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Investigation of Factors Influencing Solubility of Whey Protein Hydrolysate-Skim Milk Powder Mixtures

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Abstract

Whey protein hydrolysate (WPH) and skim milk powder (SMP) offer nutritional and functional properties of milk proteins. Physicochemical changes during rehydration alter solubility, which is an important techno-functional property of milk powders that may limit their regular usage in food products such as ready-to-drink beverages. This study explored how mixing WPH with SMP and chelating salt affects its solubility in a protein mix. SMP34 and WPH80 were mixed in various ratios, with trisodium citrate added at concentrations from 0 to 2.5% and rehydrated in ultrapure water. The effects of SMP and trisodium citrate on the solubility of WPH, particle size distribution, zeta potential, buffering capacity, pH and colour were investigated. The resulting data were analyzed using Minitab version 14. At 10% and 20% SMP-WPH total solids content (w/v) blend, solubility increased significantly ($P< 0.05$) from 68.9 to 63.5%. There was no significant ($P>0.05$) effect observed on zeta potential with increasing trisodium citrate concentration in the mixtures. However, the protein mixtures demonstrated colloidal stability. The study demonstrated an increase in the solubility of milk protein powder blends with the addition of trisodium citrate, potentially increasing the value of dairy ingredients and their application in new categories of ready-to-drink protein beverages.