

Influence of air composition during egg storage on egg characteristics, embryonic development, hatchability, and chick quality

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Egg storage beyond 7 days is associated with an increase in incubation duration and a decrease in hatchability and chick quality. Negative effects of prolonged egg storage may be caused by changes in the embryo, by changes in egg characteristics, or by both. An adjustment in storage air composition may reduce negative effects of prolonged egg storage because it may prevent changes in the embryo and in egg characteristics.

An experiment was conducted to investigate the effects of high CO₂ concentrations or a low O₂ concentration in the storage air on egg characteristics, embryonic development, hatchability, and chick quality. Eggs from a Ross (308) broiler breeder flock of 38 weeks were stored for 14 days in 4 different storage air compositions: normal air (control; 20.9% O₂, 0.05% CO₂, 78.1% N₂), 0.74% CO₂ treatment (20.8% O₂, 0.74% CO₂, 77.5% N₂), 1.5% CO₂ treatment (20.6% O₂, 1.5% CO₂, 77.0% N₂), or 3.0% O₂ treatment (3.0% O₂, 0.04% CO₂, 96.0%

N₂). The storage temperature was 16°C and the relative humidity was 75%.

Results showed that the change in albumen pH and albumen height between oviposition and the end of storage was less in the 0.74 and 1.5% CO₂ treatments than in the control and 3.0% O₂ treatments ($P < 0.001$ and $P < 0.001$, respectively). None of the treatments affected the stage of embryonic development on day 4 of incubation, hatchability, or chick quality on the day of hatch in terms of body

weight, chick length, and yolk-free body mass. Although high CO₂ concentrations in the storage air had a positive effect on albumen height and albumen pH, it is concluded that the storage air compositions, studied in the current study, do not affect

embryonic development, hatchability, or chick quality when eggs are stored for 14 days at a storage temperature of 16°C.

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