



Evaluation of Two Commercial Toxin Binders in Reducing the Harmful Effects of Aflatoxins on Broiler Performance, Serum Biochemistry, and Histopathology

Mohammad Sadegh Moradi^{1✉}, Seyed Ahmad Madani^{2✉}, Mohsen Farkhoy^{2✉}, Mehrdad Modir Sanei^{2✉}

¹ Graduated from the Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran

² Department of Animal and Poultry Health and Nutrition, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran

Received: 8 July 2024, Accepted: 15 September 2024



10.22059/jvr.2024.360000.3351

Abstract

BACKGROUND: Aflatoxins are among the most important contaminating mycotoxins in poultry feeds. To reduce their adverse effects, toxin binders are applied.

OBJECTIVES: This study was conducted to evaluate the adverse effects of moderate levels of aflatoxins in broilers' diets and the ability of two commercial toxin binders to reduce these effects.

METHODS: In the first experiment, 480 male day-old chicks were randomly allocated to six treatments and reared for 42 days. The treatments included A: basal diet, B: basal diet+100 µg/kg aflatoxin, C and D: basal diet+3 kg of each commercial toxin binder, respectively, E and F: basal diet+3 kg of each commercial toxin binders, respectively, +100 µg/kg aflatoxin. In the second experiment, 360 male day-old chicks were randomly divided into six treatments. The treatments included A: basic diet, B: basic diet+200 µgkg⁻¹ aflatoxin, C and D: basic diet + 2.5 and 5 kg of first toxin binder+200 µg/kg aflatoxin, D and E: The basic diet+2.5 and 5 kg of the second toxin binder+200 µg/kg aflatoxin. Production performance, relative weights of internal organs, serum biochemical parameters, histopathologic findings, and antibody levels against Newcastle disease virus (NDV) were evaluated.

RESULTS: Feeding the broiler chickens with a diet containing 100 µg/kg of aflatoxin only reduced weight gain in the first 14 days but did not affect other parameters. In the second experiment, 200 µg/kg of aflatoxin significantly increased feed consumption, feed conversion ratio, and gamma-glutamyl transferase (GGT) enzyme in the first 10 days. Adding toxin binders to the feed could not improve performance indicators, and only in the second experiment they could alleviate the increase in GGT enzyme. There are no significant differences between groups in the two experiments regarding the hepatic histopathology and NDV antibody levels.

CONCLUSIONS: The broiler feed contamination with moderate levels of aflatoxins up to 200 µg/kg did not significantly affect the economic performance, serum biochemical parameters, and histopathologic lesions. Regarding the health and performance of the broilers, the positive effects of toxin binders in chickens confronting moderate levels of aflatoxins could not be observed.

Keywords: Aflatoxin, Biochemical parameters, Broiler chicken, Performance, Toxin binder

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Publisher: University of Tehran

Conflict of interest: The authors declared no conflict of interest.

Corresponding author: Seyed Ahmad Madani, Tel/Fax: +9821-61117101/ +9821-66933222



How to cite this article:

Moradi MS, Madani SA, Farkhoy M, Modir Sanei M. Evaluation of Two Commercial Toxin Binders in Reducing the Harmful Effects of Aflatoxins on Broiler Performance, Serum Biochemistry, and Histopathology. J Vet Res, 2024; 79(4): 201-212. doi: 10.22059/jvr.2024.360000.3351

Figure Legends and Table Captions

Table 1. The effect of feed contamination with 100 µg/kg of aflatoxin and two toxin binders on broilers. *A) negative, B) positive control, C) toxin binder I, D) toxin binder II, E) aflatoxin + toxin binder I, and F) aflatoxin + toxin binder II.

Table 2. The effect of feed contamination with 200 µg/kg of aflatoxin and two toxin binders on broilers. *A) negative control, B) positive control, C) basic diet + 2.5 kg of toxin binder I + aflatoxin, D) basic diet + 5 kg of binder toxin I + aflatoxin, E) basic diet + 2.5 kg of binder toxin II + aflatoxin, and F) basic diet + 5 kg of binder toxin II + aflatoxin.

Table 3. The effect of aflatoxin and two toxin binders on different parameters in broilers at day 41. *A) negative control, B) positive control, C) basic diet + toxin binder I, D) basic diet + toxin binder II, E) basic diet + aflatoxin + toxin binder I, and F) basic diet + aflatoxin + toxin binder II.

Table 4. The effect of feed contamination with aflatoxin and two toxin binders on some parameters in broilers. *A) negative control, B) positive control, C) basic diet + 2.5 kg of toxin binder I + aflatoxin, D) basic diet + 5 kg of binder toxin I + aflatoxin, E) basic diet + 2.5 kg of binder toxin II + aflatoxin, and F) basic diet + 5 kg of binder toxin II + aflatoxin.