



ModWoodLife

Evaluation of hardness of heat treated yellow poplar wood

Emilia-Adela Salca

Salim Hiziroglu

Cost Action FP1407 2nd Conference

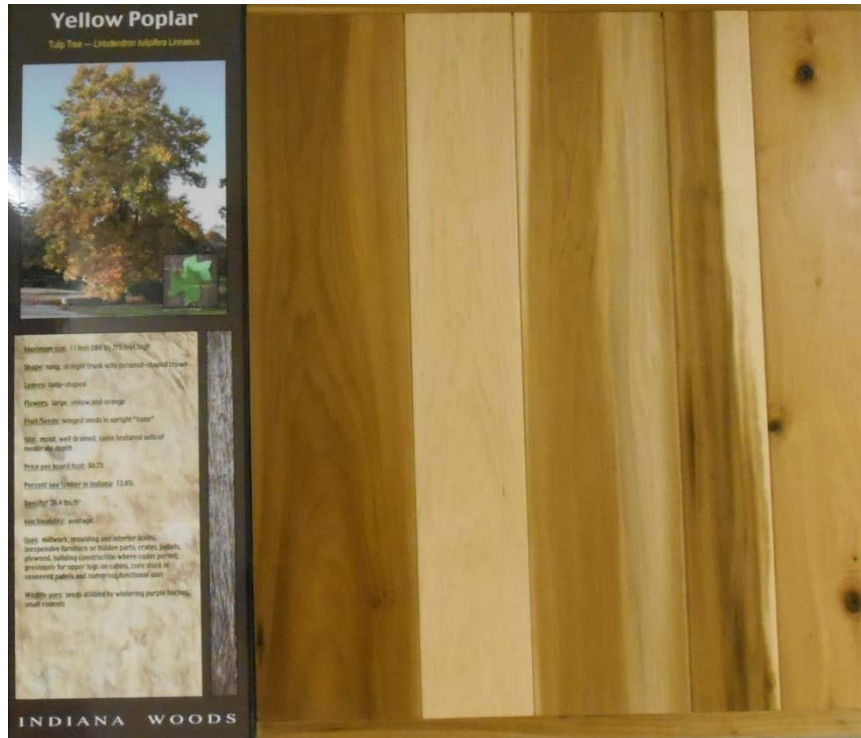
Innovative production technologies and increased wood products recycling and reuse,
Brno, Czech Republic, 29-30 September 2016

Yellow poplar



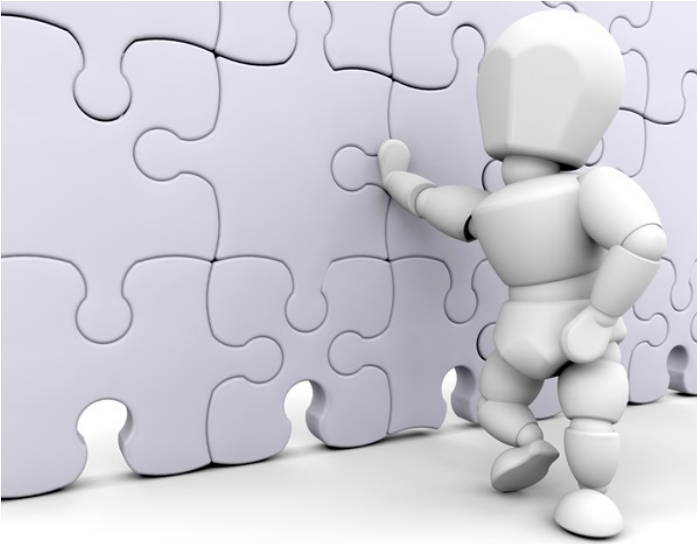
Yellow poplar (*Liriodendron tulipifera*) also known as the tulip tree or tulip poplar is a popular tree in the USA.

Yellow poplar



Wood from this fast-grown species is extensively used for many indoor and outdoor applications, such as for siding, moulding, millwork, cabinetry, and decking.

Objective



- This study aims to evaluate the influence of heat treatment on hardness of yellow poplar specimens.
- SEM micrographs were also taken to observe the anatomical structure of the samples.

Material and method

- 15 defect free samples
- 55 x 38 x 19 mm
- 3 groups were set
- a temperature of 190°C was applied in a laboratory oven for 3 and 6 hours



Hardness measurement

- Janka hardness
- Comten 95 Series Testing Machine
- by embedding a steel sphere with 11.2 mm Φ
- 4 measurements were taken from each sample



Comten 95 Testing Unit

SEM micrographs

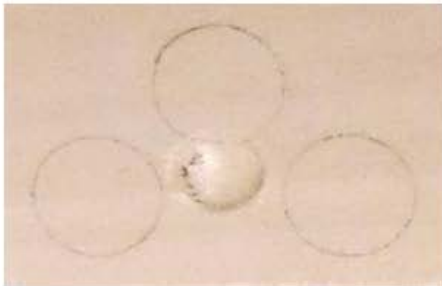
- The anatomical structure of samples was investigated by using SEM.
- The samples (3 x 3 x 3 mm) were put under vacuum and coated with a thin film of gold using an ion sputtering device, before micrographs of the surfaces were taken.



