As published in

PoultryAdvisor™

Research Update

Effects of AviCare™ and Original XPC™ during production challenges in turkey hens

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Turkeys raised in commercial field conditions may experience stress during routine management practices including catching, relocation, and vaccination, as well as during extreme ambient temperatures. Exposure to these challenges can result in loss of appetite, lethargy, reduced body weight gain, loss of feed efficiency, and increased mortality.

Products such as Original XPC™ can be effective in helping to manage production-related challenges that can negatively affect performance.

Diamond V has introduced a new liquid product that is conveniently administered via drinking water. Using proprietary technology and comprised of similar metabolites to Original XPC (XPC), AviCare™ has been designed to support the health and wellbeing of birds during times of production challenges, when feed consumption may be suppressed. Therefore, it was of interest to investigate the potential effects of AviCare, with and without XPC, on performance in commercial turkeys during a known challenge.

Objectives

The objectives of this experiment were to:

1. Determine the effects of production-related induced stress events on turkey performance and stress indicators in the blood; and
2. Determine whether AviCare supplementation and AviCare plus XPC can ameliorate any such stress effects on performance and blood stress indicators.

Experimental design
Day of hatch Nicholas turkey hen poults (n = 960) were used in this study, consisting of:

- 4 treatments
- 12 replicates per treatment
- 48 pens
- 20 birds per pen

Treatment groups included:

- T1 – negative control (NC) – no challenge, no treatments
- T2 – positive control (PC) – management challenge, no treatments
- T3 – AviCare (AV) – PC plus 20 oz AviCare/100 gal water (0-10 d and 28-42 d)
- T4 – AviCare plus XPC (AVX) – AV plus 2.5 lb/ton XPC in feed (0-63 d)

Experimental diets and treatments
Common corn-soybean meal-poultry meal starter and grower basal diets were prepared (nutrient profile in Table 1). Treatment diets were then completed from allocated portions of the basal diets. The pelleted-crumbled starter diet was provided to birds from 0 to 42 days of age, followed by a pelleted grower diet from 42 to 63 days of age.

Table 1. Experimental starter and grower feed nutrient composition

Nutrient	Starter	Grower
CP (%)	29.50	25.10
ME (kcal/lb)	1410	1511
Lysine (%)	1.87	1.55
Met + Cyst (%)	1.30	1.03

Production challenge
To evaluate the effects of production challenges in turkey hens and the potential impact of treatments, the following adverse situations were imposed on birds in T2, T3, and T4:

1. Re-used litter (pine shavings) whereas T1 pens had new pine shavings for bedding;
2. Live coccidia vaccination (Immucox, CEVA Animal Health, USA) at 1X dose at 0 days of age, except for T1 poults; and
3. Fasting stress for 12-hour to simulate relocation from brooding to growing facility at 35 days of age.

Following a 3-hour rest, poults were placed into assigned pens.

Data and sample collection and analysis
All birds were weighed by pen on 0, 7, 28, 35, 36 (at 8:00 a.m. and 8:00 p.m.), 42, and 63 days of age. Body weight gain was calculated. Feed and water were recorded when new feed and water were added and when birds were weighed. Feed and water intake and feed conversion were calculated.

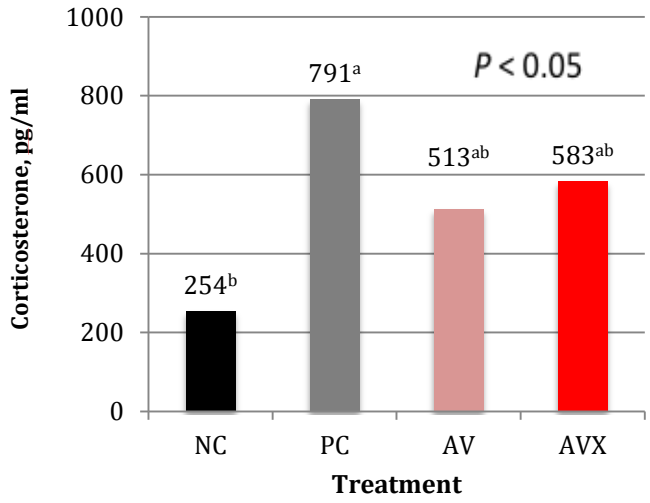
Blood sampling and analysis: At 35, 36 (8:00 a.m. and 8:00 p.m.), 42, and 63 days of age, blood samples were collected from the wing vein of two birds per pen and analyzed for corticosterone concentration. Blood was collected from naïve birds (birds that had not previously been bled) at each time point. Plasma corticosterone concentrations were determined using a corticosterone EIA (enzyme immunoassay) kit (Cayman Chemical, Ann Arbor, MI).

Results and discussion

Significantly higher ($P < 0.05$) serum corticosterone was observed in PC vs. NC immediately following the fasting at 36 days of age, with AV and AVX being intermediate (Figure 1). No treatment differences in corticosterone were observed at later testing dates.

