ABSTRACT

Phytase is a phosphatase enzyme which release inorganic phosphorus from phytate compounds available in feed and soil to enhance the uptake of phosphorus in monogastric animals and plants respectively. The present study was carried out on extraction and biological applications of phytase produced from *Aspergillus niger* under solid state fermentation. In order to optimize the fermentation protocol, the effect of various fermentation parameters were evaluated on the production of phytase enzyme such as effect of pH, incubation temperature, incubation period, phytase inducer and their concentrations, carbon and nitrogen sources and their concentrations, concentrations of various micronutrients i.e KH_2PO_4, $CaCl_2$, $MgSO_4.7H_2O$, $ZnSO_4$ and $FeSO_4.7H_2O$. Using optimized conditions, maximum production was obtained which was 3.276±0.012 U/ml. Phytase produced from *Aspergillus niger* was characterized for best activity. Effect of pH, temperature, thermal stability, pH stability, substrate concentration, different metal ions and inhibitors on phytase activity was observed. Optimum temperature and pH for phytase activity was found 30°C and 5.5 respectively. It was also observed that phytase from *Aspergillus niger* show a wide range of thermal and pH stability. It was observed that Phytase enzyme extracted from *Aspergillus niger* was purified by precipitating the protein using ammonium sulfate followed by dialysis. The purified phytase activity was found 4.774±0.032 U/ml. Phytase was applied as a biofertilizer on maize plant and as a potential bread making additive in food industry.