

Production of *Beauveria bassiana* proteolytic enzymes in different fermentation processes

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Entomopathogenic fungi have shown great potential for microbial insect control. Their mode of action through the cuticle gives them a significant advantage in integrated pest management strategies: the conidia adhere to the cuticle, penetrate the host (without the need for ingestion), grow inside the hemocoel, and ultimately cause the host's death due to nutrient depletion and invasion of tissues and internal organs and/or secretion of proteins and/or secondary metabolites with insecticidal effects. However, *Beauveria bassiana* produces several extracellular hydrolytic enzymes, including proteases (EC 3.4), which promote the degradation of the host's cuticle and are determinants of pathogenicity. In this context, the objective of this research was evaluated the production of extracellular proteases from commercial isolates of *B. bassiana* in the different fermentation process. Within the methodology, different culture media were established for protease production using two commercial isolates of *B. bassiana* as inoculum: IBCB 66, provided by the Biocontrol Company as Bouveriz, and ESALQ PL63, acquired by the Koppert Company as Boveril, respectively. To achieve this objective, the enzymes were produced in solid and liquid fermentation conditions, and Nitrogen and carbohydrate sources were evaluated to determine the highest proteolytic activity of commercial isolates of *B. bassiana* in the different liquid media: SDY broth, YPG culture medium, synthetic, and soluble starch with yeast extract. The solid media evaluated were as follows: rice supplemented with whey (10%w/v) and a 1:1 (w/w) of chrysalis flour to rice. The results reported that *B. bassiana* isolates showed a significant difference ($p < 0.01$) for protease production by *B. bassiana* ESALQ PL63 using the rice medium with whey (36 U/mg) compared to all media tested, including those evaluated for *B. bassiana* IBCB 66. In conclusion, commercial isolates of *Beauveria bassiana* successfully produced proteolytic enzymes, with the rice medium supplemented with milk whey standing out as the most effective culture medium for protease production.

Key words: entomopathogenic fungi, protease, fermentation process, optimization.

Produção de enzimas proteolíticas de *Beauveria bassiana* em diferentes processos de fermentação

A produção de proteases extracelulares é um fator crucial na determinação da virulência de *B. bassiana* contra o hospedeiro alvo. O objetivo desta pesquisa foi avaliar a produção de proteases de isolados comerciais de *B. bassiana* em diferentes processos de fermentação. Diferentes meios de cultura foram estabelecidos usando dois isolados comerciais de *B. bassiana*: IBCB 66 e ESALQ PL63. Uma diferença significativa para a produção de protease foi observada pelo *B. bassiana* ESALQ PL63 usando o meio de arroz com soro de leite em comparação com todos os meios testados, e também em relação ao isolado IBCB 66.

Palavras-chave: fungos entomopatogênicos, protease, processo de fermentação, otimização.

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