

Characterization of Enhanced Thermostable Polyhydroxyalkanoates

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Abstract : 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 a ratio of 32.5 mM at neutral pH. The structural analyses showed that the polymer comprises 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 thermostability of the accumulated PHA.

Keywords : bioplastic polyhydroxyalkanoates *Rhodobacter sphaeroides* ADZ101 thermostable PHA

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