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Abstract

Temperature and CO_2 during the Hatching Phase

1. Effects on Chick Quality and Organ Development

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The objective of this study was to investigate the effect of eggshell temperature (EST) and carbon dioxide (CO_2) concentration during only the hatching phase on embryonic development and chick quality.

Three batches of eggs were incubated at an EST of 37.8°C until d 19 of incubation (E19). From E19, embryos were incubated at low (36.7°C), normal (37.8°C), or high (38.9°C) EST and at low (0.2%) or high (1.0%) CO_2 concentration. Organ growth and embryo and chick quality were measured at E19, internal pipping (IP), hatch, and 12 h after hatch. A few interactions between EST and CO_2 were found at IP, hatch, and 12 h after hatch, but all of these interactions were temporary and in most cases weak. High EST resulted in a lower relative heart weight compared to low (Δ = 0.05) and normal EST (Δ = 0.06) at IP, compared to low (Δ = 0.11) and normal EST (Δ = 0.08) at hatch, and compared to low (Δ = 0.11) and normal EST (Δ = 0.08) at 12 h after hatch. At hatch, high EST resulted in a lower YFBM compared to low EST (Δ = 0.65). At 12 h after hatch, high EST resulted in a lower relative liver weight compared to low EST (Δ = 0.12). At low EST, greater relative intestinal weight was found compared to normal (Δ = 0.41) and high EST (Δ = 0.37). The effect of CO_2 solely was found at 12 h after hatch at which a higher relative heart weight (Δ = 0.05) and a higher relative lung weight (Δ = 0.0542) was found at high CO_2 compared to low CO_2. High EST during only the hatching phase negatively affected chick development, mainly expressed by the lower relative heart weight at IP, hatch, and 12 h after hatch and lower YFBM at hatch. The resolving effect of CO_2 demonstrates that CO_2 only seem to have a temporary effect during the hatching phase.

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