

Improvement of folate biosynthesis by lactic acid bacteria using response surface methodology

ABSTRACT

Lactic acid bacteria (*Lactococcus lactis* NZ9000, *Lactococcus lactis* MG1363, *Lactobacillus plantarum* I-UL4 and *Lactobacillus johnsonii* DSM 20553) have been screened for their ability to produce folate intracellularly and/or extracellularly. *L. plantarum* I-UL4 was shown to be superior producer of folate compared to other strains. Statistically based experimental designs were used to optimize the medium formulation for the growth of *L. plantarum* I-UL4 and folate biosynthesis. The optimal values of important factors were determined by response surface methodology (RSM). The effects of carbon sources, nitrogen sources and para-aminobenzoic acid (PABA) concentrations on folate biosynthesis were determined prior to RSM study. The biosynthesis of folate by *L. plantarum* I-UL4 increased from 36.36 to 60.39 mg/L using the optimized medium formulation compared to the selective Man de Rogosa Sharpe (MRS) medium. Conditions for the optimal growth of *L. plantarum* I-UL4 and folate biosynthesis as suggested by RSM were as follows: lactose 20 g/L, meat extract 16.57 g/L and PABA 10 mM.

Keyword: Folate; Lactic acid bacteria; *Lactobacillus plantarum* I-UL4; Response surface methodology