

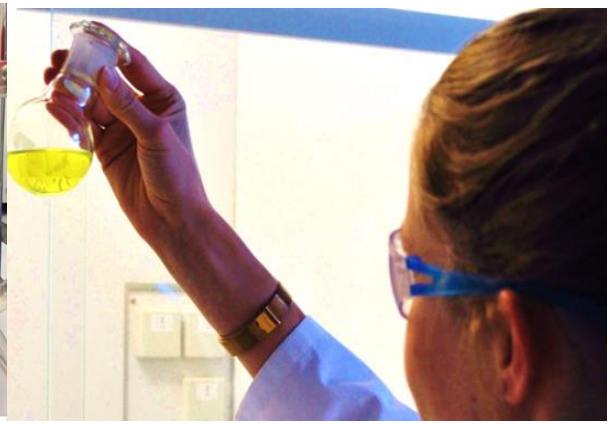

A simple, robust, and decentralized approach to utilize organic waste streams in the heterotrophic cultivation of *Galdieria sulphuraria*

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Solution

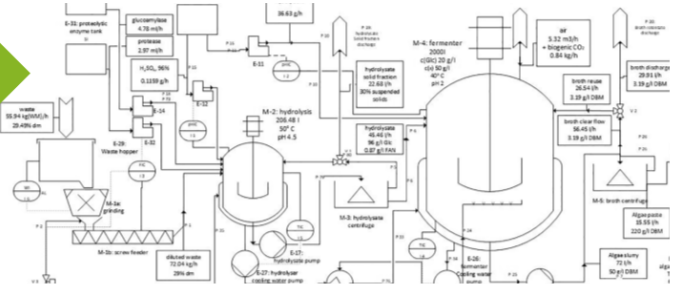
Biorefinery for biobased products out of organic residues

biology ...

- Heterotrophic **extremophilic** microalgae
- Grows at **pH 2** and 40°C
- Little commercialized

Galdieria sulphuraria

...in technology



algae cultivation ...

1000 kg (30% DM) **organic residues**

Conversion

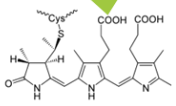
540 liters of waste water

DM = dry matter

... extraction and drying by-products

260 kg of algae mass
TR 25% (high protein)

200 kg biomass
TR 25% (fatty/to biogas)



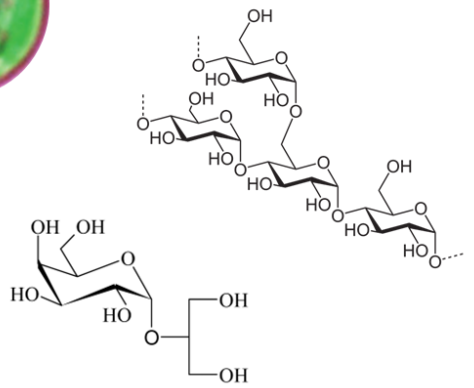
Proteins (76 kg)

Starch (18kg)

Pigment (0.8kg)

Solution

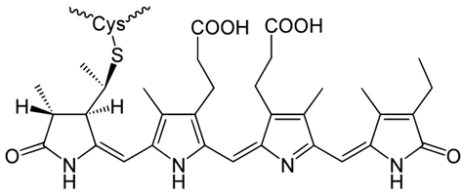
Components of the extremophile red alga *G. sulphuraria*



- **Floridean starch (35% DM)**
  - Highly branched, high degree of polymerisation
- floridoside
  - Carbon storage and osmotic agent

- **Proteins (40% DM)**
  - Glycoprotein / indigestible

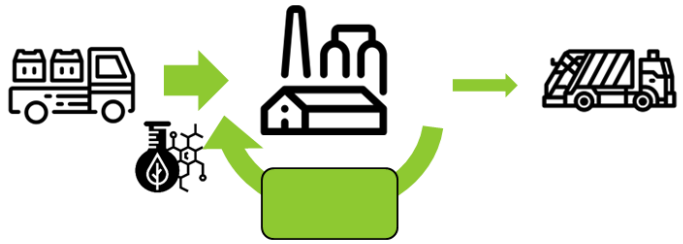
- **Phycocyanin (1.5% DM)**
  - Pigment-protein complex
  - Antioxidant
  - Heat tolerant up to 65°C



