

Identification of new bacteria with high amylase activity in Abadan Choebdeh coast, optimization and purification of enzyme with significant activity in the new strain *Salinicoccus roseus*- Persiangulf TA4

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Abstract

Persian Gulf, due to its unique ecological structure, is the habitat of marine bacteria with the potential to produce hydrolytic enzymes such as amylase. Due to the importance of microbial enzymes in various industries, this study was conducted for the first time with the aim of identifying, optimizing and purifying amylase enzyme from new bacterial strains isolated from the north of the Persian Gulf (Abadan Choebdeh port). Sampling was done in autumn, 2019 from 10 different stations (water and sediment samples) in completely sterile conditions. Phylogenetic analysis of 16S rRNA sequences identified new amylase-producing strains including *Salinicoccus roseus*-Persiangulf TA4, *Aeromonas hydrophila*-Persiangulf TA8 and *Pseudomonas oleovorans*-Persiangulf T10. The new Persiangulf TA4 strain showed significant amylase activity compared to other strains. The optimum growth temperatures for strains TA4, TA8 and TA10 were 37, 30 and 37-30 °C, respectively. The optimal growth pH for the three strains was 7/5, 7/5 and 6-7, respectively, and the optimal salt concentration for the growth of these bacteria was 7/5%, 0/0 % and 2/5%, respectively. The hydrophilic strain of TA4 was also able to grow at 25% salt concentration. Optimal conditions for enzyme production were detected by TA4 strain after 48 hours of incubation, 35 °C and pH 7, respectively. Also, starch and peptone induced higher amylase production. High specific activity (8.87 U / mg) was found in chromatography step. The optimum temperature and pH for the purified enzyme activity were 60 °C and pH 9. This enzyme was able to maintain most of its activity in a wide range of temperature and pH, so that it was able to maintain 90-100% of its activity at 65-45 °C and at 80/33% at 70 °C. Also, this enzyme was able to maintain 80-100% of its activity in the pH range of 6-11. The industrial application of this new TA4 enzyme is recommended for further investigation due to its interesting properties.

Keywords: *Salinicoccus roseus*, Amylase, Persian Gulf, Optimization, Purification.