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Analysis and optimization of polyhydroxyalkanoates production by environmental bacteria

Adhikari, Sandesh; Bhattarai, Saman; Shrestha, Roja; Shah, Shikha Shree; Kunwar, Usha
Bmc Microbiology

The versatile non-biodegradable material plastic has significantly enhanced innovation, but its production relies on fossil fuels and non-renewable resources, which causes severe pollution and ecosystem disruption.

Cited publication:

The Integration of Textile Wastewater Treatment with Polyhydroxyalkanoate Production by *Enterobacter* Strain TS3

Synthesis and Properties of Degradable Poly(3-hydroxybutyrate-co-3-hydroxyvalerate) [P(3HB-co-3HV)] from Waste Fish Oil

Volova, Tatiana G.; Kiselev, Evgeniy G.; Sukovatyi, Alexey G.; Zhila, Natalia O.; Sapozhnikova, Katerina
Polymers

The article presents the results of the first successful synthesis of degradable microbial copolymer of 3-hydroxybutyrate and 3-hydroxyvalerate [P(3HB-co-3HV)] by the wild-type strain *C. necator* B-10646 using waste fish oil.

Cited publication:

Utilisation of tuna condensate waste from the canning industry as a novel substrate for *Enterobacter* production

The genus *Halomonas*: A promising haloalkaliphilic bacterium for dye biodegradation in dye wastewater

Bogale, Fekadu Mazengiaw; Aragaw, Tadele Assefa
Journal Of Hazardous Materials Advances

The treatment of textile dye wastewater (WW) presents significant challenges, owing to its high salinity and presence of persistent synthetic dyes. Biological methods are considered the preferred ecofriendly approach.

Cited publication:

Enhanced immobilization efficiency of *Enterobacter* sp. TS3 on sugarcane bagasse and removal of dyes

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Synthesis and Properties of Degradable Poly(3-hydroxybutyrate-co-3-hydroxyvalerate) [P(3HB-co-3HV)] Derived from Waste Fish Oil

By Volova, TG (Volova, Tatiana G.) ; Kiselev, EG (Kiselev, Evgeniy G.) ; Sukovatyi, AG (Sukovatyi, Alexey G.) ; Zhila, NO (Zhila, Natalia O.) ; Sapozhnikova, KY (Sapozhnikova, Kristina Yu.) ; Ipatova, ND (Ipatova, Natalia D.) ; Shishatskii, PO (Shishatskii, Peter O.)

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Abstract The article presents the results of the first successful synthesis of degradable microbial copolymers of 3-hydroxybutyrate and 3-hydroxyvalerate [P(3HB-co-3HV)] by the wild-type strain C. necator B-10646 using waste fish oil (WFO) obtained from the heads of *Sprattus sprattus balticus*. Samples of copolymers with

3HV monomer contents from 11.9 to 59.7 mol.% were synthesized with fractional and controlled feeding of potassium valerate, a precursor of 3HV monomers, into the bacterial culture. Samples synthesized on WFO with different contents of 3HV monomers had a reduced degree of crystallinity (36.5% and below), and close average molecular weight (390-573 kDa), with polydispersity of 2.6-3.0, and retained thermal stability, with a gap between the melting point and the thermal degradation temperature of over 100 degrees C. The thermal behavior of the samples, including the kinetics of exothermic crystallization and spherulite formation, was studied. Demonstrating the possibility of using WFO for the effective synthesis of P(3HB-co-3HV) with macroinclusions of 3HV monomers without deterioration of their properties is important for expanding the raw material base, reducing costs and increasing the availability of these promising bioplastics.

Keywords

Author Keywords: waste fish oil; biodegradable polyhydroxyalkanoates; renewable materials; copolymers; biosynthesis

Keywords Plus: RALSTONIA-EUTROPHA; ENZYMATIC DEGRADATION; ALCALIGENES-EUTROPHUS; MICROBIAL-PRODUCTION; PROPIONIC-ACID; POLYHYDROXYALKANOATES; CRYSTALLIZATION; PHASE; PHB; POLY(3-HYDROXYALKANOATES)

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