BIOPLASTICS FROM FAVA BEANS

Giacomo Salvatore

Project/Research Group: Eiwit van Columbus/Biobased Resources and Energy Contact information: giacomosalvatore@gmail.com

Supervisor and mail: Guillherme De Souza Reis, ga.desouzareis@avans.nl Date: January 16th 2025

Introduction

Bioplastics are a sustainable alternative to traditional plastics, but their production often faces cost and resource challenges. The EVC project aims to address this by using renewable resources like fava bean byproducts to produce volatile fatty acids (VFAs). These can serve as less environmental impactful precursors for PHAs, a versatile bioplastic with numerous applications, promoting a more sustainable and efficient path to bioplastic production.









Methodology and Results







Based on sCOD measurements, pH 6 was chosen and scaled up to the semicontinuous bioreactor with scheduled analysis.



3 conditions (pH 5, 5.5, 6) were tested in duplicate with daily pH adjustment and incubated at 35 °C for 12 days



Production starts with activated sludge and produced VFAs as substrate. Bacteria accumulate PHA intracellularly under conditions of nutritional stress, using cycles of feast-famine.

 \sim

Obtained biomass is collected, dried and subjected to extraction using env. friendly solvents such as DMC, followed by purification to obtain a polymer film.

Expected results

The bacterial community responds positively to the feedstock consumption and indeed, based on the first analysis done, a discrete amount of VFAs produced, is enough to obtain an appreciable amount of PHAs to be tested.

Conclusions

The utilized feedstocks seem promising for other applications due the byproducts alongside the VFAs produced. A deeper investigation is needed for the optimal conditions for the suitability in PHA production



°°°°°°°°°°°°°°°°°°°°°°



Product



ぞ

Ο

