

## Abstract

This is a study of methods to reduce, eliminate or prevent fumonisins and aflatoxins in corn and to survey botanical supplements for aflatoxins. Gamma (Cobalt <sup>60</sup>) and electron beam irradiation were used to eradicate fumonisin B<sub>1</sub>. Fumonisin B<sub>1</sub> in water was irradiated with 0.5 to 30.0 kGrays. The minimum dosage (0.5 kGray) reduced fumonisin 99%. When naturally contaminated whole and ground corn was exposed to irradiation (10.0-100.0 kGray), *Aspergillus* and *Fusarium* fungi were killed; whereas, the level of fumonisins was not changed.

Transgenic Bt and non-Bt (NBt) 2000 and 2001 corn were inoculated with *Fusarium verticillioides* and *Aspergillus flavus* at silking. At harvest, corn was rated for insect damage, mold populations and levels of fumonisins and aflatoxins. There were little aflatoxins in 2000 corn and none in 2001 corn. Levels of fumonisins in 2000 Bt corn were not significantly lower than the level found in Bt corn; however, 2001 Bt corn showed significantly higher levels of fumonisins than those found in NBt corn.

Whereas irradiated herbal material contained no microorganisms, non-irradiated material was contaminated with *Aspergillus*, *Penicillium*, and *Rhizopus*. All *A. flavus* isolates from herbal material produced aflatoxin B<sub>1</sub> on rice cultures. Twenty-four of 25 irradiated and non-irradiated herbals contained AFB<sub>1</sub>, ranging from trace levels to 450 ng/g.

An analytical method to detect aflatoxins in herbal products was developed for ginseng root, *Panax quinquefolius*. Aflatoxins AFB<sub>1</sub>, AFB<sub>2</sub>, AFG<sub>1</sub>, and AFG<sub>2</sub> were added to toxin free ginseng at 2 ng/g, 4 ng/g, 8 ng/g and 16 ng/g. Based on HPLC analysis, mean recoveries ranged from 77% to 92%.

This method was used to survey wild simulated and cultivated ginseng roots harvested after a dry growing season (2002) and a wet growing season (2003). Root samples were from UMD field plots, a commercial source, and from Appalachian growers. Levels of 5.5-32.0 ng/g AFB<sub>1</sub> were found in 4 samples from a wild simulated grower. One of nine cultivated samples contained trace amounts (0.10 ng/g) AFB<sub>1</sub> from the 2002 season, and no aflatoxins were found in 2003 samples. In the commercial fresh root sample 16 ng/g of AFB<sub>1</sub> was found.