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## INTRODUCING A NEW BACTERIAL STRAIN CAPABLE OF PRODUCING PHA FROM PETROCHEMICAL INDUSTRY WASTEWATER

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### Abstract

Polyhydroxyalkanoate (PHA) is a biodegradable and environmentally friendly thermoplastic that is produced as a carbon-energy storage source by bacteria that are challenged by nutrient limitation. The major problem associated with the industrial production of PHA is their high production cost, this study was carried out using petrochemical wastewater as the major substrate to decrease the production cost in isolating and cultivation of PHA-producing bacteria. For this purpose, microorganisms were isolated from the Bandar Imam petrochemical (BIPC) wastewater of Iran. The purified colonies were screened for intracellular granules by staining with Sudan Black and Nile blue. The positive-staining strains were cultured for production of PHA in BIPC wastewater. The culture was incubated at 37°C with shaking at 150 rpm for 5 days. Among positively stained, one novel gram positive bacteria capable of accumulating PHA was isolated and according to partial sequencing of its 16s ribosomal RNA gene with 98% similarity identified as *Bacillus axaraquiensis*. PHA content in 30 g/l biomass was reached 75.4% and 79.96% in synthetic medium and BIPC wastewater, respectively. This polyester was purified from freeze-dried cells and analyzed. The growth curve of this isolate was also drawn. This curve showed that the polymer production begins from stationary stage. Interestingly, its growth curve didn't followed classical bacterial growth curve and during 80 hours showed 10 log phases followed with stationary phase. Hence that PHA production is occurs routing in stationary phase and considerable biomass is needed to obtain maximum PHA, this isolate can be a good candidate for industrial PHA production from a cheap and easily accessible carbon source such as petrochemical wastewater.

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