

IMPROVED HEAT STABILITY OF WHEY PROTEIN ISOLATE BY GLYCATION WITH INULIN

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ABSTRACT

Glycation between protein and saccharide has been shown to improve heat stability of protein. In this study, inulin, a healthy dietary fiber, was selected for glycation with whey protein isolate (WPI). Conjugates were prepared by freeze drying the mixture solutions of WPI and inulin at different weight ratios followed by dry-heating at various temperatures, relative humidity levels and incubation times. Visual observation of the conjugate solutions after heating was used to evaluate heat stability and color development. Heat stability was evaluated by turbidity, particle size, and rheological measurements. Degree of glycation was assessed by quantifying the loss of amino groups and the amount of Amadori compounds.

Results showed that optimum glycation can be achieved by dry-heating WPI-inulin at 2:1, 4:1 and 6:1 weight ratios at 80°C for 12 to 72 h without controlling the relative humidity. Glycation was confirmed by an increase in the Amadori compounds and a small loss of available amino groups. Improved heat stability of conjugates was shown by a decrease in turbidity and particle size after heating 6% w/w protein at pH 6.0 without significant change in flow behaviors. Improved heat stability may be due to an increase in negative charge as well as increased stabilization of the protein. With limited degree of glycation, low viscosity and improved heat stability, glycated WPI-inulin has a great potential to be utilized as food ingredients, especially in beverage industry.