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HYDROLYTIC ENZYME PRODUCTION POTENTIAL OF BACTERIAL POPULATION FROM SAHASTRADHARA COLD SULFUR SPRING, UTTARAKHAND

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Abstract

Hydrolytic potential of bacterial isolates from Sahastradhara sulfur spring was explored using qualitative approach. A total of 14 isolates, obtained by serial dilution and spread plate method, were purified by quadrate streaking. The isolates were characterized morphologically and biochemically. Bacterial population was comprised of rod shaped members. All the recovered isolates were Gram positive in nature and were screened for production of amylase, cellulase, lipase and protease. All the isolates exhibited amylolytic activity. 71.4%, 85.7% and 64.2% were positive for cellulase, lipase and protease respectively. Majority of isolates were positive for more than one hydrolytic activity. The percentage of isolates exhibiting single, two, three and four hydrolytic activities was 7.1%, 14.2%, 14.2% and 64.2% respectively. Larger proportion of population had good amylolytic potential. Enzyme index greater than one was shown by 42.8%, 28.5%, 14.2% and 21.4% isolates for amylase, cellulase, lipase and protease respectively.

Key words: Sulfur spring, Amylase, Cellulase, Lipase, Protease.

Introduction

Microorganisms are absolutely indispensable for sustenance of life on earth and intricately involved in virtually every aspect of life. They are ubiquitous in nature, inhabiting almost every environment from favourable habitats to extreme environments like hydrothermal vents, where sustenance of life is really hard to even imagine. Microbes are very sturdy and adaptable to changes in environment and bedwell a wide range of temperature, pH, salinity and nutrient availability conditions. They maintain balance in ecosystem by involvement in biogeochemical cycling and interaction with other life forms. To thrive in and adapt to a variety of conditions, they have to produce a vast array of enzymes and other compounds. A number of microbial products produced for their sustenance are also commercially valuable to humans. Therefore microbial wealth has been exploited from long time and continues to be studied for availing novel products. Amylases, cellulases, lipases and proteases are extracellular hydrolytic enzymes with well established uses in a number of industries. Continuous investigations are being carried out to avail better variants of existing enzymes to make the processes safer for environment and lighter on pocket. Present study is an attempt to explore hydrolytic potential of an untouched site to reveal the hidden microwealth.

Amylases are used in starch processing industries, liquefaction, manufacturing of high fructose containing syrups, maltotetraose syrup (G4 syrup), maltose, oligosaccharide mixtures, high molecular weight dextrins, desizing process, direct fermentation of starch to ethanol and an array of other applications (Aiyer 2005; Karnwal & Nigam 2013). Cellulases have uses in paper and pulp, detergent, textile, bioethanol, wine and brewery, food processing, animal feed, olive oil extraction, carotenoid extraction industries and in waste management (Kuhad *et al.* 2011). Lipases have application in food, dairy, paper and pulp, textile and detergent industries (Hasan *et al.* 2006). Proteases have essential role in manufacturing of all types of detergents including regular detergents and the ones used for cleaning contact lenses and dentures. Use of proteases has made leather processing process safer for environment by replacing hazardous chemicals

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