Секція 2. **ІННОВАЦІЙНІ ТЕХНОЛОГІЇ ФУНКЦІОНАЛЬНИХ ОЗДОРОВЧИХ ПРОДУКТІВ ДЛЯ ПІДПРИЄМСТВ ХАРЧОВОЇ, ПЕРЕРОБНОЇ ПРОМИСЛОВОСТІ ТА ТОРГІВЛІ**

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THE WAY OF OBTAINING OF CAROTENECONTAINING DIETARY ADDITIVE FROM MICROALGAE DUNALIELLA SALINA (ОТРИМАННЯ КАРОТИНОВМІСНОЇ ДІЄТИЧНОЇ ДОБАВКИ НА ОСНОВІ МІКРОВОДОРОСТІ DUNALIELLA SALINA)

У тезах розглянуто перспективу використання мікроводоростей, зокрема *Dunaliella salina,* для одержання каротинвмісних дієтичних добавок у вигляді жирових екстрактів.

Imbalance of modern nutrition, inability to provide the human body with necessary amount of essential substances is the global problem. 32% of our country population have an imbalanced of the β-carotene content ration because of the inadequate intake of fruits and vegetables. Children receive the amount of vitamin A 40–70% less than recommended standards. Today, the active development of the food industry is characterized by high consumption of food dyes, including β-carotene. However, the most commonly imported synthetic substance is used. It can contain impurities of one way or another toxic substances, that are used in its synthesis. The alternative is a natural β-carotene, which traditional sources are fruits and vegetables. Disadvantages of obtaining β-carotene from plant material are its low contain, dependence of its accumulation from climatic conditions and the difficulty of these process controlling.

In recent years the attention is paid to microalgae, particularly *Dunaliella salina*, as a new unconventional source of natural β-carotene. It is a species of unicellular green algae that live in hypersaline ponds, mainly known for its ability to generate from 1 to 10% β-carotene on the dry weight. β-carotene from *D. salina* has high biological activity due to the isomeric composition, which can not be obtained by chemical synthesis. As a source of β-carotene alga *D. salina* is a natural , non-genetically modified raw material, growing under natural conditions. In addition, the biomass of this species contains a number of other biologically valuable substances, suh as polyunsaturated fatty acids, tocopherols, proteins, chlorophyll, macro- and micronutrients. There is no dense cellulose or pectin cover in *D. salina* cells and they are surrounded by a thin protoplasmic membrane (plasma membrane), that greatly facilitates the extraction of carotenoids from microalgae biomass.

D. salina is widespread in the Black Sea coastal hypersaline ponds. The maximum biomass production is falling on the warm season, causing the "red bloom" of brine. The total stock of carotenoids in saline pool is about 80 kg per, while there is about 60–70 tons of carrots can be harvested from 1 hectare, which is about 3.6 kg of carotene.

However, it is clear that the use of natural saltwater ponds can not meet the ever growing demand for β-carotene. These problem is solved by the artificial breeding of carotene synthesizing algae in aquaculture on an industrial scale. Scientists in The A.O. Kovalevsky Institute of Biology of the Southern Seas developed the theory of controlled microalgae cultivation, that allows to obtain *D. salina* biomass with controlled composition of carotenoids and other biologically active substances. This makes *D. salina* a promising raw for producing dietary additives and functional foods.

The aim of the work was to develop a technology of carotenecontaining dietary additive based on unconventional raw material – biomass of *D. salina* microalgae.

Modern technology of β-carotene extraction from *D. salina* microalgae biomass includes steps using toxic organic solvents, which complicates its use for food. We have investigated the possibility of carotene extraction from dried microalgae mass with natural extractants: plant oils and animal fats. Such a choice of extractants is due to lipid solubility of carotenoids. Furthermore, the extraction with food oils will simultaneously remove a carotenoid and other oil-soluble bioactive substances, particularly tocopherols. The static batch method was selected as the extraction method, as it does not require costly equipment and materials. In operation, the dried *D. salina* biomass with mass fraction of β-carotene 3.3% on a dry weight was used. Samples were provided by the Department of Biotechnology and phytoresources of The A.O. Kovalevsky Institute of Biology of the Southern Seas. The biomass of microalgae was extracted with different types of oil: refined deodorized sunflower oil, corn oil, soybean oil and butter, to select the extractant.

It has been established that the maximum extraction was provided with sunflower and corn oils, but the accessibility of sunflower oil made it priority. The rational modes of β-carotene extraction process from dried *D. salina* biomass with refined deodorized sunflower oil were identified as: the ratio of raw material: extractant – 1:20, the temperature of the process – 30° C, duration – 4 days. The high degree of β-carotene extraction was confirmed in the study of the algae biomass microstructure before and after extraction.

The resulting extract has a liquid consistency, dark red color and a neutral odor. Such organoleptic characteristics enable its use in a wide range of food products, as well as a separate dietary supplement.