectin,% on dry matter
Bilinka	17,2	3,3	7,0	6,6	4,5	5,2
National	23,4	4,5	6,5	6,1	5,1	5,8
Anniversary	18,2	3,5	7,2	4,3	3,6	6,9
Glory to F1	21,3	4,1	9,4	6,1	5,6	5,7
Gray Ukrainian	33,2	6,4	9,3	5,4	6,7	5,1
Universal	36,9	7,1	10,8	6,5	8,5	6,3
Ferro	27,5	5,3	9,9	4,1	5,9	5,6
Steppe	33,8	6,5	10	5,1	6,6	7,9
HIP	2,6					

data generated from [8]

As a result of the comparative evaluation of yield and content of biologically valuable substances in the fruits of rayon varieties of large-fruited pumpkin (table 1), it was found that the varieties of breeding Southern State Agricultural Experimental Station of the Institute for Growing namely Universal and Steppe are distinguished by yield, high content of carotene, pectin. Thus, in the manufacture of prototypes for confectionery and canned food was used pumpkin of the above varieties.

WELLNESS PUMPKIN CANDY FROM THE FRUITING PUMPKIN.

To determine the optimal composition of confectionery products that will have a positive effect on the human body, it is necessary to analyze the chemical composition of each. The basis of the offered sweets is pumpkin, but there are also available lemon, honey, stevia powder and natural cocoa products.

Recent research by scientists from the East China Institute of Physiology has shown that pumpkin is an effective preventative and therapeutic agent for diabetes. The antioxidants contained in this vegetable help restore pancreatic tissues, and the chiroinositol substance activates the production of insulin in the body [9].

In addition, low levels of calories and vitamins, minerals and dietary fiber are essential for a healthy diet of diabetics. Pumpkin at diabetes helps control weight and maintain the right level of glucose in the body. Dessert from the pumpkin can be a great substitute for confectionery and baked sweets.

The substances contained in the stevia leaf help to restore the sensitivity of the body's cells to insulin and increase their penetration of glucose. Thus, adjusted lipid metabolism and burn accumulated fats. [10]

Lemon is a great alternative to diabetes, because type 2 diabetics reduce the amount of fruit in their diet due to its high sugar content, and the glycemic index of lemon does not give a sharp increase in blood glucose. Lemon with type 2 diabetes helps:

– increase immunity at the expense of a large number of vitamins in the composition;

– reduce blood sugar and cholesterol levels;

– cleanse the body of toxins;

– lead to normal pressure;

– reduce the risk of cancer [11].

Diabetic chocolate is allowed (and only bitter), but in very small quantities and not every day. The pancreas of these patients produces insufficient insulin. However, the need for carbohydrates is because they are a source of energy. It is possible to enter bitter chocolate at diabetes only with the permission of the doctor [12].

Honey with type 2 diabetes can eat, because its composition contains glucose and fructose - a natural sweetener. Their absorption takes place without the help of insulin, which is extremely important for a patient with diabetes who has a hormone produced in insufficient quantity. Honey components are slowly absorbed into the human body and do not increase sugar. Therefore, honey is considered a kind of regulator of sugar levels and advised to eat daily [13].

Thus, after analyzing the benefits of the components of the developed confectionery products, it is advisable to offer wellness candy to travelers in hotels, to add them as a compliment to tea at catering establishments and to offer catering events. This opportunity is caused not only by the wellness value and marketing course of each enterprise, but also by the high percentage of patients with diabetes.

Recipe per 1 kg. ready-made chocolates of the health resort "Nastochka" are shown in table 2,%.

Table 2

Recipe for wellness candy "Nastochka"

№	Name	Number of components,%
1	Pumpkin	75
2	Honey	15
3	Lemon juice	25
4	Cinnamon	1
5	Cocoa butter	3
6	Cocoa is rubbed	2,5
7	Stevia (powder)	1

[author operation]

Candy made as follows (fig. 1):

I. Making stuffing

1) the pumpkin is cleaned of seeds, peels and parts of the pulp;

2) rubbing the pumpkin on wiping machines to a homogeneous mass;

3) mixing pumpkin puree, honey and stevia on a mechanical type stirrer;

4) cooking until thickening is carried out in cooking machines of periodic action;

5) at the end of cooking, lemon juice and aromatic substances are added, namely cinnamon or vanilla.

6) the preparation of molds is carried out by starching the inner walls of the cells

7) filling with the dispensers of the prepared forms stuffing and long-term cooling for 6 hours;

8) the removal of sweets and coating by chocolate.

II. Making chocolate coating

Chocolate is prepared by mixing natural ingredients, namely cocoa butter, cocoa liquor, stevia powder, in stirrers, followed by trituration of the mixture to obtain a liquid, finely dispersed coating of chocolates.

