

**МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ
ОДЕСЬКА НАЦІОНАЛЬНА АКАДЕМІЯ ХАРЧОВИХ ТЕХНОЛОГІЙ**



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**XI Всеукраїнської науково-практичної конференції
молодих учених та студентів
з міжнародною участю**



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здорового способу життя у молоді»**

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ЛІКУВАЛЬНО-ОЗДОРОВЧОГО НАПРЯМКУ

**ТЕХНОЛОГІЯ М'ЯСНИХ, РИБНИХ
І МОРЕПРОДУКТІВ**

DEVELOPMENT OF NEW METHODS OF POND FISH REFRIGERATION

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Pond fish farming is a promising direction of the fish industry in Ukraine. Taking into account the large volumes and sizes of fish that need to be preserved without significant deterioration in quality and with minimal losses, the choice of the freezing method gave preference to methods characterized by high speed. Studies of recent years have shown the economic and energy efficiency of contact brine freezing of large fish species in a solution of calcium chloride. This method is the most affordable for small pond farms as it does not require additional material costs and special equipment. The freezing rate in a solution of calcium chloride is 8 - 10 higher than in air freezing. Despite significant advantages, a significant drawback of contact brine freezing is the salting out of fish tissues, which reduces the duration of its subsequent refrigerated storage and quality. Traditionally, to prevent the diffusion of calcium ions, the fish is pre-packed in polyethylene film, which requires special equipment and additional material and labor costs. In many countries, the efforts of researchers are aimed at creating biologically inert protective coatings formed directly on the product. In connection with this, we proposed a protective coating based on a natural biopolymer, a low-methoxylated pectin-containing extract obtained from fresh apple pomace by alkaline hydrolysis. The degree of esterification of the pectin-containing extract in the process of alkaline hydrolysis decreased from 70 to 35 - 20%. The film is based on the ability of low-methoxylated pectic substances in the presence of calcium ions to form strong jellies. Pectin molecules interact with each other due to free carboxyl groups, bound by calcium ion to a strong framework that is capable of retaining enough fluid. The effect of the degree of esterification, the concentration of pectin substances, the active acidity of the medium, the concentration of calcium ions on the strength characteristics of pectin coatings was investigated. The degree of esterification was controlled by the duration of alkaline hydrolysis, the concentration of pectic substances by the carbosol method, the active acidity by the pH meter, and the strength of the pectin coatings by a penetrometer. The barrier properties of films with a concentration of pectin in a solution of pectin-containing extract 1, 2, 3, 4% were examined with a dialysis tube. It is established that the minimum of calcium penetrates when using coatings with a concentration of pectin substances of 3 and 4%. Moreover, the barrier properties of films with a pectin content of 3 and 4% differ slightly. When the fish are frozen in a solution of calcium chloride using a protective pectin coating (3 - 4% pectin), the amount of diffusing calcium in the fish tissue decreases by 6.25 - 6.5%, respectively, compared to uncoated fish, respectively. Using citric acid can reduce the amount of diffusing calcium by another 3 - 3.5%. Employees ONAPT developed an autonomous mobile refrigeration apparatus based on an adsorption refrigeration machine that realizes a method of contact freezing of fish in an aqueous solution of calcium chloride. On the trailer or in the truck body, two low-temperature chambers are installed near the sides. The height of such chambers corresponds to the height of the standard adsorption chiller - about 1 m, width - to the length of the vehicle, the depth varies in the range 0.7 - 0.8 m. The work of the adsorption refrigerating machine can be carried out either from individual burners or from a centralized burner with wiring on refrigeration units. The solution of calcium chloride is in the containers installed in the lower part of the chambers. Thus, the conducted studies showed the expediency of using pectin coatings in the contact freez-

ing of fish in a solution of calcium chloride and allowed to determine the conditions for their production.

Scientific supervisor – Ph.D., docent Patyukov S.D. and Ph.D., docent Palamarchook A.S.

THE ROLE OF TROPHOLOGY IN THE DEVELOPMENT OF NUTRITION SCIENCE

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The theory of balanced nutrition prevailing during the twentieth century gave way to the theory of adequate nutrition at the end of the century. The natural science foundation of this theory was a new science - trophology, one of the founders of which is academician AM Ugolev. Trophology arose at the intersection of a number of sciences, such as the science of food, nutrition, trophic connections, and the totality of food assimilation processes at all levels of the organization of living systems, from cellular to biospheric. It was on the basis of trophology that the theory of balanced nutrition was transformed into the theory of adequate nutrition. The main difference between the new theory and the old one is the rejection of the anthropocentric approach and the transition to a universal approach. An example of anthropocentrism of the old theory is the new type of food proposed by the French chemist Berthelot - synthetic for parenteral nutrition. It was assumed that the food will contain all the ingredients that a person needs - all amino acids, including essential, all fatty acids, including essential, carbohydrates, vitamins, minerals, water. In this case, all the components had to be in the form of monomers, so that there was no need for the process of digesting food. Such food was supposed to be injected directly into the bloodstream intravenously. Man was considered in this case in isolation from the rest of the world of living nature. Did not take into account the relationship between humans and microorganisms that live in the human intestines, and these microorganisms produce a number of substances necessary for the normal functioning of the human body. The interaction between man and microorganisms has developed throughout the evolution of man, and the beginning of evolution was laid not even at the time of appearance of the species Homo Sapiens, but much earlier, and symbiosis is an important factor in human physiology.

The connections between man and the plant world were not taken into account. Many plants produce phytohormones - substances that can perform the functions of hormones in the human body, for example, plants such as hops, soybeans, and a number of others produce phytoestrogens, which, when ingested, act as estrogens. It was in view of the main provisions of trophology that the concept of five flows in the human body was formulated. The first flow is nutrients (proteins, fats, carbohydrates, water, vitamins, minerals). The second flow is different types of hormones, hormone-like substances and mediators that control all life processes in the human body. The third, fourth and fifth flows are formed due to the action of microorganisms living in the human digestive tract. These are microbial modified nutrients, bacterial metabolism products and dietary fibers modified with microbes. The theory of adequate nutrition did not take into account the last three streams, which, nevertheless, play an important role in the human body. Ignoring these three streams led to a wide spread of the so-

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НАУКОВЕ ВИДАННЯ

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