

## SUBSTANTIATION OF COMPOSITION OF THE ANTI-ACNE REMEDY WITH PROBIOTIC

Soloviova A. V., Kaliuzhnaya O. S., Strilets O. P.

*National university of pharmacy*

*Biotechnology department*

soloviova.alina@gmail.com

Despite modern methods of treatment, acne is still one of the most common dermatoses among young people. The incidence of acne doesn't have a clear downward trend, but also increases significantly. Acne is one of the most common skin diseases. The formation of acne depends on several processes: follicular hyperkeratosis, excessive sebum secretion, the activity of *Cutibacterium acnes* and the cascade of inflammatory reactions. Of primary importance in the treatment of acne is the removal of inflammation and the restoration of the skin barrier.

Among modern cosmetics, becoming popular usage of probiotics as a part of anti-aging, regenerating, moisturizing creams, masks and lotions. Appears new cosmetics brands which produce products with probiotics, but also appears probiotic lines of world-famous brands. Probiotics in the composition of cosmetic products help to maintain the pH balance and microflora of the skin, reduce skin inflammation and prevent the appearance of new ones, helps to improve oxygenation and maintain skin immunity. In addition, probiotic cultures help maintain healthy levels of collagen, soften skin and reduce wrinkles. Probiotics modify several factors in the pathophysiology of the development of acne and can also improve the condition of the skin. Probiotics applied topically directly inhibit *C. acnes* by producing antibacterial proteins. Clinically, it has been shown that local use of probiotics changes the barrier function of the skin with a secondary increase in the antimicrobial properties of the skin. In particular, it has been shown that, usage of probiotic as a cream for 7 days, increases the production of ceramides both in vitro and in vivo. Ceramides not only retain moisture in the skin, but some components of ceramides, such as phytosfingosin (PS), have a direct antimicrobial activity against *C. acnes*. Clinical use of PS was further confirmed by a two-month experimental study showing 89% reduction in acute papules and pustules after applying 0.2% PS.

For development a complex therapeutic and cosmetic remedy with probiotics for acne treatment, were selected the most promising components:

– *Lactobacillus plantarum* as a probiotic component – contribute to the production of collagen, and also serve as a sunscreen filter. These bacteria prevent the formation of wrinkles and age spots, make the skin more elastic.

– Azelaic acid, as an antimicrobial component. Azelaic acid displays bacteriostatic and bactericidal properties against aerobic and anaerobic microorganisms present on acne-bearing skin. Topical application of azelaic acid cream and lipid lipid *Cutibacterium acne*, sebum production, sebum composition and sebaceous gland morphology were not significantly altered.

– Vitamin B5, as a prebiotic component, stimulates the proliferation of fibroblasts and re-epithelialization of the skin, which also promotes healing, improves the permeability of the skin for various substances. Dexpanthenol moisturizes the skin, reduces roughness, peeling and improves its elasticity, protects sodium lauryl sulfate from irritation and damage caused by sodium, has softening, anti-inflammatory and antipruritic properties.

–  $\alpha$ -lipoic acid (thioctic acid, also called vitamin N) makes an invaluable contribution to the skin of the face: improves the functions of protection against the negative effects of UV rays; normalizes the sebaceous glands; speeds up the recovery process. In addition,  $\alpha$ -lipoic acid fights

one of the most important factors in skin aging, the process of glycation. Glycation is the deposition of sugar on the elastin and collagen fibers, which, as a result, stick together and lose their elasticity.

– Lactic acid, helps reduce the thickness of the upper layer of the epidermis, makes the skin smooth and prevents clogging of the ducts of the sebaceous glands and the formation of comedones. Penetrates into the mouth of the sebaceous gland, lactic acid contributes to the timely removal of cornified scales accumulated in the duct, which prevents inflammation, helps to eliminate traces and scars after acne.

– Calendula oil, as a component in the base of the product. Calendula oil has healing, bactericidal and anti-inflammatory agents. Calendula oil has strong moisturizing and protective properties that increase the skin's resistance to negative external factors, and is also a natural UV filter.

– Grape seed oil is a natural remedy, deservedly referred to as the “youth hormone”. Characterized by a high content of bioflavonoids, whose structure is very similar to the structure of estrogen. Bioflavonoids stimulate the production of collagen fiber, as well as monitor the content of subcutaneous fat, prevent early aging of the skin, accelerate the regenerative function in the cells of the epidermis.

– Peach seed oil, has a tonic, nourishing, as well as anti-inflammatory and healing effects. Peach seed oil can prevent premature aging of the skin, improves its tone and eliminates fine wrinkles.

– Propolis, as a bioactive preservative. Propolis is not only a great antiseptic, it has the unique ability to accelerate tissue renewal, without the formation of coarse scars, in addition, propolis increases the natural permeability of the skin and facilitates penetration into the deeper layers of the skin of other medical components.

– Beeswax as a natural emulsifier and preservative. The usage of beeswax, which has antiviral, anti-inflammatory and antibacterial properties that prevent the development of bacteria and fungi, helps reduce redness, irritation, eliminate excessive dryness and itching that accompany many skin diseases in sensitive skin.

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