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Isolation and characterisation of potential probiotic yeast strains from local fermented foods: Gastrointestinal tolerance and antimicrobial activity assessment

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Abstract. Probiotic microorganisms, offering health benefits when consumed in sufficient quantities, are gaining recognition for their potential role in promoting wellness. This study focuses on isolating and characterising potential probiotic yeast strains sourced from fermented food products. This research evaluates the gastrointestinal tolerance and antimicrobial activity of isolated yeast strains, with the potential application in probiotic supplements and functional foods. Yeast strains were isolated from fermented food sources and identified using morphological analysis, PCR, gene sequencing, and genetic identification. Gastrointestinal tolerance was assessed through simulated gastric fluid (SGF) exposure, and antimicrobial activity was tested against foodborne pathogens. Six yeast strains (*Diutina mesorugosa*, *Pichia kudriavzevii*, *Candida mesorugosa*, *Candida* sp) were identified. They exhibited varying resistance to low pH in SGF, suggesting survivability in the stomach. Some strains selectively inhibited specific Gram-negative pathogens like *Pseudomonas aeruginosa* and *Salmonella* sp. These findings suggest the isolated yeast strains may serve as probiotics, promoting digestive health and food safety. They are potentially used in probiotic supplements and functional foods, promising improved overall well-being.

Keywords: antimicrobial, fermented food, functional food, gastrointestinal tolerance, probiotic yeast

INTRODUCTION

It is thought that the term probiotic comes from the Greek meaning "for life.". However, the term probiotics is used more commonly when it refers to supplementing the body with viable bacterial species believed to promote health. Probiotics are believed to be beneficial for overall health and well-being and may even help strengthen the body's natural immunity. FAO/WHO describes probiotics as live microorganisms that, when administered in adequate amounts, confer a health benefit on the host (FAO-WHO 2001). There are a few properties of probiotics that give benefits to host life. To be considered a probiotic, a strain must have certain characteristics that provide health benefits to the host. For example, probiotic bacteria must be able to survive in the digestive tract, adhere to the intestinal wall, and produce substances that inhibit the growth of pathogenic bacteria. Probiotics' beneficial effect is improving intestinal health, enhancing the immune response, and preventing cancer (Cruz *et al.* 2020; Śliżewska, Markowiak-Kopeć, and Śliżewska 2020).

The global demand for probiotics is increasing in nutraceuticals, nutricosmetics, and dietary supplements. The probiotic market is expected to increase from USD 57.8 billion in 2022 to USD 159.1 billion in 2027 at a compound annual growth rate (CAGR) of 8.1%, which is a significant increase compared to the previous year's market size of USD 57.8 billion. As consumers become more accustomed to preventative healthcare, the market is being

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