**Production of laccase from *Serratia proteamaculans* and its potential in decolourisation of an anthraquinonoid dye - Remazol Brilliant Blue R**

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**Abstract**

A potential ligninolytic γ- proteobacterial strain originally screened and isolated from decomposed biomass near Ottawa riverside was identified as *Serratia proteamaculans*. The impacts of cultural conditions on laccase production of the bacterial strain in submerged culture conditions was investigated using one-variable-at-a-time methodology (OVAT). The bacterial strain was found to produce laccase between 20-35°C (opt. 30°C) and 6 - 11 pH (opt. 9 pH). Maximum enzyme production was observed after 48 hours of incubation time and the production of laccase increased at alkaline pH. Laccase production was enhanced by using yeast extract and NaNO3 as organic and inorganic nitrogen sources, respectively. Significant increase in laccase production was found in the presence of cations like Cu2+, Li+, Mn2+, Ca2+ (0.5mM) and in the presence of organic solvents like acetone and chloroform (10%). The OVAT method of optimization resulted in a 6-fold increase (3523 U/ml) in the yield of laccase from the unoptimized media. Decolourisation of recalcitrant anthraquinone dye Remazol Brilliant Blue R (RBBR) by *Serratia proteamaculans* was also investigated and the bacterial strain effectively decolourized the dye at an alkaline pH range in 48 hours of incubation. The results of this study indicate a promising potential of this strain and its enzymes in industrial applications and wastewater treatments.

Keywords: Laccase; screening; *Serratia proteamaculans*; optimization; Remazol dye

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