

The BioLaMer route to address food waste and petrochemical plastic challenges



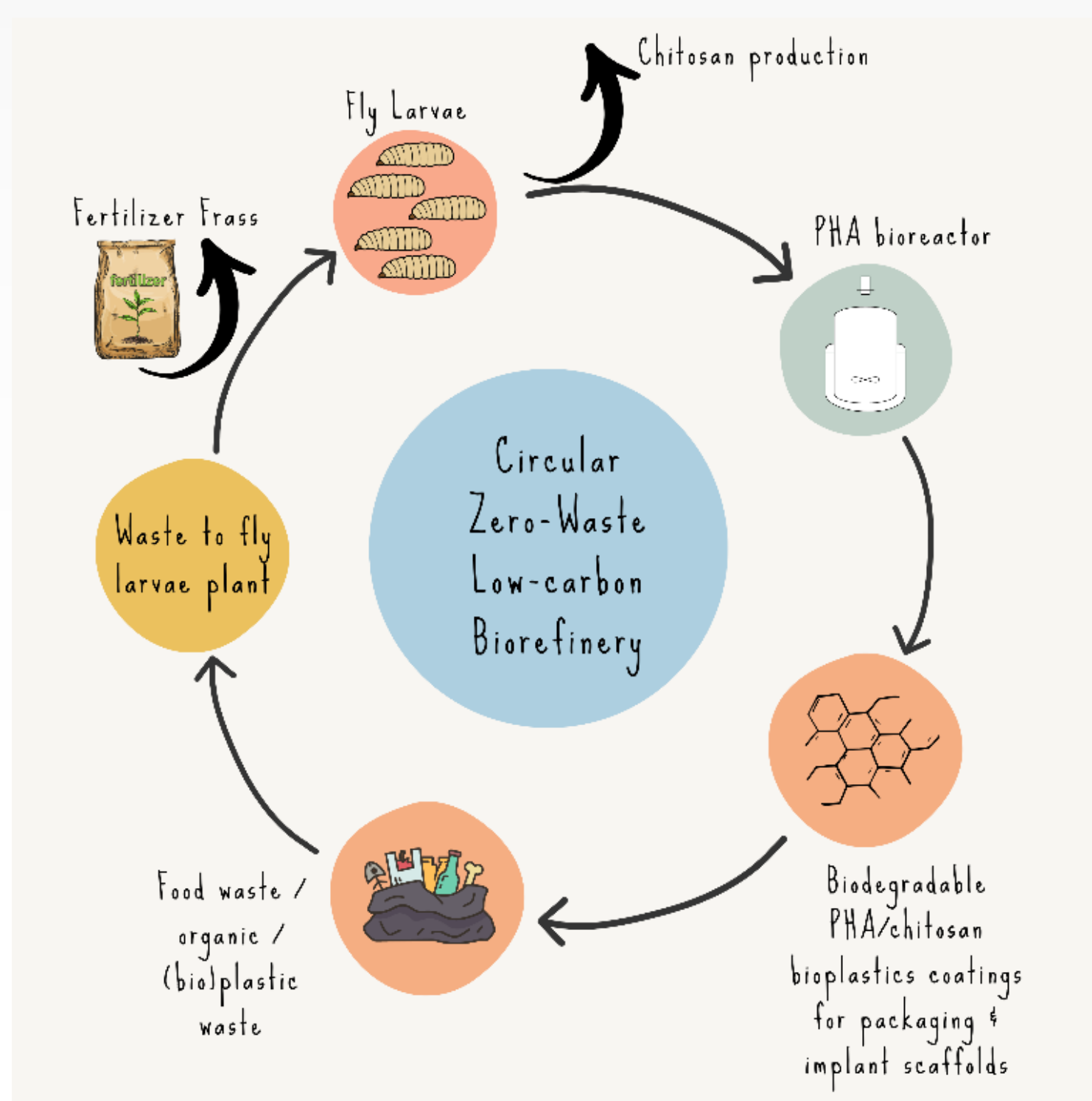
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Research Challenge / Objectives

BioLaMer Project aims to address two major global challenges,

- **Food Waste challenge**, caused due to food discarded at the consumer level and ending up in landfills causing methane emission.
- **Petrochemical plastics pollution**, being non-degradable, plastics and microplastics accumulate in land, soil, and water bodies, persisting for generations, causing widespread ecosystem pollution.

