

Compatibility of *Beauveria bassiana* Strains with Chemicals

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ABSTRACT

Two *Beauveria bassiana* strains were evaluated for compatibility with selected fungicides and insecticides. The results on the effect of pesticides on the growth of *B. bassiana* colony showed that all the treatments showed a significant reduction in the growth of fungus. The growth of fungus in poisoned media with Propiconazole 25 EC at 0.025% was one centimeter which shows the highest per cent inhibition of 85.71% for both NBAIR and VKA strain. This was followed by Malathion with 75% and 70.29% inhibition for NBAIR and VKA strain respectively, which was at par with Lambda cyhalothrin with 68% inhibition in case of *B. bassiana* VKA strain. The lowest per cent

inhibition was recorded for Flubendiamide with 30.57 and 34.95% inhibition for NBAIR and VKA strain respectively.

Keywords *Beauveria bassiana*, Compatibility, Fungicides, Insecticides, Inhibition.

INTRODUCTION

Beauveria bassiana (Bals.) is an entomopathogenic fungus that grows naturally in soils throughout the world. It has the ability to manage various insect pests. They are ideally suited as biopesticides owing to their amenability for mass production and formulation as well as ease of application. Steinhaus (1956) reported that *B. bassiana* causes mycosis in 175 insect hosts from Lepidopteran, Coleopteran and Hemipteran orders. Alizedeh et al. (2007) compatibility of *B. bassiana* with Flufenxuron, Imidaclopride, Endosulfan, Teflubenzuron, Phuzalon and Amitraz and effect of these pesticides on vegetative growth, conidial germination and sporulation of fungus were studied. The result obtained was Flufenxuron is not compatible with *B. bassiana* and all other tested pesticides can simultaneously use along with *B. bassiana* in Integrated Pest Management (IPM).

Dhar and Kaur (2009) conducted a compatibility

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Table 1. Chemicals tested against NBAIR and VKA strain of *B. bassiana*.

Treatments	Insecticides/fungicides	Dose
T ₁	Flubendiamide	25 g ai h ⁻¹
T ₂	Lambda cyhalothrin	50 g ai h ⁻¹
T ₃	Malathion	500 g ai h ⁻¹
T ₄	Acephate	750 g ai h ⁻¹
T ₅	Azadirachtin	0.005%
T ₆	Propiconazole	0.025%
T ₇	Copper hydroxide	0.2%
T ₈	Control	

study of *B. bassiana* and Acetamiprid 0.003% using poisoned food technique and documented an increase in the radial growth of *B. bassiana*. However Anderson and Roberts (1983) reported the inhibitory effect on radial growth.

Joshi et al. (2018) conducted an experiment to test the impact of chemical pesticides on *B. bassiana*. Six insecticides viz., Profenophos, Indoxacarb, Emamectin benzoate, Noveluron, Chlorantraniliprole and Lambda cyhalothrin and four fungicides viz., Carbendazim, Mancozeb, Hexaconazole and Propiconazole at different concentration on growing media were selected to test their effect on sporulation and mycelial growth. Profenophos 50 EC was the most incompatible insecticide. Whereas other insecticides like Chlorantraniliprole 18.5 SC, Indoxacarb 15.8 EC, Emamectin benzoate 5 WG, Noveluron 10 EC and Lambda cyhalothrin 4.9 CS were found to be compatible with *B. bassiana*. Among all the four fungicides tested only Mancozeb 75 WP showed compatibility to some extent whereas Carbendazim 50 WP, Propiconazole 25 EC and Hexaconazole 5 EC showed complete inhibition in all concentrations.

In this experiment two strains of *B. bassiana* were tested for its compatibility with selected insecticides and fungicides. Poisoned food technique (Falck 1907) was carried out.

MATERIALS AND METHODS

Potato Dextrose Agar medium (PDA) was used for the study. The insecticides and fungicides (Table 1) used for testing were UV sterilized by placing it in laminar air flow chamber. The recommended dose

Table 2. Compatibility of *B. bassiana* with selected pesticides.

Treatments	Per cent inhibition	
	<i>B. bassiana</i> NBAIR strain	<i>B. bassiana</i> VKA strain
T ₁ : Flubendiamide	30.57 ^g	34.95 ^d
T ₂ : Lambda cyhalothrin	57.14 ^d	68.00 ^b
T ₃ : Malathion	75.00 ^b	70.29 ^b
T ₄ : Acephate	35.95 ^f	31.29 ^e
T ₅ : Azadirachtin	70.71 ^c	48.19 ^c
T ₆ : Propiconazole	85.71 ^a	85.71 ^a
T ₇ : Copper hydroxide	48.71 ^e	48.10 ^c
CD	3.175	2.477

of each chemical was added to the PDA medium aseptically and required amount transferred to sterile Petri plates. The one cm disc of entomopathogenic fungi from actively growing culture was taken with the help of a cork borer. Using a sterile inoculation needle place the fungal disc to the center of the PDA plate treated with different chemicals. PDA medium inoculated with fungus alone was served as control. The Petri plates were kept at room temperature for incubation till the fungal growth on the control plate completely covers the Petri plate. For each treatment three replications were maintained.

