

Exploration of Thermophilic Microorganisms in Bundelkhand Region

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ABSTRACT

Extremophiles are microorganisms that thrive in extreme environmental conditions, such as high or low temperatures, extreme salinity or high acidic conditions that are inhospitable to other forms of life. These organisms have evolved with remarkable adaptations to survive and function in extreme environments. This study investigates the discovery of thermophiles in the Bundelkhand region, a semi-arid area prone to drought. Thermophilic bacteria were isolated from water samples collected from the Augasi pump canal in the Banda district. These bacteria were cultivated under controlled conditions simulating the region's environmental parameters, including elevated temperatures (45-60°C) and high salinity and characterised morphologically on the basis of shape, size, colour and colony. The isolated cultures exhibited hydrolytic enzymes, such as proteases, amylases, and lipases, which are highly stable and active at elevated temperatures. The presence of thermophiles in Bundelkhand expands our understanding of microbial diversity and its potential for biotechnological innovations. Future research will focus on characterizing these thermophiles on molecular and biochemical level to identify the strains as well as explore their enzymatic capabilities. Conservation of ecosystems supporting thermophilic microorganisms is essential for ensuring their continued availability for future research and applications. This research underscores the strategic importance of thermophiles in addressing environmental challenges and enhancing industrial processes in arid regions like Bundelkhand.

Keywords: Extremophiles, thermophiles, Bundelkhand region, high temperature.

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