The obtained wellness candy with pumpkin puree contains natural sugar substitutes and are suitable for consumption by patients with diabetes.

The technical result is the creation of pumpkin puree candies with improved organoleptic characteristics and nutritional value, low calories and reduced cost compared to classic candies.

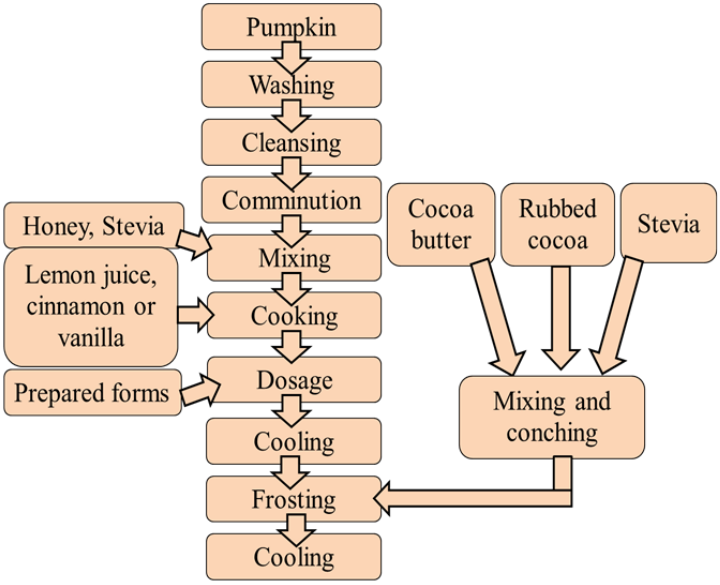

Fig. 1. **Technological scheme of production of candies "Nastochka"**

HALVA WITH OILCAKE OF OILSEED FLAX.

Tasks currently set before the oil and fat industry determine not only the quantitative increase in production volumes, but also require the search for innovative technologies. One of the ways of qualitative nutrition of the population of Ukraine is the production of oil and fat products, both functional and intended for preventive maintenance, which ensure the preservation and improvement of human health. The products of these groups should have a balanced fatty acid composition and an increased content of fat-soluble vitamins and mineral elements [14].

The processing of linseed oil in the oil industry produces a significant amount (up to 64%) of the meal or cake, as well as husks and solvents. Their rational use will be able to solve the problem of multi-tonne landfill emissions or the natural environment and to provide an additional product of significant value to the food industry.

The benefit of linseed oilseed is related to its composition of seeds. Note that the composition of the seeds are important, required by the body substances: magnesium, potassium and manganese. There are essential amino acids, vitamin E, and effective natural antioxidants. In addition, the seeds contain natural fiber. Its fibers are not digested, but come out of the body naturally. In this case, there is a soft cleaning of the small, large intestine from the accumulated slag, poisonous, toxic deposits. One of the main advantages of this product is the high content of the necessary body, very valuable fatty acids ω-3. These substances protect against disease, support the normal functioning of the heart, brain and joints. Therefore, doctors recommend that their patients regularly take linseed oil or drink decoctions, infusions of seeds. This is especially important for the elderly. Seed-based healing agents prevent heart disease, blood vessels. These remedies are very useful in diseases of the joints, as they have a positive effect on the damaged cartilage tissues and eliminate inflammation. Another valuable quality of the product is the presence of lignins in their composition. These amazing substances have the most important property of reducing the risk of breast cancer in women [15-16].

Oilcake of oilseed flax have special dietary properties, contain peptic substances that swell in water and form a mucous mass. Mucus has a very beneficial effect on the intestines; it encloses its walls and protects it from irritation, so linen cake is used as a valuable, slightly weakening dietary remedy.

The crude protein content of the oilcake reaches 30-50%, where 95% of the nitrogen is protein nitrogen. Despite the slightly better quality of protein in this waste compared to cereal grains, lysine remains the first limiting amino acid in them.

Oilcake has a high energy value (1.04 - 1.25 kW / kg). It is characterized by high phosphorus content (6.6 - 12.2 g / kg) with relatively low calcium content

(2.7-8.6 g / kg). It is a good source of B vitamins except B12. They are mainly used in the diets and feeds of all kinds of animals to balance them with protein [17].

As the meal offer applied to food production, namely halva, then it must comply with safety requirements and does not contain harmful solvents.

There are two ways in the world of oil production: mechanical or press, and a method of dissolving oil in volatile organic solvents, or extraction. In the production of vegetable oil, these two methods are used separately or in combination.

For processing usually receives a heterogeneous composition of oilseeds. The impurity content adversely affects the quality of the oil and oilcake, increases its losses, reduces the productivity of the machines [18].

