

# Production of Polyhydroxyalkanoates (PHAs) from Domestic Organic Waste

Reuse of domestic or other organic waste as raw material in the production of bioplastics and biogas



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## IP Status

Patent application submitted

## Seeking

Licensing, Development partner

# Background

The proposed invention is a process of anaerobic digestion in separate phases to optimize the biological production of Polyhydroxyalkanoates (PHAs - precursor to bioplastics) from the organic fraction of domestic solid waste, using an anaerobic digestion process in separate phases. This method uses mixed microbial cultures (MMCs) and is based on the combination of a three-stage biological process in sequence with a two-step fermented flow filtering system to reduce the concentration of suspended solid particles and nutrients.

## Tech Overview

The method is adapted to reuse domestic or other organic waste, with a residual solids content greater than 10.0 g/L, as raw material in the production of bioplastics and biogas. The method is based on the combination of a biological process in three sequential phases (Phase I: anaerobic fermentation, Phase II: sequential aerobic fermentation, Phase III: batch aerobic fermentation), with a flow filtering system. After a first filtration of the discharge from Phase I, the flow is divided between the reactor for Phase II, where the biomass is produced and a membrane filter before entering Phase III, where the Polyhydroxyalkanoates (PHAs) are accumulated. This second filtration step reduces the concentrations of particulate matter and nutrients, favoring the synthesis of PHAs (Figure 1, Figure 2).

## Benefits

- Reuse of organic waste with TSS > 10.0g/L
- Two different solids removal steps
- First filtration favors specialized biomass production
- Second filtration favors maximization of PHAs production

## Applications

- Treatment of Organic Fraction of Municipal Solid Waste (OFMSW) or other fermentable organic waste
- Production of biogas and bioplastic compounds

## Opportunity

Open to collaborative projects to further develop the technology and/or licensing.

# Patents

- IT: 102018000003322
- PCT: WO2019171316A1



## Appendix 2

Figure 2

