# Olive mill-based lignocellulosic waste as a substrate for halotolerant endo-1,4-β-glucanase production from high promising multienzyme-producing *Bacillus velezensis* H1 without pretreatments

**Hadjer DJELID [1,2], Sigrid FLAHAUT [2], Corinne VANDER WAUVEN [3] and Noreddine KACEM CHAOUCHE [1]**

[(1)]Laboratoire de Mycologie, de Biotechnologie et de l'Activité Microbienne (LaMyBAM). Département de Biologie Appliquée, FSNV, Université Frères Mentouri Constantine 1, 25017

[(2)]Laboratoire de Microbiologie Appliquée, Ecole interfacultaire de Bioingénieurs, Université Libre de Bruxelles. Campus du CERIA, Bât. 4B, 1 avenue Emile Gryson, 1070 Brussels, Belgium.
[(3)] LABIRIS, 1 Avenue Emile Gryson, 1070 Brussels, Belgium.
**Email:** hadjer.djelid@umc.edu.dz

Facing the crucial issue of high production costs for cellulase, numerous studies have focused on improving the efficiency of cellulase production by potential microorganisms capable of secreting this enzyme using low-cost agricultural wastes as inducer substrates, extremophilic cellulases, in particular, are crucial in the biorefinery process because they can maintain activity under harsh environmental conditions. This study aims to investigate the ability to produce a thermotolerant and halotolerant cellulase from untreated olive mill wastes using the potential carboxymethylcellulose-hydrolyzing bacterial strain H1 that was newly isolated from an Algerian saline soil and identified as *Bacillus velezensis*. The enzyme produced under optimized conditions, was succefully purified and its molecular mass was estimated to be 26 kDa by SDS-PAGE. Identification by LC-MS analysis and substrate specificity revealed that the studied enzyme is an endo-1,4-β-glucanase. Physico-chemical characterization showed that optimal enzymatic activity was at pH 6.0-6.5 and at 60-65 °C. It was fairly thermotolerant, retaining 76.9% of the activity at 70 °C, and halotolerant, retaining 70% of its activity in the presence of 4 M NaCl. Kinetic analysis and the ability of the enzyme to release cello-oligosaccharides were also investigated.

**Keywords:** Olive mill wastes degradation · Endo-1,4-β-glucanase · Halotolerance· *Bacillus velezensis* · Thermotolerance · Thermostability.