

MODERN METHODS FOR DETERMINING THE QUALITY OF COSMETICS

Rakhimova M.V., Sych I.A., Yaremenko V.D., Grinevich L.A., Suleiman M.M.,
Kobzar N.P., Perekhoda L.O.

National University of Pharmacy, Kharkiv, Ukraine

RakhimovaMV@gmail.com

Nanoparticles in a cosmetic composition can be divided into two groups: those that act on the surface of the skin and do not cross the transdermal barrier and those that are able to cross the epidermis. If the former are conditionally safe, then the latter can have a direct impact on the biochemical processes in the dermis, are able to enter the capillaries and spread with the bloodstream throughout the body.

The lack of the information on the safety of nanoparticles has aroused interest from international regulators. In the US, the Food and Drug Administration (FDA) has already proposed introducing controls on the use of nanoparticles.

Two authoritative British organizations - the Royal Society and the Royal Academy of Engineering - issued a message that questioned the safety of sunscreens and other cosmetics containing nanoparticles. The report emphasizes that there is a lack of information about the possible penetration of nanoparticles through the skin, so more research is needed on this issue.

Among the physicochemical methods for the analysis of products containing nanoparticles, it should be noted methods that determine the concentration of nanoparticles without knowing which it is impossible to draw a conclusion about the quality of cosmetic products and their safety.

Far from everywhere it is required there is equipment to analyze the content of nanoparticles. In particular, MRI equipment is expensive and requires qualified personnel to maintain it, which limits its use.

To solve this problem, as an alternative to magnetic resonance imaging (MRI), we propose to use a simplified previously developed method for determining the concentration of magnetic nanoparticles in a colloidal medium, which involves excitation of magnetic nanoparticle oscillations in the target area of the medium, which is in an external constant magnetic field, using ultrasonic radiation. when replacing the use of a superconducting magnetometer with a highly sensitive voltmeter. As experiments have shown, the sensitivity of the simplified technique is sufficient for detecting the signal of an ensemble of magnetic nanoparticles. It eliminates the use of cryogenic liquid for measurements.

The proposed method has a number of advantages. Compared to MRI, it is direct and promises to be less expensive and more accessible. Unlike most other methods, it allows use not only at in vitro measurements, but also at in vivo measurements, which will allow us to conclude whether there is a penetration of nanoparticles through the skin in dermatology.