

Iranian Processed Cheese under Effect of Emulsifier Salts and Cooking Time in Process

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Abstract : Sodium Hexametaphosphate (SHMP) is commonly used as an Emulsifying Salt (ES) in process cheese, although rarely as the sole ES. It appears that no published studies exist on the effect of SHMP concentration on the properties of process cheese when pH is kept constant; pH is well known to affect process cheese functionality. The detailed interactions between the added phosphate, Casein (CN), and indigenous Ca phosphate are poorly understood. We studied the effect of the concentration of SHMP (0.25-2.75%) and holding time (0-20 min) on the textural and Rheological properties of pasteurized process Cheddar cheese using a central composite rotatable design. All cheeses were adjusted to pH 5.6. The meltability of process cheese (as indicated by the decrease in loss tangent parameter from small amplitude oscillatory rheology, degree of flow, and melt area from the Schreiber test) decreased with an increase in the concentration of SHMP. Holding time also led to a slight reduction in meltability. Hardness of process cheese increased as the concentration of SHMP increased. Acid-base titration curves indicated that the buffering peak at pH 4.8, which is attributable to residual colloidal Ca phosphate, was shifted to lower pH values with increasing concentration of SHMP. The insoluble Ca and total and insoluble P contents increased as concentration of SHMP increased. The proportion of insoluble P as a percentage of total (indigenous and added) P decreased with an increase in ES concentration because of some of the (added) SHMP formed soluble salts. The results of this study suggest that SHMP chelated the residual colloidal Ca phosphate content and dispersed CN; the newly formed Ca-phosphate complex remained trapped within the process cheese matrix, probably by cross-linking CN. Increasing the concentration of SHMP helped to improve fat emulsification and CN dispersion during cooking, both of which probably helped to reinforce the structure of process cheese.

Keywords : Iranian processed cheese, emulsifying salt, rheology, texture

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