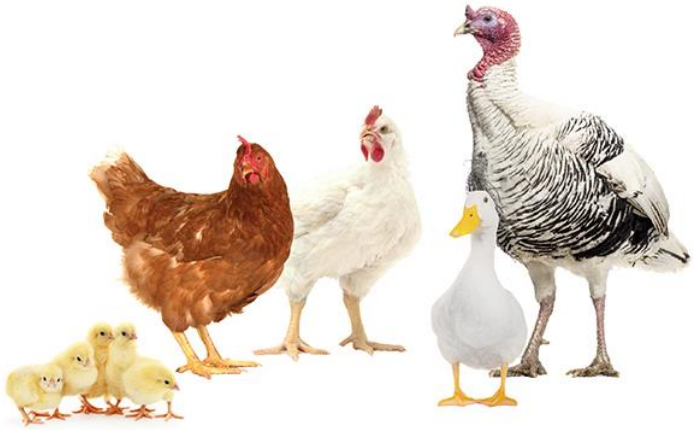
HISTORY OF OCHRATOXIN

Ochratoxin A (OTA) was isolated and chemically characterized in 1965 (Van der Merwe at al., 1965). OTA was discovered in South Africa as a toxic metabolite of *Aspergillus ochraceus* in a corn meal that was intentionally inoculated with this microfungus.

Further research has shown that OTA is nephrotoxic, hepatotoxic, embryotoxic, teratogenic, neurotoxic, immunotoxic, genotoxic, and carcinogenic in many species with species and sex-related differences (Pfohl-Leszkowicz and Manderville, 2007). OTA is present at all stages of the food chain (cereals, meat, fruits, wine, beer, coffee, etc.) (Pfohl-Leszkowicz et al., 2002). Based on previous studies the presence of OTA may be associated with the chronic tubulo-interstitial kidney disease called Balkan Endemic Nephropathy (BEN) (Pavlovic, 2013). BEN is a chronic progressive disease with a period of 6–10 years leading to irreversible kidney failure.



Ochratoxin-contaminated feed has its major economic impact on the poultry industry. Chickens, turkeys, and ducklings are susceptible to this toxin. Clinical signs of avian ochratoxicosis generally involve reduction in weight gains, poor feed conversion, reduced egg production, and poor egg shell quality (Niemiec and Borzemska, 1994). Economic losses also occur in swine farms, linked to nephropathy and costs for the disposal of carcasses. Toxicity does not seem to constitute a problem in cattle, as the rumen harbors protozoa that hydrolyze OTA (Battacone et al, 2010). However, contamination of milk is a possibility.

Remember:

- OTA is potentially carcinogenic to humans (Group 2B), and has been shown to be weakly mutagenic, possibly by induction of oxidative DNA damage.
- The European Commission (2006) issued the recommendation 2006/576/EC on the presence of OTA in products intended for animal feeding. A maximum tolerable level of 0.1 mg OTA/kg was established for poultry feeds.

Good to know:

- In 10 minutes, the ROSA OCHRAQ test enables grain and feed producers to quantitatively detect ochratoxin. This Rapid One Step Assay is a lateral flow test that is read in the Charm EZ-M system or the ROSA-M Reader. The ROSA OCHRAQ test has been validated by the USDA GIPSA (Grain Inspection, Packers & Stockyards Administration) using a 70% methanol extraction for detecting ochratoxin in the many different commodities.

References:

1. Van der Merwe K.J., Steyn P.S., Fourie L. Ochratoxin A, a toxic metabolite produced by Aspergillus ochraceus Wilh. Nature. 1965; 205:1112–1113. doi: 10.1038/2051112a0.
2. Pavlovic, N.M. Balkan endemic nephropathy—Current status and future perspectives. Clin. Kidney J. 2013, 6, 257–265.
3. Pfohl-Leszkowicz, A.; Petkova-Bocharova, T.; Chernozemsky, I.N.; Castegnaro, M. Balkan endemic
4. nephropathy and associated urinary tract tumours: A review on aetiological causes and the potential role of mycotoxins. Food Addit. Contam. 2002, 19, 282–302.
5. Pfohl-Leszkowicz A., Manderville R. Ochratoxin A: An overview on toxicity and carcinogenicity in animals and humans. Mol. Nutr. Food Res. 2007; 51:61–99. doi: 10.1002/mnfr.200600137.
6. Niemiec, J.; Borzemska, W. (1994). "The effect of Ochratoxin A on egg quality development of embryos and the level of toxin in egg and tissue of hens and chicks". Journal of Animal and Feed Sciences. 3 (4): 309–316.
7. Battacone G. Nudda A. Pulina G. (2010). "Effects of Ochratoxin A on Livestock Production". Toxins. 2: 1796–1824. doi:10.3390/toxins2071796.
8. Hamilton P.B., Huff W.E., Harris J.R., Wyatt R.D. Natural occurrences of ochratoxicosis in poultry. Poult. Sci. 1982;51:1832 - 1841.
9. COMMISSION RECOMMENDATION of 17 August 2006 on the presence of deoxynivalenol, zearalenone, ochratoxin A, T-2 and HT-2 and fumonisins in products intended for animal feeding. (2006/576/EC). Official Journal of the European Union. P 227-229.