Screening of microorganisms for chitinase production by solid-state fermentation using insect meal

Ana Margarida De Matos Gonçalves[a], *Patrícia Marlene Alves Ferreira*[b], *Maria Helena Tabuaço Rego Martins Peres*[c], *Isabel Maria Pires Belo*[a], *and José Manuel Salgado Seara*[a]

[a]*CEB-Centre of Biological Engineering, University of Minho, Braga, Portugal*

[b]*Departamento de Biologia, Faculdade de Ciências, Universidade do Porto, Porto, Portugal*

[c]*CIMAR/CIIMAR-Centro Interdisciplinar Marinha e Ambiental, Universidade do Porto, Porto, Portugal*

email address: *margaridamgoncalves@hotmail.com*

The use of insect meal as a new and sustainable feed ingredient has received intensive research effort, but its dietary inclusion levels are limited to its chitin content. Chitin is a complex cross-linked molecular structure, which cannot be digested by animals. To digest chitin, chemical methods may be used, presenting, however, low yield, high cost and environmental impact. Thus, the development of natural chitinases has important biological relevance, allowing it incorporation in animal feed. In this work, a screening of fungi producers of chitinase was performed in agar plates with insect meal (*Hermetia illucens*) and *Aspergillus niger* 01UAs183 had the best performance. In insect meal fermentation during 7 days, *A. niger* produced 50 units of chitinase per gram of dry meal. The mixture of insect meal with brewerýs spent grain (1:1, w/w) fermented during 14 days lead to a 10-fold increase of chitinase activity. Mixtures of insect meal with other agro-industrial wastes are promising substrates for chitinase production, opening new strategies to improve the production of chitinase and the nutritional properties of new alternative protein sources. Acknowledgement: This study was supported by InovFeed (ref. MAR-02.01.01-FEAMP-0111; Mar 2020), SPO3 (ref. POCI-01-0145-FEDER-030377; FCT), BiotecNorte (NORTE-01-0145-FEDER-000004 and strategic funding (UIBD/04469/2020).