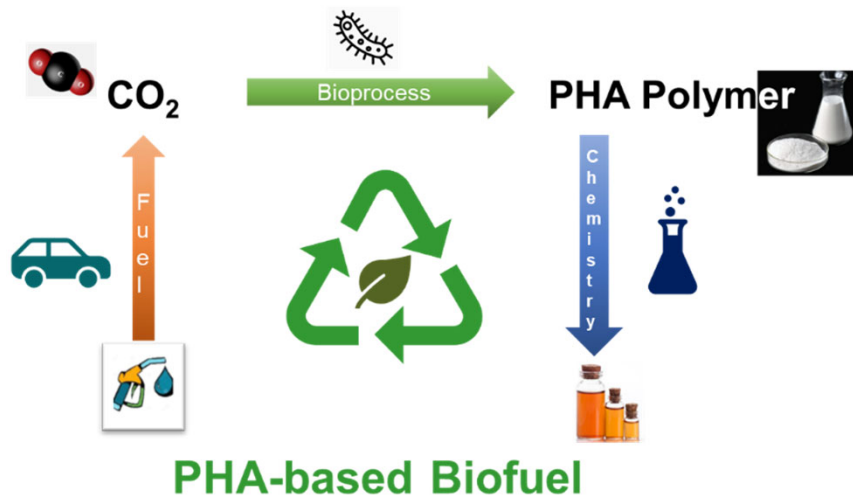


Projet PHAbiofuel

PHA-based biofuels for sustainable mobility

Overview



Objective

Develop sustainable fuels that are:

- CO₂ neutral
- Compatible with existing infrastructure
- Not in direct competition with food production

Description

Traffic emissions

To understand why reducing traffic emission is a key environmental challenge, consider the following statistics for Switzerland (2018):

- 10'000 km was the average annual distance travelled by passenger cars
- 700 L of fossil fuel were used per year and person
- Transport accounted for 39% of all CO₂ emissions

However, thanks to new breakthroughs in bio/chemical processes, sustainable biofuels can make a lasting contribution to mobility.

Traditional biofuels

Fossil fuels mixed with renewably-sourced biodiesel or bioethanol have been on the market for years, yet they only account for 3% of total fuel consumption, and their production chains are in direct competition with food production.

A new bioprocess

Polyhydroxyalkanoate (PHA) is produced by various kinds of bacteria in the presence of a carbon substrate

and under nutrient-limited growth conditions (e.g. nitrogen or phosphorus).

We developed a novel bioprocess for biofuel production using PHA-synthesizing microorganisms and up to 80% biomass sourced from CO₂ or other renewable resources. The obtained PHA was chemically converted into biofuel derivatives (yield >90%, scale >100 g). The selected chemical refining approach ensures that competition with food production for humans and animals can be avoided.

Scientific evaluation

The environmental impact of this new PHA-based biofuel was evaluated using lifecycle analysis (LCA) and compared to competing technologies.

Conclusive trials

Testing of our PHA-based biofuels on engine test benches confirm the potential of this new and innovative biofuel production chain.

A patent application has been filed (PCT/EP2021/085203)

Collaboration opportunities

Mandats, Innosuisse Projects, Horizon Europe Projects for scale-up et l'industrialisation of the novel biofuels

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