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A new isolate of thermophilic and organic solvent tolerant bacteria for lipase production using basal medium of palm kernel cake

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Abstract

Aims: This research focused on the selection of potential strains especially bacteria that can grow effectively in palm kernel cake (PKC) and produce high amount of thermostable and solvent tolerant (TS-OST) lipase. The work involved the exploration of renewable PKC as potential fermentation medium for discovery to novel TS-OST lipase that would have excellent tolerance and activity in presence of organic solvents with high temperatures for industrial applications.

Methodology and results: Using palm kernel cake (PKC) as source of thermophilic bacteria, 53 bacterial strains were found survived at temperature 65 degrees C. However, after subcultured several times, only 17 strains were found as pure thermophilic strains. Preliminary screening both qualitative and quantitative was performed to all 17 potential thermophilic bacterial strains and showed that only 11 purified thermophilic strains are lipase producer. Strain PKC-P1 produced highest enzyme activity (11.13 U/g), followed by PKC-P13 and PKC-C9. The lowest enzyme activity was lipase produced by PKC-C10 (0.76U/g). Strain PKC-P1 has been classified as Gram negative bacteria and identified as *Bacillus smithii* strain PKC_P1.

Conclusion, significance and impact of study: PKC as a by-product of oil palm industry consists of many nutrients that can give benefits towards industry and can be utilized in order to produce enzymes like lipases. From these results, it could be concluded that this lipase stable at temperature 65 degrees C and pH 7 and may be a potential candidate to be used in a variety of biotechnological applications. This finding revealed that a bacterial strain obtained from oil-rich environment which is PKC through isolation process has potential as a source of more economical enzyme to be applied in biotechnology industry.

Keywords

Author Keywords: Palm kernel cake (PKC); lipase; Solid state fermentation (SSF); thermophilic bacteria; thermostable (TS); organic solvent tolerant (OST)

KeyWords Plus: DIRECTED EVOLUTION; BACILLUS-SMITHII; ENZYMES; MICROORGANISMS; PURIFICATION

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