In the press method of oil production, a two-phase scheme of pressing is used, which results in the oilcake containing up to 8% linseed oil, which, due to the bitter taste, can affect the organoleptic characteristics of halva. Therefore, we recommend the use of a small amount in the recipe composition of the finished confectionery. In this method, it should be noted that chemicals are not used, so the resulting oilcake is quite safe to eat.

The extraction method uses a large amount of solvent, but it is separated by precipitation during the process of extraction of oil after the stage of re-extraction. Therefore, this product is already prepared for use in cattle compounding and in the case of the halva production technology we offer.

Thus, raw materials for the production of halva, namely the oilcake of linseed oil is prepared raw material for processing at confectioneries.

It is important to create food products with specified chemical composition, functional-technological and structural-mechanical properties in order to improve the quality of finished products.

Achieving the desired ratio of nutrients in the product and obtaining the required composition is based on knowledge of the chemical compositions of raw materials, and is solved using optimization methods based on the principle of formalized design. According to the developed recipe was made prototype halva and studied its main qualitative characteristics.

In the development of recipes used traditional raw materials [19] and oilcake of linseed oil (table. 3). Technological losses, which are on average: for the protein mass of 1% humidity, which is obtained by a "dry" method of purification from sunflower with a content of shells of 28% and qualitative characteristics that meet the basic standards of GOST, the yield is equal to 52.14%. In addition, it should be remembered that when you receive the protein mass in the process of unrolling of the oatmeal is collected oil dust, which goes to obtain vegetable oil. The table below takes into account the loss of movement of the intermediate during its movement in the cess, which is 59.8 kg. per 1 ton of finished products (ie 0.59%).

Table 3

Halva recipe with oilcake of oilseed flax

Raw materials	Consumption of raw materials per 1 ton of finished products, kg.
Sugar	253,1
Sugar Stream	220,3
Sunflower mass	476,9
Meal flax oil	100
Vanillin	0,3
Soap root extract	8,8
10th hydrochloric acid solution	0,3
Baking soda	0,1
Result	1059,8
Output	1000

[author operation]

The introduction of waste from the oil and fat industry, that is, the meal of linseed oil is offered in the amount of 10% by weight of the finished product, which means 100 kg.

The theoretical studies performed were the basis for the development of technological scheme for the production of halva with oilcake of oilseed flax (fig. 2).

The introduction of a dietary supplement in the formulation is recommended when mixing the protein mass of sunflower kernels with pre-fine grinding.

The obtained data indicate the possibility of regulation of functional and technological properties, chemical, amino acid compositions and microbiological parameters of finished products using different types of raw materials.

CANNED HEALTH PRODUCTS FROM PUMPKIN VARIETIES OF LARGE-FRUITED BREEDING.

The ability to create organic canned foods of a functional nature from a pumpkin varieties of large-fruited breeding is based on the availability of basic raw materials, the benefits to the human body and the versatility of these vegetables.

According to the results of the analysis, the main products that are most useful for the human cardiovascular system and which can be constituents of the above canned food are identified. Among them are the following:

– Apples, as they are rich in flavonoids, are substances necessary for the prevention of coronary heart disease and other cardiovascular diseases, and they also reduce the level of "bad" cholesterol in the blood. In addition, apples contain phytoelements, namely quercetin, which has not only antioxidant but also anti-inflammatory properties and also helps prevent blood clots.

