A reappraisal of fungi producing aflatoxins

Aflatoxins are decaketide-derived secondary metabolites which are produced by a complex biosynthetic pathway. Aflatoxins are among the economically most important mycotoxins. Aflatoxin B1 exhibits hepatocarcinogenic and hepatotoxic properties, and is frequently referred to as the most potent naturally occurring carcinogen. Acute aflatoxicosis epidemics occur in several parts of Asia and Africa leading to the death of several hundred people. Aflatoxin production has incorrectly been claimed for a long list of Aspergillus species and also for species assigned to other fungal genera. Recent data indicate that aflatoxins are produced by 13 species assigned to three sections of the genus Aspergillus: section Flavi (A. flavus, A. pseudotamarii, A. parasiticus, A. nomius, A. bombycis, A. parvisclerotigenus, A. minisclerotigenes, A. arachidicola), section Nidulantes (Emericella astellata, E. venezuelensis, E. olivicola) and section Ochraceorosei (A. ochraceoroseus, A. rambellii). Several species claimed to produce aflatoxins have been synonymised with other aflatoxin producers, including A. toxicarius (=A. parasiticus), A. flavus var. columnaris (=A. flavus) or A. zhaoqingensis (=A. nomius). Compounds with related structures include sterigmatocystin, an intermediate of aflatoxin biosynthesis produced by several Aspergilli and species assigned to other genera, and dothistromin produced by a range of non-Aspergillus species. In this review, we wish to give an overview of aflatoxin production including the list of species incorrectly identified as aflatoxin producers, and provide short descriptions of the ‘true’ aflatoxin producing species.

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