**Poly(3-hydroxybutyrate-*co*-3-hydroxyvalerate) produced by *Azotobacter vinelandii*: Synthesis and characterization.**

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Unlike traditional plastics derived from fossil fuels, biopolymers offer a more sustainable alternative, as they have similar thermomechanical characteristics. The growing potential of sustainable materials such as polyhydroxyalkanoates presents an opportunity to promote the circular economy [1,2]. Among them, poly(3-hydroxybutyrate-*co*-3-hydroxyvalerate) (PHBV) has attracted substantial attention as a promising material for different industrial applications [2]. The bacterium *Azotobacter vinelandii* produce PHBV by the addition of valerate during cellular growth [3]. In cultures in a bioreactor, the molar composition of PHBV is affected by agitation rate and modality of culture. In this study, PHBV production by *A. vinelandii* OP was evaluated in extended batch cultures to agitation rates of 300 and 600 rpm. 3-hydroxyvalerate (3HV) fraction into the PHBV was measured using GC-MS and PHBV yield from sucrose (YPHBV/S) was determined. Staining with Nile Red was performed to observe through fluorescence microscopy the production of PHBV. The results indicate that under the conditions evaluated, a similar PHBV content (up to 61 ± 2 % w w-1) was obtained, however, different 3HV fractions were obtained. In cultures performed to 300 rpm a YPHBV/S of 0.17 g g-1 and 3HV fraction of 11.5 ± 1.4 mol % (at 96 h), whereas to 600 rpm a highest YPHBV/S (0.24 g g-1) and 3HV fraction of 7.6 ± 1.1 mol % was achieved (at 48 h). PHBV films containing 11.5 and 14.9 mol % 3HV (cell harvested at 96 h) from cultures performed at 300 and 600 rpm, were prepared through the conventional solvent-cast technique, and characterized through thermomechanical analysis. The TG graph analysis showed that the two PHBV films did not begin thermal decomposition until 293 °C, and there were no significant decreases in the Tonset and Tpeak (in °C) with increasing 3HV content, showing equal thermal stability. Overall, the results of this study will improve the understanding of the PHBV production by *A. vinelandii* OP and could be suitable for the production of biopolymer blends for different biotechnological applications.

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