THE DROPLETS SIZE DISTRIBUTION OF THE MAYONNAISE SAUCE EMULSION: THE METHODOLOGY OF MEASUREMENTS BY LASER DIFFRACTION

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Для визначення реального розподілу крапель за розміром є доцільним розведення емульсії водою без ультразвукової обробки (викликає руйнування флокул з заниженням середнього значення діаметру крапель D_{43}) та додавання диспергатора (сприяє розширенню піку об'ємного розподілу з отриманням завищених значень D_{43}).

Measuring the size of emulsion drops plays an important role in food production. The main reason for this is a strong dependence on product taste and consistency on droplet size. At the same time, the size of the emulsion droplets is directly related to the viscosity, which allows not only to monitor changes in stability over time, but also to preliminarily model the properties of emulsions.

This study presents the results of determining the size of mayonnaise sauce particles using a PSA 1190 laser diffractometer (Anton Paar, Austria). The object was low-fat mayonnaise sauce, with aquafaba from commercial white canned beans as an emulsifier instead of egg yolk. The purpose was a comparative assessment of the prospects of using ultrasonic treatment and adding 2 % wt. solution of anionic surfactant sodium dodecyl sulphate (SDS) on the parameters of the volume distribution D_{43} of drops by size. In addition to classical particle size determination without ultrasonic treatment, an experiment with sonication 1 minute before measurement and 1 minute during measurement was performed.

The volume distribution of the diluted mayonnaise emulsion particles is described by a monomodal curve with a pronounced peak corresponding to droplets with a diameter of about 6.0 μm. Under the influence of ultrasonic treatment, large flocks and unstable aggregates are destroyed. As a result, the number of smaller particles in the system increases. The consequence of this is the displacement of the position of the maximum on the volume distribution curve towards particles of smaller diameter.

Under the SDS influence, dispersion of the system increases due to the forces of electrostatic repulsion between emulsion droplets and surfactant anions. This process is accompanied by a broadening of the peak of the volume distribution and a shift of the maximum towards particles with a diameter of 6.5–8.5 μm. Thus, the addition of SDS changes the picture of the real droplet size distribution.