

Supawadee Cham 2013: Hydrothermal Modification of Rice Flour and its Application in Food.
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Heat-moisture treatment (HMT) and annealing (ANN) are hydrothermal treatments used in modifying the physicochemical properties of flour. This research studied the effects of HMT and ANN on high amylose (Chai Nat 1 variety; CN1) and medium amylose (Khaw Dawk Mali 105 variety; KDML 105) rice flour. The research aimed to improve rice flour quality in order to apply in rice noodle making and thickening agent in foods. Response surface methodology (RSM) was applied to optimize the hydrothermal treatment conditions – moisture content (18 22.5 and 27%); heating temperature (90 105 and 120 °C) and heating time (1 2 and 3 h.) on pasting; rheology; and textural properties. The responses studied were better explained by a second-order model. Predictive model with high fitting ($R^2 > 0.85$), final viscosity, setback, hardness, springiness, G' 95 °C, G' 25 °C, To and ΔH , were selected for optimization. Result showed that the optimization for KDML105 and CN1 by HMT at 105 °C, 22.5% moisture content for 2 h. gave similar responses to those of 4 months old rice flour ($p > 0.05$) which was suitable for rice noodle making. The optimum condition for CN1 by ANN at 65 °C 60% moisture content for 24 h was suitable for fresh rice noodle making. The optimum condition for HMT at 105 °C 22.5% moisture content for 2 h and 105 °C 27% moisture content for 2 h were suitable for semi-dry and dry rice noodle making respectively. Those flours gave responses which were not significant different from those of commercial flours (PS1[®], PS2[®] and PS3[®]; National Starch and Chemical Thailand Co., Ltd). Moreover, rice flour was also modified to be used as thickening agent in tomato sauce, salad cream and custard cream. Result showed that rice flour (KDML105) which was HMT at 120 °C 27% moisture content for 2 h obtained responses which were not significantly different from commercial flour (NL[®], National Starch and Chemical Thailand Co., Ltd) ($p > 0.05$). The hydrothermal modified rice flour could improve native rice flour's quality, however its modifying conditions depended on products' quality requirement. Hydrothermal treated rice flour was safer and cheaper than chemically modification.

Student's signature

Thesis Advisor's signature