

DURABILITY AND STABILITY IMPROVEMENT OF *PINUS PINASTER* WOOD BY FURFURYLATION

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ABSTRACT

Wood preservation has become increasingly important in the last years due to the scarcity of high quality wood since wood preservation can enhance wood life time, and improve some of its properties. However the use of toxic chemicals has been a major concern. Wood modification is an ecological way to improve mainly dimensional stability and durability of wood without harmful chemicals. Several wood modification processes have emerged in the last few years, the most important being thermal, chemical, surface and impregnation modification. Furfurylation is considered the most important impregnation process with promising perspectives, since furfuryl alcohol can be obtained from secondary products of bioethanol production, and its price shows a tendency to lower in a near future.

Sapwood pine boards (*Pinus pinaster* Aiton) were treated with a furfuryl alcohol mixture (FA 70 mix) at Kebony (Norway). The treatment was carried out in an autoclave with a vacuum and pressure stage and subsequently cured and dried in a vacuum drying kiln. Equilibrium moisture content, radial, tangential and volumetric dimensional stability measured as anti-shrinking efficiency between 35% and 85% relative humidity (ASE_{35-85}), and durability to brown rot (*Postia placenta*) and wet rot fungus (*Coniophora puteana*) were determined.

Equilibrium moisture content (EMC) of furfurylated pinewood decreased from 9% to 5% (at 35% relative humidity) and from 17% to 9% (at 85%), corresponding respectively to 43% and 48% improvement in relation to untreated wood. Dimensional stability improved for furfurylated wood with radial, tangential and volumetric ASE_{35-85} of 26.1%, 46.7% and 46.4%, respectively. Mass loss due to wood decay decreased from 29.2% to 1.1% for brown rot (*Postia placenta*) and from 5.7 % to 0.8% for wet rot (*Coniophora puteana*).