

Purification of polyhydroxybutyrate produced by a mixed enriched culture

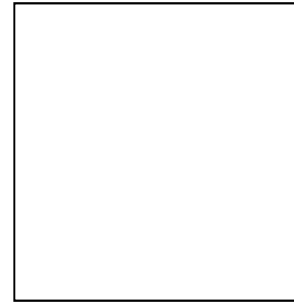
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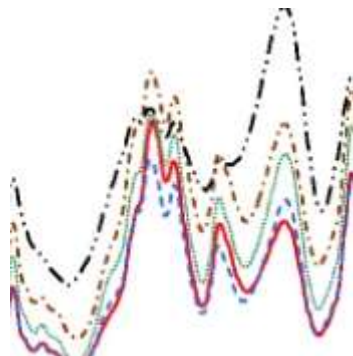
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Description

This study focused on investigating the feasibility of purifying polyhydroxybutyrate (PHB) from mixed culture biomass by alkaline-based chemical treatment. The PHB-containing biomass was enriched on acetate under non-sterile conditions. Alkaline treatment (0.2 M NaOH) together with surfactant SDS (0.2 w/v% SDS) could reach 99% purity, with more than 90% recovery. The lost PHB could be mostly attributed to PHB hydrolysis during the alkaline treatment. PHB hydrolysis could be moderated by increasing the crystallinity of the PHB granules, for example, by biomass pretreatment (e.g. freezing or lyophilization) or by effective cell lysis (e.g. adjusting alkali concentration). The suitability of the purified PHB by alkaline treatment for polymer applications was evaluated by molecular weight and thermal stability. A solvent based purification method was also performed for comparison purposes. As result, PHB produced by mixed enriched cultures was found suitable for thermoplastic applications when purified by the solvent method. While the alkaline method resulted in purity, recovery yield and molecular weight comparable to values reported in literature for PHB produced by pure cultures, it was found unsuitable for thermoplastic applications. Given the potential low cost and favorable environmental impact of this method, it is expected that PHB purified by alkaline method may be suitable for other non-thermal polymer applications, and as a platform chemical.



Publication

Yang Jiang, Gizela Mikova, Robbert Kleerebezem, Luuk AM van der Wielen & Maria C Cuellar, Feasibility study of an alkaline-based chemical treatment for the purification of polyhydroxybutyrate produced by a mixed enriched culture, [AMB Express volume 5, Article number: 5 \(2015\)](#)