

Wipasri Suwanaphol 2014: Development of Frozen Fried Egg Process. Master of Science (Food Science), Major Field: Food Science, Department of Food Science and Technology. Thesis Advisor: Associate Professor Sanguan Sri Charoenrein, Ph.D. 121 pages.

Freezing induces the quality changes in fried eggs, where fried egg white become tough or rubbery in texture with large voids caused by ice crystals on the surface which increasing during storage. Thus frozen fried egg is not preferable by most consumers when compared to a freshly fried egg. In order to develop the frozen fried egg process, the temperature (80, 95 °C) and time (5, 7.5, 10 min) used for deep fat frying of egg were studied. It was found that the optimum condition was 80°C, 7.5 min. Thus fried egg sample was prepared from 35 g cheese cloth filtered egg white. Since xanthan gum (Xa) and sodium alginate (Al) show good water holding ability therefore Xa at 0, 0.1, 0.2 % (w/w) and Al at 0, 0.1, 0.2, 0.4, 0.6% (w/w) were added in egg white before frying where 3x5 factorial in RCBD were conducted in the experiment. It was found that frozen fried egg white with the addition of low concentration of Xa+Al (0.1+0.2) showed lower amount of large ice crystals formation than other treatments. However, frozen fried egg white that were reheated by microwave with 600 W for 1 min and subjected to sensory evaluation (9 point hedonic scale) using 30 panels indicated that fried egg white has soft and watery texture. Further study was carried to improve product texture by mean of preheating the egg white in hot water bath before mixing with hydrocolloids. Meanwhile the addition of calcium chloride (0.02, 0.04% w/w) was also studied. The results revealed that preheating egg white at 45°C for 10 min followed by mixing with 0.1 Xa+0.2 Al+0.04 calcium chloride can reduce quality changes caused by freezing and decrease soft and watery texture of product. The product showed the increases in preference score of firmness, flexibility and overall liking by tested panels. The effects of type of freezing (sharp freezer at -25°C and cryogenic freezer at -40 °C to get product temperature of -25°C) and storage time (60 days at -20°C) were also studied. After 10 days storage at -20°C some small area of structural collapses were found in sharp freezer egg white sample. The increase in crystal size and a decrease in water holding ability after thawing and an increase in tough and rubbery texture occurred with the increase of storage time. However, cryogenic freezer sample showed less structural collapses of protein gel and less degree of quality changes in products. The study suggested that fried egg can be prepared by pouring pretreated egg white (according to the above results) in circular mold, rapidly dropped egg yolk and deep fat frying at 80°C, 7.5 min.

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