

Ability of Bentonite-lactobacillus Rhamnosus GAF06 Mixture to Mitigate Aflatoxin M1 Damages in Balb/C Mice

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Abstract : Mycotoxin contamination of food and feed is a global concern, both economically and for public health. Aflatoxin M1 (AFM1) is the principal hydroxylated metabolite of aflatoxin B1. It is frequently found in milk and other dairy products. It is responsible for the development of hepatocellular carcinoma and immunotoxic in humans and animals. The reduction of its bioavailability becomes a great demand in order to protect human and animal health. The use of probiotic bacteria and clay are demonstrated to be able to bind AFM1 in vitro. This study aimed to investigate, in vivo, the activity of two-component mixture: *L. rhamnosus* GAF06 (LR) and bentonite for reducing the oxidative stress and the histological alterations induced by AFM1 in the liver and kidneys. For the experiment, male mice were divided into 7 groups (6 mice/group) and treated, orally, by AFM1, alone or in combination with LR and/or bentonite, for 10 days as follows: group 1 control, group 2 treated with LR alone (2.108 CFU/ml), group 3 treated with bentonite alone (1g/kg), group 4 treated with AFM1 alone (100µg/kg), group 5 co-treated with LR+AFM1, group 6 co-treated with bentonite+AFM1, group 7 co-treated with bentonite+LR+AFM1. At the end of the treatment, the mice were sacrificed, and the livers and kidneys were collected for histological assays. Intracellular antioxidant activities and lipid peroxidation were also studied. The results showed that AFM1 caused damage in liver and kidney tissues, being evidence of hepatotoxicity and nephrotoxicity marked by necrotic cells. It increased the MDA level and decreased the antioxidant enzyme activities (SOD) in both organs. In contrast, the co-treatment with AFM1 plus LR and/or bentonite significantly improved the hepatic and renal tissues, regulated kidney, and liver antioxidant enzyme activities. This improvement was more remarkable with the administration of LR-bentonite mixture with AFM1. LR and bentonite alone showed to be safe during the treatment. This mixture can be a promising candidate for future applications in biotechnological processes that aimed to detoxify AFM1 in food and feed.

Keywords : aflatoxin M1, bentonite, *L. rhamnosus* GAF06, oxidative stress, prevention

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