

Hathaichanok Bouvaree 2010: Physicochemical Properties of Modified Sorghum Flour and Starch by Different Pregelatinization Methods. Master of Science (Food Science), Major Field: Food Science, Department of Food Science and Technology. Thesis Advisor: Assistant Professor Masubon Thongngam, Ph.D. 111 pages.

This research was aimed to investigate the effect of pregelatinization methods (drum-dried and spray dried methods) on sorghum flour and starch properties. In addition, the effect of sucrose and sodium chloride on the pasting properties of native and modified sorghum flour was investigated. The conditions of both Pregelatinization methods were studied. For drum dried method, the gap distance (0.15, 0.25 and 0.35 mm) and drum surface temperature (120 and 130 °C) were carried out. For spray dried method, the temperatures (65, 75 and 85 °C), used to heat flour suspension prior to spray dry, were investigated. The drum dried sorghum flour (DSF) had higher yield than spray dried sorghum flour (SSF) (based on sorghum flour). In addition, the resistant starch content of both pregelatinized modified flour were increased. When the morphology of the starch granules was observed, the result shows that the starch granule of native sorghum flour (NSF) appeared polygonal; while those of SSF was slightly increased in size with crease but still intact. However after drum dried modification, the starch granules showed flake-like and fragment shape. In comparison to native flour, the water retentions of both DSF and SSF were increased. Moreover, the results show that the cold water solubility of DSF was increased; while that of SSF was increased with increasing preheating temperature. When using the X-ray diffraction, SSF showed A-type crystalline structure similar to NSF but had lower intensity due to the lower degree of crystallinity. However DSF did not show peak intensity owing to the loss of crystallinity after modification. Furthermore, the thermal property of flour was determined and the results show that the gelatinization temperature and enthalpy of NSF were 67.93-75.98 °C and 9.63 J/g respectively. However after spray dried modification, the gelatinization temperature of flour was higher but the enthalpy of gelatinization was lower than that of native. When the pasting property was carried out, the result shows that DSF gave an instant increase of viscosity. On the other hand the pasting profile of SSF was similar to that of native but its pasting temperature was higher compared to the native. Upon the addition of sucrose, it caused an increase in the pasting viscosity of all samples; whereas, the pasting temperature remained unchanged. Moreover in the presence of sodium chloride, the results show that the pasting temperature of NSF and SSF increased but the breakdown and setback were decreased. Unlike DSF, the addition of sodium chloride caused the increase of the pasting viscosity.

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Student's signature

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Thesis Advisor's signature