

PRECEDING

Publieke samenvatting / Public summary

Aanleiding

Microplastics are accumulating in the environment and can be found at mountaintops, in the depth of the seas and inside our bodies. Biodegradable plastics, like PHBV, degrade under natural conditions and do not form persistent microplastics. Paques Biomaterials has developed a process in which microorganisms use wastestreams to make bio-based PHBV, resulting in a biomass containing the biopolymer. Concentrated residual streams from the food industry are well suited for PHBV production. Within these concentrates, lower quality whey permeates represents a great opportunity. Looop is specialized in providing logistical assistance for organic waste products from the food-, beverage- and fermentation industry, such as whey permeate and other dairybased co- and waste products, and in finding the most sustainable applications of these. Research has shown whey permeate can be used to produce PHBV in large quantities (>3 kton/year) when a centralized plant receiving from different sources can be realized. In a subsequent extraction step pure PHBV can be obtained from the PHBV-biomass. Construction of a large scale extraction plant (CEP, 6.000 ton/year) is planned for the near future.

Doelstelling

Paques Biomaterials and Looop have joined forces to identify all key-aspects, which need to be considered in the construction of and operation of the PHBV-biomass production plant (PHA Hub, 3 kton/year, upgradable to 6 kton/year), using whey permeate and/or other concentrated and diluted organic streams from different factories as input.

Projectinformatie / Project information

Projectnummer / Project number

TESN24-03733632

Subsidiebedrag / Grant amount

€ 519.054,00

Algemene informatie / General information

Penvoerder / Secretariat

Paques Biomaterials B.V.

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Aspects such as a conceptual engineering design and an economic evaluation of construction, feedstock sourcing and production will be investigated with the goal of answering several feasibility questions. These include the best configuration for the production process, the challenges posed by receiving and buffering concentrated streams on site and the possibilities to integrate the PHA Hub and the PHA extraction plant (considering that they could be built side-by-side in Emmen). The information package will allow a go/no-go decision for the next development phase towards the PHA Hub.

Korte omschrijving

The main activity of the first work package will be the conceptual engineering design of the demo-plant for PHBVbiomass production. The following issues will be addressed: site feasibility, site layout, detailed mass balance, permits, production planning and an estimation of CAPEX and OPEX. Also testing of equipment for one or more unit operations may be part of this work package. In the next work package various whey permeates will be analyzed and validated for PHBV-production. Limited testing of mixing, and of addition of the feedstock to the process line will be part of this activity as well. In the final work package an LCA will be made for the PHBVproduction process using whey permeate and other concentrated residual streams as input. Combined with the information obtained in the other work packages this will lead to a refined business case and project planning, supporting a go/no-go decision for the next phase, a more refined basic engineering of the PHA Hub demo plant.

Resultaat

The conceptual engineering design will be the main result of this study and will include the following aspects: process design choice, process flow diagram, a basic engineering lay-out and a CAPEX and OPEX estimate. Other intended results are: • Site feasibility including ground check and permit request path preparation; • Feedstock supply security; • Compliance evaluation of produced PHBV-rich biomass (e.g. End-of-Waste and REACH);

- LCA analysis of the process starting with whey permeate as feedstock;
- Planning of follow-up project;
- Updated business case.

De data in deze applicatie is afkomstig van de Rijksdienst voor Ondernemend Nederland (RVO) en wordt in samenwerking met de Topsector Energie ontsloten.

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