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## Cyanobacteria Biorefinery – Production of poly(3-hydroxybutyrate) with *Synechocystis salina* and utilisation of residual biomass

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### Highlights

- Evaluation of downstream processing on quality of photoautotrophically produced PHB
- Pre-treatment is necessary to achieve PHB with a high molecular weight
- Quality of photoautotrophically produced PHB is comparable to heterotrophically produced PHB
- Using residual biomass to obtain further products and close the nutrient cycle
- CH<sub>4</sub> potential of residual biomass (348 m<sub>n</sub><sup>3</sup> t<sup>-1</sup> VS) is similar to maize silage

### Abstract

This study evaluates a biorefinery concept for producing poly(3-hydroxybutyrate) (PHB) with the cyanobacterial strain *Synechocystis salina*. Due to this reason, pigment extraction and cell disruption were investigated as pre-treatment steps for the harvested cyanobacterial biomass. The results demonstrated that at least pigment removal was necessary to obtain PHB with processable quality (weight average molecular weight: 569 – 988 kg mol<sup>-1</sup>, melting temperature: 177 – 182°C), which was comparable to heterotrophically produced PHB. The removed pigments could be utilised as additional by-products (chlorophylls 0.33 – 2.45 mg g<sup>-1</sup> TS, carotenoids 0.26 – 1.87 ng g<sup>-1</sup> TS, phycocyanin 0 – 123 mg g<sup>-1</sup> TS), whose concentration

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