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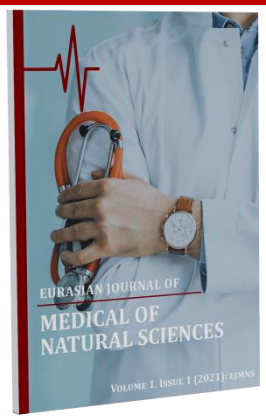

DEVELOPMENT OF A NEW BIOTECHNOLOGICAL METHOD USING SOY FLOUR TO INCREASE THE AMOUNT OF IODINE IN MEAT PRODUCTS

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ABSTRACT

The regulation of iodination and the binding patterns of iodine to full-fat soybean meal were established experimentally. It is proposed to combine the iodization process with the soybean meal hydration process directly in the process stream.

РАЗРАБОТКА НОВОГО БИОТЕХНОЛОГИЧЕСКОГО МЕТОДА С ИСПОЛЬЗОВАНИЕМ СОЕВОЙ МУКИ ДЛЯ УВЕЛИЧЕНИЯ КОЛИЧЕСТВА ЙОДА В МЯСНЫХ ПРОДУКТАХ

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ABSTRACT

Экспериментально установлены регуляция йодирования и закономерности связывания йода с полножирным соевым шротом. Предлагается объединить процесс йодирования с процессом гидратации соевого шрота непосредственно в технологическом потоке.

GO'SHT MAHSULOTLARIDA YOD MIQDARINI OSHIRISH UCHUN SOYA UNINDAN FOYDALANISH YANGI BIOTEXNOLOGIK USULNI ISHLAB CHIQISH

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ABSTRACT

Yodlanishni tartibga solish va yodning to'liq yog'li soya uni bilan bog'lanish shakllari eksperimental tarzda o'rnatildi. Yodlash jarayonini to'g'ridan-to'g'ri jarayon

Yod, endemik bo'qoq, triiodotironin, qalqonsimon bez, gormonlar.

oqimida soya unini hidratsiya qilish jarayoni bilan birlashtirish taklif etiladi.

Relevance of the topic. It is known that iodine deficiency in the biosphere, mainly in the soil, leads to the development of endemic goiter and other iodine deficiency diseases. According to a large number of epidemiological studies, more than one billion people in the world suffer from this pathology. Iodine deficiency is characteristic of mountainous regions or regions far from the ocean. Iodine deficiency is also observed in a large part of the territory of Uzbekistan. These are Fergana, Karakalpakstan, Khorezm, Navoi and others.

Iodine is the main component of the synthesis of thyroid hormones, which regulates all metabolism in the body, stimulates cellular and therefore tissue respiration.

The main intake of iodine in the body is due to food (up to 95%). Therefore, diseases associated with the lack of this microelement can be eliminated or leveled by nutritional correction. The assimilation of the iodine element is carried out mainly through food. The basis of food is protein, and proteins are of great importance in the absorption of iodine. It is known from the literature that protein-rich foods have a positive effect on the absorption of iodine. Protein amino acids (tyrosine, histidine, etc.) form strong compounds with iodine.

Thus, the amount of protein in food, together with a sufficient amount of iodine, plays an important role in the prevention of iodine deficiency diseases, so casein, elastin - animal proteins and iodized proteins are a cure for a number of diseases.

The purpose and objectives of the research. The purpose of the subject is to study the feasibility of iodizing full-fat deodorized soybean meal and its subsequent use in the production of small meat semi-finished products intended to reduce iodine deficiency in the population's diet.

To achieve this goal, the following tasks were solved:

- comparative evaluation of the protein binding ability of soy protein and soy flour;
- developing a procedure for memorizing soy flour; determining the level of binding of iodine to the main components of soy flour;
- development of technology for the production of ground semi-finished products using beef and iodized soy flour; assessment of new product quality;
- development of regulatory documents for fresh meat products.

Iodine is a trace element necessary for humans and animals. It is an important component of thyroid hormones - thyroxine (T4) and triiodothyronine (T3). Sufficient intake of iodine in the body is necessary for their physiological synthesis and secretion [2].

