

Determination of Aflatoxins B1, B2, G1 and G2 in Traditional Medicines

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Abstract: Aflatoxins B1, B2, G1 and G2 in traditional medicine preparations were determined using reversed-phase high performance liquid chromatography (HPLC)-spectrofluorimetry. The samples were first extracted with acetonitrile-water (9:1) and cleaned-up on a multifunctional solid phase extraction (IMC) column. The samples were pre-column derivatised using trifluoroacetic acid (TFA) to enhance the fluorescent intensities of B1 and G1 before their HPLC separation using a mobile phase of acetonitrile-methanol-water (10:20:70). Oily materials were removed prior to the HPLC injection by extracting them into hexane. Samples analysed included the popular after-birth medications *jamu* and *makjun*. Aflatoxins were not detected in any of the 35 samples analyzed. Average recoveries for the determination of aflatoxins B1, B2, G1 and G2 for three different extracts spiked with 10 ppb each of B1 and G1 and 20 ppb each of B2 and G2 were 91.4, 92.9, 102.1 and 90.8%, respectively.

Keywords: Aflatoxins, traditional medicine, multifunctional solid phase extraction

INTRODUCTION

Aflatoxins are toxic metabolites of fungus, especially *Aspergillus flavus* and *Aspergillus parasiticus*. Since the report of their outbreak amongst farm animals in 1960s, the high toxicity and carcinogenicity of these toxins are well known. The order of toxicity is reported to be B1 > G1 > B2 > G2 and the International Agency for Research on Cancer has classified all four aflatoxins as Group 1 carcinogens (Chiavaro *et al.*, 2001). Many countries have imposed stringent legal limits for aflatoxins in feed and foods. The legal limits vary significantly from country to country and by mycotoxin type and matrix

(Gilbert and Anklam, 2002). The European regulatory limits are 4 ppb (w/w) for the sum of aflatoxins B1, B2, G1 and G2 (Figure 1), and 2 ppb for the most toxic aflatoxin, B1, in groundnuts, nuts, dried fruits and cereals (Stroka *et al.*, 2000; Gilbert and Anklam, 2002). These are to be extended to cover spices with legal limits of 5 ppb and 10 ppb for aflatoxin B1 and total aflatoxins, respectively (Gilbert and Anklam, 2002). New limits are being established in the EU for aflatoxin B1 in baby food (0.1 ppb) and animal feeds (1 ppb) (Stroka and Anklam, 2002). As aflatoxin B1 can be metabolized to aflatoxin M1 in cattle, and appear subsequently in milk, the content of aflatoxins in animal feed is also regulated.

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