GreenSolRes

Deliverable 3.6

Report on market potential of a new adhesive product based on MeBDO supporting the decision of achievement of milestone 3 and milestone 6

Demonstration of solvent and resin production from lignocellulosic biomass via the platform chemical levulinic acid

The project leading to this application has received funding from the Bio Based Industries Joint Undertaking under the European Union's Horizon 2020 research and innovation programme under grant agreement No 720695

BBI JU

Bio-based Industries Consortium

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About GreenSolRes

The need to establish economic and sustainable large-scale operations for the conversion of renewable resources to chemical building blocks is becoming increasingly urgent in the context of climate change and depleting fossil fuel reservoirs. Pathways for manufacturing of bio-based fuels and chemicals have been developed but most of them rely on sugar and starch crops for feedstock. GreenSolRes aims at a sustainable and competitive industrial production of the platform chemical levulinic acid (LVA) from non-food lignocellulosic biomass. Further, the conversion of LVA and LVA esters into industry relevant building blocks γ-valerolactone (GVL), 1-methyl-1,4-butanediol (MeBDO) and 2-methyltetrahydrofuran (2-MTHF) will take place by new catalytic methods developed during the course of this project. Finally, these chemicals will be upgraded to solvents and resin monomers for the production of high added value adhesives and consumer products. This project was started in September 2016 and has a duration of five years.

Project Coordinator

Project Office

Consortium

About this document

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Publishable Summary

This report deals with the market potential assessment of bio-based MeBDO as raw material in adhesives. The technology focus for this report is on polyurethane (PU) adhesives. Market assumptions and requirements for future bio-based MeBDO containing adhesives are based on Henkel internal technical experiments, interviews and market report data. Other market potentials for MeBDO and derivates will not be discussed within this report.

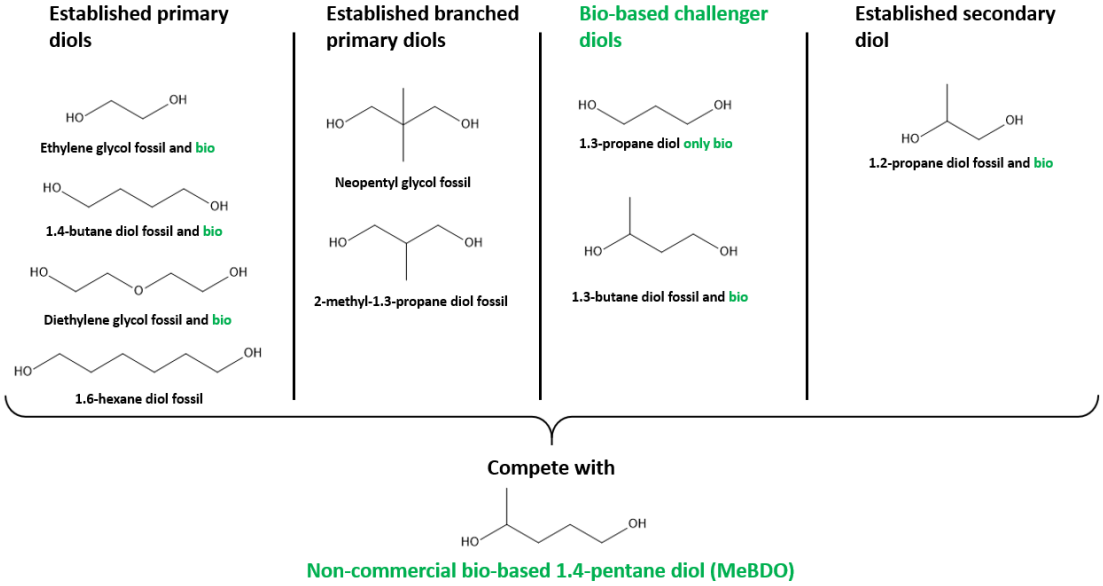

Figure 1: Overview of typical diols used in polyurethane adhesives.

Henkel has proven that MeBDO can be beneficially utilized as building block for polyurethanes and specifically reactive polyurethane hotmelt adhesives. First developments have proven similar and partially even better performance compared to standard fossil-based alternatives. MeBDO itself is not a drop-in chemical and will provide new properties to adhesives. Its unique selling point is a combination of properties, like renewable carbon content, chain length, OH group reactivity as well as hydrophobicity, due to its chemical structure. No other state of the art diol (see figure 1) can deliver this set of properties all in one. By analyzing the economics, Henkel concludes a market start, naturally accompanied by estimated higher costs and lower volumes, is promising for reactive polyurethane hotmelt (PURHM) adhesives in high value adhesive markets. Further growth and scale up opens up MeBDO utilization for PURHM technology covering other market segments beyond electronics. Deeper market penetration and commercialization will be reached when MeBDO prices drop down into a price range similar for other state of the art diols. When fully commercialized and registered including toxicological assessment, MeBDO is seen as very valuable building block to expand the material toolbox based on renewable carbon. Combined with other renewable carbon based raw materials, MeBDO can help adhesive manufacturers to gain additional market share and set the latest trends towards sustainability. MeBDO can contribute to reduce the carbon footprint in adhesive formulations.