

Modification of wood by oil heat treatment

Miklós Bak, Róbert Németh
University of West Hungary, Faculty of Wood Sciences, Institute of Wood Science

H-9400 Sopron
Bajcsy-Zsilinszky utca 4.
e-mail: bakm@fmk.nyme.hu

Poplar (*Populus × euramericana Pannónia*) and Robinia (*Robinia pseudoacacia* L.) wood were treated at 160°C and 200°C in different vegetable oils, in absence of Oxygen, using laboratory equipment. Three different vegetable oils were used, namely sunflower oil, linseed oil and rapeseed oil. Three different durations were chosen for the thermal treatment: 2h, 4h and 6h. The aim of the research work was to prove, in what extent the treatments influence some important characteristics of the wood. The investigated properties were: MOR, impact bending, compression strength, ASE and colour. Untreated samples from the same wood material served as control.

The treatments decreased the impact bending in case of Robinia and poplar as well. Longer duration of the treatment delivered proportionally lower values in impact bending. The same could be observed regarding the MOR values for Robinia, whereas in case of Poplar the more intensive treatments (longer duration and higher temperature) caused a significant increase in MOR.

Regarding the compression strength values the treatments resulted in higher strength values by Poplar, whereas in case of Robinia a clear increase could be observed at 160°C, and a significant decrease at 200°C.

As a consequence of the treatments the dimension stability could be enhanced for both wood species, so the ASE values increased with increasing duration and temperature. Because of decreasing the moisture/water uptake of the wood, also the service life of the products made of the treated wood can be longer. The reduced moisture/water uptake reduces the crack formation and the fungal decay.

The treatments caused significant darkening for both wood species by all temperatures. The colour coordinates L* and a* (lightness and red hue) shifted to the same direction for both species. The value b* (yellow hue) increased for Poplar, whereas a decreasing was observed for Robinia.

Comparing the oils used for this research work, no significant differences in effectiveness could be proved for the investigated properties.

An important observation for the practical use was done, as in Robinia wood numerous cracks could be observed in case of wet samples, while practically no damages (cracks, collapses) were observed in Poplar wood using wet samples. The treatments on laboratory scale enhanced the dimensional stability by acceptable decrease in mechanical stability for Robinia and an increase for Poplar. The results encourage the authors to perform further investigations towards development of technologies for industrial application.