Title : Microscopic Characterization and Biotechnological Potential of Rock-Inhabiting Yeast

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ABSTRACT

Yeasts can thrive in diverse environments, including rocks, which are extreme habitats characterized by drought, temperature fluctuations, and limited nutrients. Previous research has identified 24 and 74 rock-inhabiting yeast (RIY) isolates from limestone and sandstone, respectively. However, the available data lack clarity due to insufficient image resolution, inadequate detail, suboptimal composition, and the absence of standardized imaging conditions. This study aims to investigate the microscopic characteristics of these yeasts to obtain more detailed information and evaluate their biotechnological potential. RIY isolates were first recovered from glycerol stocks by culturing them on Yeast Extract-Malt Extract (YM) agar and incubating them at 25°C for three days. After colony formation, their morphology—including colony characteristics, cell shape, and budding patterns—was examined. The results showed that RIY isolated from limestone exhibited a 100% recovery rate (24 isolates), while those from sandstone had a lower recovery rate of 35.14% (26 isolates). Microscopic observations revealed that most RIY colonies from both rock types shared similar morphological characteristics and were classified as non-pigmented yeasts. Additionally, key yeast structures—such as nuclei, hyphae, blastospores, and ballistospores—were documented to support the discovery of novel yeast genera or species. Furthermore, this study found that traditional preservation methods were inadequate for maintaining RIY viability, particularly for sandstone isolates, due to their low recovery rate. To further evaluate their biosurfactant production potential, screening using the oil spreading and emulsification index methods is currently in progress.

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