Note

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Mycotoxic Properties of Fruits of *Foeniculum vulgare* and *Pimpinella anisum*

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Green plants, being reservoir of new chemicals may be exploited as sources of chemotherapeutants (Farnsworth & Bingel, 1977). Substances of plant origin seldom accumulate in ecosystem and are easily biodegradable, hence have better prospects especially under present ecological awareness (Mahadevan 1982).

During the course of our search for antifungal substances in higher plants, we recorded strong antimycotic activity in *Foeniculum vulgare* Mill. and *Pimpinella anisum* L. which is reported in this communication.

Freshly harvested fruits of *F. vulgare* and *P. anisum* were macerated separately with 5 ml distilled water. The pulp was tested against *Aspergillus flavus* Link. and *Penicillium italicum* Wehmeyer using inverted Petri plate technique (Singh *et al.* 1983). The nature of fungitoxicity, effect of temperature, sterilization, storage and increased inoculum density on fungitoxicity of fruits were determined by the technique (Pandey *et al.* 1983). The effect of volatile vapours on spore germination of both the test fungi was assessed by the technique of Shukla (1987). In order to observe the distribution of antifungal activity in different parts of *F. vulgare* and *P. anisum* at various growth stages, the fruits of both the plants were sown in small beds of the botanical garden. The fungitoxicity of the pulp of different parts collected during growth stages was also measured by macerating 5 g of plant material with 5 ml distilled water.

The volatile vapours emitted by freshly harvested fruits of *F. vulgare* (4 g) and *P. anisum* (3 g) were fungistatic to mycelial growth and spore germination of *A. flavus* and *P. italicum*. Fresh fruits of both the plants when autoclaved (15 lbs for 30 min), treated up to a temperature of 100°C for 1 h and stored up to 240 days at room temperature also emitted volatile vapours which inhibited the mycelial growth of the fungi indicating the presence of thermostable and durable fungitoxic factor(s). The vapours emitted by fruits of *F. vulgare* (4 g) and *P. anisum* (3 g) inhibited the growth of 4 and 6 mycelial discs (each of 5 mm diameter) of *A. flavus* and *P. italicum* respectively. The fruits of both the plants, at their respective doses emitted vapour which were also toxic to *A. awamori* Nakazawa, *A. flavipes* Bain & Sart) Thom. & Church. *A. fumigatus* Fres., *A. Japonicus* Saito, *A. niger* Vgn Tiegh., *A. ruber* (Bremer) Thom. & Raper, *A. terreus* Thom., *Botryodiplodia theobromae* Pat., *Chaetomium indicum* Corda, *Colletotrichum capsici* (Sydow) Butler & Hassis, *Curvularia lunata* (Wakker) Boedijin, *Fusarium oxysporum* Schlecht, *Macrophomina phaseoli* (Maub.) Ashby and *Penicillium citrinum* Thom. indicating a broad antifungal spectrum.

However, at post flowering stage maximum fungitoxicity was present in fruits while minimum in leaf and stem of both the plants. At flowering stage maximum toxicity was detected in flowers and immatue buds followed by stems and leaves while minimum in roots. At pre-flowering stage,

Table 1 Fungitoxicity of different plant parts at different growth stages

Plant part	Percentage mycelial inhibition															
	Foeniculum vulgare								*Pimpinella anisum*							
	Seedling		Pre – flowering		Flowering		Post – flowering		Seedling		Pre – flowering		Flowering		Post – flowering	
	AF	PI	AF	PI	AF	PI	AF	PI	AF	PI	AF	PI	AF	PI	AF	PI
Entire Plant	69	66	–	–	–	–	–	–	53	50	–	–	–	–	–	–
Root	–	–	45	50	43	45	40	40	–	–	38	46	36	46	30	35
Stem	–	–	75	73	70	70	68	70	–	–	70	70	69	65	60	68
Leaf	–	–	75	73	71	71	65	65	–	–	70	70	69	65	66	64
Unopen bud	–	–	–	–	83	85	–	–	–	–	–	–	84	86	–	–
Flower	–	–	–	–	86	89	–	–	–	–	–	–	84	87	–	–
Fruit	–	–	–	–	–	–	100	100	–	–	–	–	–	100	–	100

AF : *Aspergillus flavus*
PI : *Penicillium italicum*

maximum toxicity was recorded in stems and leaves while minimum in roots. The seedling stage possessed moderate fungitoxicity (Table 1). Various plants have been reported to possess antimicrobial substances generally called 'prohibitins' (Mahadevan, 1982). Unfortunately, little effort was made to detect volatile prohibitins (Mahadevan, 1982). The present study on some aspects of mycotoxicity of fruits of fennel and anise indicate the presence of potent volatile prohibitins in these plants.

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