

Effects of feeding a blend of grains naturally contaminated with *Fusarium* mycotoxins on swine performance, brain regional neurochemistry, and serum chemistry and the efficacy of a polymeric glucomannan mycotoxin adsorbent¹

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ABSTRACT: The co-occurrence of *Fusarium* mycotoxins in contaminated swine diets has been shown to result in synergistic toxicity beyond that observed for individual toxins. An experiment was conducted, therefore, to investigate the effects of feeding a blend of grains naturally contaminated with *Fusarium* mycotoxins on growth, brain regional neurochemistry, serum immunoglobulin (Ig) concentrations, serum chemistry, hematology, and organ weights of starter pigs. Three levels of glucomannan polymer (GM polymer, extract of yeast cell wall, Alltech Inc.) were also tested for its efficacy to overcome *Fusarium* mycotoxicoses. A total of 175 starter pigs (initial weight of 10 ± 1.1 kg) were fed five diets (seven pens of five pigs per diet) for 21 d. Diets included (1) control, (2) blend of contaminated grains, (3) contaminated grains + 0.05% GM polymer (4) contaminated grains + 0.10% GM polymer and (5) contaminated grains + 0.20% GM polymer. Diets containing contaminated grains averaged 5.5 ppm deoxynivalenol, 0.5 ppm 15-acetyldeoxynivalenol, 26.8 ppm fusaric acid, and 0.4 ppm zearalenone. Feed intake and weight gain of all pigs fed contaminated grains was significantly reduced compared to controls throughout the experiment. The weights of liver and kidney, expressed as a percentage of body weight, were lower in pigs fed the contaminated diet than in those fed the control diet. The feeding of contaminated grains significantly reduced concentrations of dopamine in the hypothalamus and pons and concentrations of dihydroxyphenylacetic acid and norepinephrine in the pons. The ratios of 5 hydroxyindoleacetic acid to serotonin, however, were elevated in the hypothalamus and pons. The feeding of contaminated grains increased serum IgM and IgA concentrations, while serum IgG concentrations were not altered. The supplementation of GM polymer prevented some of the mycotoxin-induced alterations in brain neurotransmitter and serum Ig concentrations. In summary, the feeding of grains naturally contaminated with *Fusarium* mycotoxins reduced growth, altered brain neurochemistry, increased serum Ig concentrations, and decreased organ weights in starter pigs. Some of the *Fusarium* mycotoxin-induced changes in neurochemistry and serum Ig concentrations can be prevented by the feeding of yeast cell wall polymer at appropriate concentrations, although this was not reflected in increased growth rate under these experimental conditions.

Key Words: Fusaric Acid, *Fusarium* Mycotoxins, Immunoglobulins, Neurochemistry, Pigs, Vomitoxin

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