

## ABSTRACT

The present study is concerned with biosynthesis and characterization of  $\alpha$ -amylase by *Aspergillus niger*. In this context, solid-state fermentation technique was employed using potato peel as substrate. Various cultural conditions such as incubation period, incubation temperature, pH of the medium, moisture level and inoculum size were optimized for maximum  $\alpha$ -amylase yield. The results indicated that maximum enzyme production (1262.27 U/g) was observed after 72 h incubation at 30°C, pH 5 with 5% moisture level & inoculum size. Effect of nitrogen sources, carbon sources and surfactants on production of  $\alpha$ -amylase was also studied and optimum conditions were determined, accordingly. Among different nitrogen and carbon sources evaluated, peptone (1.5%),  $\text{NH}_4\text{NO}_3$  (0.75%) and soluble starch (1.25%) gave maximum  $\alpha$ -amylase production. However, surfactants 0.1% Tween 40, Tween 80 and Triton X-100 were most effective for enhancement of enzyme yield. Under all the optimized culture conditions, the maximum enzyme production was 1298.12 U/g.

For characterization of crude  $\alpha$ -amylase, effect of incubation time, temperature, pH, substrate concentrations and metal ions on enzyme activity was investigated. The results revealed that the maximal enzyme activity was found at 40°C, pH 6.0, substrate concentration 1% incubated for 10 min. Enzyme activity was enhanced in the presence of  $\text{Ca}^{2+}$ ,  $\text{Cs}^{2+}$ ,  $\text{Mn}^{2+}$  and  $\text{Co}^{2+}$ , whereas reduced in the presence of  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ag}^{2+}$  and  $\text{Cu}^{2+}$ .