

## **Physicochemical Properties and Radical Scavenging Activity of Whey Protein Hydrolysate by Conjugation with Lactose**

### **ABSTRACT**

Whey protein isolate (WPI) has been hydrolysed to whey protein hydrolysate (WPH) using alcalase produced by *Bacillus licheniformis* at 65°C for three hours with an enzyme to substrate ratio of 1:50. The WPI and WPH are then conjugated with lactose via Maillard reaction by heating the solution at 95°C for different heating times which are 0h, 1h, 2h, 3h and 4h. The objectives of this study are to characterise the physicochemical properties (pH value, browning intensity, degree of glycation and Fourier transform infrared spectroscopy) of conjugation of WPI and WPH with lactose and to analyse the antioxidant activity of WPI and WPH after conjugation with lactose. In this study, the pH value, browning intensity, degree of glycation, structure and antioxidant activity of both conjugates are analysed. The pH value and degree of glycation of WPH-Lactose for all different heating time is higher compared to WPI-Lactose while for browning intensity, the WPH-Lactose heated four hours has higher browning intensity than WPI-Lactose. The secondary structure of both conjugates has been altered after conjugation in which the beta structure in proteins has been reduced. The antioxidant activity of WPH-Lactose conjugate is higher compared to WPI-Lactose conjugate as shown the analysis of ABTS+ radical scavenging activity which is 2.37% for WPI-Lactose and 12.68% for WPH-Lactose that have been heated for four hours. However, the antioxidant activity of WPH is high even though without the conjugation with lactose. Hence, the findings show that WPH can be used as a potential ingredient for encapsulating bioactive compounds due to its high antioxidant activity.