

Achana Yimjaroenpornsakul 2006: Applications of Duck Egg White: Case Studies of Edible Film and a Food Product Development. Master of Science (Food Science), Major Field: Food Science, Department of Food Science and Technology. Thesis Advisor: Associate Professor Wunwiboon Garnjanagoonchorn, Ph.D. 133 pages.
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The popular Thai desserts, Tongyip, Tongyod, and Phoitong, are processed by small scale industries using duck egg yolk as a major ingredient, leaving egg white as a by-product. A film forming property, an interesting function of egg white protein was studied. The effects of factors: egg freshness, pH of egg white solution, type and concentration of plasticizers, on the edible film properties were investigated. The results showed that egg white from fresh duck egg kept at room temperature ($28 \pm 3^{\circ}\text{C}$) for not more than 4 days formed edible film when adjusted pH to 10.5 and added 50 % (w/w of egg protein) sorbitol as plasticizer. The films were clear, transparent and smooth with the average thickness of 0.113 mm. The mechanical properties of the film were determined and the results were 0.57 kg/mm^2 tensile strength and 6.92 % elongation. The water vapor permeability and oxygen permeability were determined and the results were $0.098 \text{ g.mm/m}^2.\text{hr.mm.Hg.}$ and $7.04 \text{ cm}^3.\text{mm/m}^2.\text{hr.atm.}$, respectively. The experimented duck egg white film is classified as good water vapor barrier when compared with other protein films, such as whey protein film and soy protein film, but poor oxygen barrier when compared with these protein films.

The binding properties of duck egg white protein were also studied. Egg white and egg white mixed with Water Meal were formulated as dried slice products. Water Meal is water plant that was consumed in the North and North-East of Thailand, is rich in protein, beta-carotene and calcium. Freshly harvested Water Meal is cooked in boiling water for 3 minutes and drained the excess water. Egg white were mixed with cooked Water Meal at the ratio of 2:1 by weight. Pepper and soy sauce were added to give some flavor to the product. The egg white mixture was molded as flat sheet by heated mold (150°C , 1 min), cut into strip (width 0.7 cm, length 5-7 cm), tied to form a knot shape and oven dried at 60°C for 3 hours. The dried products consisted of 6 % moisture and less than 1 % fat. Dried slice egg white product consisted of 80% protein, it was 14% higher than the dried egg white mixed with Water Meal. The addition of Water Meal increased carbohydrate content of the product to 21 %. The products were boiled in soup stock and served to 25 untrained panelists. The egg white product with Water Meal showed higher overall acceptability score.

Student's signature

Thesis Advisor's signature

