



Evaluation of a method to determine the natural occurrence of aflatoxins in commercial traditional herbal medicines from Malaysia and Indonesia

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Abstract

Traditional herbal medicines, popularly known as 'jamu' and 'makjun' in Malaysia and Indonesia, are consumed regularly to promote health. In consideration of their frequent and prolonged consumption, the natural occurrence of aflatoxins (AF) in these products was determined using immunoaffinity column clean-up and high-performance liquid chromatography with pre-column derivatization. The evaluated method, which entails dilution of sample extracts with Tween 20–phosphate buffered saline (1:9, v/v) and a chromatographic system using isocratic mobile phase composed of water–methanol–acetonitrile (70:20:10, v/v/v), was effective in separating AFB₁, AFG₁ and AFG₂ from interference at their retention times. Results were confirmed using post-column derivatization with photochemical reactor. For 23 commercial samples analyzed, mean levels (incidence) of AFB₁, AFB₂ and AFG₁ in positive samples were 0.26 (70%), 0.07 (61%) and 0.10 (30%) µg/kg, respectively; one sample was positive for AFG₂ at a level of 0.03 (4%) µg/kg. In contrast to the high levels of AF in crude herbal drugs and medicinal plants reported previously by other researchers, the low contamination levels reported in this study may be attributed to the higher selectivity to AF of the method applied. Based on the AFB₁ levels and the daily consumption of positive samples, a mean probable daily intake of 0.022 ng/kg body weight was calculated.

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1. Introduction

Aflatoxins (AF), the mycotoxins produced mainly by *Aspergillus flavus* and *Aspergillus parasiticus*, represent a worldwide threat to public health due to their frequent

occurrence in food and feed. Researches have shown AFB₁ to exhibit carcinogenic, teratogenic and mutagenic properties; the current Group 1 (carcinogenic to humans) classification of naturally occurring AF was reaffirmed and updated (IARC, 2002). AF is regulated in more than 75 countries. The most common limits for AFB₁ and total AF in food are 5 and 20 µg/kg, respectively, and in countries belonging to the European Union (EU) are 2 and 4 µg/kg, respectively (Van Egmond and Jonker, 2004). The natural occurrence of AF in tropical areas such as the Southeast Asian

Abbreviations: AF, aflatoxins; IAC, immunoaffinity column; MFC, multifunctional column; PDI, probable daily intake; TDI, tolerable daily intake.

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