



ABSTRACT

Cellulase production from bacteria can be an advantage as the enzyme production rate is normally higher due to the higher bacterial growth rate as compared to fungi. Optimization of fermentation conditions and selection of substrates are important for the successful production of cellulase. This study was conducted to optimize the parameters for fermentation to enhance cellulase production and characterization by our local isolate *Bacillus subtilis* BS-07 by submerged fermentation technique in 250ml Erlenmeyer flasks. The agricultural byproduct, rice husk was used as a substrate for the production of enzyme. The effect of different parameters like substrate concentration, pH, carbon source, nitrogen source, organic acid, salt concentration, inoculum size, Sodium dodecyl sulfate (SDS) concentration and fermentation period were investigated and optimized. Concentration of enzyme was estimated by taking optical density of enzyme mixture and calculating enzyme units from optical density. Optimized enzyme production was achieved by using 4% substrate concentration, pH 6.5, 0.4% NaCl concentration, 2.5% inoculum concentration, 0.4% SDS, Xylose as a carbon source, yeast extract as organic nitrogen source, ammonium citrate as inorganic nitrogen source for 48 hours fermentation.

Characterization of cellulase was done by determining the effect of temperature, pH and metal ions on activity and stability of the cellulase enzyme. It was observed that the enzyme was most active at 50°C, 7.0 pH, in the presence of Na⁺, K⁺, Co²⁺, Al³⁺ while inhibited by Ag⁺, Ni⁺², Zn⁺², Pb⁺² and Hg⁺² metal ions. It was found that enzyme was most stable under 30°C, pH 7 and K⁺.