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аспірантів і студентів**

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Частина 2

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7. Improvement of process and equipment for homogenization of components of soft pharmaceutical dosage forms

Oleksandr Marchenko¹, Kateryna Hrininh²,
Kostiantyn Omelianenko², Oleksii Gubenia²

National University of Food Technologies, Kyiv, Ukraine

Introduction. Research was conducted to improve the process of homogenization of the components of soft pharmaceutical dosage forms and cosmetic products.

Materials and methods. Analytical studies are based on the analysis of modern scientific and informational literature, patent databases of Ukraine and the world, as well as publicly available information of manufacturers of pharmaceutical and cosmetic products. The rheological indicators of soft medicinal and cosmetic products, in particular, ointments and toothpaste, were performed by the viscometry method.

Results and discussion. The main advantages and disadvantages of the available process theory and equipment for homogenization of emulsions – ointments, pastes and components of cosmetics are determined. The main disadvantages of the available equipment:

- Low efficiency of mixing and partitioning of the emulsion particles, and as a consequence – poor productivity;
- Presence of stagnant areas where the product is not homogenized;
- Insufficient data on the rheological parameters of the investigated products and operating parameters of the equipment.

The rheological properties of liquid medicines and cosmetics were investigated. It was found that the shear stress with increasing shear rate initially increases, at high shear rates it increases more slowly, that is, the viscosity decreases. However, the viscosity of some gels in the studied range of shear rates decreases slightly. The viscosity of all tested products decreases with increasing temperature. The viscosity of toothpastes decreases slightly with increasing temperature, which is explained by their water base compared to oily for most ointments. The obtained data are confirmed by the results of other researchers on similar products, and allow to calculate the drive power of homogenizers at the design stage.

The modernization of the homogenizer consists in the installation of a turbine mixer and an external circulation circuit. This reduced the homogenization time from 4 to 1 hour and, accordingly, increased productivity.

Conclusion. The scientific novelty of the results is to obtain a number of dependences of the viscosity of ointments and pastes on the shear rate and temperature. The practical value is to improve the design of the homogenizer and, accordingly, to reduce the time of homogenization.

References

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