

The chicken embryo and its micro environment during egg storage and early incubation

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When egg storage is prolonged (>7 days), hatchability and chick quality declines. The reason for this decline has been investigated, but is still not completely understood. At oviposition the developmental stage of the chicken embryo varies and so do the total number of viable cells. During storage, changes can occur in the embryo.

Embryo viability at the end of storage seems to be dependent on the number of viable cells and the developmental stage of the embryo at oviposition. When the hypoblast is completely formed (during the quiescent developmental stage), the embryo seems to be more able to endure prolonged storage periods than embryos that are less or more advanced. During storage, changes also occur in egg characteristics such as albumen viscosity, albumen pH, and yolk pH. There appears to be an interaction between albumen pH and embryo viability during early

incubation and perhaps also during storage. An albumen pH of 8.2 seems to be optimal for embryo development. Albumen pH may influence embryo viability, but embryo viability may in turn, affect albumen pH. It has been hypothesized that an embryo in which the hypoblast is completely formed is better able to provide an effective barrier between the internal embryo and the exterior (yolk and albumen) and/or is better able to produce sufficient amount of carbon dioxide, which will reduce the pH level in the micro environment of the embryo to the optimal pH of 8.2.

It appears that, to maintain hatchability and chick quality after prolonged storage periods, embryonic development should be advanced to the stage in which the hypoblast is completely formed or the atmosphere during storage and early incubation should be altered in such a way that albumen pH is maintained at the optimal level of 8.2.

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