

Short Communications

<https://doi.org/10.20546/ijcmas.2021.1003.120>

Standardization of Different Substrates for Mass Production of Conidial Yield of Entomopathogenic Fungus *Beauveria bassiana*

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ABSTRACT

Keywords

Beauveria bassiana,
Substrates, Conidia,
Sporulation

Article Info

Accepted:
10 February 2021
Available Online:
10 March 2021

Beauveria bassiana, an entomopathogenic fungus, was evaluated for production of conidial mass on different grain of wheat, barley, sorghum, rice and bajra. Out of five grain the highest conidial sporulation was observed on rice grain. However, it was difficult to produce the conidia at mass level due to boiling of rice grain and conversion into compact mass during sterilization resulting in difficulty for harvesting the conidial mass from conidial flask in solid state fermentation conditions. So, sorghum grain was found better than rice grain for mass production of conidial by *Beauveria bassiana*.

Introduction

There are several methods for the control of pest such as biological, physical, and chemical etc. Many micro-organisms such as bacteria, viruses and fungi are being used as biopesticides and are known as viable methods of insect control. The entomopathogenic fungus, *Beauveria bassiana* is known to attack over several species of insects covering Coleoptera, Lepidoptera, Orthoptera and Hemiptera throughout the world (Deva *et al.*, 1990, Alves *et al.*, 1996, Feng, *et al.*, 1994 and Hunter *et al.*, 1999). In India, pathogenicity of

Beauveria bassiana has been reported on Gram pod borer (*Heliothis armigera*), coffee berry borer, rice bugs (*Leptocorisa spp.*) and other insect/larva by several author's (Deva *et al.*, 1990, Sarode, 1999, Padmaja and Kaur, 2001, Hara Prasad *et al.*, 2001, Latifian and Rahkhodaei, 2012 and Shapiro-Ilan and Mizell, 2015). Currently, the Entomopathogen is being mass multiplied and distributed to farmers for the management of insect pest. The main expenses incurred in the production of this biopesticides are the cereal grains. The present investigation was carried out to standardize the suitable substrate *i.e.* Wheat, Barley, Sorghum, Rice and Bajra for the

highest conidial yield production under solid-state-fermentation conditions. Entomopathogenic fungus *Beauveria bassiana* for potential use as effective biological control, it's necessary to standardization of different substrate *i.e.*, Wheat, Barley, Sorghum, Rice and Bajra for the highest conidial yield production under solid-state-fermentation conditions.

Materials and Methods

The fungal conidial suspension used in this study was single spore isolated from cultures obtained originally from diseased *Helicoverpa armigera* collected on Tomato fruit borer (*Lycopersiconesculentum*) Fig. 1 (a & b). The fungus was subculture on PDA (Potato dextrose agar) medium at $25\pm 2^{\circ}\text{C}$ temperature for 6 days incubation. After obtaining the pure nucleus (mother) culture, the conidia were inoculated on to different grains of wheat, barley, sorghum, rice and bajra, which were previously soaked in water for 24 hours; than wash with tap water and mixed with 0.5% yeast, starch, peptone, 4.0% dextrose, 80 grams mixed grain poured in each 250 ml borosil conical flask, plugged, and autoclaved at 15 pa for 20 minutes. Six disc of 5mm size, from 6-day-old inoculums were inoculated and incubate at $25\pm 2^{\circ}\text{C}$ temperature. The fungus grew well on the grains by producing white mycelial growth and sporulated profusely on twenty-one day after inoculation. The conidia were harvested using sterile double distilled water. Colony forming unit (cfu) of fungus was done with

the help of Neubauer chamber (haemocytometer) and phase contrast microscope.

Results and Discussion

Beauveria bassiana revealed that different grain of wheat, barley sorghum, rice and bajra was found good for conidial sporulation. The conidial sporulation occurred in wheat ($2.90 \times 10^8 \text{ g}^{-1}$), barley ($1.88 \times 10^8 \text{ g}^{-1}$), bajra ($2.11 \times 10^8 \text{ g}^{-1}$) followed by rice ($5.46 \times 10^8 \text{ g}^{-1}$) and sorghum ($4.38 \times 10^8 \text{ g}^{-1}$). (Table 1). The growth of *Beauveria bassiana* was found maximum sporulation of conidia on rice grain comparison to sorghum grain. Although, the highest conidial sporulation produced on rice grain, but it showed some draw back during mass production due to boiling of rice grain, during autoclaving.

The rice grain converts into solid compact mass and it is difficult to extract of the conidia from conidial flask so in spite of high conidial yield, rice grain can not be used *Beauveria bassiana* conidia mass production. Similarly, Latifian. *et al.*, 2013 and many other workers Soper *et al.*, 1981, Sharma *et al.*, 2002, Prasad and Gangwar, 2013, Sivakalai and Ramanathan, 2014 and Mascarin, *et al.*, 2016 supporting our finding in the present study sorghum grain may be use for the commercial conidial mass production under of *Beauveria bassiana* comparison to tested all grains solid state fermentation conditions.

Table.1 Effect of Different Substrates on Conidial Sporulation of *Beauveria bassiana* after 21 Days of Incubation (Each Figure Reveal the Mean of three Replicates)

S. No.	Substrates	Conidial Count g^{-1}	S.D.
1.	Wheat grain	2.90×10^8	± 0.22
2.	Barley grain	1.88×10^8	± 0.31
3.	Sorghum grain	4.38×10^8	± 0.15
4.	Rice grain	5.46×10^8	± 0.44
5.	Bajra	2.11×10^8	± 0.24



Fig 1-(a) Tomato Fruit Borer *Helicoverpa armigera*



Fig.- 1-(b) *Beauveria bassiana*
(Entomopathogenic Fungus)

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How to cite this article:

Mahesh Kumar, Varun Kumar Tomer and Pradip Kumar Sharma. 2021. Standardization of Different Substrates for Mass Production of Conidial Yield of Entomopathogenic Fungus *Beauveria bassiana*- Short Communications. *Int.J.Curr.Microbiol.App.Sci.* 10(03): 951-954. doi: <https://doi.org/10.20546/ijcmas.2021.1003.120>