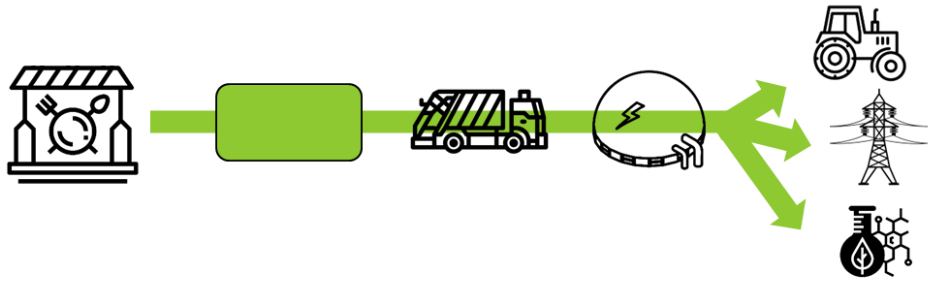
Solution

Biorefinery integrated in disposal system

Industry
by-product



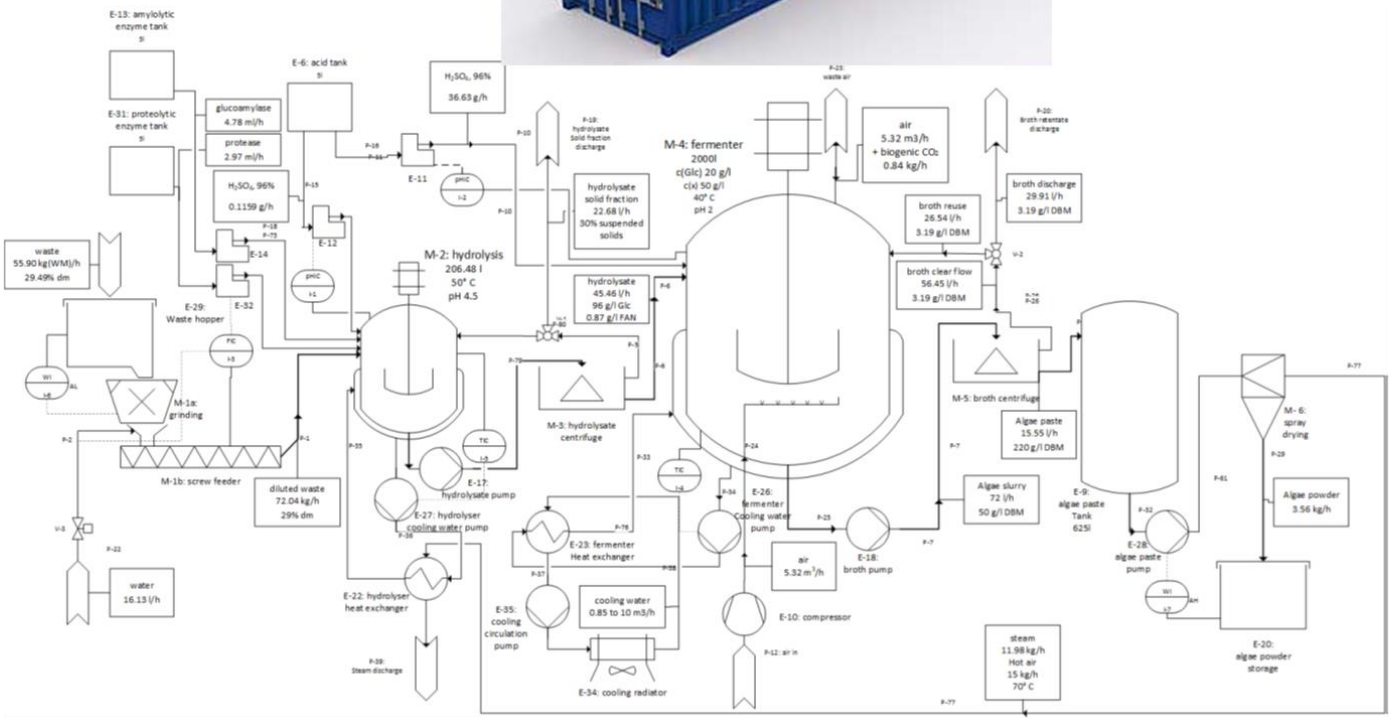
Disposer
organic waste



- Up to 80% reduction in organic waste for disposal
- Provision of regenerative raw materials
- Reduced nitrogen loads, 30% higher energy density in biogas plants

