



Effect of Addition Xanthan gum, Guar gum and Arabic gum on Thermal and Rheological Properties of Brown Rice Batter

Jehan Aboukzail^{1*}, Aminah Abdullah², Maaruf Abd Ghani³

^{1,2,3}Department of Food Science, School of Chemical Sciences and Food Technology, Faculty of Science and Technology, University Kebangsaan Malaysia, 43600 Bangi, Selangor, Malaysia

Abstract: The objective of this study was to determine the effect of adding xanthan gum, guar gum and Arabic gum by addition percentages (0.5%, 1%, 1.5%, and 2%) individually on thermal and rheological properties of brown rice batter. Thermal properties were performed by using Differential Scanning Calorimetry (DSC) and viscoelastic behaviour by using Rheometer to assess storage modulus, loss modulus and flow behavior. The result of the study indicated that no significant differences ($p < 0.05$) on T_o and ΔT by adding gums. T_p increased significantly ($p < 0.05$) by 1% guar gum while no significant variations ($p < 0.05$) on it by the addition of xanthan and Arabic gum. T_{end} differed significantly ($p < 0.05$) by 0.5% xanthan and 1% guar. Enthalpy (ΔH) increased significantly ($p < 0.05$) by adding 2% Arabic gum. Furthermore, the addition of xanthan and guar gum increased brown rice batter viscosity significantly ($p < 0.05$) while adding Arabic gum by more than 0.5% made the viscosity decrease ($p < 0.05$). Storage modulus dropped by the addition of xanthan, Arabic gum, and 0.5% guar gum. Moreover, loss modulus decreased significantly ($p < 0.05$) by Arabic gum and 0.5% xanthan, but it grew up ($p < 0.05$) by 2% xanthan. Addition of guar gum made storage and loss moduli higher compared with xanthan and Arabic gum. Adding gum increased the consistency index significantly ($p < 0.05$), while flow index decreased significantly ($p < 0.05$) by 1.5% and 2% gum (xanthan, guar and Arabic).

Key words: brown rice batter, thermal, rheological properties, starch gelatinization, xanthan, guar, Arabic gum.