

PUFA IN COSMETIC AND MEDICINAL CREAMS

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In cosmetology today, both medical and cosmetic creams are used. Medical cosmetic creams are used for various pathological conditions of the skin for its treatment. Cosmetic products are used for cleansing, regenerating healthy skin, as well as for correcting and preventing cosmetic defects that don't require medical intervention.

In recent years, for the treatment of inflammatory skin diseases, creams have been developed containing omega-3 and 6 polyunsaturated fatty acids (PUFA) – linoleic, linolenic, arachidonic or their esters. They are characterized by anti-inflammatory, antioxidant, cell membrane stabilizing action [1]. Linoleic acid restores dry, aging, depleted skin with impaired barrier properties. α -Linolenic acid promotes moisture retention in the skin and also has anti-inflammatory properties. γ -Linolenic acid strengthens the structure of cell membranes, blocks pain, relieves itching and inflammation. PUFA and their derivatives are sometimes considered as vitamin-like substances, conventionally called "vitamin F". PUFA are included in the form of acyl residues in the triacylglycerides of fats, oils and other lipids. Cosmetic creams also often include PUFAs, either in natural form, or synthetic acids or their esters.

The dermatological effects of PUFAs have been described by two mechanisms. First, PUFAs can physicochemically influence the structure of the intercellular binding substance of the stratum corneum. Secondly, they form biologically active metabolites - eicosanoids. However, not all dermatological effects of PUFA can be explained by these mechanisms. The third mechanism is the possibility of interaction of PUFA with receptors that activate the proliferation of peroxisomes - PPAR. In the epidermis, PPARs affect the process of keratinocyte division and are directly related to the synthesis of ceramides and sterols - vital components of the lipid barrier of the stratum corneum, as well as some epidermal proteins [2].

When storing creams, PUFAs are oxidized at double carbon bonds by atmospheric oxygen. Oxidation is intensified by exposure to sunlight and high temperatures. In order to prevent oxidation and loss of beneficial effect, it is recommended to combine PUFA in creams with antioxidants - β -carotene, vitamin E.

The specific content of ingredients in cosmetic creams, as opposed to medicated creams, is usually not reported. After a certain period of storage, especially after opening the tube, the content of PUFA may decrease. Therefore, it is important to control the content of PUFA in cosmetic creams.

The purpose of the work is to check the presence of PUFA declared by the manufacturers in the samples of cosmetic creams.

Material and methods. Object of research: cosmetic creams of various manufacturers, purchased in the retail trade of the city of Vitebsk.

1. "Cream-oil for hands and nails intensive nutrition. "Folk recipes". Manufacturer: "Fito Cosmetics" (Russia).

On the packaging of this cream, it is indicated that the cream contains "vitamins A, E and F". The composition contains extracts of carrot and lemon, as well as flaxseed oil, which may contain natural forms of these vitamins - triglycerols PUFA, tocopherols, retinol.

Creams manufactured by "Belita - Viteks" (Minsk), which contain PUFA and tocopherol acetate: 2. "Milkline Youth Proteins"; "Radiance cream, daytime for the face, for all skin types"; 3. "Milkline Youth Proteins"; "Rejuvenation cream, night face, for all skin types"; 4. "Skinsensation"; "Day cream for the face, for all skin types".

5. "PRO hand cream for hands, nails and cuticles". Manufacturer: "Faberlic" (Russia). The composition includes: tocopherol acetate, glyceryl linoleate, glyceryl linolenate and a rarer component with PUFA - glyceryl arachidonate, as well as natural sources of vitamins - linseed oil, jojoba oil, cornflower blue extract.

6. "Hyaluronic hand cream mask". Manufacturer: "Eveline Cosmetics" (Poland). The composition of this cream contains: linolenic acid, tocopherol.

All of the mentioned creams were analyzed within the expiration dates.

The research method is an analytical color reaction for the detection of PUFA with bromine water.

Sample preparation – alcohol extraction. A strip of the test cream of about 1 cm, corresponding to the usual portion for a single use, was placed in a test tube, 10 ml of alcohol (96%) was added, covered with a stopper, vigorously shaken for 3 minutes, and allowed to stand for 10-15 minutes. The extract was taken from the sediment with a pipette and transferred to a bottle for storage. If the extract was cloudy, it was centrifuged and the supernatant was additionally taken.

In a cylindrical laboratory test tube 10 cm in height, add about 0.5 cm³ of the alcohol extract, add 1-2 drops of bromine water and shake the test tube. A positive result is discoloration of the light yellow color of the reagent solution.

Findings and their discussion. When shaking a test tube with an alcoholic extract of creams "Folk recipes"; "Hyaluronic cream-mask for hands"; "Day cream for the face "SkinSensation"; "Youth proteins. Night rejuvenation cream for face " with 1-2 drops of bromine water, a light yellow discoloration was observed. Thus, the presence of PUFA has been confirmed for these creams.

The test for unsaturation was negative (the light yellow color was not discolored, even when an excess of cream extract was added) for the extracts of the "Proteins of Youth. Day Facial Radiance Cream" and "PRO hands". Thus, we failed to confirm the presence of PUFA in these two creams.

Conclusion. Analytical color reaction confirmed the presence of PUFA in the creams "Cream-oil for hands and nails intensive nutrition." "Folk recipes", "Hyaluronic cream-mask for hands", "Day cream for the face "SkinSensation", "Youth proteins. Night rejuvenation cream for face. Bielitamilkline". The fact that for extracts of creams "Proteins of youth. Bielitamilkline Day Facial Radiance Cream "and" Hand, Nail and Cuticle Cream. PRO hands ” we were unable to confirm the presence of the components declared in the composition does not necessarily mean that they were not included in the composition during production. These creams have already been opened and used prior to testing, although the expiration date has not yet passed. And as mentioned, after a certain period of storage, especially after opening the tube, the content of PUFA may decrease.

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ANALYSIS OF AVERAGE MONTHLY AIR TEMPERATURES BY SEASONS OF THE YEAR IN VITEBSK DURING THE PERIOD OF INSTRUMENTAL OBSERVATIONS

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The relevance of the topic is determined by the availability of data sets of observations of the air temperature in Vitebsk for the period of instrumental observations to analyze its natural fluctuations and identify the features of the temperature regime of individual regions in conditions of climate change. The purpose of the work is to identify changes in air temperature in Vitebsk for the period 1897-2020.

Material and methods. The study was carried out on the basis of archival data of the Vitebskobhydromet Branch with the aim of analyzing the average annual, average monthly and seasonally average air temperatures for the period of instrumental observations based on data from the Vitebsk meteorological station. At the same time, data on air temperature have been completely preserved from January 1945 to the present, data aren't available for the periods 1900–1924 and 1942–1944 and for some years they have been partially preserved.