THE RELATIONSHIP BETWEEN PLASMA AND EGG ALBUMEN CORTICOSTERONE LEVELS

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Many stresses result in activation of the hypothalamic-adrenal axis with consequent changes in the plasma and tissue levels of glucocorticoids and catecholamines. Corticosterone is the main glucocorticoid secreted by the adrenal gland in hens. Measuring plasma corticosterone levels is difficult because sampling procedures are themselves stress inducing. A non-invasive means of measuring corticosterone would alleviate this problem (Downing et al., 2001). The gradual accumulation of albumen over 5-6 h during egg formation potentially provides an accurate reflection of circulating hormone levels over this time. The purpose of the study was to determine if there is a relationship between plasma and egg albumen corticosterone levels.

Isa Brown hens (63 weeks of age) were used in the study. At 0600 h, 20 hens for each treatment were given a subcutaneous injection of 5 or 10 mg of corticosterone suspended in 1 ml of peanut oil or 1 ml of peanut oil alone. Between 1600-1700 h, a 1 ml blood sample was taken from each hen and the plasma harvested and stored until assayed. All eggs laid on the day following the injection were collected, broken open and the albumen separated and stored until assayed. Corticosterone levels in plasma and egg albumen were determined by radioimmunoassay.

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y = 0.139x + 1.423 \quad r = 0.872
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The injection of corticosterone resulted in a significant increase in plasma corticosterone levels. There was a significant positive relationship between the level of plasma corticosterone and the level in the egg albumen. The data suggest that in hens, corticosterone levels in egg albumen provide a non-invasive measure of plasma corticosterone levels.


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