

**Extracting wood flakes for composite panel innovation:
Assessment of process stream characteristics**

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Concerns over energy security have recently raised the profile of wood and related lignocellulosic materials as a potentially important source of alternative fuels, both liquid and solid. This creates the opportunity to consider new market outlets for residue generated from harvest operations and manufacturing processes. These additional markets also introduce the potential to more directly integrate bioenergy opportunities into current processing systems, as has been advocated for the pulp and paper industry in the “value prior to pulping” (VPP) concept.

In VPP, a substantial portion of the hemicellulose component is extracted prior to the pulping process, generating a sugar stream for conversion to fuel, chemicals, or paper additive. Analogous prospects exist for wood composite manufacturing processes, such as that used for oriented strandboard. Recent work has demonstrated that panels prepared from hot water-extracted flakes exhibit significant improvements in many performance properties. For example, water absorption and thickness swell of panels was reduced by 52 percent and 38 percent, respectively. This presentation will describe the effect of extraction conditions on physical and mechanical properties of the resulting composites. Research has shown that considerable control over the amount and composition of extracted material is available through this relatively simple pre-treatment step. Also, the effect on cell wall mechanical properties appears to be minimal; however, dynamic mechanical analysis of individual, modified flakes clearly reveals significant structural disruption. Details associated with the two process streams (i.e., wood flakes and hemicellulose extract) will be discussed.