RECONSTITUTION OF DRY WHEY BY CAVITATIONAL DISINTEGRATION BASED ON THE WATER CATHOLYTE

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Abstract

Dry whey is widely used in dairy, meat and confectionery foodstuffs technology. The problems of whey reconstitution connect with stable whey solution production with properties, which must be similar to the natural whey. Other problems deal with the pH level control and reduction of the chemical stabilizers quantity for high quality products manufacturing. The aim of the research was to study of cavitational disintegration using for whey reconstitution process. The different types of activated water were used for whey solution preparing instead of traditional water.

The object of research was dry milk whey with the 50%-level of demineralization, produced according to Russian Standard 53492-2009. The pH level and redox of activated water and whey solutions were determined by potentiometric measurement on analyzer pH “Expert 001-1.0.1”. Water activity and structural properties were measured based on the traditional methods. Catholyte had pH level value about 10.45 - 11.2, and redox was equal to (-300 ÷ -350) mV. The cavitational disintegration was carried out by ultrasonic treatment of studied water or catholyte solutions of dry milk whey in homogenizer «Hielscher UP 400» at different intensiveness and time of treatment. Concentration of dry whey was varied from 5 to 20 %.

Reduction of pH level for all solutions with different concentration of dry whey was established. Cavitational disintegration promoted the stable solutions preparing. pH level of the system based on catholyte higher by 0.2-0.5 points than the same solutions based on water. Optimal parameters of the whey reconstitution, when the technological acceptable pH and water activity as well as redox potential could be obtained, were formed at 15 % of dry whey concentration when the solutions treated under 100% in relative units of intensiveness (which is equal to the absolute intensiveness of the ultrasonic waves at $3.6 \cdot 10^5 W/m^2$) and total time of treatment could be varied from 30 to 50 s. It was established that viscosity of the solutions made on catholyte had values in 1.5-2.0 times higher than for solutions made on water at concentrations of dry whey up to 15%.

The results may be used for manufacturing of high quality fermented milk products and milk deserts based on reconstituted whey.

Key words:*Cavitation, Reconstituted whey, pH level, Redox, Catholyte, disintegration, Ultrasonic treatment, Stability.*