

## Tannic substances in *Tectona grandis* L. F.

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As secondary metabolites, tannins are phenolic compounds of great economic and ecological interest. They can be found in roots, flowers, fruits, leaves, barks and wood. In the industrial processing of wood, the barks and pieces of wood are discarded. For teak (*Tectona grandis*) from thinning, waste is even greater. Is necessary find other uses besides energy for materials from young forest stand with a diameter less than the industry standards, because it's a noble material with high investment.

In view of this, it is important to propose alternative uses for this raw material, such as tannins that have many applications. The objective of this study is examine the proportion of tannin in the bark and wood from first thinning of teak.

Were used five teak trees with 6 years old from Mato Grosso State, Brazil. The timbers were collected at 1.30 m above the ground (D1, 30m) with 50 cm in length. The bark was removed from the timber, and air dried and then ground in a mill type Willey. To determine the yield of condensed tannins from the bark and wood, was used the methodology described by Stiasny. The Stiasny index is a measure of the percentage of the extract that reacted with formaldehyde. The results showed 19% of Stiasny index for bark and 28% for wood. The yield for tannic substances was 1,61% for bark and 1,3% for Wood, the yield for non tannic substances was 5,25% for bark and 1,92% for wood. Thus the bark and wood of the first thinning of teak with 6 years old did not show good performance in tannin.

Thus it is possible to suggest other ways of using young teak forests. Woods with lower extractive content has the higher permeability, thereby the performance in the bonding process in better, using less chemical reagents for the production of fibers and the drying process tends to accelerate.

**Keywords:** *Tectona grandis* (Teak), first thinning, bark, wood, tannin

## Nirs Tools for Prediction of Main Extractives Compounds of Teak (*Tectona grandis* L.) Heartwood

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Biochemical and physiological process which occurred during heartwood formation have consequences on wood properties

such as colour, natural durability and some mechanical properties. However, it is very time-consuming to take measurements of extractives contents. Teak has been reported to contain 1-hydroxy-2-methyl-antraquinone, 2-hydroxy-methyl-antraquinone, 2-methyl-antraquinone, lapachol, 1,4-naphthoquinone for the main compounds.

In teak, natural durability is ascribed to extractives. Consequently, it's possible to estimate natural durability by measurement of extractives indirectly. For the purposes of selection for the production of improved varieties, the number of samples to be measured rapidly exceeds the capacity of a traditional laboratory.

Near-infrared spectroscopy approach, based on spectral data and reference data, is a tool enabling many of the chemical properties of wood to be predicted and the number of laboratory measurements to be reduced exponentially. The issue here is a question of checking the effectiveness of NIRS tool to build models and predict the main extractive compounds of teak wood from Ivory Coast. We try to calibrate these chemical properties with Nirs spectral information measured on grounded wood.

The results show the possible use of NIRS to predict total phenol content and some main extractive compounds of teak heartwood as tectoquinone, 2-hydroxymethylantraquinone, ...

Consequently, after verification on other sets of teak samples, which may or may not be included in the prediction model, NIRS can be used to predict extractive compounds accurately for a large number of samples, making it possible to estimate natural durability indirectly and to include these characteristics in the selection criteria for classifying wood and high throughput phenotyping.

**Keywords:** wood extractives; Nirs; teak; polyphenol

## Development of a quality control assessment method to predict properties of heat treated wood

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Heat treatment has been used to improve properties of non durable European species. Chemical modification of some of the wood components provides improved dimensional stability and biological performance against decay fungi while mechanical properties such as modulus of rupture are reduced. Quality control of commercially made thermally treated wood is one of the major challenge to allow its industrial development. The variability inherent within a wood species and between wood species, density and chemical compositions variation combined with the heat treatment parameters such as temperature duration and levels contribute to the production of heterogeneous heat treated wood. The development of a heat treatment process by convection which monitor the weight changes during the process will facilitate and help in controlling, in understanding and predicting the properties of heat treated wood. Data collected from a pilot study of heat treated wood using conditions similar to commercial process show that hardwood species were more susceptible to thermal degradation as compared to softwood. It was also established that wood chemical composition is directly