

Optimization and Characterization of Cold Active Amylase from a Psychrotroph Isolated from Samiti Lake, Sikkim

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Abstract—Microbes have been intriguingly associated with the world of science since time immemorial, they have been presumed to be present ubiquitously. However, of late their presence in extreme environments has posed a curiosity in the human minds with regard to their infinite possibilities. This particular avenue has captivated a lot of attention with regards to the various research and development, with a whole new era of possibilities in today's world. The ocean depths, polar and alpine regions comprise a major part of the cold ecosystems. Cold tolerant enzymes produced by the cold-tolerant bacteria are of commercial interest because of their applications even at low temperature. Amylases are extensively used in a wide range of starch industries such as baking, brewing, distillery, textile industry, paper industry and detergent industry; and also have abundant biotechnological applications such as food processing, pharmaceutical and bioremediation. The objective of the present study was to isolate a cold-adapted bacterial strain from the water samples of Samiti Lake (27.5617° N, 88.1874° E, alt 15,700 ft, West Sikkim) for production of cold-active amylase and carry out their production optimization. A potential isolate (lab designation ABSL1) was selected for enzyme production. The amylase production was found to be maximum at 15° C and pH 8. Glucose was found to be the most suitable carbon source and sodium nitrate was found to be the best nitrogen source. The phylogenetic analysis revealed that ABSL had the highest homology (99%) with *Bacillus flexus*.