

Public Final Report

1 Motivation

Recently, a fully biobased thermosetting resin has been developed at the Orineo Technical Center (OTC). This binder, branded as OriBond is not just 100% biobased, it is also 100% safe for people and environment. OriBond can be used in several applications, but one of the best opportunities is as alternative to fossil formaldehyde and isocyanate resins to agglomerate (particleboard, OSB, MDF) or impregnate (Plywood, High Pressure Laminate, Composites) fibres. The problem, mainly for agglomerated materials, is that the market is almost entirely supplied by large companies, operating huge plants and focused on bulk markets. An almost impossible challenge for a novel biobased binder.

2 Objective

The objective of this study was to investigate the technical and economic feasibility of applying OriBond as an alternative to fossil resins in board production and the production of said panels, as a preparation for a potential pilot project.

3 Results, future prospects and impact

In this study, OTC validated the market opportunity for specialty panels, produced in small quantities and offered at a premium price. Such panels are 100% biobased (fibres and resins), based on traceable feedstock ('controlled origin'), can be safely returned to the environment and can have additional benefits such as water resistance and unique aesthetics.

The technical challenges have already been covered by Proof-of-Concept projects with some end users. Now, as second subject, this study showed the economic feasibility of a small-size specialty panel. Our suggestion is to start with a rather low-cost facility of 100.000 m² capacity (0,002% of the current EU market) as it is critical to quickly move the panels to the market, together with a limited financial risk. When successful, a 10x larger plant can be considered and be financially attractive.

Finally, the environmental benefits of OriBond-based panels have been documented: preliminary LCA, toxicity analysis, biodegradability, CO₂ abatement etc. At its current development stage, OriBond emits max. 2,2 kg CO₂/kg resin, or +/- 4kg CO₂ less than fossil thermosetting resins. Further improvements in process is expected to bring this number close to 0. OriBond is also assessed on its non-toxicity, its long-term biodegradability and its suitability for Cradle-2-Cradle design (suited for Gold certification).

If all wood panels consumed in the Netherlands would be made with OriBond, at least 70.000T of fossil CO₂ emission will be saved, just considering the emissions during incineration!

4. Contribution to TSE objectives

This study directly contributes to *MMIP6 – sluiting van industriële ketens* by the development of high-end applications for biobased materials. Specifically, OriBond can replace the usage of fossil based resins in boards.

5. Spin-off

Two direct spin-off opportunities were identified: production of innovative HPLs with textile finishing sheet and production of 3-D moulded objects or panels for furniture and interior decoration. Both options can be produced on the same machine, providing some retrofit of the front end (HPL) or insertion of moulds in the press (3-D panels).

For more information on this Final Report, please contact Philippe Willems, phw@orineo.com.

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