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IDENTIFICATION OF THE RHIZOPUS SP. FUNGI AS AN ALTERNATIVE LACTIC ACID PRODUCTION SOURCE

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Abstract

The search for eco-friendly alternatives to conventional petroleum-based materials has intensified in an era marked by a growing global awareness of environmental sustainability. This study addresses the critical need for molecular identification and characterization of fungi sourced from a tempeh commercial starter culture for their potential role in fungal-based polymer production. The problem is the limited knowledge and understanding of the genetic composition of these fungi and their suitability for lactic acid (LA) production, which is a crucial component of fungal-based polymer manufacturing. This research examined the tempeh starter culture fungi to identify suitable strains for LA production.

The fungi were genotyped by DNA sequencing of the ITS region. The study revealed that the Ragi tempeh commercial starter culture contained only one strain of *Rhizopus* (*R. microsporus*), which was verified through ITS rRNA sequencing with 99.8% similarity to the GenBank database, simplifying control over fungal growth and potentially leading to consistent biomaterial yields. The method employed, involving DNA PCR and sequencing of the ITS region, proved to be accurate, straightforward, and not excessively labor-intensive. The PCR conditions were as follows: initial denaturation at 98°C for 2 min, followed by 25 cycles of denaturation (98°C for 15 seconds), annealing (60°C for 30 seconds), and elongation (72°C for 30 seconds), with a final extension at 72°C for 10 min. Consequently, the consistent presence of only one *Rhizopus* species in commercial starter cultures of tempeh presents a promising avenue for sustainable biomaterial production, particularly in LA production. The pilot flask setup at 1×10^7 spores/mL was inoculated into 150 mL shake flasks with 1.2 g/mL glucose, incubated at 37°C for 1 to 7 days with 100 rpm shaking, yielding 1.037 g/g after 5 days, demonstrating the feasibility of using this strain for industrial applications. © (2025), (International Islamic University Malaysia). All Rights Reserved.

Author keywords

DNA PCR sequencing; DNA sequencing of the ITS region; fungal polymer production; lactic acid production; molecular identification of fungi

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