



Bio-Based Glues for Natural Bonding

Forget fossil-based glues! By harnessing the natural potential of lignosulfonates and combining them with biotechnology, acib has developed a scalable, fully biobased adhesive platform. The technology delivers bonding performance comparable to conventional PVAc glues – minus the formaldehyde, fossil origin and microplastic risk. The result? A ready-to-implement green alternative that doesn't compromise on quality.

BACKGROUND

Synthetic adhesives dominate today's wood and paper industries, but they come with downsides: formaldehyde emissions, microplastic contamination, fossil dependency, and high environmental impact. Even existing "green" options often require energy-intensive production or lack durability – especially under wet conditions. Meanwhile, lignosulfonates, a massively available and underused by-product from pulp and paper production, are mostly burned for energy. While their natural structure suggests high potential as a binder, past formulations have struggled to meet industrial requirements such as tensile strength and water resistance.

TECHNOLOGY

acib's innovative enzymatic polymerization technology transforms low-cost, water-soluble lignosulfonates into high-performing, formaldehyde-free adhesives with excellent mechanical properties and enhanced wet resistance. Using laccases from fungi such as *Myceliophthora thermophila* or *Trametes modesta*, lignosulfonates are selectively oxidized, forming larger, branched polymers that significantly boost viscosity, molecular weight and bonding performance. This technology can be used:

- As a pure lignin adhesive for wood (performance equal to PVAc class D3 glues)
- As a lignin-starch hybrid glue with improved wet resistance (up to 10x longer durability in wet tests)
- In combination with crosslinkers like BTCA for enhanced bonding and tunable viscosity

This modular approach enables customized formulations for solid wood, plywood, paper bags, or laminates – all based on non-toxic, 100% renewable ingredients.

OFFER

acib offers a fully developed, laboratory-proven, bio-adhesive platform based on enzymatically polymerized lignosulfonates. We invite industrial partners to co-develop application-specific formulations (wood panels, paper products, packaging), upscale production, and validate performance in your industrial process of choice.

EXPERTS

Prof. Dr. Georg Gübitz

DEVELOPMENT STATUS:

Technology Readiness Level 4
(Technology Validated in Lab)

KEYWORDS

- Bio-based adhesives
- Lignosulfonate
- Enzymatic polymerization
- Wood glue
- Wet resistance
- Sustainable bonding
- Formaldehyde-free
- Eco-Friendly Solutions
- Industrial Sustainability
- Green Chemistry

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