

Effect of certain Botanicals on the Conidial Germination in *Beauveria bassiana* (Bals.) Vuill.

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The use of botanicals for pest management is gaining importance and there is a possibility of integrating the use of botanical pesticides with entomopathogens (Jayaraj, 1980). Information on the compatibility of entomopathogens with insecticides of plant origin is scanty. Earlier, Dirimanov and Angelova (1962) reported that nicotine sulphate, an insecticide of plant origin, at 0.2 per cent was highly inhibitory to the growth of *Beauveria bassiana* (Bals.) Vuill. in *in vitro* tests. The present study was carried out with a view to find out the effect of certain botanicals, viz., *Ocimum sanctum* L., *Allium sativum* L., *Acorus calamus* L., *Tribulus terrestris* L. as well as neem (*Azadirachta indica* A. Juss) seed kernel extract and neem oil on the conidial germination of the entomofungal pathogen, *B. bassiana*.

Leaves and stems of *O. sanctum*, rhizomes of *A. calamus*, bulbs of *A. sativum*, whole plant of *T. terrestris* and neem seed kernel were shade-dried, powdered and soaked in distilled water for 12 h. The aqueous extracts were collected by passing through a muslin and concentrations of one and two per cent were prepared using 0.05 per cent Tween 80. Neem oil was also similarly emulsified and concentrations of one and two per cent were prepared. Distilled water containing 0.05 per cent Tween 80 alone was used for controls. Conidia of *B. bassiana* were suspended in the different treatments at 10^5 ml⁻¹. Quantities of 5 ml from each suspension with four replicates were transferred to individual embryo dishes and incubated at 25°C in a moist chamber. After 24 h, germination of conidia was recorded for which the criterion was the development of a germ tube equal to the diameter of the conidium. Inhibition of germination was expressed as per cent inhibition over control and data subjected to analysis of variance.

All the botanicals included in this study inhibited the germination of conidia (Table 1). Neem oil followed by neem seed kernel extract proved to be the most deleterious to the germination. Other botanicals were not as deleterious as the neem products. Among them, the descending order in terms of rate of inhibition was *A. calamus*, *T. ter-*

restris, *A. sativum* and *O. sanctum*. The same trend was also seen among the botanicals at both the concentrations. However, higher concentrations ex-

Table 1. Effect of certain botanicals on the conidial germination in *B. bassiana*

Particulars	% inhibition over control		Mean
	Concentrations* (%)		
	1	2	
<i>O. sanctum</i>	21.7 ^a	35.1 ^a	28.4 ^a
<i>A. sativum</i>	29.1 ^b	38.9 ^a	34.0 ^b
<i>A. calamus</i>	33.4 ^b	48.4 ^{bc}	40.9 ^c
<i>T. terrestris</i>	30.6 ^b	41.8 ^{ab}	36.2 ^{bc}
NSKE	43.4 ^c	51.2 ^c	47.3 ^d
Neem oil	48.6 ^c	67.1 ^d	57.8 ^e
Mean*	34.5	47.1	

* Differences between the concentrations significant at 5% level in all the botanicals

Mean separation in a column by DMRT at 5% level

hibited significantly greater inhibition. It has been reported earlier that 5 per cent neem oil had a significant inhibitory effect on conidial germination and sporulation in *Metarhizium anisopliae* (Metschn.) Sorok. (Aguda *et al.*, 1986) and 10 per cent neem oil completely inhibited certain species of *Aspergillus*, *Fusarium* and *Macrophomina* (Pamar, 1987). In the light of the present finding, it can be inferred that the combined use of *B. bassiana* and the botanicals tested may not be advantageous in the IPM programme.

Key words: *Beauveria bassiana*, Conidial germination, botanicals

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