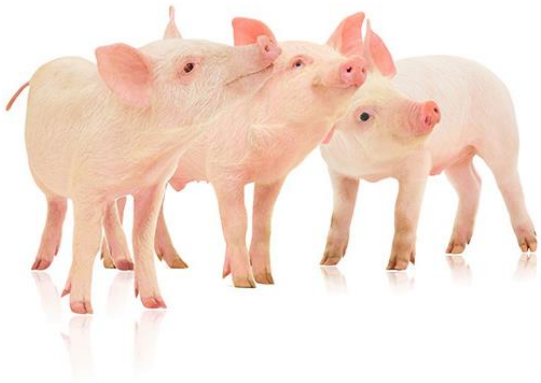
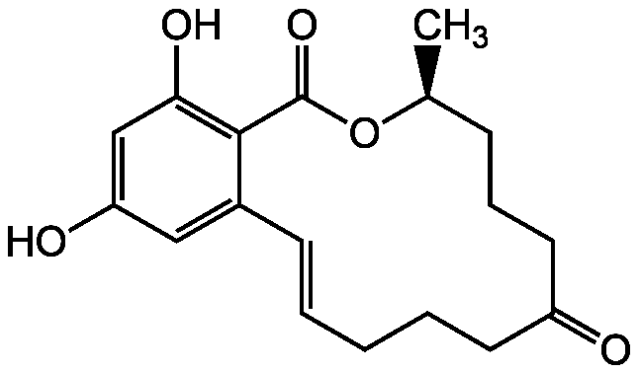
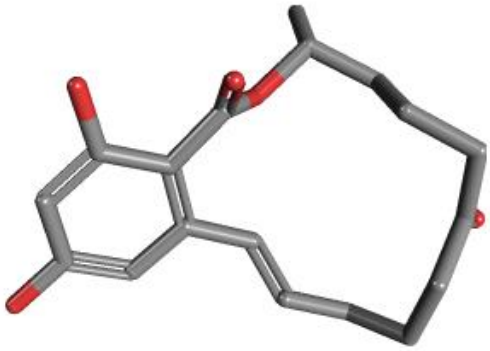
THE HISTORY OF ZEARALENONE

Zearalenone (ZEN) was discovered, identified, and named by two separate groups of investigators in the 1960s. Symptoms associated with ZEN in livestock feed were seen more than 50 years ago in 1963 (Christensen et al., 1965).

In 1963, herds of young swine in Minnesota that consumed pelleted feeds were found to have symptoms which included: tumefaction of the vulva, prolapsed vagina, and hypertrophy of the mammary glands. The same feed was then fed to guinea pigs and white rats and both developed enlarged uteri. In 1964, a herd of swine that was fed grain (containing 30% mold ridden corn and 70% sound corn) developed similar symptoms. Christensen and colleagues were able to isolate compounds from the moldy corn, which were not isolated from the sound corn, identifying them as F-1 and F-2. F-1 was confirmed through various reactions to be ergosterol. F-2 was purified and identified (Christensen et al., 1963). Urry et al., (1966) identified the chemical structures of F-2, later naming it ZEN due to its structural name in combination with the name of the fungus it produces (*Fusarium graminearum*; teleomorph *Gibberella zeae*).







ZEARALENONE IN HUMAN FOOD CHAIN

Remember:

- A synthetic form of the metabolite α-ZAL, called zeranol (Ralgro©), has been used as an anabolic agent for both sheep and cattle. This synthetic form, used as a growth promoter was patented in the United States by some of the researchers who originally gave “zearalenone” its name.

- In 1989, zeranol, was banned by the European Union (EU). It remains a Food and Drug Administration (FDA) approved growth promoter and there are currently no FDA regulations regarding ZEN in the United States.

- Established tolerable daily intake (TDI) for ZEN is 0,5 µg/kg-body weight/day, whereas its maximum limits in foods in the EU range from 20 to 350 µg/kg.

Good to know:

In several minutes, the quantitative lateral flow test available from different quick test suppliers enables grain and feed producers to quantitatively detect zearalenone. For example, the quantitative lateral flow tests of Charm Sciences ZEARQ-WETS5 or ZEARQ-FAST5 read in the Charm EZ-M system is one of the options. These tests have been approved by USDA Grain Inspection, Packers & Stockyards Administration (GISPA) for many different commodities.

References:

1. Christensen, C.M., G.H. Nelson, and C.J. Mirocha, Effect on the white rat uterus of a toxic substance isolated from Fusarium. Applied microbiology, 1965. 13(5): p. 653-659.
2. Urry, W.H., et al., The structure of zearalenone. Tetrahedron Letters, 1966. 7(27): p. 3109-3114.