

Poly(3-hydroxybutyrate-co-3-hydroxyvalerate) production: Processes stored in data warehouse structured by an ontology

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Due to the rising amount of plastic waste generated each year, multiple questions are emerging about their harmful long-term effects on the environment, the ecosystems and human health. One possible strategy to mitigate these issues is to substitute conventional plastics by renewable materials fully biodegradable in natural conditions, such as poly(3-hydroxybutyrate-co-3-hydroxyvalerate) (PHBV) and which can be produced from agro-industrial residues. The 3HB/3HV monomeric ratio depends on the kind of strains, the carbon sources, the nutrient limitation and its intensity used to promote the production of the copolymer as well as the feeding strategy. In this dataset, a total of 19 production itineraries of PHBV production has been collected in 4 interdisciplinary projects (EU GLOPACK, EU RESURBIS, EU ECOBIOCAP, ANR LOOP4PACK) . Available data concern the technical process descriptions, including the description of each step and the different observations measured during the agro-industrial by-products pretreatment (x, y, acidogenesis), PHBV biosynthesis from glucose or volatile fatty acids and its recovery.

This dataset uses a vocabulary defined with experts and described by PO² (Process and Observation Ontology) [1], an ontology dedicated at its core to the representation of transformation processes through the definition of steps, the relations between those steps and the associated observations. In our case, specific domain vocabulary has been elicited and used to define precisely the different technologies used for the biomass treatment and the biocomposites production. This vocabulary can be reused for other projects on the domain [2].

[1] M  lanie Munch, Patrice Buche, St  phane Dervaux, Juliette Dibie, Liliana L. Ibanescu, et al.. Combining ontology and probabilistic models for the design of bio-based product transformation processes. *Expert Systems with Applications*, 2022, 203, pp.117406. [10.1016/j.eswa.2022.117406](https://doi.org/10.1016/j.eswa.2022.117406). [hal-03662183](https://hal.archives-ouvertes.fr/hal-03662183)

[2] Weber et al. (2023). PO2/TransformON, an ontology for data integration on food, feed, bioproducts and biowaste engineering, *npj Sci Food* 7, 47. <https://doi.org/10.1038/s41538-023-00221-2>