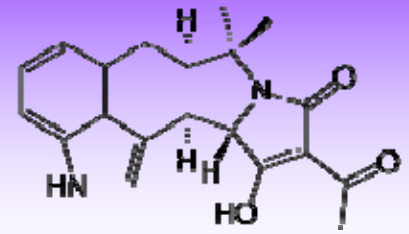


Cyclopiazonic Acid



Cyclopiazonic acid—Is a toxic compound (an indole tetramic acid) produced by several fungi. They are not fluorescent and must be visualized on thin layer chromatograms by spray reagents.

Producing organisms—The compound was originally described from *Penicillium cyclopium*, thus the name. Other organisms include *P. patulum*, *P. viridicatum*, *P. puberulum*, *P. crustosum*, *P. camembertii*, *Aspergillus versicolor*, *A. oryzae*, *A. tamarii*, and *A. flavus*. The latter may be of considerable significance as many isolates produce this compound.

Conditions favoring disease and toxin formation in the field—Cyclopiazonic acid was first described from stored corn in Iowa as well as from corn taken directly from the field. Therefore, the compound is formed in the field, at least in corn, and likely the conditions favoring aflatoxin formation in this crop are similar for cyclopiazonic acid (i.e., high temperatures and drought stress). This compound has also been found in peanuts, sunflower seeds (screenings), Kodo millet and cheese likely as naturally occurring. The exact conditions necessary for their occurrence in these commodities or products is not known. Some of the isolates of the producing organisms are used in fermented foods so selection must be made to use isolates that do not produce cyclopiazonic acid.

Visible presence of the fungus on grain—Most of the commodities on which cyclopiazonic acid occurred had evidence of mold damage but where *A. flavus* is the producing organism there may be little or no evidence of the presence of the mold. The organisms involved with producing this compound are important as storage fungi growing saprophytically on grain or they may be important plant pathogens.

Storage occurrence of cyclopiazonic acid—As mentioned most of the fungi are likely involved in contaminating commodities while in storage but certainly field contamination occurs as well for those commodities noted above. Again, grain should be stored below 14% moisture and kept this way to avoid fungal growth and toxin production. Condensation should be avoided to control mold growth as once initiated the fungus can create sufficient moisture of metabolism to allow for further growth and mycotoxin formation.

Toxicity impact—Cyclopiazonic acid may be important as a single mycotoxin or as a cocontaminant as some isolates of fungi may produce other mycotoxins simultaneously. In fact, the original outbreak of aflatoxin poisoning likely included cyclopiazonic acid in the toxic episode in poultry. Cyclopiazonic acid accumulates in skeletal muscle of selected animals and human exposure may occur through ingestion on contaminated muscle tissue. It has been shown to be toxic in several animal species including swine, chickens, turkeys, guinea pigs, rats, and dogs. Toxic evidence in animals, depending upon the species, includes gastrointestinal changes of necrosis and inflammation, hepatitis, kidney lesions and incoordination due to effects on muscle tissue. The importance of this compound in immunosuppression has been studied with little significance on this system.

No regulatory actions are in place for cyclopiazonic acid.