The first evidence that iodine is an important component of thyroid tissue was obtained in 1895 by E. Baumann. At the beginning of the 20th century, A. Oswald discovered that thyroglobulin is the main iodine-containing protein of the thyroid gland. In 1918 E.S. Kendall isolated thyroxine, C.R. in 1926. Harington established his true structure. J. Gross and R. Pitt-Rivers discovered triiodothyronine in 1952, the most active thyroid hormone.

Iodine requirements Food supplies 95% of the iodine required by humans. After receiving a sufficient amount of iodine, the physiological level of thyroid hormones and the normal development of the body are ensured. With insufficient intake of iodine in nature (food, water),

as well as with any changes in intrathyroidal or excess thyroid metabolism, there is a violation of the use of iodine in the formation of thyroid hormones.

Consumption of iodine during human life does not exceed 5 g, and its total amount in the body is 15-25 mg. The amount of iodine in the thyroid gland is 200-500 μg/g. the need for iodine depends on age and physiological state: it increases during puberty, pregnancy and lactation.

According to modern concepts [35], the daily need for iodine is described by the following amount:

90 mcg for infants and children under 6 years of age

Children 7-10 years old 120 mcg

150 mcg for adolescents and adults

Pregnant and lactating 200 mcg

It is known that iodine is one of the most diffuse elements of the earth's crust and is a very mobile migrant. The biogeochemical cycle of iodine in nature is determined by the characteristics of its physical and chemical properties, which determine the active movement of air and water, the state of the environment, the properties of natural components, and active participation in the biochemical processes of living organisms.

Experimental results. Systems of deodorized flour meat system with soybean oil, a new type of minced semi-finished products - "Bandages for minced meat" were developed.

We used male Wistar rats weighing 150-200 g for the study. In vivarium conditions, animals were housed in standard cages, with the same care and feeding, with free access to water. Experimental studies were conducted according to the rules. The level of thyroid hormones was determined by enzyme-linked immunosorbent assay using ELISA-T4, ELISA-T3 standard kits.

In the formation of the world's protein resources, legumes, primarily soybeans, occupy the most important place. The use of soy is due to the high content of protein (38-40%) and lipids (19-21%).

Today, there are more than 300 types of products using soy raw materials. It is widely used in the dairy, oil, confectionery and baking industries, in general nutrition, as well as in medical, preventive, therapeutic and dietary nutrition for children. However, the majority of soy products are consumed by the meat processing industry.

Soy isolates and concentrates have high functional properties, i.e., moisture-binding and fat-binding properties, which provide a stable emulsion or gel-like form for cooked sausages, thus improving the yield of the finished product. allows to achieve results.

In the internal concept of healthy nutrition, the use of vegetable proteins in the production of food products has an important place. In this regard, the interest in soy proteins is constantly growing and the production of products using them is increasing.

Products combined with soy proteins can solve the problem of rational use of animal raw materials and effectively use the high biological and nutritional value of soy proteins and their functional properties. However, all imported soybeans are genetically modified.

Today there are different opinions about genetically modified foods. In the United Kingdom, Spain and Canada, there have been reports of adverse long-term effects of GM foods. For example, in Canada, a decrease in births was observed in pigs fed GM corn. Infertility

occurred in mice of the sixth generation. All this speaks about the need to carefully expand the production of products with GM ingredients, especially for baby food.

Comparative characterization of macronutrients in native soybean and soybean whole oil

The name of the indicator level	% relative to dry matter		
	In the original Soybean version	Full fat flour in soybean oil	In soy flour, experimental data
Oqsil (N-6,25)	36,0-36,4	40,5-41,0	41,0±0,15
Lipid	19,0-19,8	19,9-20,2	20,0±0,25
Uglevod	26,0-25,0	18,0-18,5	18,0±0,5

In the carbohydrate system of soy flour, it is primarily involved in the binding of starch. Interacts only with soluble starch, amylase, iodine. Amylase molecules are linear in the sense that only the glycosidic residues are linked together without branching. X-ray diffraction analysis proved the spiral twist of glucose molecules connected in series around the axis of the cylinder.

