

**TITLE:** CAATINGA'S SEMIARID SOIL AND ITS POTENTIAL AS A SOURCE FOR HALO-THERMOTOLERANT PROTEOLYTIC ENZYMES

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**ABSTRACT:**

Caatinga, also known as semi-arid, is a Brazilian biome still barely explored, that presents microorganisms and plant species highly resistant to the long periods of drought, high temperatures and salinity. One of the most abundant phylum in the semiarid soil is Actinobacteria, which is known for the high capacity to produce secondary metabolites. The soil region with the greatest presence of microorganisms is the rhizosphere, this microbiota presents different mechanisms of adaptation in response to the stressful conditions characteristics of this environment, which allows to infer about its important potential as a probable source of new biocatalysts in environmental and industrial processes. Enzymes occupy important roles in industrial products and processes, among them, proteases represent a huge group of enzymes, having as characteristic and attractiveness degradative and synthetic properties and versatility of application in different areas. With this purpose, the proteolytic activity was evaluated using fluorescent peptide libraries (Abz-KLRSSKQ-EDDnp) with fixed amino acid sequences, analyzing specificity and the enzyme cleavage pattern at acidic, neutral and basic pHs. A total of 52 actinobacteria were isolated and screened, among this 31 (73%) strains displayed the enzymatic activity at temperature of 30°C and in 0,1-4M salt's concentration range (NaCl). The proteases secreted hydrolyzed preferentially polar uncharged amino acid residues (Y - Tyrosine and N - Asparagine) following by positively charged groups (R - Arginine) in neutral to basic conditions, its S<sub>1</sub> subsite showed selectivity for L (Leucine) and were partially inhibited for PMSF and EDTA, suggesting the presence of serino and metalloproteases. This large repertoire of proteolytic and halophilic enzymes opens perspectives for the great potential of Actinobacteria as biocatalysts and other industrial and environmental applications.

**Keywords:** Caatinga, peptide library, protease, Actinobacteria

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