# Carbon Metabolism of *Beauveria bassiana* May be Related to Virulence Against *Plutella xylostella* (Lep.: Plutellidae) and *Leptinotarsa decemlineata* (Col.: Chrysomelidae)

R. Talaei-Hassanloui[1] , A. Kharazi-Pakdel[1] , M. S. Goettel[2] , J. Mozaffari[3] and J. Bissett[4]

**Abstract**

Fermentation of 49 carbohydrates and oxidation and apssimilation of 96 substrates were examined for ten *Beauveria bassiana* isolates. Principal component analysis indicated that there are significant differences among isolates for utilization of some substrates. Esculine and D-glucose were positively fermented by all isolates. Isolates were grouped into four clusters on the basis of hierarchial analysis of 96-hr reaction data. Using canonical variate analysis, it was determined that N-acetyl-D-glucosamine fermentation and β-cyclodextrin oxidation were strongly and positively correlated with pathogenicity of isolates against diamondback moth, *Plutella xylostella* and Colorado potato beetle, *Leptinotarsa decemlineata*. In contrast, Sebacic acid assimilation was negatively correlated to virulence against these insects.

**Key words:** *Beauveria bassiana*, carbohydrate utilization, virulence, sebacic acid, β-cyclodextrin, N-acetyl D-glucosamine

## Introduction

Despite many advances in pest control, including the transgenic expression of insect toxic proteins in crop plants, insects continue to represent serious competition for food globally (1). Furthermore, insect resistance to chemical insecticides (2), to *Bacillus thuringiensis* and to Bt-transgenic crops (13) suggests that crop protection alternatives should be exploited. One of these alternatives is the utilization of entomopathogenic fungi, as one of the most important factors regulating insect populations in nature (1). *Beauveria bassiana* , the most common and ubiquitous fungal entomopathogen (7), has a wide host range but differences in both virulence and host specificity among isolates have been reported (4, 8).

1- Department of Plant Protection , College of Agriculture, University of Tehran, Karaj, 31587-11167, Iran
2- Lethbridge Research Center, 5403-1 Avenue South, P.O. Box 3000, Lethbridge, Alberta T1J 4B1, Canada
3- Department of Genetics, Seed and Plant Improvement Institute, Karaj, Iran
4- Easter Cereal and Oilseed Research Centre, Ottawa ,Ontario, K1A 0C6, Canada