Title : Studies on Sake Fermentation from Blend of Sticky Millet and Job's Tears

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ABSTRACT

Sticky millet and Job's tears are indigenous cereals with high nutritional value, as they are rich in carbohydrates, proteins, dietary fiber, and bioactive compounds, particularly phenolic compounds that contribute to antioxidant activity. Fermentation of these cereals into alcoholic beverages represents an effective strategy to enhance their added value and biological functionality. This study aimed to investigate the production of sake from sticky millet combined with Job's tears and to evaluate the key biological properties of the resulting products. Sake was produced from sticky millet combined with either dehulled or non-dehulled Job's tears, using 1.02 g of starter culture per 50 g of cooked sticky millet and 100 g of cooked Job's tears. Solid-state fermentation was conducted in a 1.45 L container at room temperature (25–30 °C) for 7 days, followed by the addition of 350 mL of drinking water. Samples were collected during fermentation and analyzed for reducing sugar content using the DNS method, ethanol content by gas chromatography (GC), total phenolic content by the Folin–Ciocalteu method, and antioxidant activity by DPPH assay. After 13 days of fermentation, sake produced with non-dehulled Job's tears showed a decrease in reducing sugar content from 30.58 to 11.26 mg/mL, whereas sake produced with dehulled Job's tears exhibited an increase from 44.08 to 51.55 mg/mL. Correspondingly, ethanol content was higher in sake

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produced with non-dehulled Job's tears (4.31% v/v) compared to that produced with dehulled Job's tears 2.70% v/v. In addition, sake produced with non-dehulled Job's tears showed a slightly higher total phenolic content 16.70 g GAE/g than that produced with dehulled Job's tears 16.42 g GAE/g, and also exhibited higher antioxidant activity, with %inhibition values of 36.15 and 35.05 for non-dehulled and dehulled Job's tears, respectively. These results suggest that sticky millet combined with Job's tears is a promising raw material for sake production, and that the dehulling condition of Job's tears significantly influences ethanol production and quality characteristics of the final product.

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