Technical Bulletin

In-vivo Impact of DON on the Blood Chemistry of Growing Pigs

Objective: To evaluate the ameliorating effects of FloMatrix® Feed Technology (FloMatrix® FT, FM) at 5 lb per ton of feed on the blood chemistry of growing pigs when fed diets containing 0.9 and 1.8 ppm DON.

Experimental Design: Sixty four commercial pigs (32 gilts, 32 barrows) approximately 9 weeks old were randomly placed into individual pens at Virginia Diversified Research Corp's Lacey Spring North Facility and conducted by Michael Sims. The pigs weighed between 40 and 60 lbs with 4 pigs in each of the 8 treatment groups (0 ppm DON; 0 DON+5 lb FM; 0.9 ppm DON; 0.9 ppm DON+5 lb FM; 0.9 ppm DON+ 10 lb FM; 1.8 ppm DON; 1.8 ppm DON+ 5lb FM; and 1.8 ppm DON+ 10 lb FM) which were replicated 8 times. Gilts and barrows were equally represented in each of the treatment groups. Each pen contained 1 water fountain and a 50 lb capacity feeder. The pens were 4' x 4'. All pigs were weighed on day 0 and day 7, and all pen feeds were weighed back on day 7. Visual health inspections were performed at least twice daily.

DON contaminated corn was purchased from a supplier in Iowa (analyzed to contain 5.6 ppm DON). A commercial feed concentrate (44.4%) and corn meal (55.6%) made up the diet. The non-contaminated corn meal was blended with the contaminated Iowa corn meal to make a feed for both the titration and the FloMatrix® FT ameliorating study. The DON values reported in these trials were the levels that were confirmed by mycotoxin analysis (AnaLab, Fulton IL).

Blood sera from 32 of the 64 study pigs (4/treatment) were collected on Day 7 for determination of liver disease. Serum levels of specific enzymes of mycotoxin exposed pigs were compared to those of non-exposed control pigs.

Blood was collected from 2 males and 2 females of each treatment group by vena cava puncture. All samples were centrifuged and the supernatant serum was collected, labeled and delivered to Virginia Department of Agriculture's Hematology Lab, located in Warrenton, VA. At this lab samples were prepared and evaluated using ABAXIS Veterinary Diagnostics VetScan® Classic Analyzer. Samples were analyzed for albumin (ALB), alkaline phosphatase (ALP), aspartae transaminase (AST), blood urea nitrogen (BUN), calcium (CA), creatinine kinase (CK), gamma glutamyl transpeptidase (GGT), globulin (GLOB), magnesium (MG), phosphorus (PHOS) and total protein (TP):

Results:

Blood chemistry data for the 5 lb FloMatrix® FT per ton of feed will be reported since the difference in animal performance between the 5 and 10 lb FM per ton of feed was not different regardless of DON level.

Pigs consuming feed with 0.9 ppm DON had significantly ($p \leq 0.10$):

a) Lower levels of blood albumin than the control or FM supplemented pigs. Since albumin is produced in the liver, reduced blood levels indicate liver damage or kidney disease.

b) Higher levels of blood globulin than the control or FM supplemented pigs. Globulin contains antibodies and levels increase when liver damage has occurred.

c) Lower levels of blood phosphorus than the control or FM supplemented pigs, indicating an over active parathyroid.

d) Lower levels of aspartate transaminase than the FM supplemented pigs.

e) Also, no significant difference ($p \geq 0.10$) in blood levels of Ca, ALP, BUN, CK, GGT, MG or TP were detected.