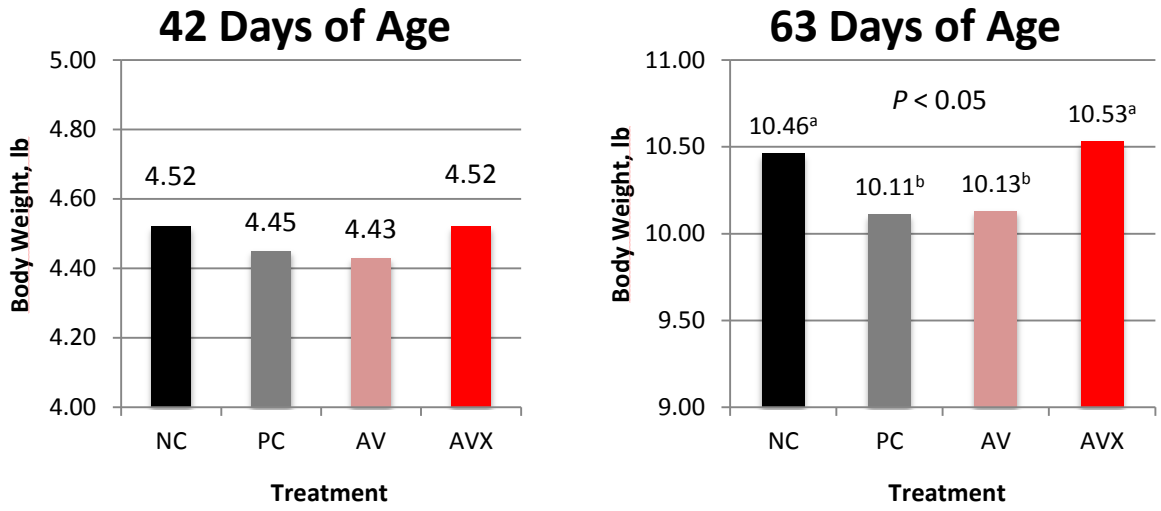
Corticosterone is a non-specific stress response adrenal hormone produced during stress events. Corticosterone impacts muscular efficiency and influences carbohydrate and electrolyte metabolism. The hormone has been shown to inhibit protein synthesis and degrade proteins in birds.

Figure 1. Serum corticosterone levels after 12-hour fast in turkey hens at 36 days of age



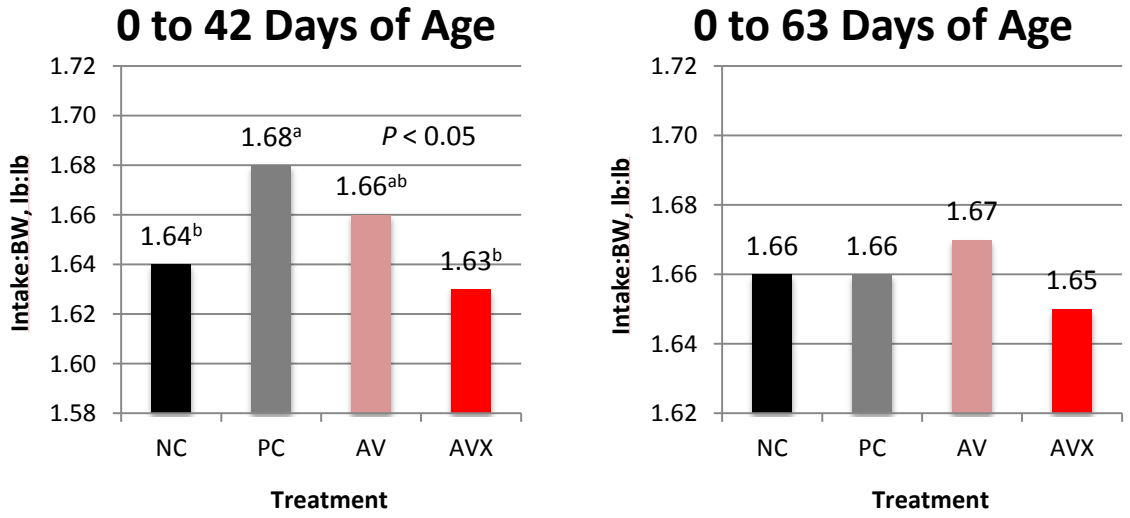
Body weights were reduced ($P < 0.05$, data not shown) in PC, AV, and AVX treatments compared to controls (NC) after the fasting stress at 35 days of age. At 36 days of age, birds returned to feed (post fasting). At 42 days of age, body weights were similar between treatments (Figure 2). However, by 63 days of age, average body weight of PC birds was significantly lighter ($P < 0.05$) compared to NC birds. Birds in the AVX group (fed XPC and administered AV in the water) were not different ($P > 0.05$) from NC birds and were significantly ($P < 0.05$) heavier than PC birds (Figure 2).

Figure 2. Body weight of turkey hens



Feed conversion was not affected post-fast at 36 days of age (Figure 3). However, when evaluating feed conversion ratio (FCR) from 34 to 42 days of age and cumulative FCR from 0 to 42 days of age, PC treated birds had significantly lower ($P < 0.05$) feed conversion compared to control (NC). Supplementing feed and water with both XPC and AviCare (AVX) statistically improved ($P < 0.05$) feed conversion compared to PC, with AV birds being intermediate. Furthermore, birds receiving AVX had similar ($P > 0.05$) FCR compared to NC birds. There were no treatment differences ($P > 0.05$) in FCR from 42 to 63 days of age (Figure 3).

Figure 3. Feed conversion ratio (FCR) of turkey hens



No differences were observed between treatments for livability or water consumption during this study.

Conclusions

1. AviCare in the water (AV) and AviCare in the water plus XPC in feed (AVX) reduced corticosterone levels following a 12-hour fast in turkey hens.
2. Feed conversion was improved from 34 to 42 days of age and cumulatively from 0 to 42 days of age by the supplementation of AviCare (AV) or AviCare plus XPC (AVX). Feed conversion in turkey hens receiving the combination of AviCare plus XPC (AVX) was similar to non-stressed birds (NC).
3. Body weight gain was greatest in the AviCare plus XPC (AVX) turkey hens at 63 days of age, similar to non-stressed birds (NC).

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