

APPROACHES FOR ALLEVIATING TOXIC EFFECTS OF  
AFLATOXIN IN LACTATING DAIRY COWS AND WEANLING PIGS

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ABSTRACT

Aflatoxin (AF) is a mycotoxin found in feed ingredients used in livestock diets including dairy cattle and pigs. Aflatoxin causes reduced performance, liver damage, increased prevalence of infectious disease, and secretion of the metabolite aflatoxin M<sub>1</sub> (AFM<sub>1</sub>) into milk. Aflatoxin M<sub>1</sub> is toxic and carcinogenic, and is of great concern with respect to human health because of the high consumption of milk and milk products by humans, especially children. Due to the involvement of AF in disease and death in humans and animals safe, practical and effective strategies for alleviating or preventing the toxic effects of AF are highly desirable. Therefore, two experiments were conducted to evaluate two approaches for reducing the toxic effects of dietary aflatoxin when fed to lactating dairy cows and weanling pigs.

Experiment 1 was conducted to determine the efficacy of three adsorbents, Solis (SO; Novus International, Inc), NovasilPlus (NOV; Engelhard Corp.), and MTB-100 (MTB; Alltech), in reducing aflatoxin (AFM<sub>1</sub>) concentrations in milk of dairy cows fed an AF-contaminated diet. Twelve early to mid lactation dairy cows averaging 163 d in milk were used in a 4 x 4 Latin square design with 3 replications. Milk samples were collected at both a.m. and p.m. milkings on d 6 and 7 of each of the experimental periods. The addition of SO and NOV to the AF diet resulted in a significant reduction in milk AFM<sub>1</sub> concentrations (SO, 45%; NOV, 48%) and AFM<sub>1</sub> excretion (SO, 44%; NOV, 46%). In contrast, MTB was not effective in reducing milk AFM<sub>1</sub> concentrations (4%), or AFM<sub>1</sub> excretion (5%). Results indicated that SO and NOV at 0.56% of the diet were effective in reducing milk AFM<sub>1</sub> concentrations in cows consuming a total mixed ration (TMR) containing 112 µg of AFB<sub>1</sub>/kg of diet DM, but MTB at 0.56% was not.

Experiment 2 was conducted to evaluate the efficacy of curcumin, an antioxidant supplied by turmeric (*Curcuma longa*) powder (TMP), to ameliorate the adverse effects of aflatoxin B<sub>1</sub> (AFB<sub>1</sub>) in weanling pigs. Thirty crossbred weanling pigs were assigned to a 3 x 2 factorial

arrangement of treatments [3 concentrations of AFB<sub>1</sub> and 2 concentrations of curcuminoids (TCMN)] with 5 weanling pigs assigned to each of the six dietary treatments beginning on day 14 post weaning and lasting 21 days. Results indicated that dietary concentrations of AF as low as 0.5 mg/kg of diet negatively affected weanling pigs by depressing growth performance, increasing relative liver weight, red blood cell number, and hemoglobin concentration. Curcuminoids from turmeric at 100 mg/kg of diet did not alleviate toxic effects of aflatoxin, and appeared to negatively affect growth and health of weanling pigs.