Protective effects of Lactobacillus casei strains on growth performance, serum inflammatory cytokines, and fecal microflora of deoxynivalenol exposed mice

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Introduction: Deoxynivalenol (DON) is one of mycotoxins produced by Fusarium species that contaminate corn, wheat, rice, oats, and other grains frequently used in food and feed products resulting in a permanent health risk for humans and animals. The objective of this study was to investigate the effect of oral supplement of Lactobacillus casei on degradation of DON using mice model.

Materials and methods: Twenty-four 6-week old B6C3F1 male mice were randomly assigned into 4 groups with 6 replicates per group. The experimental groups were classified into control (basal diet), bacteria (10^8 CFU of Lactobacillus supplementation), DON (5 mg/kg body weight), and DON with bacteria groups. Mycotoxin and bacterial strains administered orally by oral gavage for two-weeks. Daily weight gain, feed intake was measured. At final day, blood samples and organ samples were collected for serum inflammatory cytokines, and organ weight analyses. Fecal Lactobacillus, and E. coli counts were determined at week 1 and 2.

Results: The results showed that DON decreased the body weight ($P < 0.05$) and feed intake of mice compared with control and bacteria groups. There is no significant difference between control, bacteria, and DON with bacteria groups. In contrast, bacterial supplementation showed increasing trend of growth performance ($P = 0.078$). Fecal Lactobacillus counts not differed between control and DON groups in week one. In week two, the Lactobacillus counts were significantly higher ($P = 0.045$) in DON with bacteria group than DON group. Fecal E. coli counts were significantly increased ($P < 0.05$) in DON group compared to control at week 1 and 2. DON with bacteria supplementation showed decreasing trend of E. coli counts compared to DON group. The relative organ weight of kidney, liver and spleen were not affected by DON and treatments. Inflammatory cytokines IL-2, IL-1β, IL-6, and IFN-β levels decreased in DON with bacteria group compared to DON group.

Conclusion: Bacterial supplementation might be able to downregulate the inflammatory process caused by DON. In conclusion, Lactobacillus might be used as potential additive to prevent negative effects of DON in food and feeds.

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