ACUTE PHASE PROTEIN REACTION IN LAYER CHICKENS. A CALCULATED ACUTE PHASE PROTEIN INDEX AS MEASURE TO ASSESS HEALTH DURING THE REARING PERIOD

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Introduction

Acute phase proteins (APPs) have been defined into two groups, positive and negative APPs. With their levels an acute phase index (API) may be calculated to increase the sensitivity of non-healthy condition assessment. APPs and API have been used as a biomarker to assess animal health so far; for poultry, however, limited data are available. The aim of the present study was to investigate kinetics of a small set of APPs (serum amyloid A [SAA], transferrin [TFR], serum albumin [Alb] and apolipoprotein A-I [apoA-I]) in commercial layer after injection with turpentine (a sterile reaction model, TM) and with *Staphylococcus aureus* (a septic reaction model, SM) and to evaluate the sensitivity of the API as a health monitoring method.

Materials and Methods

Forty seven-week-old birds were randomly assigned into 4 groups of 10 chickens each: a turpentine-injected brown chicken group, turpentine-injected white chicken group, *S. aureus*-injected brown chicken group, and a *S. aureus*-injected white chicken group. Serum samples were collected before injection and 6 h, 12 h, 24 h, 48 h, and 72 h after injection. SAA was examined by gel electrophoresis and immunoblotting and ELISA. TRF, Alb, and apoA-I were examined by gel electrophoresis and immunoblotting.

Results

In untreated birds the SAA levels was less than 20 ng/ml. At 12 h after injection levels increased up to 500 to 10000 times (mean 28.93 µg/ml), and they were even much higher after 72 h (mean 84.56 µg/ml). There was no difference of the SAA levels between chicken groups. The mean serum TFR levels in all chicken groups were less than 4 mg/ml before treatment, increased slightly at 24 h after injection, and increased 5 times of their levels to pretreatment at 72 h after injection. The TRF levels in TM chickens were higher than those in the SM chickens. The Alb levels in all chicken groups before treatment were 50% to 60% of TSP and were slightly decreased 12 h after injection. After 72 h injection the Alb levels were about 10% to 20% lower than those before injection. The apoA-I levels in all birds ranged 2 to 3.29 mg/ml before injection, decreased slightly at 24 h after injection, and decreased 50% from normal levels 72 h after injection. The API values in all chickens were less than 0.5 before injection, increased 8 to 25 times at 24 h after injection, and increased 100-times 72 h after injection.

Conclusions

The results showed that SAA is the fastest positive APP, while TFR reacts less vigorously. ApoA-I and Alb are negative APPs. Similar to SAA, API is a suitable biomarker to assess the chicken health conditions.