27 Competitive Exclusion of Aflatoxin Producers: Farmer-driven Research and Development

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Overview: Aflatoxins are highly toxic, cancer-causing chemicals produced by fungi belonging to the genus *Aspergillus*. *Aspergillus flavus* is the most important causal agent of crop aflatoxin contamination. We developed a strategy for preventing aflatoxin contamination based on the use of naturally occurring isolates of *A. flavus* that lack aflatoxin-producing ability (atoxigenic strains). The atoxigenic strains displace aflatoxin producers during crop development and infection and thereby reduce contamination. Although significant single-season effects are achieved, the greatest potential is for long-term and area-wide influences. This chapter discusses the history of development and commercialization of atoxigenic strains.

Aflatoxin Contamination

Aflatoxins are highly toxic, cancer-causing chemicals produced by several fungal species within *Aspergillus* section Flavi. Presence of aflatoxins in human foods causes acute and chronic health effects (aflatoxicoses), ranging from immune-system suppression, growth retardation and cancer to death from acute poisoning (Wild and Turner, 2002). In developed countries, stringent government regulations limit the use of aflatoxin-contaminated crops in foods and feeds, and, as a result, commodities with aflatoxin content exceeding the maximum permissible level have significantly diminished cash value. In crops intended for human consumption, maximum permitted aflatoxin levels range from 2 ppb in the European Union to 20 ppb in the USA. As aflatoxins are readily transferred from animal feed to milk, similar stringent regulations are imposed on feed intended for dairies (Wu, 2004). The action level for aflatoxins in US milk is 0.5 ppb.

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