ELEVATE

Publieke samenvatting / Public summary

Aanleiding

The target of Dutch climate change legislation (Klimaatwet) is to reduce CO2 emissions by 49%, by 2030, and 95% by 2050, compared to 1990 levels. Within the chemical industry, the largest potential for CO2 reduction is to transition from fossil oil derived feedstock and advance towards biobased feedstock. Regarding biobased feedstock, various famous reports by NREL have identified levulinic acid as one of the top twelve future building blocks: Levulinic acid (and derivatives thereof) is a biobased chemical that can be derived from non-edible biomass, possesses a high potential to be used as a platform chemical for the chemical industry, and is currently being developed by Dutch based GFBiochemicals. However, fully unlocking the huge potential of levulinic acid requires further technological and market development.

Doelstelling

(ELEVATE) encompasses the development of a highly efficient electrochemical process to convert levulinic acid into dedicated non drop-in chemicals with unique properties to be used in high value added products. This will accelerate the market uptake of biobased levulinic acid and contribute to the biobased economy in the Netherlands. The ultimate aim of ELEVATE partner GFbiochemicals (GFB) is to produce levulinic acid at a 100,000 tonnescale at prices close to 1 €/kg (2030-2035, depending on market developments), enabling levulinic acid to be used as feedstock for bulk chemical production. To achieve this, first of all, smaller markets with higher added value need to be developed. ELEVATE will contribute to this by

Projectinformatie / Project information

Projectnummer / Project number
TIND23-03473946
Subsidiebedrag / Grant amount
€ 460.806,00

Algemene informatie / General information

Penvoerder / Secretariat
Stichting Wageningen Research

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developing the application potential of levulinic acid-based products, building upon the previously-established expertise of Wageningen Food and Biobased Research (WFBR) and GFbiochemicals alongside expertise of key Dutch SMEs like Van Loon Chemical Innovations (VLCI) and global resin producer Allnex, with huge knowledge regarding the paints, coatings and adhesives industry.

Korte omschrijving

WFBR will develop an optimised electrosynthetic approach to produce levulinic acid derivatives by optimising electron utilisation efficiency, space time yield, minimise energy usage and optimise downstream processing strategies. Levulinic acid derivatives will be used by GFBiochemicals as an intermediate in the further production of building blocks and solvents to be evaluated by Allnex, VLCI and WFBR on their suitability to be used in paint and coatings applications. BDS will evaluate the toxicological profile of starting components, intermediates, building blocks and solvents. GFBiochemicals will be responsible for the techno-economic evaluation of the processes developed. WFBR will perform a preliminary life cycle assessment of products. All these data will be combined to determine the future market potential of the levulinic acid derivatives.

Resultaat

The project will result into an optimised process for the electrochemical dimerisation of levulinic acid, resulting in biobased buildings blocks that can be used in a variety of applications like resins for coatings, adhesives and in addition can also serve as comonomers in biobased thermoplastic polymers to fine tune properties. Toxicological profiles of the starting materials, intermediates, building blocks and low molecular weight products will have been established. Results of the techno- economic and market evaluation will be used as a basis for subsequent investment decisions and an exploitation plan

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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