

Improvement of medium composition for heterotrophic cultivation of green microalgae, *Tetraselmis suecica*, using response surface methodology

ABSTRACT

Optimization of medium composition for the improvement of heterotrophic cultivation of green microalgae, *Tetraselmis suecica*, was performed using response surface methodology (RSM). Heterotrophic cultivation of *T. suecica* was conducted in total darkness using Walne medium formulated with natural sea water. Initially, the effect of two types of carbon source (glucose and sodium acetate) and various types of nitrogen source (peptone, yeast extract, meat extract, malt extract, urea, sodium nitrate and ammonium nitrate) on growth of *T. suecica* was studied. The concentration of medium component that was found to significantly influence the heterotrophic growth of *T. suecica* (glucose, peptone, yeast extract and meat extract) was further optimized using RSM. The medium that consists of 5.78 g/L glucose, 9 g/L peptone, 4.48 g/L yeast extract and 3.01 g/L meat extract was found optimal for heterotrophic cultivation of *T. suecica*. The final cell concentration (28.88 g/L) obtained in heterotrophic cultivation using this optimized medium was about 3 and 2 times higher than obtained in photoautotrophic culture (8.40 g/L) and non-optimized medium for heterotrophic cultivation (13.81 g/L), respectively. In addition, the cell yield based on glucose consumed (9.31 g cell/g glucose) was increased by about 3 times as compared to non-optimized medium (3.61 g cell/g glucose).

Keyword: Green microalgae; *Tetraselmis suecica*; Heterotrophic algae culture; Medium optimization; Response surface methodology