

Section:

5. Technical innovations for regional economic development

**Chemical-free wood preservation**  
**The effect of dry thermal treatment on wood properties with special emphasis on wood resistance to fungal decay**

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Heat treated wood, as a raw material is discovered again and more and more frequently used in the wood industry nowadays. The aim of this treatment is to amend the wood properties without chemicals. The thermally modified wood is discussed as a new material for several applications.

The primary aim of the presented study was to promote the production of thermal treated wood in Hungary. In the research the most important wood species with low fungal decay resistance - Turkey oak (*Quercus cerris* L.), beech (*Fagus sylvatica* L.) and Pannonia poplar (*Populus × euramericana* Pannonia) - were investigated at the Institute of Wood Sciences of the University of West Hungary in Sopron. This project called "Chemical-free wood preservation" was supported by the Ministry of Economy and Transport and was completed in March 2008. Due to the success of this endeavour, the industrial production of the thermal treated wood was started at the SOKON Ltd. The thermal treatments were carried out under atmospheric conditions. The temperature of the treatments ranged between 180-200°C and was combined with a wide range of durations. The know-how developed within the frame of this research is owned by the members of the consortium formed by the University of West Hungary, SOKON Ltd., and Apostol és Társai Ltd. The most important physical and mechanical properties were analysed using the European Norms (EN). The biological durability tests were carried out in accordance with the EN 113 (Test method for determining the protective effectiveness against wood destroying basidiomycetes) standard. The test fungi were *Daedalea quercina* and *Coriolus versicolor*. Based on the results, the fungal decay resistance and the dimension stability of wood can be enhanced for the wood species studied. In addition, the heat treatment was found suitable for homogenizing the colours between white and red heartwood of beech and decreased the colour-difference between sapwood and heartwood of Turkey oak. Significant correlation was found between brightness (L\*, CIE-Lab) and other tested properties.

These findings can be utilised to produce thermal treated wood with required quality. According to these results, the CIE-Lab colour measurement can be used to predict physical and mechanical properties of thermal treated wood. Aesthetical appearance of Turkey oak and red heart beech becomes better parallel with the homogenization of colour-differences. The higher fungal decay resistance of dry heat treated timber can result new applications of these raw materials.