Quanta SEM device



Colour changes



Control sample



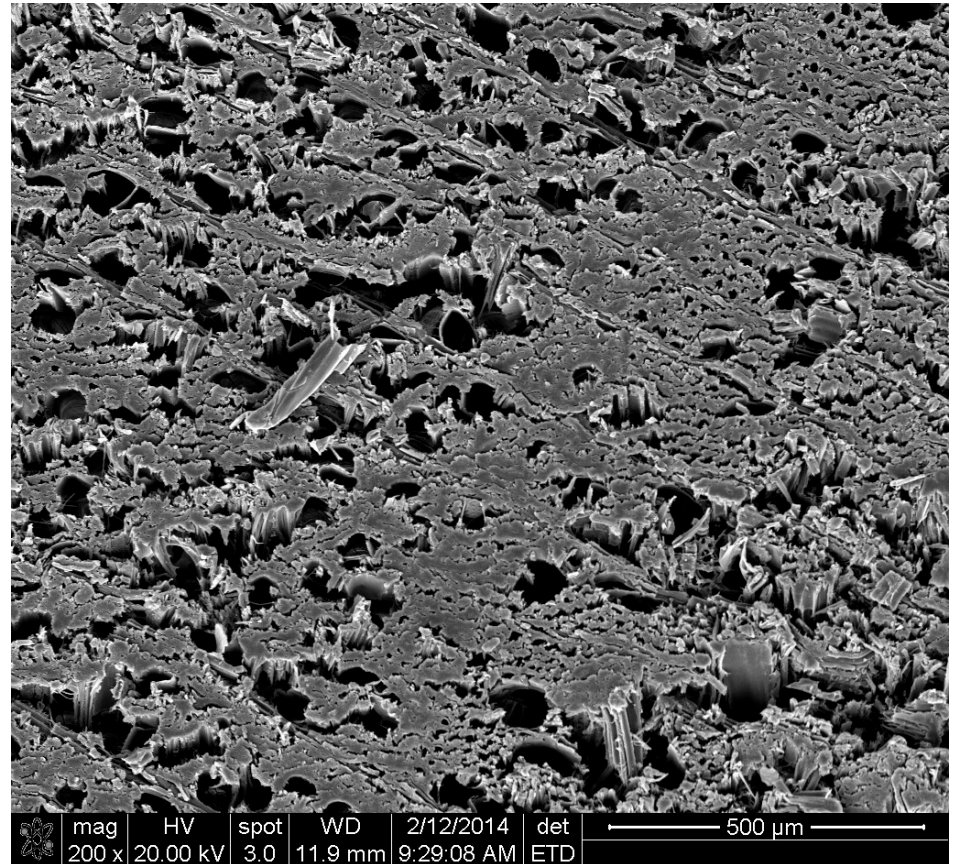
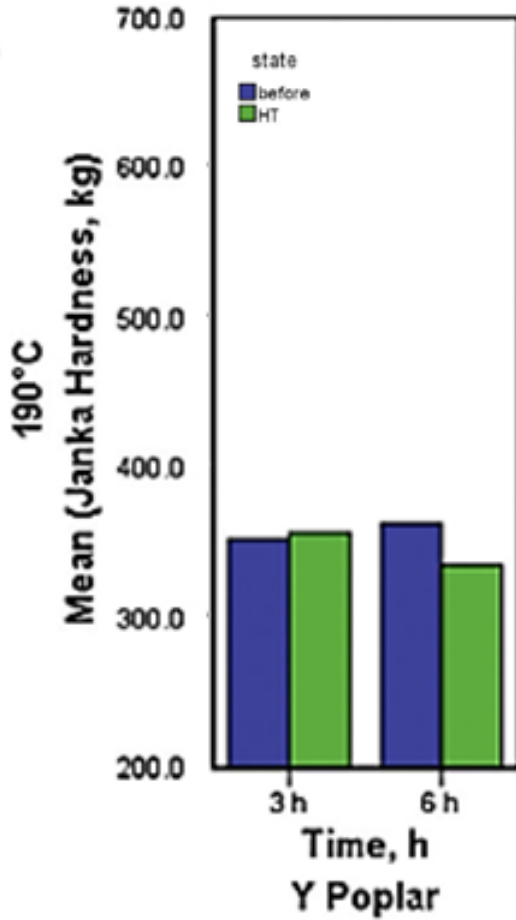
HT at 190°C for 3h



HT at 190°C for 6h

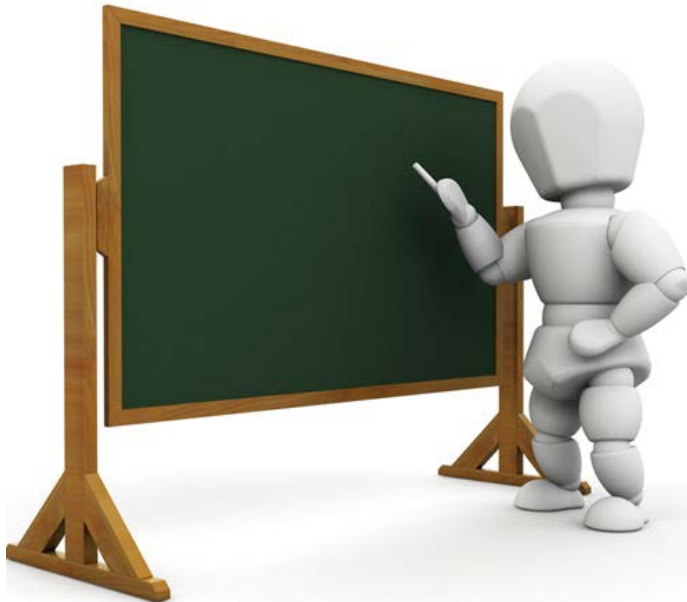
Progress of discoloration as function of heat treatment

Results



Influence of heat treatment on hardness and anatomical structure of the samples

Conclusive remarks



- It was found that the hardness of the samples was influenced by the treatment.
- But the results were found to be sufficient for different uses of yellow poplar.
- The application of heat treatment could therefore enhance the use of yellow poplar wood for high value product.

Acknowledgements

The authors are grateful to the Cost Action FP1407 for the invitation to attend the 2nd Conference of the Action.



Thank you for your attention!

