Response Surface Optimization of Exopolysaccharide Production from Sugarcane Juice by *Lactobacillus confusus* TISTR 1498

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ABSTRACT

Lactobacillus confusus TISTR 1498, isolated from Thai traditional fermented pork (Nham), could secrete large amounts of exopolysaccharides (EPS). Response surface methodology was applied to optimize the culture conditions for EPS production using Central Composite Design (CCD). The effects of three variables including pH (4-7), temperature (20-40°C) and nitrogen source (0.25-1.75 PYB) on EPS yield and biomass were investigated. The 1PYB was the mixtures of 5 g/L peptone (P), 2.5 g/L yeast extract (Y) and 2.5 g/L beef extract (B). Response surface methodology showed that the data were adequately fitted to a second-order polynomial model via quadratic regression relationships. The optimal culture conditions for EPS production in sugarcane juice were pH of 5.55, 29.75°C and 1.22PYB, which was composed of 6.1 g/L peptone, 3.05 g/L yeast extract and 3.05 g/L beef extract. Under the optimum condition, the predicted maximum EPS production was 107.5 g/L and the predicted biomass was 1.92 g/L. In submerged fermentation, sugarcane juice enhanced EPS yield twice as well as the modified MRS sucrose medium. In addition, the cost of medium can be lowered to 0.53 THB/g EPS, which was lower than that of the medium from the mixtures of the PYB (0.78 THB/gEPS).

Keywords: *Lactobacillus confusus*, exopolysaccharides, optimization, response surface methodology, sugarcane juice

INTRODUCTION

Exopolysaccharides (EPS) produced by lactic acid bacteria have important applications (Welman and Maddox, 2003), including as thickeners, stabilizers, emulsifiers, bodying and gelling agents in food, pharmaceutical and chemical products (Prasertsan et al., 2008). Some generally recognized as safe (GRAS) bacteria, particularly lactic acid bacteria (lactic acid bacteria), propionibacteria and bifidobacteria, are known for their EPS production ability (Andaloussi et al., 1995; De Vuyst and Degeest, 1999; Gorret et al., 2001). EPS derived from