detection of a small level of antifungal activity allows to predict the possibility of use in dermatological practice.

SELECTION OF AUXILIARY COMPONENTS FOR THE DEVELOPMENT OF A SOFT PREPARATION FOR PROBYOTIC COMPONENTS

Soloviova A.V., Kaliuzhnaia O.S.
National University of Pharmacy, Kharkiv, Ukraine

Introduction. In skin care products, probiotics can help restore the skin's natural balance by ensuring that it functions properly and is replenished with the necessary nutrients to stay protected from harmful factors and fight the signs of aging and environmental damage. Probiotics are also an effective anti-inflammatory, helping to relieve redness, irritation and skin conditions, including acne, rosacea and dry skin [1].

Therefore, the creation of effective means of correction and/or maintenance of human normoflora to maintain a healthy skin microbiome today is an urgent task.

The aim of the study. Selection of excipients in a new mild skin preparation with probiotic.

Materials and methods. The main active ingredient of the drug are lactobacilli, the introduction of which was carried out in the form of biomass of the drug "Lactobacterin dry", which is a microbial mass of live, antagonistically active strains of *L. fermentum* 90T-C4, *or L. fermentum* 39, or *L. plantarum* 8P-A3, or *L. plantarum* 38, lyophilized in the culture medium with the addition of a protective medium. As gelling agents used acrylates, which are stable, inexpensive, technologically convenient: Sepiplus 400, Carbopol 934 and Aristoflex AVC, as solvents - glycerin, propylene glycol, polyethylene glycol, emulsifier - polysorbate-80.

In the analysis of the components when creating the emulsion phase, the linear size and shape of the particles were determined by microscopic method. The number of living microorganisms, expressed in CFU, was determined by the method of ten-fold dilutions, followed by surface seeding on the nutrient medium MRS-4. The acidification activity, expressed in degrees Turner, was determined by titrometric method, titrating with 0.1 M sodium hydroxide solution with the addition of phenolphthalein indicator until a stable pink color [3].

Obtained results. Specificity of the created tool, and puts forward a number of requirements for the preparation of the dosage form. The basis and parameters of the production of living biotherapeutic drugs, in the first place, should ensure the viability of cells and the preservation of their probiotic activity.

Therefore, the main problem with the use of live lactobacilli in the base is to preserve their survival and stability. Analyzing foreign technologies for the production of soft dosage forms with probiotics, we have identified the following approaches to the introduction of the optimal basis of the probiotic component in the form of: lyophilized biomass and stabilized liquid bacterial culture, previously converted into a gel state by adding surfactants [2].

The manufacture of a drug with a probiotic component, which is a live lyophilized bacteria, eliminates the content in the dosage form of water, which leads to hydration of lyophilized biomass and cell proliferation in the composition, which, in turn, will contribute to the instability of the dosage form. In addition, it should be borne in mind that hydrophilic bases, in particular PEO bases, have a hyperosmolar effect: when the base comes into contact with living microbial cells of probiotic cultures, the osmotic pressure is equalized due to water absorption from the bioobject, which leads to dehydration and osmotic shock. . In this case, these characteristics of hydrophilic bases limit their use, leading to the use of only hydrophobic ointment bases in the development of soft dosage forms with a probiotic component.

But in the development of mild preparations for dermal use for the treatment of dermatological diseases should take into account the main pathogenetic factors whose interaction contributes to the manifestation of infectious and inflammatory diseases of the skin, including acne: sebaceous gland production, changes in keratinization, colonization of *P. acnes* follicles and the release of inflammatory mediators. That is, in such dermatological diseases, the increase in the amount of sebum, in which the skin surface becomes oily, calls into question the use of ointment or cream bases, the components of which are oily substances. This can lead to overload of fatty components already oily skin, pH shift to the alkaline side, clogging of pores and lack of positive effect of the active components of the drug.

In addition, the use of hydrophobic bases raises another problem - how easily microorganisms can be released from the oil base applied to the skin and thus become metabolically active, sufficient to provide the necessary probiotic effects.

Thus, for the implementation of both approaches, the introduction of the probiotic component into the appropriate base as the optimal soft dosage form was chosen gel, and among the gels settled on acrylates, which are stable, inexpensive, technologically convenient, and the introduction of the probiotic component was carried out through the oil phase. by stabilizing lactobacilli. Thus, when using hydrophilic bases, the creation of an oil phase in which lactobacilli are incorporated will protect cells from the action of moisture and hyperosmolar action of the components of the bases.

Lyophilized biomass of lactobacilli is a hygroscopic, fine substance, which is proposed to be administered through natural vegetable oils, which due to their affinity with skin lipids have a positive effect on lipid metabolism in tissues, restore skin barrier functions and have emollient properties. But the direct introduction of lyophilized biomass of lactobacilli in oil showed uneven distribution, accumulation of crystals and the formation of large conglomerates, so the next step was to test the introduction of lyophilized biomass in oil through other non-aqueous solvents: ethanol, glycerin, propylene glycol, polyethylene glycol.

The choice of non-aqueous solvents from the list of permitted HFCs was based on information on the ability of lactobacilli to maintain cell viability in the presence of these substances and their own studies.

