Isolation and culture medium optimisation using one-factor-at- time and response surface methodology on the biodegradation of the azo-dye amaranth

ABSTRACT

Isolate JR1 was isolated from the polluted textile industry activities site in the Juru Penang area. This bacterium was characterized as a gram-positive Bacillus bacterium and also gave a positive biochemical test or catalase test and oxidase test. The isolate JR1 gave a maximum decolourization of Amaranth dye under static conditions with the rate of decolorization of 98.82%. Seven variables which are pH, temperature (°C), ammonium acetate (g/L), glucose (g/L), sodium chloride (g/L), yeast (g/L) and dye concentration (ppm) was run by using Plackett-Burman design for the effective parameter of the decolourization of Amaranth. From the seven variables, three effective variables which were ammonium acetate, glucose, and dye concentration were further optimized by using a central composite design. The optimum value of ammonium acetate concentration at 0.74 g/L, glucose concentration at 3.0 g/L and a dye concentration at 58.1 ppm gave the highest percentage of ecolourization. Thus, this isolate could provide an alternate solution in removing toxic dyes from environments.