Mycotoxins - Their Biosynthesis in Fungi: General Introduction

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Mycotoxins are toxic metabolites produced by fungi in foodstuffs that cause health problems in exposed humans and animals. Due to their wide-spread occurrence in food commodities and their distinct biological activities, mycotoxins have recently received recognition as a significant class of natural toxicants in foods.

The commodities that have been found susceptible to mycotoxin contamination include grains, oilseeds, tree nuts, dehydrated fruits, and preserved animal products. Under practical conditions, contamination of certain mycotoxins can reach levels lethal to man and animals. Acute mycotoxicosis episodes involving large numbers of human and animal deaths have been well documented. At lower levels, mycotoxins are known to produce carcinogenic, mutagenic, teratogenic and hallucinogenic effects in animals.

Despite their significant animal toxicity, mycotoxins are secondary metabolites of their appropriate producing fungi, and the significance or benefit of their biosynthesis to the physiology and reproduction of these toxigenic fungi remains obscure. Questions arise then: (a) Why and how do fungi produce these secondary metabolites that happen to be so toxic to animals? (b) Is there any way that fungal secondary biosynthesis of mycotoxins can be altered and controlled? These have been intriguing and challenging questions faced by numerous natural product biochemists and microbiologists.

In a seminar organized for the 78th annual meeting of the American Society for Microbiology, addressing these questions, six prominent researchers in the field of microbiology of fungal toxigenicity were invited to speak on the mechanism of biosynthesis of six representative classes of mycotoxins — aflatoxins, patulin and penicillic acid, zearalenone, ochratoxins, trichotheccenes, and ergot alkaloids. These six classes are currently of the greatest concern to food safety regulatory agencies as mycotoxins associated with human and animal health problems.

The presentations are now graciously elaborated by these experts in writing and published as a series to present an overall and comparative view of fungal secondary biosynthesis of mycotoxins. The information contained in this series will certainly shed light on the answer to the aforementioned challenging questions.

For general toxicology of mycotoxins, the reader is referred to the following monographs:


