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
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Studies on Lignin-Based Adhesives for Particleboard Panels

Nihat Sami ÇETİN, Nilgöl ÖZMEN

Kahramanmaraş Sütçü İmam University, Faculty of Forestry, Department of Forest
Industry Engineering,

46060, Kahramanmaraş - TURKEY

 [Keywords](#)
 [Authors](#)



agric@tubitak.gov.tr

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Abstract: The ultimate aim of this work was to develop a phenolic resin for partially replacing phenol with modified organosolv lignin in phenol-formaldehyde (PF) resin production. The lignin-formaldehyde relationship was determined in a reactivity test. Organosolv lignin-phenol-formaldehyde (LPF) resins were produced in a two-step preparation with different additions of lignin. The method selected for the manufacture of lignin resins dealt with modification of the lignin by the methylation route. The effects of different substitution levels of organosolv lignin on strength properties were evaluated by testing lignin resin impregnated paper strips. A comparison of the tensile properties of organosolv lignin formulations, impregnated and cured onto glass fibre paper strips, was made with those of PF resin. Organosolv lignin-based resins showed comparatively good strength and stiffness. The tensile strength properties of test samples made from organosolv lignin resins were equal to or better than those of test samples made from PF resin only. The physical properties (solid content, specific gravity, viscosity and gel time) of formulated resins were also determined before use and compared to a control PF resin used to bond particleboards. The particleboards were manufactured using liquid phenolic resins. The particleboards were tested for their physical strength and dimensional stability properties. The properties of particleboards bonded with LPF resins were comparable to those of the control-bonded particleboards. The results indicated that organosolv lignin was a feasible replacement for up to 30% of the phenol in particleboard-type PF resins.

Key Words: Organosolv lignin, lignin-phenol-formaldehyde resin, methylation, tensile strength, physical properties, particleboard

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