

stationary phase from the suspension culture were used. Further cell division did occur albeit at a slower rate in the immobilized cells of lag and exponential phase cultures, as was evident by the formation of callus over the surface of alginate beads and the beads started disintegrating after 60 days of incubation. Immobilized stationary phase cells did not show this behaviour indicating very low or no cell division in them during immobilization. Our observation agrees with those of Jones and Veliky¹¹

The yield of solasodine in the spent medium used for cell immobilization was higher in stationary phase culture (80.6 µg solasodine in 40 ml of medium in 24 days) compared to that in the media used for immobilization of exponential phase cell suspension where it is 95.5 µg per 100 ml medium over 60 days. Solasodine content within the immobilized cells of all three types, viz. lag, exponential and stationary phase suspension cultures was 2–2.2 fold greater than freely suspended cells of suspension culture of identical stages respectively.

Clearly this explains the increased capacity for alkaloid production in the immobilized condition by the cells compared to their freely suspended state, indicating the potential of this technique for large scale production of secondary metabolites of plants.

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AFLATOXIN CONTAMINATION IN SEEDS OF MEDICINAL VALUE

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AFLATOXIN contamination in seeds of various agricultural commodities^{1–3} has been reported from different parts of India and abroad. However, occurrence of aflatoxin in seeds of medicinal value has not been reported so far from India. Earlier reports^{4,5} stated that the traditional methods adopted for the storage of medicinal seed samples led to the association of moulds with them. In the present communication, aflatoxin-producing potential of *Aspergillus flavus* isolates and aflatoxin contamination in seeds of two plants, viz. *Argyrea speciosa* and *Embelia ribes*, which have carminative, alterative, anthelmintic and stimulant activity, have been studied.

Ten different samples of each seed were collected from storage centres of private concerns located in plateau regions of Bihar. One hundred seeds of each sample were plated on moist blotting paper⁶ and the growing fungi were isolated and identified under a Nikon stereomicroscope. The aflatoxin-producing potential of *A. flavus* isolates was tested in SMKY liquid medium⁷. All the samples were observed under long-wave UV light for the characteristic fluorescence⁸ and the samples that fluoresced were extracted chemically to determine the natural occurrence of aflatoxins⁹. Aflatoxins were qualitatively detected on thin-layer chromatography plates¹⁰ and were quantified by spectrophotometry¹¹. The results are presented in table 1. The table also gives (last column) natural occurrence of aflatoxin B₁ in the two seeds. Ten different samples each of *A. speciosa* and *E. ribes* were screened for natural aflatoxin contamination. Six samples of

Table 1 Aflatoxin contamination in medicinal seeds and aflatoxin-producing potential of *A. flavus* isolates

Medicinal seed	No. of <i>A. flavus</i> isolates screened	No. of toxigenic isolates of <i>A. flavus</i>	Aflatoxin production		Range of aflatoxin conc. ($\mu\text{g/g}$)		Natural contamination, Afl. - B ₁ conc.* ($\mu\text{g/g}$)
			B ₁	B ₁ and B ₂	B ₁	B ₂	
<i>Argyreia speciosa</i>	35	15	9	6	0.09-2.81	0.05-0.30	0.36
<i>Embelia ribes</i>	30	14	10	4	0.08-2.66	0.05-0.55	0.11

*Mean level of aflatoxin B₁ detected from six and four contaminant samples of *A. speciosa* and *E. ribes* seeds.

A. speciosa and four of *E. ribes* were contaminated. Aflatoxins B₂, G₁ and G₂ were not detected as natural contaminants in any sample.

The present study shows that plant samples should be properly checked for the presence of aflatoxin before being used for the preparation of drugs. Otherwise naturally occurring contamination may cause toxic effects.

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LEAF ROT OF OIL PALM

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DURING a survey on diseases of oil palm (*Elaeis guineensis* Jacq.) in Kerala the authors observed 'leaf rot' symptoms on oil palms at Chithara Estate and also at the Regional Agricultural Research Station, Kumarakom, in December 1987.

The symptoms first appear as small brown spots with yellowish halos on leaflets of the inner whorl. These spots soon coalesce into brown necrotic areas which spread over the whole leaf lamina and later become grey and brittle. The dried-up portions gradually fall off in the wind, resulting in the destruction of the whole leaf lamina. The severity of attack is generally apparent on the tender leaves (figure 1). The disease does not kill the palm outright, but it progresses slowly and steadily until finally the tree succumbs to the disease. The disease



Figure 1. Oil palm leaves showing leaf rot symptoms.