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Histo-chemical Studies of Some Angiosperm Plant with respect to wood formation

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ABSTRACT

Current work deals with the histological research of angiosperm viz. *Albizia lebbeck, Anogessus latifolia, Lagerstroemia parviflora, Melia azedarach* and *Pterocarpus marsupium* for starch, lipids and phenol. The harvested plant was subjected to a standard method and the results were recorded on starch granules of their size, lipids and phenol content in relation to their effect on tree formation in plants

1. Introduction

Wood is produced by a vascular cambium one layer of cell division at a time, but we know from general experience that in many woods there are large cohortsof cells produce more or less together I time, and these cohorts act tighter to save the tree (S. V. Deore and P. V. Ramaiah 2012). The living cells of the sapwood are also the agents of heartwood formation. Heartwood forms a core with a roughly conical shape in the trunk (Sterky et al., 1998). Once its formation initiates, the diameter and the height of the core continue to increases thought the life of a tree (Berthier S et al., 2001and Sudhakar Reddy C. and Arijit Roy 2008). The mechanism of heartwood formation is not clearly known in spite of various works efforts to elucidate the problem (Star J. et al., 1997 and Satish V Deore 2017). Majority of the information in regards to heartwood formation revolves around conifers and knowledge on the process of heartwood formation in angiosperm in meager (Esau, K. 1964.).

2. Description of study Area

In the present study Nandurbar District has been chosen as the used for study area. Nandurbar district 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. It lies in the Valley of Tapi Rivers and Satpuda mountains. The district can be divided into hilly tracts and undulating plain areas. Very small part of Narmada basin toward the west, middle region of Satpuda Mountain, called Kandesh Satpuda, lies west word in Dhule and Jalgaon and Nandurbar.

3. Material and Methods

Angiosperm wood plant Used:

1. ***Albizia lebbeck (L)*Willd.:** A large deciduous tree with umbrella shape crown. Hard wood and softwood is large white or yellowish. The wood is excellent for high class furniture and agriculture equipment's. (Anonymous, 1948.)

2. ***Anogessus latifolia* (Roxb. Ex DC):** A deciduous tree with grayish, hard, shining and smooth wood in irregular shaped. Sapwood is yellow in young trees and branchless, heartwood very hard. The wood is highly valued on account of its great strength and touches. It is used for agriculture implementation and in shipping usages.

3. ***Lagerstroemia parviflora*Wall.ex.w.:** It is 6-10 meter tall deciduous tree having very hard wood in grayish brown coloured. It is an important tree both for economically and sylviculturally. Berceuses wood is used for ships, railways slippers and motor bodied etc.

4. ***Melia azedarach* L.:** It is moderate size 7-10 meter tall, deciduous tree. The wood is soft sapwood is yellowish white and the heartwood is red. The wood is useful and pretty for museum cassis and furniture and durable.

5. ***Pterocarpus marsupium* Roxb. :** It is large deciduous tree, wood is very hard close grained giving a red resin. Sapwood is small and the heartwood is yellowish brown with darker stickers. The heartwood is full of gum resin and stains yellow when damp. The wood gum is much used in medicine like diabetes.

Table. i. Angiospermic tree species location and collection

Sr.no.	Botanical Name	Family	Location	Collection of Month	Disc Diameter (cm)
1.	*Albizia lebbeck* (L) Willd.	Mimosaceae	Toranmal	Sep, Dec, Apr	14.20
2.	*Anogessus latifolia* (Roxb. Ex DC)	Combretaceae	Taloda	Jan, June, Nov	12.60
3.	*Lagerstroemia parviflora*Wall.ex.w.	Lythraceae	Dang Forest	Nov	13.20
4.	*Melia azedarach* L.	Meliaceae	Taloda	Feb, Apr, July	14.00
5.	*Pterocarpus marsupium* Roxb.	Fabaceae	Taloda	May, Sept	14.90

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 (Table i) (Johansen, D.A. 1940 and Uggla 2001).

The collected wood samples are sized into discs. Matched paired of clear heartwood and softwood disc were cut into 1 cm in 3 blocks, and form each block 10-15µm thick, radial longitudinal sections were cut on a microtome. For Histo-chemical localization sections were fixed in FAA were used. Fresh section was collected in distilled water used for Histo-chemical localizations.

4. Results and Discussion

In present study the general distributional pattern of different Histochemical parameters have been investigated for five species namely *Albizia lebbeck, Anogessus latifolia, Lagerstroemia parviflora, Melia azedarach* and *Pterocarpus marsupium* for Starch, Lipids and Phenol contain in wood tissue.

1. **Starch:** The starch granules of varying size and shape have been observed in axial and ray parenchyma cells. The grain are oval, oblong and special with smooth outline in *Melia azedarach* and *Pterocarpus marsupium*. The starch grain are abundant in axial parenchyma cell while in ray parenchyma they are less in number in *Lagerstroemia parviflora*. Outer sapwood shows maximum in number of starch grain than the middle and inner sapwood cells. There was gradual decreases in their number and size from the outer to the inner sapwood of all plant wood.

   Starch grain in ray parenchyma cell in middle sapwood were more than in inner sapwood. In axial parenchyma also they were more in middle sapwood than the inner sapwood. In the transition zone there was no trace of starch grain in ray parenchyma cells, but axial parenchyma showed few starch grain. Starch grain were absent in both axial and ray parenchyma cells in the heartwood in all plant.

2. **Lipids:** Lipids were localized as minute droplets in the ray parenchyma cells of outer sapwood in *Albizia lebbeck*, *Anogessus latifolia, Melia azedarach* and *Pterocarpus marsupium.* While they were absent in ray parenchyma cells of outer sapwood in the rest of species investigated. Gradually the size and number of lipid droplets increase towards the transition zone. But in *Albizia lebbeck* and *Anogessus latifolia* only the size of lipid droplets increased. In heartwood adjacent to the transition zone some ray cells showed lipids droplets along with the phenolic extractives.

3. **Phenols:** The phenolic extractives may be amorphous granular or globular. Some ray parenchyma cells and vessels in the transition zone showed accumulation of the phenolic extractives in *Albizia lebbeck* and *Anogessus latifolia,*. Particularly the ray parenchyma cells abutting the vessels element showed the presence of phenolic extractives in the transition zone but are not observed in the outer and inner sapwood of *Lagerstroemia parviflora* and *Melia azedarach*. In the heartwood, the entire wood element was more or less field with the phenolic extractives.

5. Conclusion

There were mark histochemical changes at the treated zone of wood in *Albizia lebbeck, Anogessus latifolia, Lagerstroemia parviflora, Melia azedarach* and *Pterocarpus marsupium* wood tissue. The parenchyma cells and the vessels in the vicinity of the treated zone shoes more accumulated of phenolic than those at the site of the control.

Starch grain were absent at the vicinity of the treatment with ethylene releasing compounds, while they were peered in the zone treated with ether inhibiting compounds. Accumulation of lipids occurred at the treated site with ethylene releasing compound, while they were absent at the site treated with ethylene inhibiting compounds.

This Histo-chemical provides light on the biochemical process involved in heartwood formation of angiosperm plants.

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