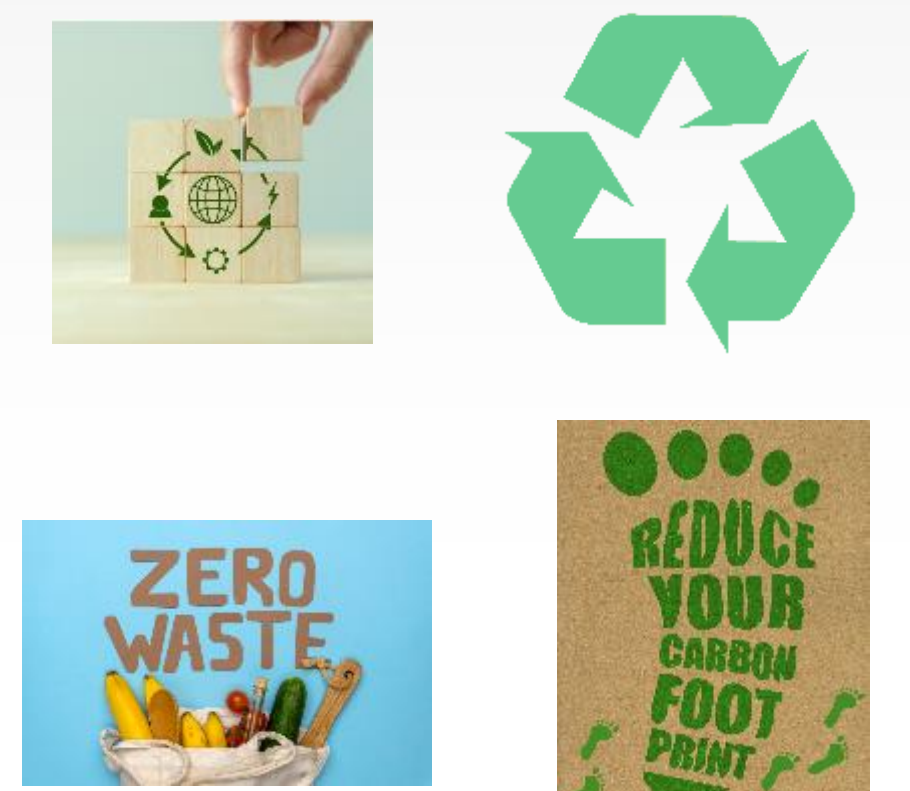


Methodology

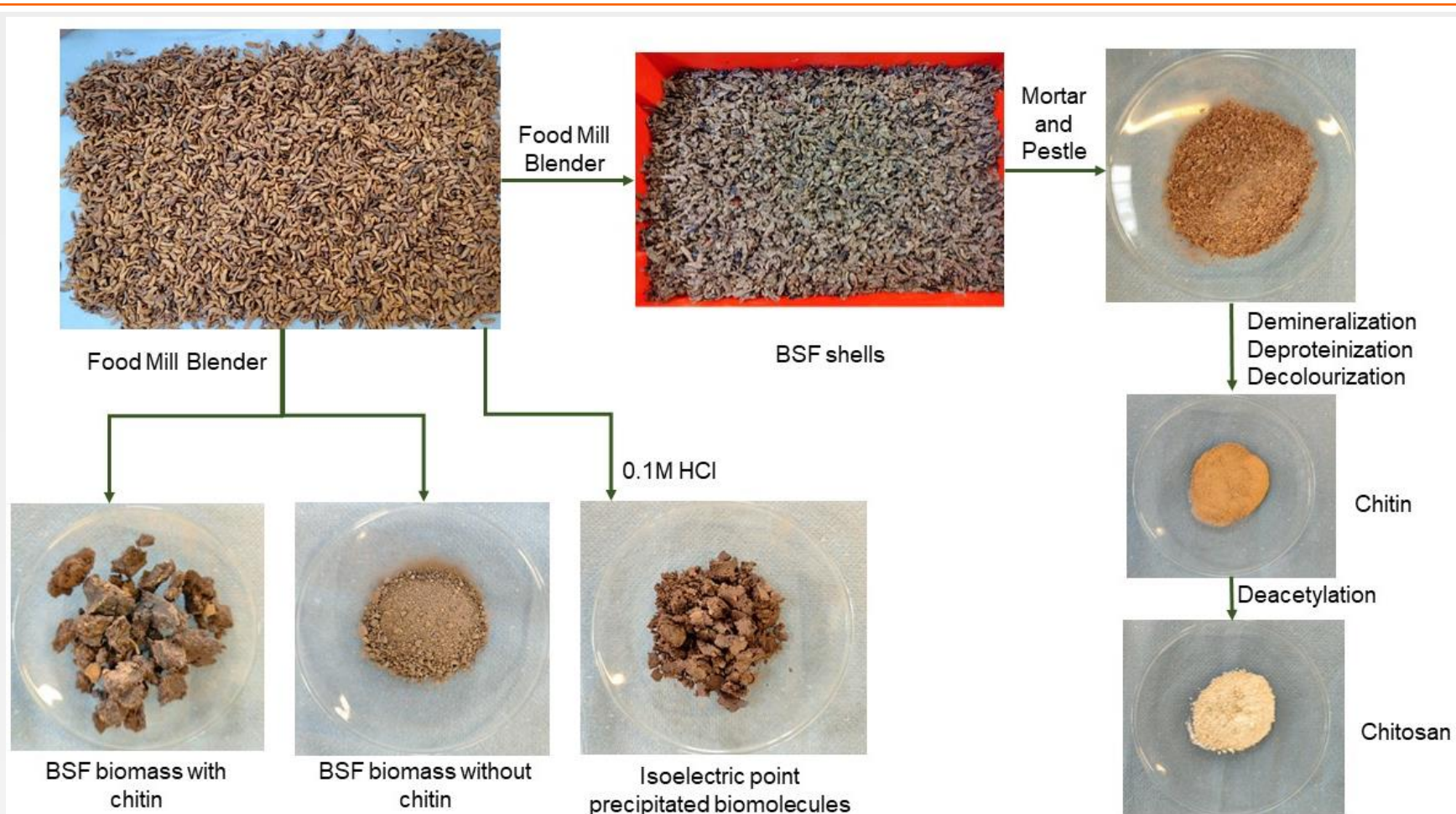
- BioLaMer demonstrates the impact of cultivating black soldier fly larvae (*Hermetia illucens*) using low-grade food waste to generate biopolymers: **polyhydroxyalkanoates (PHA)** and **chitosan**, and value-added **bioplastics**.
- Apply **LCA** and **LCC** throughout its feedstock preparation, processing and production steps to demonstrate the environmental and economic sustainability.
- Assess, optimize and validate the biorefinery processes by applying machine learning-based **hybrid models**.

Impact

- Optimized chitosan production from larvae shells
- Reduce PHA production cost
- Promote biodegradable plastics
- Embrace sustainability
- Reduce carbon footprint
- Zero waste
- Foster circularity
- Economic & societal impacts
- Support Green Deal



Results



Chitosan from larval shells has been prepared by a series of steps including demineralization, deproteinization, decolourization and deacetylation

The advantage of larvae route are:

- **renewable** and **inexpensive** feedstock;
- **mitigate** FW problems;
- provides **less complexity** as larvae has almost invariable chemical composition;
- doesn't disturb **biodiversity**;
- reduce **crop-based feedstock**;
- **Reduce pre-treatment costs** that are associated with other waste-streams to produce the platform chemicals for biopolymer production.

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