Studies on Antifungal Properties of Essential Oil of *Semecarpus anacardium* Against Seed Mycoflora

R.M. KADAM AND R.B. ALLAPURE

International Journal of Plant Protection, Vol. 2 No. 1 : 126-127 (April to September, 2009)

See end of the article for authors' affiliations

Correspondence to :
R.M. KADAM
Department of Botany, Mahatma Gandhi Mahavidyalaya, Ahmedpur, LATUR (M.S.) INDIA

SUMMARY

In the present studies evaluation of essential oil from *Semecarpus anacardium* was used for seed treatment which showed maximum efficacy against seed mycoflora. 3 % extract was found to be significantly effective against various fungi associated with groundnut seeds.

Key words : Essential oil, *Semecarpus anadrium*, Seed mycoflora.

The indiscriminate use of pesticides all over the world in general and India particular has badly damaged the environment for the last forty years. Use of non-target pesticides has caused severe damage to our biodiversity and damage to soil microflora. This ultimately affected the fertility of soil, moreover the use of bulk pesticides and chemical fertilizers have polluted the environment beyond repair.

A wide variety of fungicides used for seed treatment are being produced in India. These include organomurcurial, thiram, mancozeb etc. These fungicides applied to crop are long lived and residues persist in soil causing pollution.

Time has come to avoid the use of fungicides and opt for management of diseases by biological control and by the use of biopesticides, which are target oriented and biodegradable. Hence, in view of the alarming present situation, we need to embrace alternative natural therapy for controlling the cop diseases. Use of essential oils from plants would be an alternative (Deans and Ritchie, 1987). Therefore, the studies were focused on evaluation of oil from *Semecarpus anacardium* showing inhibitory effect against seed mycoflora of groundnut. The nuts of *S. anacardium* contain a variety of phenols like, anacardic acid, cardol, catechol, anacardol, semecarpol and a fixed oil.

MATERIALS AND METHODS

The ripe fruits of *Semecarpus anacardium* were collected from Ahmedpur area of Latur District (M.S.). The seeds of plant were subjected to Soxhlet extraction separately and successfully with methanol (50° - 85° C). The fractions obtained were evaporated and essential oil was obtained, which were preserved in suitable glass vials at room temperature.

In order to study the seed mycoflora the seed samples were obtained from authentic soures like Oilseed Research Station, Latur. Surface and internal mycoflora of different groundnut varieties were worked out (Fig. 1). The pathogenic fungi after isolation were cultured for their sensitivity tests towards essential oil of *Semecarpus ancardium*.

One hundred seeds were taken randomly in a plastic pouch and the essential oil was added. In this case of seed treatment, the concentration of oil was adjusted to 1% (w/w). During the process of seed treatment, seeds were thoroughly agitated with oil taken in plastic

Fig.1: Growth of mycoflora on seeds of groundnut

Accepted :* *March, 2009

Table 1 : Effect of essential oil on seed mycoflora of groundnut

Mycoflora	% Occurrence of fungi due to essential oil treatment on groundnut	
	C	T
Aspergillus niger	50	02
Aspergillusflavus	20	05
Alternaria sp.	27	–
Curvularia sp.	10	–
Fusarium sp.	30	–
Penicillium sp.	40	10
Rhizopus sp.	60	–

pathogenic agents like *Alternaria* sp., *Curvularia* sp., *Fusarium* sp., *Rhizopus* sp., Aspergilli and Penicillia.

These days an alternative to synthetic fungicides, products of botanical origin are being used to per cent fungal diseases in crop plants (Singh *et al*., 1980). Large number of plants contain essential oils which are known to be antifungal in nature. In the present study, while evaluating the efficiacy of essential oil from *Semecarpus anacardium* against seed mycoflora, in general it was observed that the antifungal efficacy of essential oil was effective against *Curvularia, Fusarium, Alternaria,* and *Rhizopus* sp. (Table 1).

Table 2 : Antifungal effect of essential oil against plant pathogenic fungi

Essential oil	Average value of zone of inhibition in mm against fungi				
	Aspergillus	*Penicillium*	*Rhizopus*	*Fusarium*	*Alternaria*
Semecarpus anacardium oil	29	36	34	28	40

pouch. Such treated seeds were then plated equidistantly on three layers of wet blotters in Petri dishes and then the plates were incubated for a period of 1 week as per the standard recommendation of ISTA.

For evaluating antifungal efficacy of essential oil under study, disc diffusion method was adopted (Maleyar and Narasimham, 1987). For this sterilized blank, Whatman filter paper discs were used. The discs were impregnated with essential oil and kept in slanted position so as to drain off excess oil.

For sensitivity testing, PDA plates were seeded with each isolated plant pathogenic fungus and oil impregnated paper disc was placed on it in the centre aseptically. All the plates were then incubated at 37^0 C for 5 days. After incubation, results were noted by measuring the zone of growth inhibition in mm and average value was calculated for each fungus.

RESULTS AND DISCUSSION

Essential oil used in general inhibited the seed mycoflora to a greater extent with respect to fungi like *Alternaria* sp., *Curvularia* sp., *Fusarium* sp., *Rhizopus* sp. Storage fungi like Aspergilli and Penicillia also were inhibited to greater extent. The biopesticide in the form of essential oil obtained from *S.anacardium* showed its exceptional efficacy as an effective inhibitor against the

The inhibitory effect of essential oil from *Semecarpus anacardium* against isolated fungi were studied individually (Table 2).

Acknowledgements:

We extend our special thanks to Principal, Dr. N.A. Mote and Head, Shri R.K. Kalme, Mahatma Gandhi Mahavidyalaya, Ahmedpur for inspiration and providing facilities to carry out the investigation.

Authors' affiliations:
R.B. ALLAPURE, Department of Botany, Maharashtra Udaygiri Mahavidyalaya, Udgir, LATUR (M.S.) INDIA

REFERENCES

Deans, S.G. and Ritchie, G. (1987). Antibacterial properties of plant essential oils. *IJFM*, **5** : 165-180

Moleyar, V. and Narasimhan, P. (1987). Mode of antifungal action of essential oil components, citral and camphor. *Indian J. Expt. Biol.*, **31** (4) : 322 - 334.

Singh, A.K. Dikshit, A., Sharma, M.L. and Dixit, S.N. (1980). Fungitoxic activity of some essential oils. *Economic Botany,* **34** : 186-190.

****