

Occurrence of Aflatoxins in Human Foodstuffs in South Africa

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Aflatoxins are toxic metabolites of *Aspergillus* spp and have been reported as contaminants in a number of foodstuffs, namely corn (Okoye, 1986) rice, peanuts, (de Campos & Olszyna-Marzys, 1979) cereals (Dutton & Westlake, 1985).

In the Republic of South Africa, Aflatoxin levels in human foodstuffs are limited to a maximum of 10 µg/kg for the total and 5 µg/kg for Aflatoxin B₁. (Foodstuffs, Cosmetics & Disinfectants Act, 1976).

During 1985 and 1986, samples of sorghum beer, sorghum cereal, peanuts, peanut butter and maize meal were purchased from supermarkets in Johannesburg and analyzed for aflatoxins.

MATERIALS AND METHODS

Aflatoxins were extracted from the samples with methanol. The aflatoxins were partitioned into dichloromethane and the extracts cleaned up by passage through anhydrous sodium sulphate and subsequent partition by silica gel chromatography. Aflatoxins were derivatized with trifluoroacetic acid (Tarter *et al.*, 1984).

Standards of the Aflatoxins B₁, B₂, G₁ and G₂ were derivatized in the same way.

The Aflatoxin derivatives were analyzed by high pressure liquid chromatography using fluorescence detection. (Excitation 365 nm; Emission 445 nm).

200 µl aliquots were injected onto a 5 µm Nucleosil column, and eluted with methanol:water:acetonitrile (20:60:20) at 50 °C and a flow of 1 ml/min.

Samples containing high levels of aflatoxin were subjected to a post column iodine derivatization procedure (Davis & Diener, 1980) for confirmation of Aflatoxin B₁. 20 µl extract was injected onto a 5 µm nucleosil column and eluted with water:

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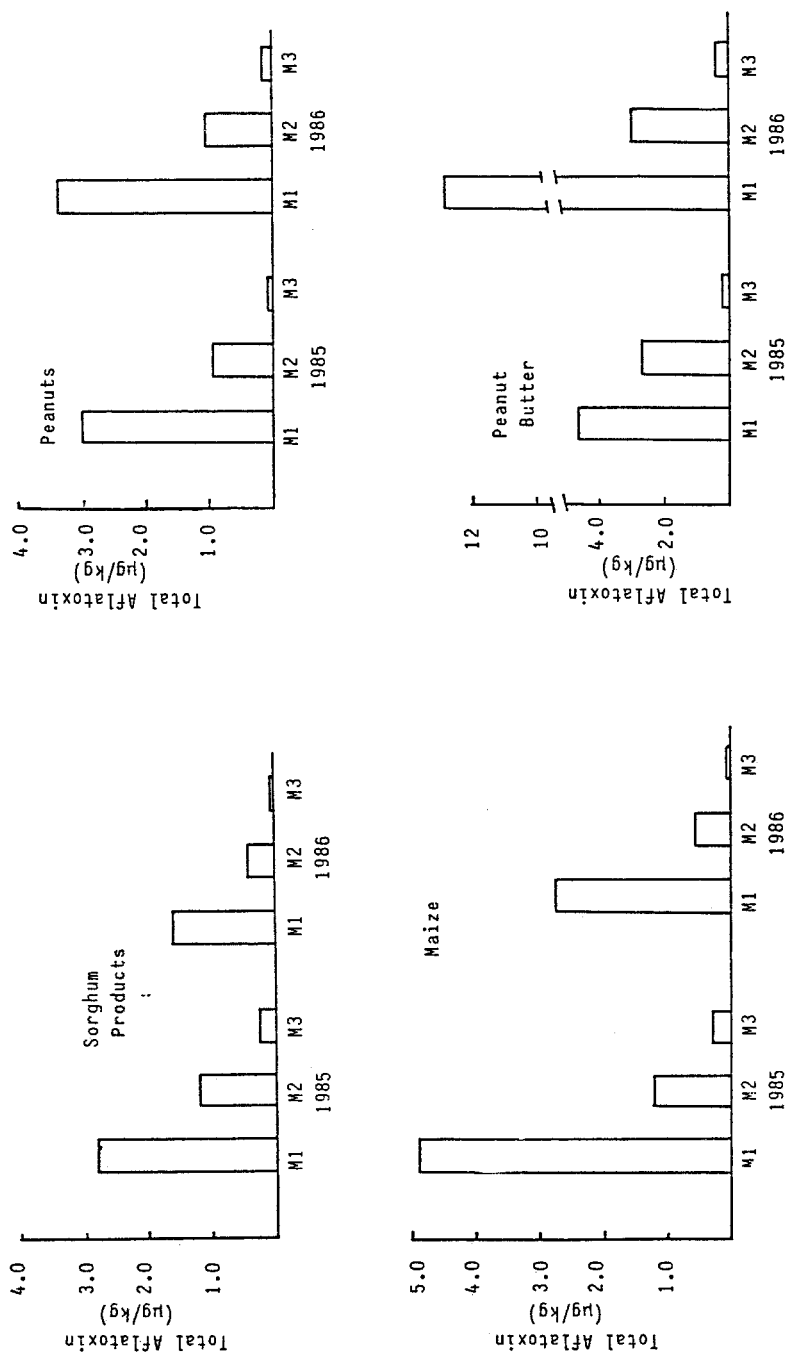


Figure 1 : Levels of aflatoxins observed in contaminated samples. M1 : Maximum value; M2 : Mean value; M3 : Minimum value.

acetonitrile (70:30). Column eluant was passed through a mixing coil to which a saturated iodine solution was added, prior to flowing through the detector cell. Aflatoxin B₁ was detected at 420 nm after excitation at 360 nm.

RESULTS AND DISCUSSION

A total of 414 samples were analyzed during the survey. The numbers containing aflatoxins are given in Table 1.

Table 1 : Occurrence of aflatoxins in foodstuffs

Commodity	Number of samples		Percent containing aflatoxins	
	1985	1986	1985	1986
Maize	80	34	28	59
Peanuts	74	32	22	75
Peanut butter	84	37	52	81
Sorghum products	49	24	29	46

In 1985, roughly a third of the samples were contaminated with aflatoxins, with no levels in excess of the legal limit. In 1986 the percentage of contaminated samples rose significantly, but the levels of contamination remained low, with only one sample exceeding the legal maximum.

The levels observed in the contaminated samples are shown in Figure 1.

The levels observed were significantly lower than those reported by Dutton and Westlake (1985) for 1982 - 1983. Their samples however included commodities used for animal foodstuffs, which have a higher maximum limit. While the levels are not in excess of the legal limit, the presence of contamination requires constant vigilance to ensure that the consumer is not exposed to risk.

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