WCTE Auckland 2012
16 - 19 July
World Conference on Timber Engineering

CHEMICAL PROPERTIES AND DECAY RESISTANCE OF *Eucalyptus grandis* WOOD FROM STEAMED LOGS

[1]Cinthia Dias Rocha, [2]Elias Taylor Durgante Severo, [3]Fred Willians Calonego, [4]Cláudio Angeli Sansígolo

Recently, the lumber industry in Brazil has passed large change. The native wood of tropical forests have presented use restrictions due to legislation and environmental friendliness. Moreover, Brazil is among the ten countries with largest reforested area, and the *Eucalyptus* is the most important kind, with about 4.5 million ha (ABRAF, 2010) [1].

However, the *Eucalyptus* wood shows adverse conditions when it is used in timber and furniture industry. The presence of high levels of growth stress cause cracks and distortions in logs and boards, resulting in low yield of the material.

Techniques that have been used to relieve the tensions from growth stress include heating logs at high humidity by certain time. This process is called steaming and leads to a relaxation of tensions in the material through plasticization of lignin. Thus, the steamed wood presents a lower percentage of defects, and better quality during and after the sawing process.

However, the thermal treatments modify the features of wood.

The objective of this study was to evaluate the effect of log steaming on the chemical properties and biological resistance of *Eucalyptus grandis* wood to decay fungus *Pycnoporus sanguineous*.

This study utilized wood from 5 years and 11 months old *E. grandis* trees with diameter of 20 to 22 cm and 6.0 m long. The twelve logs were cutted in half. One of these logs was kept in its original condition (untreated log), and the other piece were reserved for the thermal treatment (steamed log).

Two grooves were machined to a depth equal to one third of the radius of each log at 10 cm from the crosscut section to relieve growth stress and reduce cracking during steaming.

Subsequently, half of each log was steamed in Laboratory of Wood Drying and Preservation from Faculty of Agronomical Sciences – University of São Paulo State, Botucatu, SP, Brazil. The 3.0 m logs were steamed for 13 h at a temperature of 90ºC and 100% relative humidity.

Then, all the logs were cut into flat sawn boards with 40 mm thick containing the pith.

The five boards from untreated and steamed wood were sawed into samples measuring 30 by 20 by 50 mm, which were transformed into chips and then processed into sawdust. This material was used for chemical analysis and was classified between 40 and 60 mesh. The procedures were implemented according to the standards presented in TAPPI (1999) [2].

The test conducted to evaluate the effect of logs steaming on the biological durability of *E. grandis* wood was the method known as the soil-block. The twelve boards from untreated and steamed logs were sawed into test blocks measuring 25 by 25 by 9 mm in size, with the 9 mm dimension in the grain direction. The procedures were implemented according to the standards presented in ASTM D-2017 (1994) [3].

Chemical properties and decay resistance data were normally distributed and paired t test at 5% significance were used for comparison of the means.

The results showed that log steaming on *E. grandis* wood cause: (1) a significantly decreased on holocellulose content; (2) a increase of 4.43% and 4.42% in extractives and lignin content, respectively; and (3) a decrease in its durability against the decay fungus *P. sanguineus* in order of 13.03%.

[1]Cinthia Dias Rocha- Faculty of Agronomical Sciences/UNESP, P.O. Box 237, Botucatu, São Paulo, Brazil. E-mail: cinthiadrocha@hotmail.com
[2] Elias Taylor Durgante Severo- Faculty of Agronomical Sciences/UNESP, P.O. Box 237, Botucatu, São Paulo, Brazil. E-mail: severo@fca.unesp.br
[3] Fred Willians Calonego- Faculty of Agronomical Sciences/UNESP, P.O. Box 237, Botucatu, São Paulo, Brazil. E-mail: fwcalonego@fca.unesp.br
[4] Cláudio Angeli Sansígolo- Faculty of Agronomical Sciences/UNESP, P.O. Box 237, Botucatu, São Paulo, Brazil. Email: sansigolo@fca.unesp.br

REFERENCES

[1] ABRAF. Brazilian Association of Planted Forest Producers. Statistical Yearbook Brasília, 2010.
[2] TAPPI. Technical association of the pulp and paper industry. *Technical Standards*, 1999. Atlanta.
[3] ASTM.D-2017. Standard method of accelerated laboratory test of natural decay resistance of wood. In: *Annual Book of ASTM Standard*, pages 324-328, 1994.