BIOPROSPECTING FOR NOVEL BACTERIAL SOURCES OF SALT-TOLERANT ENZYMES WITH BIOTECHNOLOGICAL APPLICATIONS

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Extracellular enzymes produced by halophilic and halotolerant microorganisms have evolved to retain structural stability and catalytic activity over a wide range of salinities and thus they could be useful in numerous industrial and environmental applications where high salt concentrations would otherwise inhibit enzymatic transformations.

Considering the biotechnological importance of salt-tolerant enzymes, the growing demand for these molecules on the global market and the current need for more efficient producers of such biocatalysts, the aim of the present study was to isolate and identify novel strains of halophilic and halotolerant microorganisms able of synthesizing extracellular hydrolases. In order to achieve this goal, five under-/uninvestigated salt lakes in Romania (i.e., Lake Amara, Lake Balta Alba, Lake Caineni-Bai, Movila Miresii Salt Lake and Braila Salt Lake) and the littoral zone of the Black Sea were sampled and subjected to bioprospecting studies. A total of 151 strains (138 bacteria and 13 archaea) were isolated and identified based on 16S rRNA gene sequencing. The bacterial strains belonged to the classes *Alphaproteobacteria*, *Betaproteobacteria*, *Gammaproteobacteria*, *Bacilli*, *Flavobacteriia* and *Actinobacteria*, while the archaeal strains belonged to the class *Halobacteria*.

The screening for hydrolytic enzymes showed that most of the strains were able to produce single or combined hydrolytic activities (i.e., protease, lipase, amylase, cellulase, xylanase and pectinase). The enzymes produced by three selected strains belonging to the genus *Bacillus* were active over a wide range of salt concentrations, temperatures and pH values. Due to such functional properties, these hydrolases could be suitable in various applications that require harsh physicochemical conditions.