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**PRODUCTION, PURIFICATION, & CHARACTERIZATION OF α -AMYLASE
FROM CASSAVA (*Manihot esculenta*) PEELS BY USING *Aspergillus niger*,
Aspergillus flavus, & *Bacillus subtilis***

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Abstract

The increasing demand for industrial enzymes has intensified research into cost-effective and sustainable production methods of enzymes for daily use. This study focuses on the production, purification, and characterization of α -amylase using cassava (*Manihot esculenta*) peels as a low-cost, agro-waste substrate. The enzyme was produced through solid-state fermentation (SSF) using selected microbial strains. The research explores the enzymatic potential of strains, including two fungi (*Aspergillus niger*, *Aspergillus flavus*) and a bacterium (*Bacillus subtilis*). Cassava peels, an agro-industrial waste, were utilized as a carbon source while promoting environmental sustainability. The microbial isolates were cultured and screened for α -amylase production.

Results demonstrated that all tested microbes were capable of producing α -amylase, with *Aspergillus flavus* showing the highest enzyme yield under optimized conditions and *Aspergillus niger* showing the lowest production than *Bacillus subtilis*. The purified enzyme exhibited favorable catalytic properties with various properties and there some changes of enzyme activity with various changes in physiochemical parameters. From the study, it was found that among the three tested microorganisms, *Bacillus subtilis*, *A. flavus*, *A. niger*, there were significant differences in α -amylase production levels, as confirmed by ANOVA analysis ($F = 114.7679$, $p < 0.05$). This research highlights the viability of utilizing cassava peels as an effective substrate for microbial enzyme production, contributing to both waste valorization and cost-effective bioprocessing.

Keywords: *Manihot esculenta*, Solid-State Fermentation *Aspergillus niger*, *Aspergillus flavus*, *Bacillus subtilis*