

Natural Occurrence of *Fusarium* Species, Fumonisin Production by Toxigenic Strains, and Concentrations of Fumonisin B₁ and B₂ in Conventional and Organic Maize Grown in Spain

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Source: [Journal of Food Protection®](#), Volume 70, Number 1, January 2007 , pp. 151-156(6)

Publisher: [International Association for Food Protection](#)

Abstract:

Sixty samples of corn from both conventional and organic farms were tested for internal fungal contamination. Molds were identified to genus, and those belonging to the genus *Fusarium* were identified to species. Twenty isolates of *Fusarium verticillioides* were tested with a high-performance liquid chromatography-naphthalene dicarboxaldehyde-fluorescence method for their ability to produce fumonisins B₁ and B₂. The internal fungal infection in organic maize (63.20%) was significantly higher than that in conventional maize (40.27%) ($P < 0.05$). However, the distribution of fungal genera indicated a significantly higher prevalence of *Fusarium* in conventional (34.93%) than in organic (18.15%) maize, making *Fusarium* the predominant fungus in conventional maize. This difference in mold distribution between organic and conventional maize was attributed to the difference in cultivation system. The dominant *Fusarium* species in both conventional and organic samples was *F. verticillioides*. There were no significant differences in the ability of 20 selected isolates of *F. verticillioides* to produce fumonisins on conventional or organic corn. Up to 13.3% of the conventional corn samples contained fumonisins B₁ and B₂ at mean concentrations of 43 and 22 ng/g, respectively. Organic corn samples had somewhat lower levels of contamination: 35 ng/g fumonisin B₁ and 19 ng/g fumonisin B₂ ($P > 0.05$). The organic farming system, with well-balanced crop rotation, tillage, and compost fertilization, produced corn that was less likely to be contaminated with *Fusarium* species, although no significant difference in fumonisin concentrations was found between the two types of contaminated corn.

Document Type: Research article

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Publication date: 2007-01-01