

Title Natural occurrence of *Fusarium* and subsequent fumonisin contamination in preharvest and stored maize in Benin, West Africa

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Abstract

The natural occurrence of *Fusarium* and fumonisin contamination was evaluated from 1999 to 2003 in both preharvest and stored maize produced by small-scale farmers in four agroecological zones of Benin. Mycological analyses revealed a predominance of both *Fusarium* and *Aspergillus* in maize samples compared to other genera. The two *Fusarium* species most commonly isolated from maize were *Fusarium verticillioides* (68%) and *Fusarium proliferatum* (31%). Atypical isolates of *F. verticillioides* with some characteristics of *Fusarium andiyazi* but apparently closer to *F. verticillioides*, because the isolates were all high fumonisin producers, were also found only on preharvest maize. Study of *F. verticillioides* strains showed the presence of extremely high fumonisin producers in Benin with total fumonisin levels ranging from 8240 to 16,690 mg/kg. Apart from 2002–2003, *Fusarium* occurrence was not significantly different from one zone to another, although a slight decrease was observed from south, humid, to north, drier. *Fusarium* occurrence varied somewhat from one season to another. It significantly decreased over the 6 months of storage. Widespread fumonisin occurrence in maize was observed. Most of the maize samples collected were found positive for fumonisin with levels ranging from not detected to 12 mg/kg in 1999–2000, 6.7 mg/kg in 2000–2001 and 6.1 mg/kg in 2002–2003. Fumonisin levels in maize were found to be significantly higher in the two southern zones during all the surveys. The highest mean total fumonisin level was detected in 1999–2000 in maize samples from the southern Guinea Savannah (SGS) (12 mg/kg), whereas in both 2000–2001 and 2002–2003, it was in samples from the forest mosaic savannah (FMS) (6.7 and 6.1 mg/kg, respectively). Fumonisin levels varied from one season to another and, throughout the storage time, showing a decreasing trend in each zone. However, this decrease was not significant every season. An increasing trend was observed during some seasons in the SGS and northern Guinea Savannah (NGS) zones. The results of this study emphasise that farmers and consumers, not only in Benin but also in other West African countries, should be alerted to the danger of fumonisin contamination in maize.