FEMS 2023

Abstract Book

10th Congress of European Microbiologists

In collaboration with

9-13 July 2023 | Hamburg, Germany | www.fems2023.org

Table of Contents

W210 - Expression of PET-hydrolyzing enzymes in *Streptomyces* spp.

Presenting Author - *Milena Stevanovic, Institute Of Molecular Genetics And Genetic Engineering, University Of Belgrade, Serbia*

Author/s – *Brana Pantelic, Vukasin Jankovic, Jasmina Nikodinovic-Runic, Sandra Vojnovic*

Abstract Content

Plastic waste has become a serious global challenge that calls for sustainable solutions and requires rapid actions. Biocatalysis could present an adequate answer to this problem by providing different enzymes capable of degrading plastic polymers. *Streptomyces* strains as predominant soil inhabitants have also adapted to the presence of variety of plastic waste in natural environments, so they have been examined for the plastic degrading capabilities.

The aim of this work was to improve the biocatalytic properties of *Streptomyces* strains for their use in biodegradation of plastic polymers and develop a system for heterologous expression of polyethylene therephtalate (PET) degrading enzymes in *Streptomyces* spp.

Well studied *Streptomyces* lividans TK24 and S. albus NRRL B-1335, as well as two newly isolated Streptomycetes were used for expression of benchmark PETases and cutinases. Enzymes were cloned into pGM1202 *Escherichia coli–Streptomyces* shuttle vector and subsequently introduced into *Streptomyces* hosts either by polyethylene glycol-mediated protoplasts transformation or by electroporation. Cell-free extracts and supernatants of transformed cells were tested on different plastics using bis(2-hydroxyethyl) terephthalate (BHET), polycaprolactone (PCL) and Impranil as substrates in plate assays.

Expression of leaf-branch compost cutinase in *S. albus* and *S. lividans* resulted in an 8.5- and 2.5-times increase in esterase activities, respectively. Introduction of the enzyme into newly isolated strains that already showed some plastic degrading activity resulted in synergistic activity of the recombinant strains.