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Production of biodegradable plastic by filamentous bacteria isolated from Saudi Arabia

Magda M. Aly, Saleh M. Al-Garni * and Saleh A. Kabli

*Faculty of Science, King Abdul Aziz University, P.O.Box 80203, Jeddah 21589, Saudi Arabia. *e-mail: salgarni@kau.edu.sa*

Abstract

Polyhydroxyalkanoates (PHAs) are energy and carbon storage materials accumulated under unfavorable microbial growth conditions in the presence of excess carbon source. PHAs were attracting much attention as substitute for non-degradable petro-chemically derived plastics because of their similar material properties to conventional plastics and complete biodegradability under natural environment upon disposal. Out of twenty actinomycetes isolates obtained from different samples collected from Jeddah city, Saudi Arabia, sixteen isolates (80%) accumulated polyhydroxybutyrate (PHB) 0.5-9% of their dry weight after growth at 30°C for 7 days. The isolation media were both starch-nitrate and actinomycete isolation agar (AIA) media with and without 25 µg/ml streptomycin and 10% NaCl. The best PHB producer isolate (NM10) which accumulated 9% of PHB of its dry weight was selected for more studies. Based on the morphological, physiological and biochemical tests, it was identified as *Streptomyces* sp. NM10. Culturing of the selected *Streptomyces* isolate in production medium with pH 6.5 and incubation at 25°C and 120 rpm for 5 days enhanced both growth and % of PHB accumulation, respectively, from 9% to 15.2%.

Key words: Actinomycetes, *Streptomyces*, poly-®-hydroxybutyrate, biodegradation.