

**Fumonisin: natural contaminants of Australian maize**

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The fungal species *Fusarium verticillioides* (formerly *F. moniliforme*) and *F. proliferatum* occur worldwide on a variety of plant hosts and are invariably associated with maize. Contamination of maize with these fungi has been associated with leukoencephalomalacia (ELEM) in horses and pulmonary oedema in pigs. The causative agent in both diseases is fumonisins. This carcinogenic group of mycotoxins has also been linked with human oesophageal cancer. We have demonstrated that Australian isolates produce significant quantities of fumonisins when cultured under laboratory conditions (1). The natural occurrence of these toxins in Australian feedstuffs is suggested by the diagnosis of ELEM in this country (2). These observations and the worldwide concern over the occurrence of fumonisins in maize and maize products and possible consequences for human and animal health prompted the current survey. The aim was to determine the occurrence of fumonisins in maize destined for both animal and human use.

A total of 375 samples were analysed for fumonisins: samples (1 kg) of maize were obtained from human and animal food manufacturers and grain merchants and covered all the maize growing areas of eastern Australia. The maize was ground, extracted with methanol/water and the content of fumonisins (B1, B2 and B3) determined by ELISA (Veratox®; Neogen) with a sensitivity of 200 µg/kg. Results of the analysis are shown in the table.

Use	Fumonisin (mg/kg)								
	Content			No. positive	Occurrence				
	No.	Mean±SE	Range		No. <1	No. 1-5	No. 5-10	No. 10-20	No. >20
Animal	74	8.2±1.05 <sup>a</sup>	0-40.6	73/74	14	17	22	11	9
Human	301	1.6±0.15 <sup>b</sup>	0-20.5	218/301	103	85	23	6	1

<sup>a,b</sup> means within the columns with different superscripts differ (P<0.05)

The results demonstrate that fumonisin contamination is widespread in Australian maize. Some two thirds of the human samples were contaminated whereas essentially all the animals had detectable levels of the toxin. The highest level found (40.6 mg/kg) was associated with horse deaths from ELEM. The concentrations found in maize destined for animal consumption was significantly higher than that destined for humans. The level of contamination of Australian maize is similar to that reported for maize grown under similar agronomic conditions in other regions of the world.

1. Bryden WL, Van Wel PW, Salahifar H, Burgess LW. Fumonisin production by *Fusarium moniliforme* and related species. Proc Nutr Soc Aust 1994;18:67.
2. Christley RM, Begg AP, Hutchins DR, Hodgson DR, Bryden WL. Luekoencephalomalacia in horses. Aust vet J 1993;70:225-226.