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Soy flour dispersibility and performance as wood adhesive

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Abstract

Soy flour adhesives using polyamidoamine-epichlorohydrin (PAE) resin as the curing agent are being used commercially to make bonded wood products. The original studies on the soy-PAE adhesives used purified soy protein isolate, but the much lower cost soy flour is now used commercially. We examined the performance of commercially available soy flours that have their proteins either mainly in their native (90 protein dispersibility index (PDI)) or denatured (70 and 20 PDI) states. We expected that the more native state soy proteins with their better dispersibility would provide better adhesion to wood surfaces and enhanced reaction with PAE resin. Small-scale wood bonding tests showed that neither of these effects was observed without and with a low level of PAE. In these tests, the solids content of the soy formulations had a large influence on adhesive viscosity but little influence on bond strength. Additionally, little

difference was observed in any of the adhesive or viscosity properties between the soy flours having either a 0.152 or 0.075 mm (100 or 200 mesh) particle size.

Keywords:

soy flour

dispersibility

bond strength

viscosity

particle size

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