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ORIGINALS ORIGINALARBEITEN

Properties of furfurylated wood (*Pinus pinaster*)

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Abstract Sapwood samples of *Pinus pinaster* wood were treated with a 70% furfuryl alcohol mixture. Weight percent gain (WPG), equilibrium moisture content, dimensional stability, MOE, bending strength, hardness, density and durability were determined.

WPG was on average 38%. Equilibrium moisture content decreased more than 40%. Dimensional stability increased reaching an ASE of 45%. MOE was little affected by the treatment but bending strength increased by about 6%. Hardness increased by about 50%, and density by 37%. Mass loss due to *Postia placenta* and *Coniophora puteana* decreased by 96% and 86%, respectively. Furfurylation of *Pinus pinaster* wood shows an interesting potential to improve the wood quality for solid timber products.

Eigenschaften von furfuryliertem Kiefernholz (*Pinus pinaster*)

Zusammenfassung Kiefernsplintholzproben (*Pinus pinaster*) wurden mit einer 70% Furfurylalkohol-Mischung behandelt und die prozentuale Massezunahme (WPG), die Gleichgewichtsfeuchte, die Dimensionsstabilität, der Elastizitätsmodul, die Biegefestigkeit, die Härte, die Dichte und die Dauerhaftigkeit wurden bestimmt.

Die prozentuale Massezunahme lag im Durchschnitt bei 38%. Die Gleichgewichtsfeuchte nahm mehr als 40% ab. Die Dimensionsstabilität nahm zu und erreichte ein Quellresistenzvermögen (ASE) von 45%. Die Behandlung hatte nur wenig Einfluss auf den Elastizitätsmodul, während die Biegefestigkeit um 6% zunahm. Die Härte erhöhte sich um ca. 50% und die Dichte um 37%. Der Masseverlust durch *Postia placenta* und *Coniophora puteana* ging um 96% bzw. 86% zurück. Die Furfurylierung von *Pinus pinaster* Holz zeigt ein hohes Potential zur Verbesserung der Holzqualität von Massivholzprodukten.

1 Introduction

Several wood modification processes have emerged in the last few years, the most important one being thermal, chemical, surface and impregnation modification. Furfurylation is often considered as an impregnation modification since it is believed that furfuryl alcohol is not chemically bound to wood and instead, it is its polymerization inside the wood that inhibits the water molecules to reach the wood polysaccharides, thus reducing equilibrium moisture content and increasing dimensional stability and durability. Nevertheless Lande et al. (2004a) suggested grafting between lignin and furfuryl alcohol whereas Venås et al. (2006) found no proof of such linkages on treated wood using ATR-IR spectroscopy. Recent NMR studies by Nordstierna et al. (2008) showed that some model compounds similar to lignin form covalent bonds with poly (furfuryl alcohol) which might confirm the results reported by Lande et al. (2004a).

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