

Identification of *Monascus* sp. Isolates and Profiling of Various Fermentation Using Selected Isolated Strain

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Structured Abstract

Background: Dyes and colorants play an important role in a variety of industries, with synthetic dyes being particularly popular due to their low cost and large-scale manufacturing. However, worries about their environmental and health consequences have sparked renewed interest in natural alternatives. *Monascus* sp., a filamentous fungus known to produce natural pigments, offers a viable option. This study aims to discover *Monascus* isolates from commercial red yeast rice and assess their suitability for fermenting rice bran (RB) as an alternate substrate to increase pigment production and nutritional value.

Methods: *Monascus* isolates were obtained from red yeast rice samples and cultured on potato dextrose agar (PDA). Growth rates were analyzed at different temperatures (27°C, 30°C, and 37°C) to determine optimal conditions. Two fermentation methods, solid-state fermentation (SSF) and submerged fermentation (SmF), were applied using RB, rice, and wheat as substrates. Gas chromatography-mass spectrometry (GC-MS) analysis was conducted to observe chemical composition changes, particularly in fatty acid profiles.

Results: The study successfully isolated *Monascus* sp. from red yeast rice. The highest growth rate was observed at 37°C, but higher temperatures did not necessarily enhance secondary metabolite production. RB fermentation at 37°C resulted in a significant increase in oleic acid content (37.45% at 37°C vs. 17.48% at 30°C), while butylated hydroxytoluene, an antioxidant, decreased, indicating temperature-dependent variations in antioxidant activity. Spectrophotometric analysis confirmed that RB had the highest red pigment concentration at 500 nm (0.810 at 37°C vs. 0.661 at 30°C).

Conclusion: This work shows that *Monascus* sp. can be used as a natural pigment source, whereas RB is a cost-effective and sustainable fermentation substrate. Optimizing fermentation conditions can increase pigment yield and nutritional benefits, making *Monascus* fermentation an attractive method for industrial uses in food, medicines, and cosmetics.

Keywords: Fermentation, Gas Chromatography-Mass Spectrometry (GC-MS), *Monascus* sp., Natural Pigments, Rice Bran (RB).

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