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Characterization of Enhanced Thermostable polyhydroxyalkanoates

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The biosynthesis and properties of polyhydroxyalkanoate (PHA) are determined by the bacterial strain and the culture condition. Hence this study elucidates the structure and properties of PHA produced by a newly isolated strain of photosynthetic bacterium, Rhodobacter sphaeroides ADZ101 grown under the optimized culture condition. The properties of the accumulated PHA were determined via FTIR, NMR, TGA and GCMS analyses. The results showed that acetate and ammonia chloride had the highest PHA accumulation with ratio of 32.5 mM at neutral pH. The structural analyses showed that the polymer comprise of both short and medium chain length monomers ranging from C5, C13, C14, and C18 as well as the presence of novel PHA monomers. The thermal analysis revealed that the maximum temperature of decomposition occurred at 395°C and 454 °C, indicating two major decomposition reactions. Thus this bacterial strain, optimized culture condition and the abundance of novel monomers enhanced the thermostabilty of the accumulated PHA.

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