

Shigometric Studies of Some Angiosperm Plants to Estimate the Effect on Wood Formation

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ABSTRACT

In the present Shigometry study moisture contained indicated by electrical resistance was measured using a seismometer in different zone of wood in the tree species namely *Acacia uriculiformis*, *Albizia lebbeck* and *Lagerstroemia parviflora*. The high electrical resistance indicates low moisture content were recorded in a result.

1. Introduction

In the present Shigometric study covered under Nandurbar District which is a part of Deccan plateau is situated in the north part of Maharashtra state between 21 N to 21.32N latitude and 73.34 E to 74.3 E longitudes.

Shigometry is a measuring technique based on electrical resistance (ER) commonly used to assess vitality of living trees. It can also be utilized to estimate degradation of wood due to decay. The method takes advantage of increasing ion concentrations (i.e. K, Ca, Mg) even found at very early stages of decay.

Shigometric measurements, a fast, simple, cheap and reproduce able pre-test method, can be used to determine fungal attack on wooden raw material (solid wood, chips, etc.).

2. Material and Methods

For the experimental regulation were injected into the holes made in the tree trunk using as increment borer of tree species namely *Acacia uriculiformis*, *Albizia lebbeck* and *Lagerstroemia parviflora*. The holes were sealed with sealing wax after the treatment. The chemical used in holes are in different concentration with intervals of decided timing. The wood samples are collected from the healthy tree into disc. Matched paired of clear heartwood and sapwood discus were cut into 1cm block, 10-15um thick, radial longitudinal sections were cut on wood microtome (Hillis WE 1987, S. V. Deore and P. V. Ramaiah 2012 and Satish V. Deore 2017).

3. Results and Discussion

Table v. Pattern of Electrical resistance in three different zone of wood.

Species Name	Distance Travel by Probing wire (cm)	Diameter of the wood (cm)	Probable region of wood	Electric resistance in K Ohms
<i>Acacia uriculiformis</i>	1.10	45.00	Bark	005
	1.60	46.00	Outer sapwood	085
	2.00	46.00	Middle sapwood	122
	2.60	47.00	Inner sapwood/ transition zone	191
	3.00	46.00	Heartwood	230
	3.50	46.00	Heartwood	312
	4.00	46.00	Heartwood	379

Shigometric studies: Electrical resistance of the bark was measured using needle probes, which were inserted into the bark and reading on the shigometer were noted for different selected tree species with reference to sap wood and heartwood studied (Mellerowicz *et al.*, 2001 and Berthier *et al.*, 2011).

One hour cold water extracts of particles produced by a 6.5 mm drill bit from four typical middle European tree species (*Pinus sylvestris*, *Picea abies*, *Fagus sylvatica* and *Quercus* sp) were examined in regard to the difference of ER of sap and heartwood. For this reason radial profiles from pith to bark (ten for beech and oak, fourteen for spruce and sixteen for pine) have been produced. For uninfected wood, heartwood always showed higher ER than sapwood. Contrasting, for decayed wood a decrease of ER was observed. Measurements of ER were validated by conducto-metrical measurements (that give the reciprocal value of ER) on the same extracts. Comparison of obtained values showed a very good agreement between the two methods. Furthermore it could be shown that shigometrical measurements, as performed here, can be reproduced under deviating lab conditions (Magel *et al.*, 1994).

	4.5.	46.00	Heartwood	462
<i>Albizia lebbeck</i>	1.40	20.00	Bark	003
	2.00	20.00	Outer sapwood	084
	2.50	20.00	Outer sapwood	122
	3.10	20.00	Middle sapwood	132
	5.00	20.00	Inner sapwood/ transition zone	258
	6.50	20.00	Heartwood	308
<i>Lagerstroemia parviflora</i>	1.50	42.00	Outer sapwood	059
	2.00	42.00	Middle sapwood	162
	2.50	42.00	Inner sapwood	215
	3.00	42.00	transition zone	348
	3.50	42.00	Heartwood	380
	6.50	42.00	Heartwood	396

The electrical resistance has been lowest in the barks of all three species studied. Electrical resistance of bark was measured during needle probes. The reading shown by the seismometer were 002 k ohms in *Lagerstroemia parviflora*, 003 ohms in *Albizia lebbeck* and 004 ohms in *Acacia uriculiformis*. The resistance is gradually increasing with bark size of all three species. In outer sapwood the resistance for all absorbed species is below 100 ohms in transition zone. Heartwood shows highest electrical resistance reading are from 462 k ohms to 369 k ohms in variation of all absorbed species.

4. Conclusion

The electrical resistance is directly depends on the moisture content as it inverse resistance to a pulsed current depresses. Bark showing low value for electrical resistance

indicate height moisture contained present in that. The sudden decrease in moisture content occurred at the transition zone. Heartwood showed low moisture content indicated by high electrical resistance.

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