EGG ALBUMEN CORTICOSTERONE CONCENTRATION IN HENS EXPOSED TO HIGH TEMPERATURE

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Assessment of bird welfare is difficult but measures based on physiological changes are common and many of these are related to responses by the hypothalamic-adrenal-axis. Corticosterone is the main steroid secreted from the avian adrenal but there are difficulties with interpretation of circulating levels because of sampling complications. The egg, by providing a non-invasive means of measuring levels of stress, may help overcome these problems (Downing et al., 2001). The present study examined corticosterone levels in egg albumen when hens were exposed to a high ambient temperature.

In a short-term study, hens (15/room) were housed in two rooms and the temperatures set at constant 18°C or constant 32°C. On days 3, 4, 9 and 10 after initial exposure, eggs (10/room) were collected, opened and samples of albumen taken. On days 5 and 10 all birds were bled. In a long-term study, hens (20/room) were housed in two rooms and the temperatures set at constant 18°C or constant 30°C. Twice during each of weeks 28-32 after initial exposure, 10 eggs/room were collected, opened and samples of albumen taken. All hens were bled at the end of week 32. Albumen samples and plasma were analyzed for corticosterone using a validated radioimmunoassay. Differences on individual sampling days were assessed by unpaired student’s t-test. Corticosterone concentrations in albumen are given in the figure. Significant (P < 0.05) differences are indicated by *.

Short-term, high temperature had no effect on plasma corticosterone levels but significantly increased albumen levels on days 4 and 9. Long-term, high temperature increased significantly, mean plasma corticosterone (4.5 ± 0.3 vs 2.7 ± 0.2 ng/ml) and also, egg albumen levels at most sampling times. These results indicate that corticosterone concentrations in egg albumen could provide a non-invasive measure of stress in hens.


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