The size of iodine molecules corresponds to the space of this cylinder and forms a molecular compound inside it.

The advantage of soybean meal iodination over soy concentrates and isolates is that it is an easy way to obtain it without the addition of plant extracts. The manifestation of peroxidase activity in heat-treated soybean flour can be explained, firstly, by its high thermal stability: it loses its initial activity almost completely even after short-term boiling, and partially recovers it after a certain time, and secondly, presence of peroxidase in plants. dissolves and is closely adsorbed with the constituent elements of the plant cell.

Peroxidase oxidizes hydroiodic acid salts with the release of free iodine in the presence of hydrogen peroxide. In addition to hydrogen peroxide, some organic peroxides can also be used as hydrogen acceptors.

In a model experiment, high concentrations of potassium iodide ranging from 50 to 1200 μg per 1 g of product were introduced to determine the maximum ability of iodine to bind to isolates, concentrates, and soybean full-fat flour. Soybean concentrate and isolate were iodinated in the presence of natural fresh filtered carrot juice extract with peroxidase and catalase enzyme activity and 0.2% hydrogen peroxide. A solution of hydrogen peroxide and carrot juice was introduced in a ratio of 1:1. Unlike highly concentrated soy proteins, soy flour is iodized only with a solution of potassium iodide. All samples were iodinated for 24 hours at a temperature of 0-4°C. Then, to remove the iodine released from the iodine, the moisture is dialed for 3 hours, the samples of iodized soybean products are centrifuged for 15 minutes at a temperature of 0.002 s -1 to remove excess moisture, and they are dried at a temperature of 40°C to a moisture level of 8%. The iodine content of the obtained iodized soybean preparations was determined by two of the most common methods: rhodanide-nitrite and titrometric

The difference in the content of iodine in soy flour and highly concentrated protein products is due to the fact that iodine binds to other components of soy flour, such as fat, carbohydrates, which are 20%, 18%, respectively. Therefore, it was decided to determine the level of their participation in iodine binding. For this, the oil was separated from iodized soybean flour using a non-polar extract - ethyl ether. The amount of iodine in the obtained oil was determined, which was 10 μg per 1 g of oil. The remaining amount of iodine determined by difference is associated with carbohydrates.

Thus, based on the studies conducted, it can be seen that 95% of the iodine is bound to the protein part of deodorized soybean full-fat flour, and the remaining 5% is bound to the carbonaceous water and fat component, according to a certain iodization table.

Conclusion.

1. A new source of iodization is soy-saturated, fat-free flour. The possibility of soy flour biopolymers to be fermented in conditions other than soybean concentrates and isolates is theoretically and experimentally due to the presence of components with redox properties in the flour.
2. Regulation of iodization and binding of iodine to full-fat soybean meal were established experimentally. It is proposed to combine the iodization process with the soybean meal hydration process directly in the process stream.
3. Administration of iodized soy flour to laboratory animals with experimental mercazolyl hypothyroidism is accompanied by normalization of their hormonal background. According to the efficiency of normalization, iodized soy flour is not inferior to iodized animal protein - iodized casein.
4. The possibility of using iodized soy flour in the preparation of semi-finished meat products was studied. According to the multiple regression method, the optimal option for the amount of added additives is 20% of the total mass of minced meat.
5. The formation and technological scheme of beef cutting tools using iodized soy flour was developed. The inclusion of iodized soybean meal increases water-binding capacity by 0.54%, water-holding capacity by 1.28%, and fat-holding capacity by 8.59%. The yield of the finished product increases by 3.5 percent.
6. It was found that iodized soybean suspension can be stored for five days at a temperature of 1 = 0-4°C.
7. The nutritional value of babies has been studied. It was found that the product can be considered enriched with iodine, since its content is 30% of the daily requirement. In addition, cutlets are characterized by tocopherols, flavioids and low calorie content. Microbiological safety of the finished product was ensured.

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