

Formation and characterization of thiol-modified fibrillated whey protein isolate solution with enhanced functionalities

ABSTRACT

The effect of thiolation using propanethiol on the functionalities of fibrillated whey protein isolate (WPI) solution at different pH values was studied. Fibrillated WPI solutions were thiolated at different molar ratios of propanethiol:carboxyl group (0.5:1, 1:1, 2:1, 3:1, 4:1) and the highest esterification extent ratio was obtained at 4:1 (pH 9). We also found that the thiolation process improved the foaming capacity and foam stability. TEM micrographs evidenced aggregation of thiol-modified fibrillated WPI. A network of shortened fibrils attached to each other was formed upon thiolation, suggesting good physical interaction. This was coherent with the increment of zeta potential values, indicating a greater repulsion force to retard fibrils aggregation. Thiolation enhanced emulsifying stability index of thiol-modified fibrillated WPI solution (pH 8) and diminished its susceptibility to pH changes. This has broadened the potential application of fibrils as food ingredients.

Keyword: Esterification; Whey protein isolate; Emulsifying properties; Foaming properties