Sasipa Kerdsrilek 2010: Effect of Addition of Duck Egg White on Physico-Chemical Properties of Rice Flour and Rice Noodle. Master of Science (Food Science), Major Field: Food Science, Department of Food Science and Technology. Thesis Advisor: Associate Professor Wunwiboon Garnjanagoonchorn, Ph.D. 139 pages.

The proximate composition of rice flour consist of 12.79 ± 0.20 %moisture and 89.93 ± 0.32 % carbohydrate, 9.65 ± 0.27 %protein, 0.23 ± 0.04 %fat, 0.29 ± 0.00 %ash and 32.04 ± 0.15 %amylase (dry basis). Fresh duck egg white (pH8.11) contained 87.14 ± 0.01 %water, 12.55 ± 0.55 %protein, 0.05 ± 0.02 %fat and 0.68 ± 0.01 %ash (wet basis). The native rice starch granules are polygonal shapes with small granular sizes (2.59 ± 0.46 μm). Effects of the addition of egg white on physico-chemical properties of rice flour were investigated. It was found that the addition of egg white resulted in a decrease of size and swelling power of non aggregated starch granules. In addition the morphology of heated rice flour mixture with and without egg white observed by light microscope indicated that the presence of egg white caused aggregation of egg white proteins with starch granules. RVA analysis showed changes of the pasting properties of rice flour in presence of egg white (0, 10, 20, 30, 40, 50 % of total solution weight, with constant rice flour at 7 % by weight) noticeably increases in peak viscosity, final viscosity and setback but a significant decrease in breakdown. The 30 % egg white in rice flour solution showed the lowest ($p \leq 0.05$) breakdown value. Fresh noodles with added egg white at 0, 10, 20, 30, 40 and 50% of total weight showed no significant difference ($P > 0.05$) in moisture content and water activity value. Fresh noodles showed significant ($p \leq 0.05$) increases of b^* value (yellow) with increasing added egg white at 30, 40 and 50%, respectively. Addition of egg white resulted in an increase in strength of rice noodles as shown by higher tensile peak force, maximum cutting force and total work to cut through. SEM and CLSM micrographs illustrated egg white protein gel network separated from continuous gel matrix of gelatinized starch in rice noodle. With interesting textural and physico-chemical properties of rice noodle with 30% added egg white, it was chosen for an investigation of the effect of aging time (0, 1, 2, 3, 4, 5 and 6 h at 4°C) before drying process. The results showed no significant difference of aging time on the cooking quality and the textural properties of cooked rehydrate noodle but drying process negatively affected noodle texture. However, the addition of egg white at 30% by weight significantly increased protein content of rice noodle by twofold.

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