Per cent inhibition of growth of *B. bassiana* colony in poisoned media

Radial growth of fungus in each treatments were measured using a ruler. Per cent inhibition of *B. bassiana* growth in the poisoned media was calculated using the formula suggested by Vincent (1927).

$$\text{Per cent inhibition} = \frac{C-T}{C} \times 100$$

Where, C = Diameter of fungal growth in control,
T = Diameter of fungal growth in treatment.

RESULTS AND DISCUSSION

Two strains of *B. bassiana* were tested for its compatibility with selected insecticides and fungicides. The radial growth of fungus was measured and per cent inhibition of fungal colony in poisoned media was calculated and presented in Table 2.

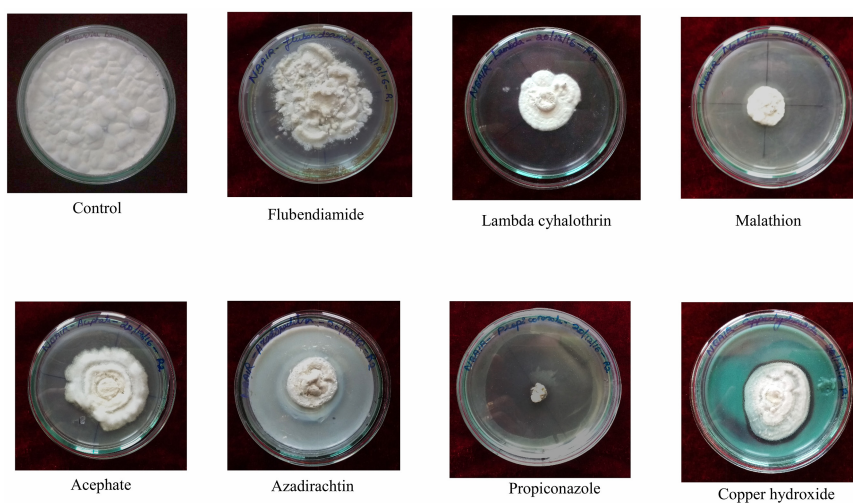


Fig. 1. Compatibility of pesticides with *B. bassiana* NBAIR strain.

***In vitro* evaluation on compatibility of *B. bassiana* with selected pesticides**

The results on the effect of pesticides on the growth of *B. bassiana* colony showed that all the treatments showed a significant reduction in the growth of fungus. *B. bassiana* NBAIR strain completely covered a 7 cm PDA Petri dish within 16 days after incubation and *B. bassiana* VKA strain in 19 days after inoculation (control) (Table 2). (Figs. 1 and 2). The growth of fungus in poisoned media with Propiconazole 25

EC at 0.025% was one centimeter which shows the highest per cent inhibition of 85.71% for both NBAIR and VKA strain. This was followed by Malathion with 75% and 70.29% inhibition for NBAIR and VKA strain respectively. Which was at par with Lambda cyhalothrin with 68% inhibition in case of *B. bassiana* VKA strain. The lowest per cent inhibition was recorded for Flubendiamide with 30.57 and 34.95% inhibition for NBAIR and VKA strain respectively. The insecticides Flubendiamide and acephate were highly compatible with both strains of *B. bassiana*.

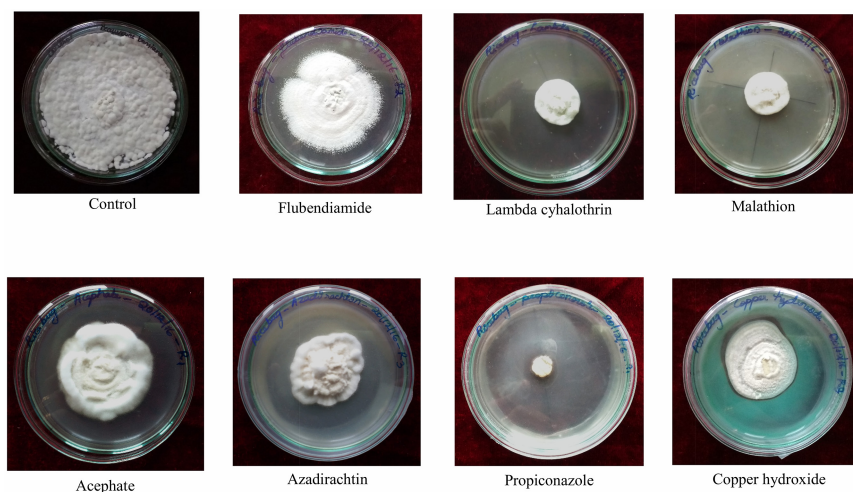


Fig. 2. Compatibility of pesticides with *B. bassiana* VKA strain.

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