

## DERMAL TOXICITY OF WHITE MUSCARDINE FUNGUS, *Beauveria bassiana* (Bals.) Vuill. ON VERTEBRATES

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### Abstract

An experiment was conducted to evaluate the dermal toxicity of *Beauveria bassiana* (Bals.) Vuill. on vertebrates. The effect on the treated skin of test animals was assessed 14 days post-introduction of *B. bassiana* conidia. Abraded skin of albino mice treated with *Beauveria bassiana* conidia showed no apparent clinical, pathological and histological abnormalities. The result of this test suggests that *B. bassiana* (GLH isolate) is a safe biocontrol agent for insect pests. It poses no harm to vertebrates including human beings.

**Key Words:** *Conidia, substrate, microbial insecticide*

### Introduction

Microbial insecticides offer effective alternatives for the control of many insect pests. Among them is the white muscardine fungus, *Beauveria bassiana*. Several studies reported that the fungus is virulent to a wide array of insects belonging to orders Lepidoptera, Homoptera, Coleoptera, Hemiptera and Diptera.

One of the major advantages of entomopathogens is by affecting other mortality agents less severely; they seldom induce outbreaks of secondary pests (Fuxa, 1987). However, the hazard posed by entomopathogens such as *B. bassiana* to vertebrates including humans has not yet been completely resolved despite several investigations into the problem. Some workers reported specific allergies caused by *B. bassiana*. *Beauveria* species have the potential to elicit allergenic reactions in humans, although no specific allergens have been characterized to date (Westwood et al., 2006). This present study aimed to investigate the dermal toxicity of tropical strain of *B. bassiana* on vertebrates.

### Materials and Methods

#### Preparation of *Beauveria bassiana*

White Muscardine Fungus, *Beauveria bassiana* is mass produced in a substrate using unmilled rice (IR-42). Rice is boiled with sufficient water until it cracks; excess water is drained and the substrate is transferred to an autoclavable polyethylene bag. PVC ring is used to seal the bag, plugged with cotton and tied with a rubber band. The substrate is sterilized for one hour in an autoclave at 15 psi.

Conidia of *B. bassiana* cultures grown in SDAY slants are scraped off from the surface using wire loop and mixed with five ml of sterile Triton X-100 (0.02%). Inoculum of *B. bassiana* is then introduced into the polyethylene bags aseptically in a laminar flow hood. After inoculation, polyethylene bags are squeezed and shaken to spread the inoculums. Inoculated substrates are incubated at room temperature for three weeks.

#### Preparation of Test Animals and Application of *B. bassiana*

Albino mice (*Mus musculus*) are used to evaluate the dermal toxicity of *B. bassiana* (GLH isolate) to vertebrates. Ten four-week-old mice are used as test animals.

Before the applications of conidia, the trunk of the test animals are clipped free of hair. The skin of the clipped area is abraded with a plastic scraper to produce minor incisions through the stratum corneum without disturbing the derma to prevent bleeding of the skin. The abraded area is moistened with sterile distilled water. Conidia are introduced at the abraded area of the mice at the rate of 0.1 gram conidia per mouse. Some of the test animals are left untreated as control. The trunk of the animal treated with conidia is wrapped with gauze and rubber damming (Fig.1). Each mouse is housed individually in elevated wire mesh provided with food and water (*ad libitum*). The gauze is removed twenty-four hours after application of conidia, and the treated sites are washed with sterile distilled water. Observation is done daily for 14 days and dermal responses are recorded. The mice (treated and untreated) are sacrificed and necropsied after 14 days. Sections of treated and untreated skins from each mouse are microscopically examined for growth and irritation induced by *B. bassiana*.

## Results and Discussions

Dermal irritation was not observed at the sites treated with conidia of *Beauveria bassiana*. Histopathological examination of the skin section from the treated and untreated sites of twelve mice revealed no dermal irritation or growths of *B. bassiana*. Sebaceous and hair follicles generally appeared intact except for superficial epidermal layers that appeared thinner compared with the untreated skin. Slightly dense collagenous tissues were discernible along the dermal and subcutaneous tissues. As a whole, a mild epidermal atrophy was noted.

## Conclusion

External and histopathological examination of the skin of albino mice treated with conidia of *B. bassiana* was negative for dermal irritation and fungal growth for *B. bassiana* infection. The result of this test suggests that *B. bassiana* (GLH isolate) is a safe biocontrol agent for insect pests. It poses no harm to vertebrates including human being.

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