

### Preparation and Stabilization of High Dispersion Gelatin Microcapsules

Kokhmetova S.T.,SivokhinaE.S.,Kurbatov A.P.,Galeyeva A.K.,Sokolov A.Y.

Microencapsulation is the process of cladding the trace amount of substances in a thin shell of a film-forming material [1]. Due to the possibility of mater encapsulation new ways to solve lots of technological and industrial problems are being opened. The microcapsules have a wide range of useful properties that can be used in various fields of human activity: pharmaceutical industry, agriculture, petrochemical industry; production of cosmetics, etc.

Method based on a simple coacervation process was used for producing microcapsules wherenatural protein, gelatin, was chosen as a shell material, which allows to reach the prolonged release of the capsulatedsubstance under the influence of various factors (mechanical impact, action of solvents, pH definition, etc.). Furthermore, they do not adversely impact on the environment.Preparation of the microcapsules was carried out in two (three) stage. The first stage is the preparation of the emulsion of the substance(organic solvent,  $CCl_4$ ) in the aqueous solution of gelatin and sodium palmitate[2]; then the deposition of gelatin macromolecules on the surface of emulsion droplets was implemented, i.e. the coacervation. This process was carried out under the influence of the coacervation agent introduced into the emulsion. For this the 20 % aqueous solution of sodium sulfate was used;- at the last stage the microcapsules were washed, as well as solidification (processes of tanning and crosslinking) of gelatin shells under the formalin influence was carried out [1].

Dimensionsof microcapsulesobtained by this way were in the range50-100microns.Laterworks for reducing their sizes were carried out. Inasmuch as the size of the microcapsules depends on the method and intensity of dispersing we used more effective supersonic emulsifier as a dispersing device [3].Also the amount of carbon tetrachloride in aqueous solution of the modified gelatin was reduced to increase the dispersion effectiveness. As a result thesizes of the microcapsuleswere reduced to 5-15microns that is presented in Fig. 1.

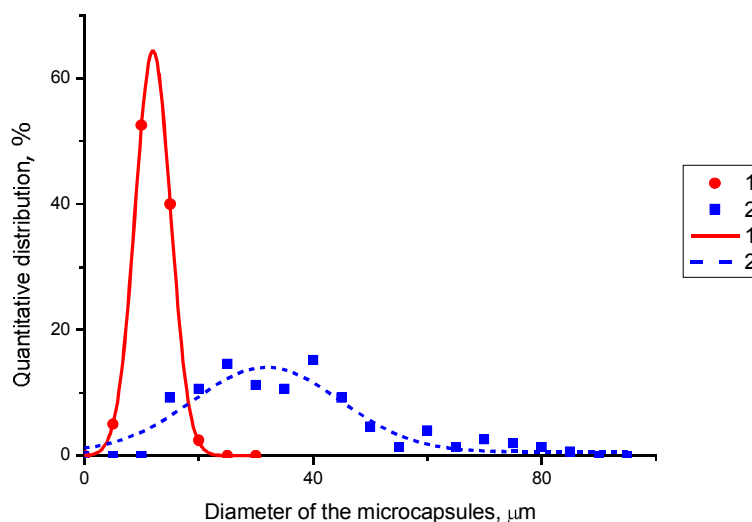


Fig. 1: Quantitative distribution of the microcapsules depending on their diameters (1 - ultrasonic dispersion; 2 - dispersion by using magnetic stirrer)

At increase of the specific surface area of particles their surface free energy increases as a result of it the coagulation process takes place [4]. To solve this problem were proposed: storing the microcapsules in more acidic solutions, and their washing with aqueous solutions of salts. In the first method the pH interval varied in range from 1 to 5. This operation was carried out in order to neutralize charges of acid groups of the gelatin macromolecule.

Drawbacks of this way are the gradual destruction (dissolution) of the gelatin capsules, as well as the resistance to coagulation increased slightly. In the second method the aggregation stability was increased due to appearance of more ordered crosslinking between gelatin macromolecules by metal cations. Therefore, this method is optimal for stabilizing the gelatin microcapsules.

**References:**

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