Original Article

PROPERTIES OF KIKAR AND ASH SPECIES GROWN IN QUETTA CITY

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Abstract

Kikar wood and ash species grown in Quetta have been studied for their anatomical properties in order to find out wood quality improvement before their utilization for making various products. Permanent slides of cross, radial and tangential sections were prepared, observed under the microscope and data were collected for the frequency and dimensional measurement of different wood elements/structures in each wood species. On the basis of results it was observed that Kikar wood may be better or medium in strength due to longer, thick-walled or narrow lumen fibers. In this study kikar locally grown wood species have been evaluated for their basic anatomical properties, in order to find out measures for wood quality improvement before their utilization for making various products. Further, the proposed study will introduce integrated uses of the studied kikar wood species extend the base of raw material for wood based industries result indicate that ash wood grown in Quetta are good in strength and hardness. The frequency of wood rays both in cross and tangential sections was found greater in Ash wood grown in Quetta, Balochistan that indicates the wood is comparatively lower in resistance against decaying agents. The length of fibers, their diameter and wall thickness were found nearly analogous in both wood samples which represents their similarity in strength and hardness.

Keywords: KIKAR, WOOD SPECIES, PRODUCTS, LUMEN FIBERS, PESHAWAR.

INTRODUCTION

The genus of Acacia is quite large in family of Fabaceae, which contain more than 1350 species, but most of them belong to Acacia genus which are high in secondary metabolites mostly containing gums, tannins, and flavonoids (Rather et al. 2015). Acacia nilotica a medium-sized tree that is 15–18 metres tall and has a stem diameter of 2–3 metres. Its crown is low, wide, and nearly symmetrical. Fissured, dark brown to blackish bark has deep vertical grooves that reveal an inner grayish-pinkish slash and exude a reddish, minimal gum. (Atif Ali, 2012). This genus' versatile tree, Acacia nilotica (L.), can be grown in Tropical, the Middle East, and the Indian subcontinent. (Hill, 1940). Young trees have paired thorns that are 3–12 pairs long, 5-7.5 cm in length, nearly straight, and slightly pointed backward at the nodes of the stem. The compound leaves are in type, 4.5-7 cm long, with 3-6 pairs of pinnae, and 10–30 pairs of leaflets per leaf. (Atif Ali, 2012). Bright yellow-golden flowers with globule-shaped heads that are 1.2-1.5 cm in diameter and are arranged whorl wise or auxiliary on 2-3 cm long peduncles. (Singh et al., 2010).It has been introduced as fuel wood, feed, and most notably as a medicinal plant in a number of nations (Kriticos et al. 2003). Smooth-grained, light-colored hardwood is called ash wood. A popular term for 45 to 65 different species of trees is "ash." All of these species have essentially the same traits and behaviours (James 2021). In essence, the ash tree is a heliophyte, a mesophyte with a high nutritional demand and distinguished by a huge canopy (Mohammad Reza and Hossein 2017). Ash is dense and tough. As a result, it is mostly utilised for windows, shutters, cabinets, and furniture. Because of its medium hardness, it is a decent flooring option. It is not readily scratched or damaged (James 2021). Ash wood is similar to oak in terms of density and grain. In fact, it frequently serves as an alternative to oak and is sometimes referred to as "golden oak." Ash trees are categorised as hardwood trees, along with cherry, oak, and maple trees. Ash has a 1200 hardness rating (most scales generally agree, but sometimes they may be slightly different in number). (Walsh 2019)

