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Antiangiogenesis and Antibacterial Activities from the Marine-Derived
SUPPLEMENTATION STUDY OF MAGNESIUM (Mg), MANGANESE (Mn), AND POTASSIUM (K) TO THE FERMENTATION OF LACTIC ACID BACTERIA

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ABSTRACT

Microelement is a chemical element needed in small amounts, but has important role for the metabolic processes of microorganisms. Microelement is necessary for the metabolism of lactic acid bacteria as enzyme cofactors. Supplementation of magnesium, manganese and potassium to Streptococcus thermophilus, Lactobacillus acidophilus, and Lactobacillus plantarum that acts as a starter in the fermentation medium in the form of soybean extracts is done in the research. The first phase of the study aims to determine the best supplementation (magnesium, manganese, and potassium) and to determine the best combination starter (S. thermophilus, L. acidophilus, L. plantarum combination 1:0:0, 0:1:0, 0:0:1, 1:1:1, 1:1:2, 1:2:1, 2:1:1, 1:2:2, 2:1:2, and 2:2:1). The second phase of the study aim to determine the best conditions of aeration (aerobic, anaerobic, and semiaerobic) for the fermentation. The results of this study indicate that the best fermentation can be achieved in the presence of manganese supplementation on combination starter 2:1:2 with aeration aerobic condition.

Keywords: lactic acid bacteria, supplementation, magnesium, manganese, potassium

INTRODUCTION

Lactic acid bacteria are a group of Gram positive bacteria are widely used in fermented food processing industry. Besides widely used in food processing industries fermentation, lactic acid bacteria has the potential to provide a positive impact for human health (Lahtinen et al., 2011).

Growth and fermentation activities of lactic acid bacteria such as S. thermophilus, L. acidophilus, and L. plantarum are influenced by two important factors, namely the media and fermentation conditions. Fermentation medium used in this study is an extract of soybean with addition of skim milk. Protein content in soybean extracts is higher than in cow’s milk protein content (USDA, 2009). Lactic acid bacteria require nitrogen compounds in metabolic activity. Availability of nitrogen compounds in soybean extracts can be utilized by the bacterial cells to increase the metabolic activity (Corry et al., 2003).

Microelement is a chemical element needed in small amounts by microorganisms (Fitzpatrick et al., 2001). Microelement has an important role for the metabolic activity of microorganisms. Microelement