

ABSTRACT

Amylases produced by thermophilic microorganisms make up a large share of worldwide enzyme market. Seven bacterial strains were collected from water samples of Gilgit hot spring and screened for amylolytic activity. The screening was based on the determination of the diameter of zone of clearance and static fermentation. Of all the strains tested, S3 gave the maximum amylase production (310 μ mol/min). The selected strain was found to be Gram +ve, rod-shaped, spore forming, catalase +ve, citrate +ve, starch and gelatin hydrolysis +ve suggesting that it belongs to *Bacillus* sp. Physical and nutritional requirements for optimized amylase production by this selected strain were investigated, such as the type of medium, temperature, pH, inoculum size, incubation time, carbon sources, and sources of both organic and inorganic nitrogen. The strain was determined to be *Aeribacillus* following 16S rRNA sequencing. The ideal conditions for maximum amylase production were found to be 65°C, pH 7.5, with a 48-hour incubation time, 1.5% dextrose as optimized carbon source and 1.5% malt extract as optimized organic nitrogen source. Ammonium nitrate proved the ideal inorganic nitrogen source for enzyme synthesis, but malt extract was the most productive organic nitrogen source. Furthermore, the inoculum size influenced production of enzyme, with 1.5 ml exhibiting as the highest yield. These findings focus on the potential of *Aeribacillus* for industrial enzyme production.