



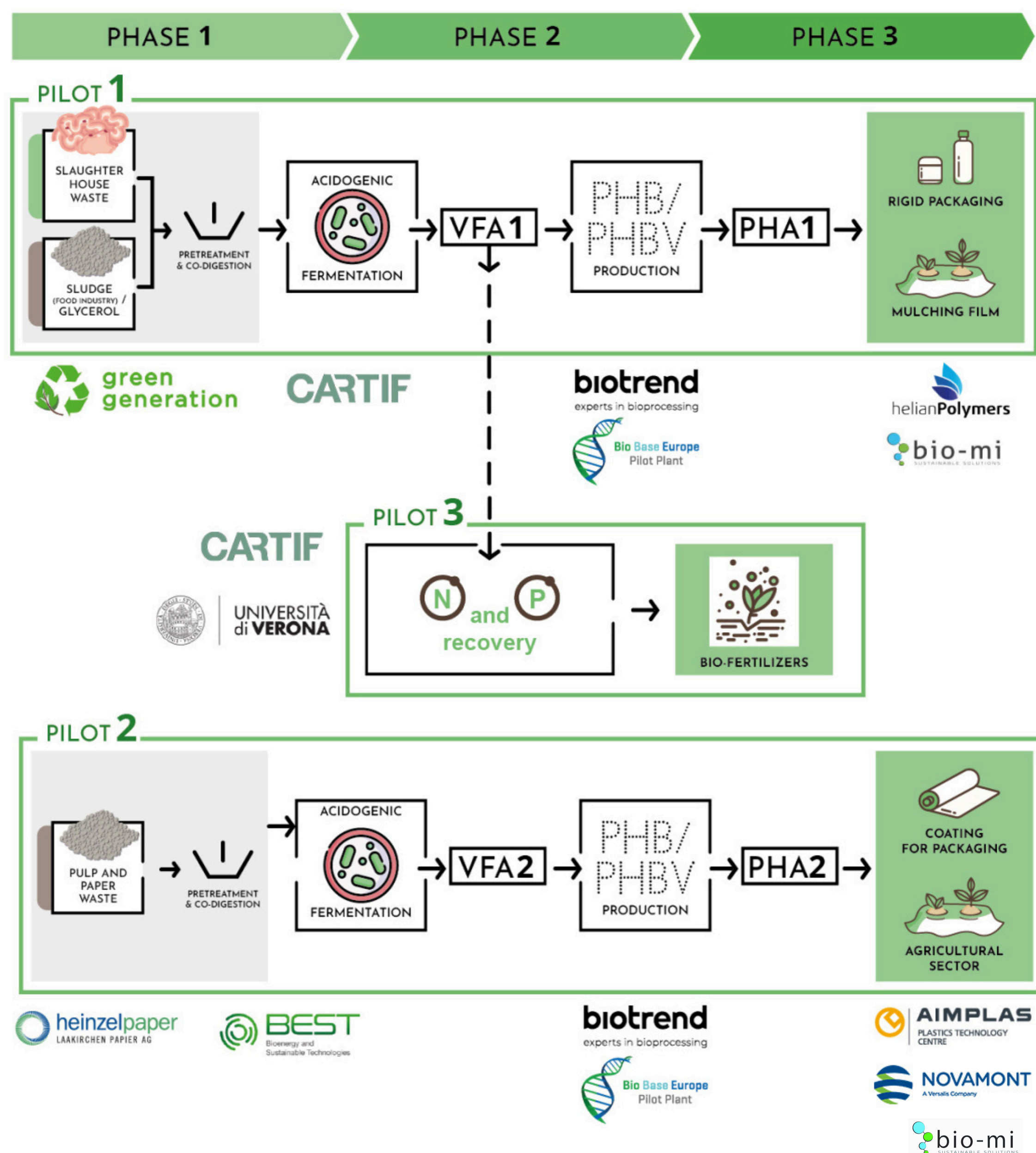
ELLIPSE: EFFICIENT AND NOVEL WASTE STREAMS CO-PROCESSING TO OBTAIN BIO-BASED SOLUTIONS FOR PACKAGING AND AGRICULTURAL SECTORS

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Introduction & Methodology

ELLIPSE project transforms industrial waste into valuable bioproducts by co-processing heterogeneous waste streams. This approach addresses waste from **slaughterhouses, pulp and paper industry, dairy industry sludge, and glycerol**, converting them into **polyhydroxyalkanoates (PHAs)** and bio-based fertilizers (BBFs) for agricultural and personal care applications.

The project started in May 2023 and is funded by Circular Bio-Based Europe Joint Undertaking under G.A. No 101112581 and during the first year, significant progress was made in **optimizing the production of volatile fatty acids (VFAs) from the waste streams**. The consortium focused on characterizing and selecting suitable waste samples, optimizing pre-treatment methods, and conducting acidogenic fermentation tests.



Results

Waste Characterization and Selection

Samples from various processes in the pulp and paper industry and organic waste from Green Generation were analyzed for parameters such as **total solids, volatile solids, pH, chemical oxygen demand (COD), and biogas yield**. Samples with the most promising results for acidification were selected for further analysis.

Pre-treatment Trials

Various physical and chemical pre-treatments were tested to enhance VFA yield. **Heat treatment** proved most effective, **increasing soluble COD (sCOD) by 15-40%**. However, combining multiple pre-treatments did not significantly improve results.

Acidogenic Fermentation Tests

Fermentation tests evaluated the efficiency of VFA production under different pH conditions. The best results were achieved under **basic conditions (pH 10)**, with **glycerine, sludge, and bellygrass** producing the highest concentrations of VFAs. These VFAs predominantly included acetic, propionic, and butyric acids.

These results demonstrated the **feasibility** of converting diverse waste streams into valuable VFAs, which can be processed into PHAs and BBFs. Future work will focus on **optimizing fermentation parameters** and exploring downstream concentration techniques to enhance VFA production and PHA quality.

The final products will consist of **rigid packaging, mulching film, biofertilizer** and packaging for **agricultural sector**.



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This project is funded by the European Union under the Circular Bio-based Joint Undertaking (CBE JU) call HORIZON-JU-CBE-2022-IA-04 under Grant Agreement No 101112581.



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