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Nanostructuring of Protein Systems by Electroactivation

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A possibility of nanostructuring protein systems is demonstrated based on whey electroactivation. Whey as a raw material is not only a valuable by-product available in most of the cheese-production industry areas, it is also relatively cheap, with high nutritional value and several functionalities, with unique properties, which allows the study of nano-sized structures of whey proteins. Various non-uniform isolations of protein fractions in the protein-mineral complexes (PMCs) at the electroactivation of the studied whey is determined, first of all, by the properties of each fraction separately and by their behavior at the electrochemical action. The experimental data on the isolation of Beta-Lactoglobulin *(*β-Lg), the most abundant whey protein, are presented; the aggregation of β-Lg in the PMCs via various mechanisms and modes has been presented by the authors earlier. The isolation of Alpha-Lactalbumin (α-La) in the PMCs upon the electroactivation of whey differs from the isolation of β-Lg in the PMCs. Electroactivation of whey allowed the formation of high molecular weight protein compounds. Three fractions of casein: –α-CSN, β CSN, and κ-CSN, with a molecular weight of 37, 33, and 46 kDa, respectively, were identified. The electroactivation of whey and the extractions in the PMCs ennobled with certain protein fractions allowed to specify different sedimentation and isolation mechanisms of the whey proteins: the formation of a calcium phosphate caseinate complex; salinization of proteins; and sedimentation of proteins in their isoelectric point.