To study the effect of non-aqueous solvent on lactobacilli, they were cultured in 100 ml of liquid nutrient medium MRS with the addition of each of the investigated components. After 48 h of cultivation at (37±1) ℃ in each sample, the number of live microorganisms, expressed in CFU, was determined by surface seeding and compared with the control. A culture of lactobacilli grown under the same conditions with the same initial inoculation dose, but without the addition of solvent, was used as a control.

According to the study of the effect of non-aqueous solvents on lactobacilli, the largest number of viable cells was observed in the cultivation of microorganisms in control and with polyethylene glycol, it was $(5.92 \pm 0.72)\cdot 10^9$ CFU/ml and $(3.08 \pm 0.72)\cdot 10^9$ CFU/ml, respectively. Slightly lower were the results in the cultivation of bacteria in combination with ethyl alcohol, glycerin and propylene glycol, they were $(2.67 \pm 0.36)\cdot 10^9$ CFU/ml, $(8.75 \pm 0.06)\cdot 10^8$ CFU/ml and $(6, 08 \pm 0.05)\cdot 10^8$ CFU/ml, respectively. These results confirm the possibility of using all the above non-aqueous solvents for further work. However, we excluded ethyl alcohol from these studies because of its potential to cause skin irritation.

Thus, on the basis of glycerin, propylene glycol, polyethylene glycol, samples of suspensions of lyophilized mass of lactobacilli in different ratios of lyophilized biomass to solvent were prepared, but all samples were unstable - precipitation of particles was observed for 1 day.

Given our previous research on the possibility of using emulsifiers with lactobacilli in dosage forms, we drew attention to the properties of tween-80 to form a stable liquid phase with lyophilized mass of lactobacilli, provide high cell viability, water solubility and solubility with vegetable oils. Thus, we focused on the introduction of lactobacilli into vegetable oil by dissolving lyophilized biomass in tween-80 in a ratio of 1:5, which showed the highest stability of suspension and solubility and uniform particle distribution. We also determined the biological activity of this combination, namely the number of living microorganisms and the activity of acid formation (Table 1).

Table 1

Determination of biological activity of lactobacilli with twin-80

The composition of the sample	Number of living microorganisms, CFU/ml	Acid formation activity, °T
Biomass of lactobacilli + twin-80 (ratio 1: 5)	$(2,15 \pm 0,10)\cdot 10^9$	320±8
Biomass of lactobacilli (control)	$(2,45 \pm 0,15)\cdot 10^9$	340±12

Note: n = 3, P = 95 %.

Conclusions. The results of this series of studies confirmed the prospects for the use of tween-80 in the dosage form with lactobacilli under development, the rational content of tween-80 is 1.5 g, but this content must be clarified by introducing the oil phase into the base.

References

1. Bay L., Barnes C.J., Fritz B.G., Thorsen J., Restrup M.M., Rasmussen L., et al. Universal dermal microbiome in human skin // mBio. - 2020. - 11(1). – P.19.
2. Dreno B, Araviiskaia E, Berardesca E, Gontijo G, Sanchez Viera M, Xiang LF, et al. Microbiome in healthy skin, update for dermatologists // Eur Acad Dermatol Venereol. – 2016. - 30(12). – P.47.
3. Grice E.A., Kong H.H., Conlan S., Deming C.B., Davis J., Young A.C., et al. Topographical and temporal diversity of the human skin microbiome // Science (New York, NY). – 2009. – 324. – P. 2.

THE SCIENTIFIC TALK OF PHARMACEUTICAL STATE EDUCATIONAL PROBLEMS AND PERSPECTIVES AND OCCUPATIONAL REGULATION ISSUES OF THE YOUTHFUL PHARMACISTS IN GEORGIA

Sulashvili N. [1,4].,Beglaryan M.[2], Gorgaslidze N. [3]

[1]Yerevan State Medical University After Mkhitar Heratsi,

[2]Yerevan State Medical University, Yerevan, Armenia.

[3]Tbilisi State Medical University, Tbilisi, Georgia.

[4]Tbilisi Open University, International School of Medicine, Tbilisi, Georgia.

Introduction: The main objective of the study was to analyze the scientific talk of pharmaceutical state educational problems and perspectives and occupational regulation issues of the youthful pharmacists in Georgia. The study was a quantitative investigation and analysis of the pharmaceutical educational facilities and vocational characterizations of the young pharmacists in Georgia, by using questionnaires. Were conducted a survey study. Questionnaires were for young pharmacists up to 35 years; 314 young pharmacists were interviewed. Were used methods of systematic, sociological (surveying, questioning), comparative, mathematical-statistical, graphical analysis. The data were processed and analyzed with the SPSS program. We conducted descriptive statistics and regression analyses to detect an association between variables. Statistical analysis was done in SPSS version 11.0. A Chi-square test was applied to estimate the statistical significance and differences. We defined $p< 0.05$ as significant for all analyses. According to the study results: Pharmacist’s specialty is a good opportunity to young specialists to take high social position, to get a certain level of economic well-being, a guarantee to be busy and have further social advancement. Pharmacists’ profession gives chance to be useful to people and to obtain self- respect among the surrounding people. The young pharmacists’ vast majority were satisfied with their professional choice, since the pharmacist’s profession is extremely demanded specialty and thus of good prestige; The most impacting factors influencing