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Effect of Whey Protein-Rice Bran Oil Incorporated Zataria multiflora Extract Edible Coating on Chemical, Physical and Microbial Quality of Chicken Egg

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Abstract : In this study, the effects of coating with whey protein concentrate (7.5% w/v) alone and/or in combination with rice bran oil (0.2, 0.4, 0.6 g in 100 ml coating solution) and Zataria multiflora extract (1 and 2 µL in 100 ml coating solution) on the quality attributes and egg shelf life were carefully observed and analyzed. Weight loss, Haugh index, yolk index, pH, air cell depth, shell strength and the impact of this coating on the microbial load of the eggs surface were studied at the end of each week (during the 4 weeks of storage in a room environment temperature and humidity). After 4 weeks of storage, it was observed that the weight loss in all of the treated eggs with whey protein concentrate and 0.2 gr of rice bran oil (experimental group) was significantly lower than that of the control group(P < 0/05). With regard to Haugh index and yolk index, egg shelf life increased about 4 weeks compared with the control samples. Haugh Index changes revealed that the coated samples remained at grade A after 3 weeks of storage, while the control samples were relegated from grade AA to B after one week. Haugh and yolk Indices in all coated eggs were more than those of the control group. In the coated groups, Haugh and yolk indices of the coated samples with whey protein concentrate and 0.2 g rice bran oil and with whey protein concentrate and 0.2g of rice bran oil and 1 micro liter of Zataria multiflora extract were more than those of the other coated eggs and the control group eggs. PH values of the control group were higher than those of the coated groups during the storage of the eggs. The shell strength of the coated group was more than that of the control group (uncoated) and in coated samples, whey protein concentrate and 0.2 gr of rice bran oil coated samples had high shell strength. In the other treatments, no significant differences were observed. The depth of the air cell of the coated groups was determined to be less than that of the control group during the storage period. The minimum inhibitory concentration was 1 µL of Zataria multiflora extract. The results showed that 1 µL concentration of Zataria multiflora extract reduces the microbial load of the egg shell surface to 87% and 2 µL reduced total bacterial load to zero. In sensory evaluation, from evaluator point of view, the coated eggs had more overall acceptance than the uncoated group (control), and in the treatment group coated eggs, those containing a low percentage of rice bran oil had higher overall acceptability. In conclusion, coating as a practical and cost effective method can maintain the quality parameters of eggs and lead to durability of supply conditions in addition to the product marketability.

Keywords : edible coating, chicken egg, whey protein concentrate, rice bran oil, Zataria multiflora extract, shelf life
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