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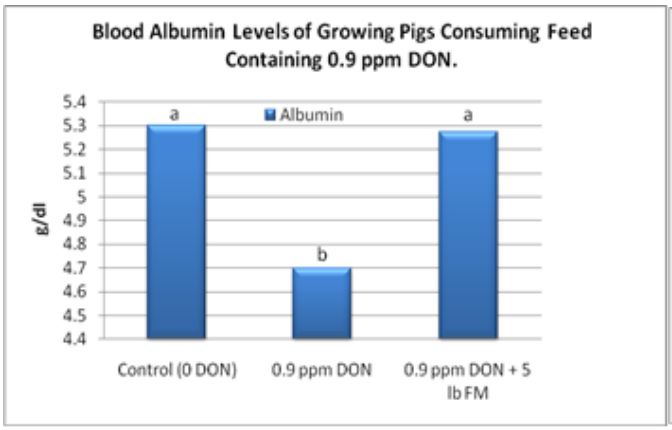

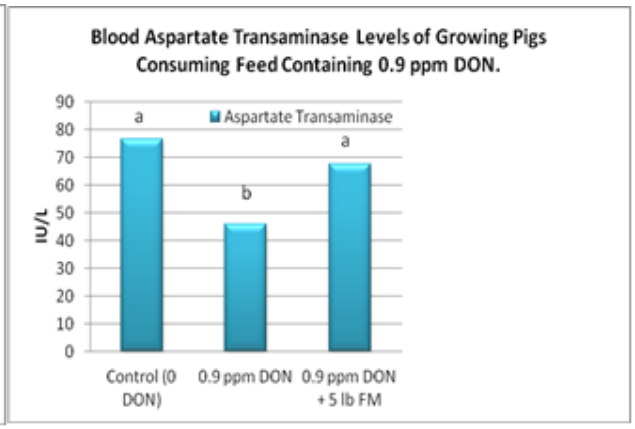

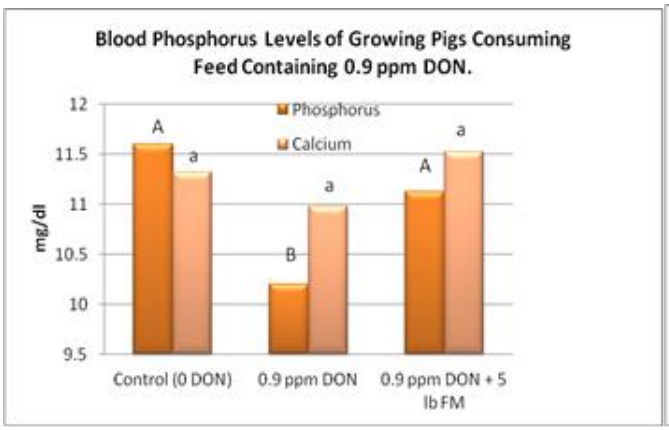

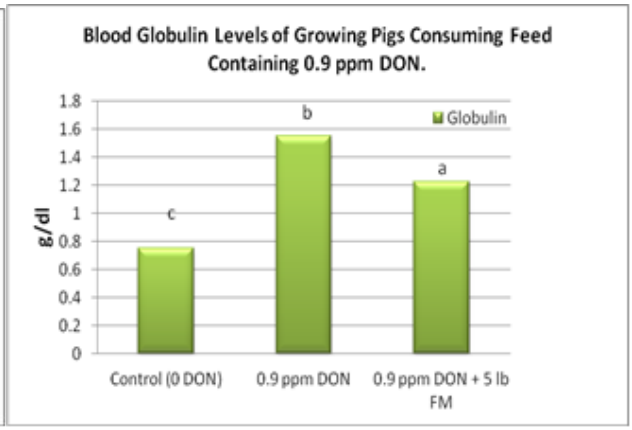

Pigs consuming feed with 1.8 ppm DON had significantly lower ($p \leq 0.10$) blood phosphorus (10.725 mg/dl) than either the control (11.6 mg/dl) or the pigs supplemented with 5 lb of FM (11.5 mg/dl).

Conclusions:

The high variability among pigs within the same treatment for most of the blood parameters measured resulted few treatment differences except for animals receiving the 5lb FM on the 0.9 ppm contaminated diet. The only blood parameter that was consistently different regardless of DON level was PHOS, which was significantly reduced in both levels of DON and was restored to that of the control with the addition of 5 lb of FloMatrix® FT per ton of feed.

It appears that 5 lb of FloMatrix® FT per ton of feed may help to mitigate some of the negative effects associated with the adsorption of DON on internal organs of growing pigs fed diets contaminated with DON at 0.9 or 1.8 ppm.

FloM4

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