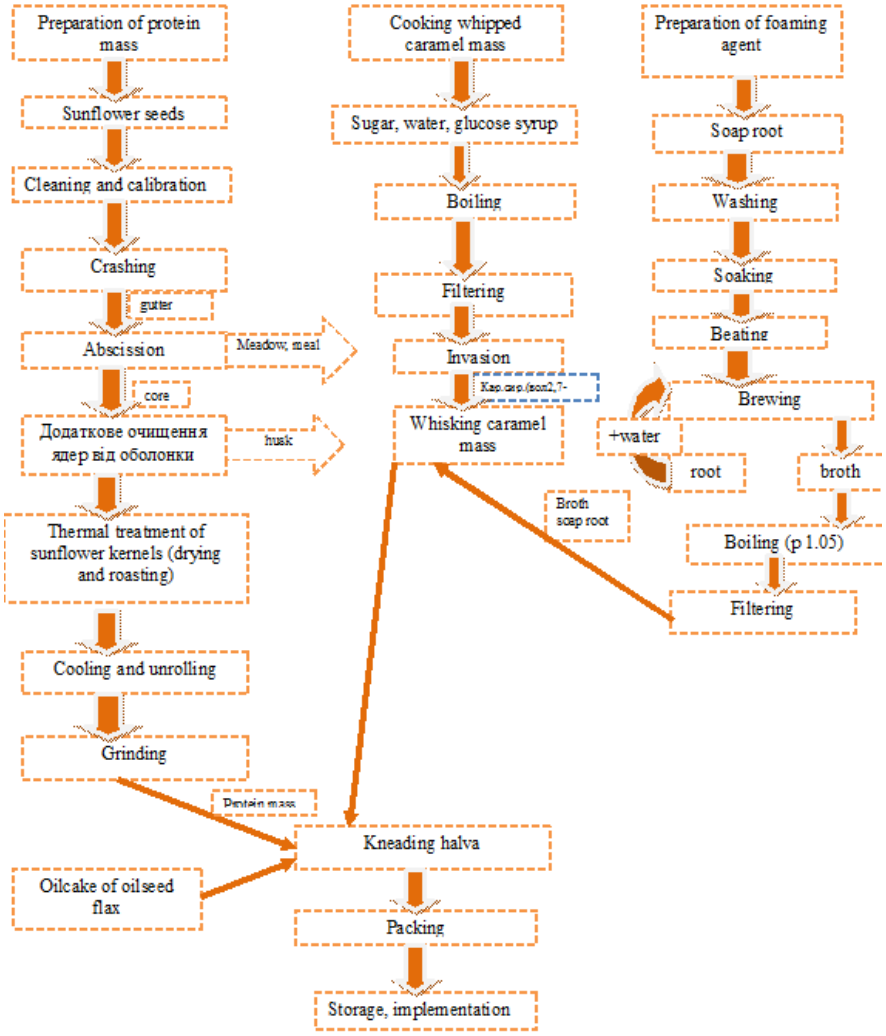

Fig. 2. **Technological scheme of production of halva with oilcake of oilseed flax**

– Rose hips contain carotene, which has a positive effect on the body's immunity, vitamin K improves blood clotting and helps in the formation of prothrombin, vitamin P strengthens the capillaries, and helps in the best absorption of vitamin C, vitamins B2 and B1 affect the hematopoietic organs.

– Tomato reduces the development of cardiovascular disease due to the effects of lycopene on the heart and blood vessels. This is the conclusion made by scientists from the Taft University in Boston. It has been found that regular consumption of this vegetable has a protective effect on the heart. Such conclusions were drawn from the analysis of more than 10 years of observations on the positive effects on the human body.

– Cucumbers are very useful for problems with the cardiovascular system. They remove excess cholesterol, which is a prevention of atherosclerosis.

– Annual (sweet) pepper, due to capsaicin alkaloid, is useful for the stomach. The rich composition of vitamins helps to strengthen the vessels, improves the growth and strength of hair, nails, as well as affect the appearance of the skin, retains good vision for a long time. Minerals help prevent diseases such as anemia, depressive states, loss of strength. Enrich the blood composition, increase the immune properties of the body.

– Pumpkin oil strengthens and makes the walls of blood vessels more elastic, neutralizes the action of free radicals, protecting the circulatory system from their harmful effects. Potassium, selenium, calcium and magnesium regulate the heart rate and frequency. And unsaturated fatty acids fight "bad" cholesterol, clearing the walls of the vessels from its dangerous clusters in the form of plaques. Pumpkin oil can and should be included in complex treatments for atherosclerosis, hypertension, coronary heart disease, arrhythmia, and other cardiovascular diseases.

Based on the analysis and selection of raw materials, which has the most significant impact on the cardiovascular system of the human body, developed three formulations of different types of canned food, as a raw material were used pumpkin varieties of large-fruited breeding of the Southern State Agricultural Research Station of the Institute of Water Problems and Land Reclamation of the National Academy of Science, namely Bylynka, Universal, Gray Ukrainian and promising Stepovy variety (Table 4, 5) [19].

Table 4

Recipe for pumpkin jam with rose hips "Deary"

Components	Weight, kg/t	%
Squash	353,36	35,34
Sugar	282,69	28,27
Rosehips (decoction)	353,36	35,34
Raisins	5,65	0,57
Poppy	4,95	0,49
Total	1000	100

[author operation]

Table 5

The recipe for pumpkin and apple jam "Riddle of the Steppe"

Components	Weight, kg/t	%
Squash	341,30	34,13
Sugar	273,04	27,30
Apples	170,65	17,06

Table 2 (continued)

Water	204,78	20,48
Raisins	5,46	0,55
Poppy	4,78	0,48
Total	1000	100

[author operation]

CONCLUSION.

Thus, considered issues of expansion of product range production due to the developed formulations and technologies thus requires a quick solution due to the annual increase in people suffering from diabetes, cardiovascular disease and overweight. The promotion of these products is possible through the hotel and restaurant complexes as a compliment to various hot drinks, as well as through the health food distribution networks. It is concluded that due to the composition of the developed flavors, their nutritional value increases and the functioning of the gastrointestinal tract, cardiovascular system and metabolism of the person improves.

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