

A CASE OF OCHRATOXICOSIS IN IOWA SWINE  
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Ochratoxin caused losses due to renal damage in a herd of Iowa swine. This is the first case diagnosed at the Iowa Veterinary Diagnostic Lab. The source of the toxin was home grown 1979 corn that had been stored in the ear. Corn harvested by shelling (combining) in the field and stored with mechanical aeration produced no problem.

The swine were part of an SPF Yorkshire herd that had been discredited due to mycoplasma pneumonia infection. A poor performance syndrome in the late summer of 1980 was assumed by the owner to be related to the respiratory disease. However enteric problems were seen, necroproliferative ileitis and an occasional gastric ulcer. There was no way of measuring water intake but a marked increase in urine output was evident.

Aware that a number of animals in a group of 90 were over 6 months of age and weighed less than 70 kg., two of the most unthrifty were submitted to the Iowa State Veterinary Diagnostic Laboratory. Necropsy revealed extreme paleness of tissues. Packed cell volumes were 10 and 14%. The most prominent feature in the abdominal cavity was the kidneys—large and pale with edema in the surrounding tissues. BUN was 80 and 90 mg/Dl in these two animals. Histology showed a chronic pan-nephrosis. Interstitial fibrosis was extensive with few functional tubules remaining. Glomeruli were shrunken and degenerated. Neither animal had gross or microscopic liver lesions. The chronicity of the kidney lesions was considered compatible with the period of poor herd health and performance. This began about three weeks after the suspect corn became the basis of the ration.

The kidney contained 200 ppb ochratoxin A. Identification was by thin layer chromatography and it was quantitated by fluorometry.<sup>1</sup>

Analysis of corn and oat samples found no detectable amounts of ochratoxin, citrinin or aflatoxin. However moldy feed residue in the self feeders contained 500 ppb ochratoxin A. This feed was considered representative of the ration being fed 30 to 60 days previously. Since the same brand of commercial supplement was used by several hundred farms in the area without trouble it was assumed the ochratoxin originated from the corn.

The 1979 corn crop was harvested and stored by two methods. The greater part was shelled in the field at ca. 23% moisture and stored with mechanical aeration, using no supplemental heat for drying. The remainder of the crop was stored in the ear with natural ventilation.

The shelled, mechanically aerated corn was fed first with no untoward results. When the ear corn was shelled an area of spoilage was noted by the owner. Clinical signs began ca. three weeks after feeding of this corn began.

A farm visit revealed 70 animals remaining from an original group of 90. These were ca. 7 months old and varied in weight from 50 to 100 kg. The owner felt that there was some general improvement in the group. Most were

eventually marketed.

A diagnosis of mycotoxic nephropathy can be made from chemical analysis, gross and microscopic pathology and clinical signs. The latter include polyuria, polydipsia and anemia with secondary enteric and respiratory signs. The predominant gross pathological features are large white kidneys, tissue edema and generalized paleness. Tendency to develop enteritides, gastric ulcers, pneumonia and septicemic diseases is increased. Feed analysis should include ochratoxin and citrinin. If liver pathology is evident aflatoxin should be considered.

Ochratoxin A and its metabolite, ochratoxin  $\alpha$  may be detected in kidney tissue. The toxins are relatively stable and have been found in canned foods. Four ochratoxins, A, B, C, and D, are produced by *Penicillium viridicatum*. The former is the most toxic and significant. Ochratoxin A may also be produced by some of the *Aspergillus* species including *A. ochraceus*.

Mycotoxin production is favored by moisture content of >16% with humidity of ambient air >85%. Temperatures of 12-25°C. are optimum. *Penicillium viridicatum* exists predominately in colder areas of the world. Colleagues in Denmark tell us that ochratoxicosis is not uncommon in their country.

Ochratoxin A was found in 25% of corn samples in Russia during 1975.<sup>2</sup> Concentrations varied from 40 to 5100 ppb. Analysis of corn in the United States during 1967 and 1969 resulted in isolation from relatively few samples. The toxin ranged from traces to 166 ppb.

An excellent review of ochratoxins has been prepared by Carlton and Krough.<sup>3</sup>

#### References:

1. Stahr, H.M. (ed.): Supplement to Analytical Toxicology Methods Manual, 1st Edition. Iowa State University Press, Ames, Iowa. 234-238, 256-259 and 262-264, 1980.
2. Muzic, S., Pepelynjak, S., Bogdanic, C. and Balzar, I.: Nalazi Ochratoxina A A Kukutuzu. Vet Arh, 69-73, 1976.
3. Conference on Mycotoxins in Animal Feeds and Grains Related to Animal Health. Rockville, Maryland, FDA, BVM, U.S. Govt. Print Off, 1979.