

Narumol Rongsirikul 2012: Peptic-Modified Whey Protein Concentrate and its Antibrowning Effect on Heated Glycine-Sugar and Whey Protein-Sugar Mixtures. Master of Science (Food Science), Major Field: Food Science, Department of Food Science and Technology. Thesis Advisor: Associate Professor Parichat Hongsprabhas, Ph.D. 93 pages.

Maillard reactions are non-enzymatic browning which generate advanced glycation end products (AGEs) and Maillard reaction products (MRPs). This research investigated the production and characteristics of the modified whey protein concentrate (MWPC) with antioxidant capacity if they had antibrowning effect on sterilized glycine-reducing sugar and whey protein-reducing sugar suspensions. The -modification processes were carried out by heating a 2% WPC suspension at 80 °C for 30 min at its natural pH of 6.6 or acidic pH of 2.0, followed by peptic treatment at 37 °C for 60 min. Acidic heating of WPC and peptic treatment reduced protein aggregation and slightly increased antioxidant capacity measured as oxygen radical absorbance capacity (ORAC) assay ($p \leq 0.05$). Spray-drying of MWPC further hydrolysed proteins, especially α -lactalbumin. The MWPC had increased antioxidant capacity measured as Trolox equivalent antioxidant capacity (TEAC), amino groups but lowered sulfhydryl groups and the exposed aromatic amino acids. The reconstituted MWPC was able to reduce the formation of AGEs in fructose-containing mixtures heated at 80 to 95 °C for 45-60 min. The addition of MWPC to reducing sugar-containing mixture; namely fructose, glucose and lactose, was also able to lower brown pigment formation of the mixed suspensions containing 0.1 M reducing sugar and 0.5-1.0% protein sterilized at 121 °C for 15 min ($p \leq 0.05$). Overall, the study showed that the MWPC had potential use as antibrowning agent, particularly against AGEs formation during sterilization process.

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