MATERIAL AND METHODS

To conduct the research work, wood material of Kikar (Acacia nilotica)and ash species were collected from different areas of Quetta and transported to Pakistan Forest Institute, Peshawar. In order to study the anatomical properties, discs were cut from the end face of butt log of each species. Then permanent slides of cross, radial and tangential sections of kikar wood species were prepared by standard laboratory procedure (Anon., 1971) and observed under the microscope for various structural features in each species. A small portion of wood of each species was macerated in 20% Nitric Acid and Potassium Chlorate to separate Discs of ash about two inches were cut from end face of each butt logs and standard blocks of 1x1x2cm were removed from each log. Permanent slides of cross, radial and tangential sections of wood from each block were prepared by standard laboratory procedures and observed under microscope for various structure features. To measure the fiber length, a small portion of wood from each sample was macerated in Schulze's mixture (20% Nitric acid and Potassium chlorate) to separate the fibers and observe the fiber length. Data were collected for the frequency and dimensional measurements of following different wood elements/structures in each species and analyzed for statistical variables: Fiber length, Fiber diameter and Wall thickness Frequency of vessels per unit area, Vessel diameter, Wood Ray size (height and width) in cells, Wood Ray size (height and width) in microns, Wood Ray frequency per unit area in tangential section, Wood Ray frequency per mm in cross section.

RESULTS AND DISCUSSION

Results given in the following table represented that Kikar wood a hard and strong owing to longer and narrow lumened fibers. The wood may be used for making various wood products but, prior chemical treatment of the wood is necessary as the wood may be non-durable because of higher frequency and large size of wood rays. Wood may behave better during seasoning and preservation process as the vessels frequency was reasonable.

Table 01: Frequency and Dimensional Measurements of kikar

Wood species	Fiber lenght	Fiber diameter	Fiber wall-Thick-ness	Fiber lumen width	Frequency of vessels	Vessl Diameter	Height of Ray	Width of Ray	Ray freq-in tang Sec	Ray freq-in Cross sec.
Kikar (Acacia nilotica)	**mm 1.31**	**(u) 14.77**	**(u) 3.57**	**(u) 7.63**	**/mm^2 8**	**(u) 178**	**Cells (u) 33 418**	**Cells (u) 4.12 56.2**	**/mm^2 11**	**/mm 2.32**

Table 02: Frequency and diamensional measurement of various wood elements/structure in Ash grown in Quetta, Pakistan

Origin	Anatomical Features												
	No.of Vessels/mm^2		Diameter of Vessels(u)		No.o rays in tangential Section/ Mm^2	No.of rays In cross Section/ mm	Height of rays		Width of rays		Fiber length(mm)	Fiber diameter (u)	Fiber wall Thickness(u)	Fiber lumen width (u)
	Early wood	Late wood	Early Wood	Late Wood			Microns	No of cells	microns	No. Of cells				

Quetta	Avg	**2.06**	**16.45**	**203**	**Range (68-106)**	**7.71**	**123.77**	**6.5**	**38.83**	**2.36**	**1.04**	**19.53**	**3.41**	**12.71**
	S.D.+	032	1.77	35.54	-	-	53.95	2.89	1456	1.07	0.22	2.95	0.57	-
	C.V.%	15.53	10.75	17.53	-	-	43.58	44.46	4180	45.33	21.42	15.14	16.74	-
	Min	1.54	13.42	116.40	-	6	30.48	2	10.16	1	0.52	15.24	2.54	-
	Max	2.66	19.10	261.90	-	8	215.9	11	63.50	4	1.37	25.40	4.82	-

In Ash wood brought from Quetta, the frequency of earlywood vessels was calculated 2-3/mm 2 and the latewood vessels were found 13-19/mm 2 .The diameter of earlywood vessels was 116-262µ while latewood vessels were 34-83µ wide. The number of wood rays was determined as 6-8/mm in cross-section and 68-106/mm 2 in tangential section. There were 2-11 cells (30-216µ) in height and 1-4 cells (10-63µ) in ray width. The fibers were 0.52-1.37mm long, 15.24-25.40µ in diameter and their walls were 2.54-4.82µ in thickness.

CONCLUSIONS

Based on the results, it can be concluded that Ash wood grown in Quetta are analogous in strength and hardness. Based on the results it can be concluded that, the wood of Kikar may be better or medium in strength and can be used for making different wooden articles. Preservative treatment of kikar wood before utilization for making products is necessary for all the studied species in order to increase service life of the wood and of the products manufactured. The wood of kikar could behave better during seasoning and preservation.

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