



“Gheorghe Asachi” Technical University of Iasi, Romania



SYNTHESIS OF BIO-BASED WOOD ADHESIVE

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Abstract

The wood-based panel industry plays a crucial role in facilitating the industrial production of everyday products like particleboard and fiberboard, which are commonly used in flooring, furniture, and more. Key inputs for board production include thermoset resins, which act as binders. Traditionally, resins based on urea-formaldehyde, melamine-formaldehyde, and melamine-urea-formaldehyde are widely used due to their reactivity and cost-effectiveness. However, the sustainability of these resins is a growing concern, and stricter regulations regarding formaldehyde emissions are impacting the industry.

In response to this challenge, this study introduces a bio-based resin formulation, utilizing corn starch and Mimosa tannin as alternatives to formaldehyde-based resins. The choice of corn starch and Mimosa tannin as raw materials is motivated by their chemical compatibility and ready availability. The study involved the determination of the solids and gel times of the synthesized resins. Additionally, laboratory-scale board production was undertaken to assess the performance of the newly developed resin formulations. The mechanical and physical properties of the resulting boards, along with formaldehyde content, were measured. Mechanical test results were evaluated in accordance with the EN 312 standard.

The findings suggest that the developed resin formulations show promise for particleboard production suitable for interior applications, as they generally meet the standard requirements for mechanical properties.

Key words: corn starch, furanic derivatives, Mimosa tannin, wood adhesive

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