

Validating Lactic Acid production by Mixed Culture Fermentation at Pilot scale, with Raw Sugar Beet

Publieke samenvatting / Public summary

Aanleiding

After extensive research on the development of productive and energy-efficient fermentation with lactic acid bacteria, a new method for the production of lactic acid has been developed by Nature's Principles and its partners, using raw feedstock. This can strengthen domestic (NL) and potentially EU-wide market resilience. The resulting product has potential use in a variety of applications as a chemical ingredient, including Industrial and Household cleaning agents and descaling agents. Due to simplification of the upstream and downstream processing, Nature's Principles aims to scale a process with a lower Carbon- and Water footprint, bringing a more sustainable production of lactic acid to the market. Our process makes use of Mixed Culture Fermentation (MCF), which, as verified in the lab, is more efficient, as it can directly ferment Raw Sugar Beet Juice (RSBJ), and by-passes the feedstock refining (See Figure 1). Nature's Principles process lowers CO₂ emissions by 40-45% as opposed to pure-culture based fermentation processes. In addition to this, cultivation and use of sugar beets as opposed to sugar cane (widely used now), has a 4x lower carbon footprint.

Doelstelling

Nature's Principles BV. aims to commercialize this energy-efficient fermentation technology and the downstream processing of the broth for production of a 50-80% w/w Lactic Acid solution. This refined lactic acid solution is our minimum viable product (MVP) with a market-entry strategy focussed on

Projectinformatie / Project information

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Algemene informatie / General information

Penvoerder / Secretariat
Nature's Principles B.V.

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Industrial & Household Cleaning grade lactic acid (as chemical ingredient). The goal of this Pilot project is to move from TRL 4 to TRL 6, validating scaled-up performance (1000x lab-scale) of the Novel Fermentation process for the processing of Raw Sugar Beet Juice to Lactic Acid, IP nr: 2023113, and from TRL 3 to TRL 5 in the downstream processing (see Appendix 3 for TRL 3 results). Processing 10 tons of sugar beets, this pilot is focussed on R&D for scaled production and processing of high Lactic Acid containing broth and delivery product that can be applied.

Korte omschrijving

The pilot project will run from 5th of May 2022 until 18th of October 2023 and will be split into 3 phases: Phase 1. Design & Engineering (USP/ Fermentation / DSP). Phase 2. Pilot Operations; USP / Fermentation / DSP. Phase 3. Product trials / Process improvement.

Resultaat

The pilot project will deliver a better understanding of the production process at scale, needed to yield production and processing of sugar beets for a more eco-friendly and less energy intensive lactic acid product that makes use of an underutilized domestic agricultural feedstock, the 'sugar beet'. This result will allow Nature's Principles BV. to move forward towards commercialization, starting with an exploitable DEMO facility producing 0.5 kton/yr. Validation of the pilot production-line for Lactic Acid from sugar beets will need to include: ? Validation of fermentation process at scale ? Validated of downstream processing design at scale ? Product application testing and improvement

De data in deze applicatie is afkomstig van de Rijksdienst voor Ondernemend Nederland (RVO) en wordt in samenwerking met de Topsector Energie ontsloten.

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