

## **Selective Recovery and Molecular Identification of Laccase-Producing Bacteria from Selected Terrestrial and Aquatic Milieu in the Eastern Cape, South Africa: Toward the Production of Environmentally Relevant Biocatalysts**

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**Abstract :** Laccase is constantly gaining status as important biocatalyst in biotechnology. The illimitable potential of its industrial applications and the corresponding aggressive need for phenomenal volumes of extracellularly secreted laccases have called for its interminable production from sources which are able to meet this demand within a relatively short period of time, preferably bacteria. In response to this call, this study was designed to source for laccase-producing bacteria from different environmental matrices. Three sampling environments were chosen such as wastewater treatment plants, University of Fort Hare vicinity and the Hogback woodland, all within the Eastern Cape, South Africa. Samples such as effluents, sediments, leaf litters, degrading wood and rock scrapings were selectively enriched with some model aromatic compounds and were further screened qualitatively and quantitatively on five phenolic substrates ABTS (2,2'-azino-bis(3-ethylbenzothiazoline-6-sulphonic acid), Guaiacol, 1-Naphthol, Potassium Ferric Cyanide and Syringaldazine). Basis for selection was their ability to elicit a colour change on at least three of the above mentioned agar based assay substrates. The choice isolates were further identified based on 16S rRNA molecular identification techniques. 33 isolates were screened out of the 40 representative distinct colonies during the qualitative plate screens, while quantitative screens selected out 11 bacterial isolates. They were, based on molecular identification, designated as members of the genera *Pseudomonas*, *Stenotrophomonas* and *Citrobacter* of the gammaproteobacteria and *Bordetella* and *Achromobacter* of the betaproteobacteria respectively. We therefore conclude based on our outcomes that we may have isolated efficient laccase-producing bacteria, which might be of beneficial significance in catalysis and biotechnology.

**Keywords :** beta proteobacteria, catalysis, gammaproteobacteria, laccase

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