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DETERMINATION OF SOLUBILITY OF ACTIVE INGREDIENTS IN COMPLEX DERMATOLOGICAL MEDICINE WITH PROBIOTIC

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Human skin is a complex and multifunctional organ in which there are not only intercellular interactions, but also complex cooperation between cells and microorganisms on its surface and in its thickness. Skin health is a prerequisite for good health in general. Most topical remedies contain active ingredients that disrupt the skin microbiome. The microflora of the skin plays an important role in maintaining homeostasis and the state of local immunity. Thus, the creation of dermatological agents for the normalization of the skin microflora is a topical issue in modern pharmacy. This paper considers the choice of solvents for active substances in a complex agent with a probiotic for the treatment of dermatological diseases. The peculiarity of dermatological diseases is that they become apparent in the early stages. It helps to decide on treatment immediately, but on the other hand, skin diseases provide people with severe psychological discomfort, especially if it is not possible to quickly suppress the symptoms.

The causes of diseases of each integument, many. These can be both external factors – the traumatic effects of the environment, and internal – at the skin level there are problems of the immune and endocrine systems, gastrointestinal tract and others.

Topical therapy is aimed directly at eliminating the symptoms of the disease, reducing the frequency of relapses and improving quality of life. Its advantage is the almost complete absence of systemic side effects, as well as targeted action. However, most existing topical treatments contain aggressive active ingredients that disrupt the skin microbiome. The microflora of the skin plays an important role in maintaining homeostasis and the state of local immunity. Of great interest are ontogenetic data on the formation of the skin microbiome after birth and during life. Extensive information about the state of the microbiome of healthy skin led to the conclusion that detailing the composition of the microbiome in the sebaceous glands is normal and in pathology can shed light on the pathogenesis of acne, seborrheic dermatitis and rosacea. Features of the dry skin microbiome can be the basis for studying the pathogenesis of psoriasis, and areas with high humidity – for studying the pathogenesis of atopic dermatitis. A detailed study of the skin microbiome and its interaction with the factors of innate and acquired immune response can be the basis for the creation of new drugs and cosmetics. The microbe of healthy skin affects pathogenic microorganisms. Therefore, research on the use of probiotic bacteria and antimicrobial peptides to create external drugs remains relevant. In particular, there are studies showing the effectiveness of the application of the probiotic *Lactobacillus plantarum* in patients with acne to reduce the number of inflammatory and non-inflammatory elements. Thus, the creation of dermatological agents for the normalization of the skin microflora is a topical issue in modern pharmacy. This paper considers the choice of solvents for the active substances in a complex agent with a probiotic for the treatment of dermatological diseases.

The route of administration of drugs through the skin has the important advantage of delivering them directly to the diseased organ. When applying drugs to the skin, you can solve various problems: keep the substance without penetrating the skin, enter the stratum corneum, epidermis, dermis, hair follicles, sebaceous glands or, without retaining the substance in the skin, enter it into the body to provide systemic action. Skin is a complex system of successive layers with different structural, functional and physicochemical properties. The mechanism of penetration of exogenous substances through the skin is a complex and diverse process, which is associated with a complex morphological structure of the skin. The skin is a multifunctional membrane. The intact keratin layer acts as a depot from which drugs penetrate deeper into the skin. In the stratum corneum, in addition, there are polar and non-polar layers. Any substance must come into contact with the water-lipid film and horny cells before penetrating these barriers.

There are many factors that affect the permeability of various substances: the state of the water-lipid film of the skin; genetic and hormonal differences, nature of the contact substances, the use of penetrators, the cell surface and the reaction of the cell, external factors, skin damage.

Permeability can be different for water- or fat-soluble substances, for compounds with low or large molecular weight, which greatly accelerates or slows down this process. In addition, the localization of the skin, the degree of hydration, the thickness of the stratum corneum, the presence or absence of a lipid layer and its qualitative composition make significant adjustments in the rate of penetration of substances through the skin. These features are important from a practical point of view, because it depends on the choice of non-aqueous solvents in the development of a mild dosage form for the treatment of dermatological diseases.

Hydrophilic non-aqueous solvents include ethanol, chloroform, propylene glycol (PG), glycerin, PEO – 200-600, dimethyl sulfoxide, isopropanol, fatty oils and mineral oils. All these substances are used in the manufacture of topical drugs, as they have a positive effect on the characteristics of ointment bases, such as osmotic properties, rate of absorption of active substances, resistance to drying and freezing, rheological properties and adhesion to the skin surface.

Physico-chemical properties of active substances affect the rational choice of composition and technology of dosage forms. To obtain a drug of proper quality requires a rational approach to the method of introducing API into the base. Therefore, microscopic analysis of active substances and study of their solubility is necessary to determine the properties of the objects of study.

The linear size and shape of the particles were determined by microscopic method using a laboratory microscope "Konus Academy", equipped with ScopeTek camcorder.

The results of determining the solubility of the active substances showed that their solubility at a temperature of 20 ± 5 0C depends on the type of solvent.

Microscopic examination showed the preservation of the size and shape of their particles in the resulting suspensions. Analysis of the suspensions showed that it was a substance with lamellar particles, yellow with a blue tinge. The smallest particle size was observed in suspension with and was 0.01 μm.

Thus, the results showed that lactobacilli and tocopherol have the smallest particle size and uniform distribution in peach seed oil, and dexpanthenol – in propylene glycol.

According to the results of microscopic studies, it is proved that the composition of the mild dosage form of lactobacilli and tocopherol should be rationally introduced as a suspension in peach seed oil, and dexpanthenol – in propylene glycol.

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