

Development of Probiotic Cereal Beverage Using Yeast and Lactic Acid Bacteria Fermentation

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Abstract : This study investigates the fermentation of cereal substrates, based on the Ethiopian traditional beverage *borde*, using probiotic strains of *Pediococcus acidilactici* WS07 and *Saccharomyces cerevisiae* AM18 used singly and in co-culture. The pH and titratable acidity, microbial growth dynamics, fermentable sugars profile, volatile organic compounds, total flavonoids content, total phenolic content, antioxidant activity, pancreatic lipase and α -glucosidase inhibition were analyzed. The viability of every tested strain remained higher than 7 log CFU/mL, satisfying the requirements suggested for probiotic food items. The formation of organic acids is what caused the pH to decrease from roughly 6.6 to 3.8, yet this had no effect on the viability of the microorganisms. The fermentation process, involving *P. acidilactici* WS07 and *S. cerevisiae* AM18, led to the utilization of initial carbohydrates, production of organic acids, and generation of volatile compounds that enhance flavor and aroma. Ethanol and glycerol concentrations increased during fermentation, particularly in co-culture assays, contributing to the sensory qualities and stability of the beverages. The primary organic acids generated during fermentation were lactic and acetic acids. A total of 22 volatile substances, such as acids, alcohols, aldehydes, esters, ketones, and other substances, were found. Furthermore, the study demonstrates that fermentation of maize and sorghum with *P. acidilactici* WS07 and *S. cerevisiae* AM18 enhances the antioxidant activity and inhibition of pancreatic lipase and α -glucosidase, suggesting potential benefits in managing obesity and diabetes. Therefore, co-cultivating *S. cerevisiae* AM18 and *P. acidilactici* WS07 in cereal fermentation led to the successful production of probiotic drinks.

Keywords : probiotic beverage, *pediococcus acidilactici*, *saccharomyces cerevisiae*, volatile compounds

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