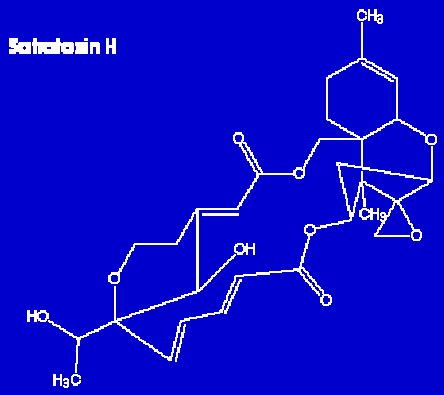
Stachybotrys Toxins

TRILOGY
Analytical Laboratory



Stachybotrys Toxins—as the name implies, these are simply toxins produced by a fungus known as *Stachybotrys chartarum* (syn. *S. atra* or *alternans*). The most notable of these toxins are called satratoxins and occur in conidia of the producing fungus.

Producing organisms—*S. chartarum* is the only organism that apparently produces the satratoxins. The greenish-black organism is cellulolytic, saprophytic and requires significant moisture to grow and produce the toxin laden conidia.

Occurrence—the satratoxins present in the condia occur under conditions favoring the growth of the fungus. The latter grows abundantly when moist cellulolytic materials such as wallboard, wallpaper, straw, or other cellulose material are available and produces copius amounts of conidia. The conidia are often not viable when found individually in the air samples and therefore are usually not described as being found in sampling for viable particles. However, the dead conidia can still retain toxigenic and allergenic components. When the fungus originally forms the conidia they are produced in a slimy matrix and are not easily air-borne at this time. However, following some desiccation they become air-borne when disturbed. This fungus is not a plant pathogen and occurs on the materials mentioned above after they have become wet by rain, floods, or other means of water damage to the cellulose components. Following these conditions the growth of the fungus may appear as a black tar-like substance on the substrate that smears when touched. One should not consider that any black mold is *Stachybotrys* but a competent mycologist should be sought for identification of the fungus. Materials that have been heavily damaged by this fungus should be removed, but bleach solution should be used to drench the affected area prior to removal. Bleach solution appears to kill the fungus but its ability to neutralize the toxin is questionable. Contamination of heating and air conditioning ductwork should be avoided or prevented. If contamination occurs a thorough cleaning should be conducted.

Toxicity impact—*Stachybotrys* toxins have been involved in intoxication for many years, perhaps even in ancient times, and have had historical significance in Russia whereby horses were notably affected by contaminated bedding and feed material. Most affected animals exhibited necrotic lesions where they had contacted the contaminated material, especially around the mouth. Gastrointestinal disturbances were noted and hemorrhage was a common finding. This condition was later found to affect humans as well and vivid descriptions of this devastating disease are present in the literature. Aside from exposure by contact and ingestion of contaminated material, air-borne exposure is considered important in important in modern times. Several outbreaks of disease appear to involve the toxin from *Stachybotrys* and include hemorrhagic lung or respiratory problems especially in young infants, however adults may be affected as well and the problem appears to be exacerbated by smoking. Manifestations of such air-borne exposure include bleeding from the nose with coughing up blood and respiratory congestion. The toxins cause a weakening of the blood vessels and bleeding results. The major problem with this entire mycotoxin-fungus-disease relationship is that the true culprits involved in the outbreaks have not been identified except that *Stachybotrys* appears to be involved and the most likely known mycotoxins are the satratoxins. However, other toxins may be produced by this and other organisms to cause the syndromes presented in outbreaks.

No regulatory actions involve this fungus or its toxins.

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