UMS+24°

SERIES

4th - 6th April 2024

MONA PLAZA HOTEL, **Belgrade, Serbia**

XIII CONGRESS OF MICROBIOLOGISTS OF SERBIA

with international participation

MIKROMED REGIO 5

FROM BIOTECHNOLOGY TO HUMAN AND PLANETARY HEALTH

BOOK OF ABSTRACTS

ORGANIZER:

SERBIAN SOCIETY FOR MICROBIOLOGY

SUPPORTED BY:

Federation of European Microbiological Societies

Republic of Serbia

MINISTRY OF SCIENCE, TECHNOLOGICAL DEVELOPMENT AND INNOVATION

Publisher
Serbian Society for Microbiology
www.ums.rs

For publisher
Prof. dr Lazar RANIN
President of the Serbian Society for Microbiology

Editors
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Technical Editor & Cover design
Vojislav SIMIĆ & Stevan MIHAJLOVIĆ

ISBN 978-86-7078-178-8

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GR13

CLONING, OVEREXPRESSION AND CHARACTERIZATION OF A THERMOSTABLE ENDO-1,4-BETA-XYLANASE FROM *ANOXYBACILLUS VRANJENSIS* ST4

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This research deals with the characterization of a thermostable endo-1,4-beta-xylanase enzyme from *Anoxybacillus vranjensis* ST4, a thermophilic bacterium isolated from Vranjska Banja hot spring, Serbia. The enzyme shows a high degree of identity with the same type of enzyme from other species of the genera *Anoxybacillus* (97%), *Geobacillus* (74%) *and Paenibacillus* (65%). The gene for endo-1,4-beta-xylanase from the thermophilic strain ST4 was cloned into the pQE_Ek expression vector and successfully expressed and purified from the *Escherichia coli* M15[pREP4]. The study encompasses recombinant production, purification, and the comprehensive characterization of the enzymatic properties of endo-1,4-beta-xylanase. This is the first successful overexpression, purification and characterization of a recombinant thermostable endo-1,4-beta-xylanase enzyme from *Anoxybacillus*. With a monomeric structure of 38.7 kDa, the enzyme demonstrates peak activity at 70°C and pH 6.5. Notably, it exhibits remarkable stability across a wide pH range and at high temperatures, rendering it suitable for diverse industrial applications. Investigation into the enzyme's kinetic parameters, substrate specificity, and its ability to degrade xylan into high-energy value products further enhances understanding of its biotechnological potential. These findings underscore the significance of thermophilic bacteria and their thermostable enzymes in various industrial processes.

KEYWORDS: endo-1,4-beta-xylanase; microbial biotechnology; recombinant production

ACKNOWLEDGEMENT: This work was financially supported by the Ministry of Science, Technological Development and Innovation of the Republic of Serbia Contract numbers: 451-03-47/2023-01/200026, 451-03-47/2023-01/200168, 451-03-47/2023-01/200177.