

In Vitro Evaluation of the Binding Capacity of Mineral Clay for Aflatoxin Decontamination

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Aflatoxin are secondary metabolites produced by *Aspergillus flavus* that infested grains especially grain corn. Among the various aflatoxins, aflatoxin B1 (AFB1) are recognized as highly potent, with its carcinogens to humans and livestock. There were several strategies has been developed to counter the aflatoxin contamination but most of the approaches often comes with limitation. The most effective strategies to reduce contamination of AFB1 is incorporation of toxin binder into animal feed. These Materials can bind AFB1 in the gastrointestinal tract, which reducing their absorption and excreted through feces. Various materials used as binders, including montmorillonite (MMT), bentonite (BEN), sodium bentonite (SBEN), kaolin (KAO), chitosan (CHI), and zeolite (ZEO), were tested for their binding capacity through in vitro study. Each binder was mixed with AFB1 at a concentration of 100 ppb for 2 hours under constant agitation. The mixture than centrifuge at 4,000 rpm for 30 minutes, the unbound AFB1 in the supernatant was quantified using high-performance liquid chromatography (HPLC). The results showed that MMT achieved the highest AFB1 adsorption at 94.15%, followed by SBEN (92.3%), BEN (90.76%), CHI (88.09%), ZEO (87.77%), and KAO (87.69%) respectively. In conclusion, the application of MMT in animal feed as effective solutions to reduce aflatoxin contamination, offering a practical approach to improve livestock health and food safety, while reducing revenue losses in the corn grain industry by up to 20%.

Keywords: aflatoxin, grain corn, toxin binder, montmorillonite