

THEME 1 | ANIMAL PRODUCTION SYSTEMS

Preliminary evaluation of zein-coated eggs to keep shelf life during 7 weeks of storage

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Zein is the main maize protein and makes up about 60% of its endosperm. It is classified in the group of prolamins, characterized by the high content of apolar amino acids, hydrophobic molecular structure, soluble in alcohol for extraction. This protein has been studied in the formation of biofilms and its use in the production of materials for packaging or food coatings. These coatings act as barriers against moisture and oxygen in order to prevent rapid deterioration and increase product shelf life. In the present study, a total of 40 eggs from an F1 laying line were used, selected according to their initial weight (average of 60 to 70g) after washing under tap water. The treatments, considering 10 replicates each, were: mineral oil, ethanolic solution containing 10% zein (1X), ethanolic solution containing 10% zein (2X) and a control treatment (uncoated eggs). The coating containing mineral oil was applied with a sponge. The eggs that received the zein-coating were immersed once (1X) or twice (2X) in the solution. Then, the eggs were stored at room temperature (20-25°C) for 7 weeks. The weight loss was evaluated weekly and the egg quality variables, Haugh unit, yolk index and shell breaking strength and shell deformation were analyzed at the last week of the experimental period. Analysis of variance (ANOVA) was used to determine whether overall difference existed between noncoated and three coated eggs treatments for the egg quality parameters. Results indicated that zein coatings (single or double application) were able to reduce the loss of egg mass in comparison to non-coated eggs at the 7th week of storage (92.5±2.5, 94.0±0.9 and 87.3±3.3%, respectively). However, these reductions were lower if compared to the mineral oil coated eggs (97.8±2.5%); additionally, the double application didn't improve apparently the protection against weight loss. Regarding the internal quality, after 7 weeks of storage, all non-coated eggs couldn't be evaluated (rotten or ruptured yolk), but the coated ones kept on analyzable, among them, a high amount of eggs with intact yolk was observed with the zein coating, despite the yolk index was reduced in comparison to the fresh eggs. Results obtained for the eggshell resistance were inconclusive due to the variability of the data (high standard deviation) probably due to genetic factors (eggs origin, non-commercial line). In conclusion, the zein coating seems to be a promising technology to extend the eggs shelf life.

Keywords: zein coatings, egg quality, eggshell resistance, shelf life