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THE FATTY ACIDS PROFILE OF KRILL MEAL PRODUCED IN UKRAINE

Since 1994, Ukraine has been a full member of the Commission for the Conservation of Antarctic Marine Living Resources, CCAMLR, which allows our country to conduct fishery of various hydrobionts' species in the Southern Ocean, including the Antarctic krill – *Euphausia superba* Dana.

Antarctic krill is used for making krill meat, krill oil and krill meal. The last product, unlike the first two, is used not in the food industry, but in fodder production. Due to the high level accumulation of carotenoids, in particular astaxanthin, the krill meal is used in the fodder production for salmon fishes, aimed at coloring of meat in red shades. In addition, Antarctic krill meal is characterized by high content of essential fatty acids, which makes it a promising raw material for the production of starter feeds for fishes and other farm animals.

Krill meal is made directly on board, and therefore its quality depends not only on natural factors, but also on the technical conditions of production. Accordingly, the purpose of the work was to analyze the fatty acid profile of krill meal samples produced in Ukraine.

The definition of fatty acids was performed by gas chromatography on HRGC 5300 chromatograph (Italy) on 3.5 m glass column filled with Chromosorb W / HP with applied 10% Silar 5CP at the programmed temperature of 140-250°C. The individual fatty acids were identified using Sigma appropriate standards, and their contents were expressed as a percentage of the total amount of fatty acids.

In the krill meal of Ukrainian production, 40 types of fatty acids have been identified, of which 19 are saturated, and 21 are unsaturated. The largest mass fraction (more than 40%) is belonged to saturated, in particular palmitic and myristic acids (16.6% and 12.0% of the total content of all fatty acids, respectively).

Table 1

The average proportion of the main groups of fatty acids from their total content in the samples of Ukrainian krill meal

∑ Saturated fatty acids	41.6 ± 0.6
∑ Monounsaturated fatty acids	33.3 ± 0.5
∑ Polyunsaturated fatty acids	25.1 ± 1.0
∑ω-3	21.3 ± 0.9
∑ ω-6	3.6 ± 0.1
ω-3/ω-6	5.92 ± 0.30
Eicosapentaenoic C20:5 ω-3	12.3 ± 0.5
Docosahexaenoic C22:6 ω-3	7.2 ± 0.4

It is shown that in addition to the energy function, palmithin and myristic acids participate in the acylation processes of membrane proteins, ensuring the regulation of their functioning (Rustan, Drevon, 2005). The content of margaric acid is also significant in the krill meal – 4.7%, while the share of all other types of saturated acids is less than 1%.

Among the monounsaturated fatty acids, oleinic (17.9%) and palmitoleic (10.4%) acids are dominant. In some samples of meal, the share of oleic acid in the fatty acid profile may exceed 25%. As is known, oleic acid is one of the main storage forms of fatty acids in the animal fatty tissue.

The use of krill meal as a valuable source of essential nutrients in fodder production is determined by the content of polyunsaturated fatty acids in it, since most animals, including

fish, are not able to synthesize *de novo* the major PUFAs that should be come with feed. It is especially important in the production of starter feeds, because the deficiency of essential fatty acids in the diet of fish larvae causes not only growth retardation, but also significant metabolic disturbances that manifest in abnormalities of the skeletal system, the central nervous system, eyes and decreased resistance of the body.

The relative content of polyunsaturated acids in the investigated samples of krill meal is rather high (more than 25%) and exceeds that in the other types of raw materials. It should be noted that in separate samples of studied meal the total share of polyunsaturated fatty acids exceeds 35%.

An effective synthesis of linolenic acid is carried out only by certain groups of microalgae. Antarctic krill, having a filtration type of feeding, accumulates a considerable amount of PUFAs in tissues that are stored during the krill processing into meal.

Eicosapentaenoic (12.3%) and docosahexaenoic (7.2%) acids are the main polyunsaturated fatty acids in krill meal. The indicated PUFAs play an important role in the physiological processes. Thus, eicosapentaenoic acid is a precursor of eicosanoids with a wide range of biological effects, and along with docosahexaenoic acid it is involved in the cholesterol transport and metabolism. In addition, docosahexaenoic acid plays an important role in the composition of membrane phospholipids, ensuring their optimal viscosity, and also takes part in providing the proper functioning of the membrane receptors.

Consequently, the use of krill meal in the fodder production will increase the content of the main types of polyunsaturated fatty acids in it and thus will improve its feed value.