DETERMINATION OF SUGAR UTILISATION BY *Pediococcus pentosaceus* IN FERMENTATION OF MADATHAWALU

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ABSTRACT

In order to study the kinetics of the Lactic acid bacteria in indigenous rice based media, it is essential to investigate sugar utilization pattern by the isolate. Therefore, the objective of the study was to determine the sugar utilization ability of *Pediococccus pentosaceus* in *Madathawalu* based fermentation media. *Madathawalu* rice samples were inoculated with the known concentration of *Pediococccus pentosaceus* and after the fermentation, the sugar concentration was determined by using high performance liquid chromatography (HPLC) and the results show the sugar utilization pattern by the isolate.

Key words: P. pentosaceus, Madathawalu, Fermentation

1. INTRODUCTION

Bio-preservation refers to extended shelf life and enhanced safety of foods using microorganisms and/or their metabolites. Lactic Acid Bacteria (LAB) is generally employed in bio-preservation due to of their significant contribution to enhance the flavor, texture and, the nutritional value of the food products. LAB is used as natural or selected starters in food fermentations. Therefore LAB performs an essential role in the preservation and production of wholesome foods. Potential probiotic LAB, *Pediococcus pentosaceus* has been isolated, characterized and identified from fermented *Madathawalu* an indigenous rice variety of Sri Lanka at Industrial Technology Institute, Sri Lanka.

The genus *Pediococcus* belongs to the family *Lactobacillaceae* in the order *Lactobacillales*. They are coccus shape microbes, Gram-positive, non-motile, non-spore forming and are spherical bacteria. Since the end product of them is lactic acid, *Pediococcus pentosaceus* are tolerant to acid and bile [1]. *Pediococcus pentosaceus* can be cultured at 35 – 40 ^{0}C but are unable to grow at 50 ^{0}C. They are able to grow in pH values between 4.5 and 8.0 [2]. *Pediococcus pentosaceus* has been intensively investigated and widely employed for food preservation due to its ability to produce antimicrobial agents. Strains of *Pediococcus pentosaceus* produce antimicrobial inhibitory compounds known as bacteriocins and it is important LAB involved as starter culture in meat, vegetable and dairy fermentation causing characteristic flavor changes, improving hygienic quality and extending the shelf life of several products [3]. They are largely found in fermented foods that are rich in sugar content and ferment glucose to produce lactic acid [4] and they are widely distributed in beverages. One of the reasons for the increasing interest in fermented foods is its ability to promote the functions of the human digestive system in a number of positive ways. This particular contribution is called probiotic effect [5]. *Madathawalu* is red rice with dark, fine grain and it is highly recommended as an ayurvedic treatment to boost the immune system [6]. The indigenous rice rich have high amount of Glutamic acid, high concentration of vitamins, rich in fiber and they have low Glycemic index [6].

The substrates from the environment that are utilized for bacterial growth are called nutrients. During anabolism, nutrients are taken up and are changed into cell constituents in an energy depending process. Lactic acid bacteria have numerous nutritional requirements for growth, especially an organic compound as their carbon source including carbohydrates, peptides or amino acids, fatty acids, organic acids, nitrogen bases and aromatic compounds [7].