Isolation and molecular identification of lipase producing bacteria in natural oil substrates

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Lipases are biocatalysts with deserving ability to catalyze hydrolysis (of triglycerides), esterification (between free fatty acids and alcohols) and transesterification (between esters and alcohols) reactions under mild conditions. The increasing demand for lipases across various industries highlights the need of microbial sources that are capable of producing high enzyme yield and activity. The main objective of this study was the isolation and molecular identification of the lipase producing bacteria from natural oil substrates; coconut, peanut, corn and grated coconut meat residue (GCMR). Different bacterial isolates obtained from oil substrates were cultured separately in nutrient agar (NA) medium. Bacterial isolates were then screened for lipase activity using phenol red and tributyrin agar media. The isolate obtained from corn demonstrated highest lipase activity and the activity was further assessed quantitatively (as 153.48 U/mL) by spectrophotometric assay, using p-nitrophenyl palmitate (pNPP) as the substrate. The highest lipase producing bacterium was subjected to molecular identification. The bacterial deoxyribonucleic acid (DNA) was extracted using modified boiled cell method and the 16S rRNA universal barcoding region was amplified by polymerase chain reaction (PCR). The amplicon was sequenced bidirectionally and the sequence was searched over GenBank database using Basic Local Alignment Search Tool (BLAST). The bacterium was identified as *Staphylococcus pasteuri.* The lipase produced by the bacteria was partially purified using ammonium sulfate precipitation. The results demonstrate that the potential of *Staphylococcus pasteuri* as efficient microbial sources of enzyme lipase, highlighting their relevance in future industrial and biotechnological applications.

Keywords: *Lipase, Staphylococcus pasteuri, Molecular identification*