Solution

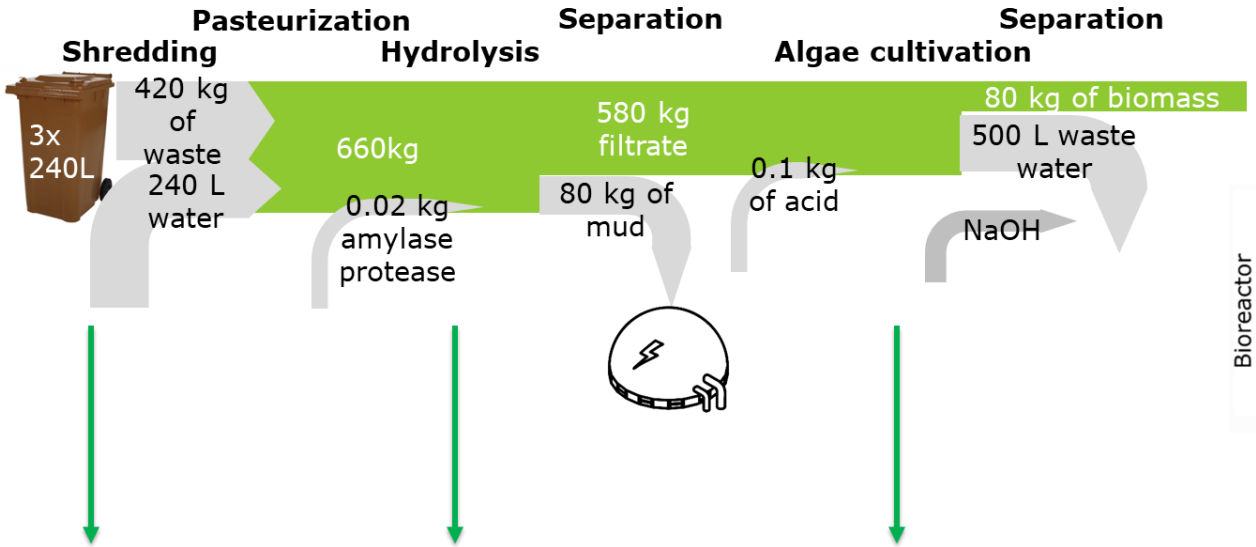
Container design

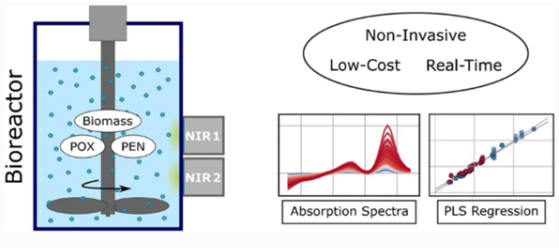


- Design of a modular bioprocess from waste to resource

Solution

No automatic process without monitoring and control

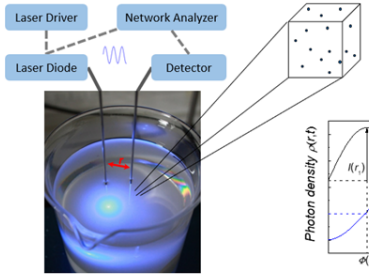




Inline characterization of substrate and hydrolysate (e.g., NIR)

Inline characterization of medium and biomass (e.g., NIR, PDW, microscopy)

Monitoring of process parameters (e.g., O_2-sensors, sensors for material and heat transfers)



PDW: Number of photons per volume

NIR = Near Infrared Spectroscopy

PDW = Photon Density Wave Spectroscopy

What we are looking for?

Partners from:

Agriculture and food industry,

waste managers,

industries for the utilization of *G. sulphuraria* biomass,

partners for the monitoring and automatization of the whole process.