ABSTRACT

The present research examines the utilization of polypropylene waste as a potential source of carbon employing bacteria for the synthesis of polyhydroxyalkanoates (PHA). PHAs are excellent substitute for some widely used synthetic plastic as they are biodegradable and renewable with less toxicity. The polypropylene waste was pyrolyzed at 400°C and 450°C for obtaining the polypropylene oil. *Bacillus subtilis, Bacillus clausii, Pseudomonas* sp. and *Xanthomonas oryzae* were selected because their cells contain PHA granules. Two strains i.e. *Bacillus subtilis* and *Pseudomonas* sp. were capable to grow on the MSM medium agar plates containing pyrolyzed polypropylene waste oil. The morphology of bacteria was observed by gram staining. Two qualitative screening tests were also performed i.e. Sudan black B and Nile blue-A on bacterial strains which were able to grow on pyrolyzed PPWO. Quantitative screening of bacterial strains revealed that *Pseudomonas* sp. was able to accumulate maximum amount of PHA utilizing pyrolyzed PPWO. Optimization of various physico-chemical parameters was performed to increase the production of PHA. After optimization, the percentage of maximum amount of pure PHA 32.24% (w/w) was obtained on basis of the CDW under: pH 7 at 30°C utilizing 1% pyrolyzed PPWO with 1% inoculum size in the presence of ammonium nitrate as nitrogen source after 120h of incubation along with an additional carbon source (sodium gluconate). This amount of PHA was collected using sodium hypochlorite extraction method along with chloroform. Then the PHA accumulated was then furthermore characterized. The bonds representing adsorption were observed at 1396.56 cm^{-1} 2954.13 cm^{-1} and 1584.75 cm^{-1} exhibited that the recovered polymer was PHA. Thermogravimetric analysis showed that complete decomposition of extracted polymer (PHA) was observed at 478°C.