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Estimation of ash content in bark, leaves and fruits of *Terminalia arjuna* Roxb

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ABSRTACT

Arjuna, *Terminalia arjuna* is well known medicinal plant. Its bark is extensively used in Ayurvedic medicines and in high trade it is sourced from tropical forests. The demand for Arjuna bark has increased several folds in international and national markets. Considering importance of this tree species as medicinal plant and demand for its bark the present study was undertaken to find out the ash content in its bark, leaves and fruits in experimental farms at Akola and Amravati districts of Maharashtra. The significant variations were observed in 20 trees of *T arjuna* selected from different locations of the two districts for ash content in bark, leaves and fruits. The highest ash content in bark was observed in *T arjuna* MB-3 (19.33%) followed by MB-1 (18.53%). The results revealed that the *T arjuna* had distinct properties in bark, leaves and fruits for ash content.

Keywords: Ash; Arjuna; bark; leaves; fruits

INTRODUCTON

Terminalia chebula Retz, *T bellarica* (Garten) Roxb, *T cattapa* L, *T elliptica* Willd and *T arjuna* (Roxb) are the most common species of the genus *Terminalia* distributed in dry deciduous tropical forests throughout Indo-sub-Himalayan tracts of the states like Uttar Pradesh, Bihar, Madhya Pradesh, Delhi, Maharashtra etc. *Tetminalia* is extensively planted in India for shade or ornament in avenues or parks even in dry and hot regions (Anon 1972).

Arjuna is a water-loving species and found in tropicals of dry deciduous forests of central India. The tree prefers humid, fertile, loamy and red lateritic soils. It grows in low land to hilly areas and can tolerate half submergence for a few weeks. Its bark has been used in traditional Ayurvedic herbalism for generations primarily as a cardiac tonic (Pandey and Kori 2011).

Calyx is glabrous and has five short triangular lobes. Fruit is drupe, smooth-skinned with five hard angles or wings, fibrous-woody, about 3.0 to 4.5 long and 2.5 to 5 cm broad. Bark is smooth, pinkish-grey from outside and flakes-off in large curved and rather flat pieces. Sapwood is reddish white and heartwood is brown and variegated with dark-coloured streaks (Dwivedi 2007).

T arjuna is well known medicinal plant. Its bark is extensively used in Ayurvedic medicines particularly as cardiac tonic. Demand for Arjuna bark both in India and abroad has been growing rapidly for over a decade (Pandey and Mandal 2012). Tannin and flavonoids are responsible for its anticancer properties (Jain et al 2009).

MATERIAL and METHODS

The plant parts for ash content analysis were collected from the even-aged stands of *T arjuna* located at Malkapur block (MB) and Nagarjun medicinal plant garden (Nag), Akola in university campus along with of Amravati from Wan Wildlife Sanctuary (Wan), Akot. Estimation of ash content in the bark of *T arjuna* was

carried out in the laboratory of Department of Soil Science and Agricultural Chemistry, Dr Panjabrao Deshmukh Krishi Vidyapeeth, Akola, Maharashtra. The bark of the selected trees was removed from the stem (trunk) without destroying the plant. The blaze was chosen on three sides (east, west, north and south). The fruits and leaves (5 each) were selected from upper, middle and lower branches of *T arjuna*.

Determination of ash content

The ash content was recorded by following standard procedure given by Rangana (1986):

$$\text{Ash (\%)} = \frac{\text{Weight of silica dish after ashing} - \text{Tare weight of dish}}{\text{Initial weight of sample}} \times 100$$

The data were subjected to statistical procedures for comparing means (Panse and Sukhatme 1987).

RSEULTS AND DISCUSSION

The data presented in Table 1 reveal that the maximum ash content in bark (19.33%) was found in MB-3 which was at par with MB-1 (18.53%), Nag-10 (17.20%), MB-4 (17.08%), MB-5 (16.80%), Nag-8 (16.80%), MB-2 (16.78%) and Nag-7 (16.33%). Minimum (12.13%) ash content was recorded in Nag-9 which was at par with Wan-15 (12.30%), Nag-6 (12.60%), Wan-11 (13.405), Wan-16 (14.23%), Wan-18 (14.335), Wan-12 (14.555), Wan-14 (15.08%), Wan-13 (15.285), Wan-17 (15.60%) and Wan-19 (15.60%).

The maximum ash content in leaves (9.92%) was noticed in Nag-6 which was at par with MB-5 (9.38%) and Wan-18 (9.21%) and minimum 5.37 per cent was recorded in Wan-20 being at par with Wan-13 (5.63%) and MB-2 (6.15%).

The data revealed significant variations among the ash content in fruits. The maximum ash content in fruits of 4.82 per cent was found in Wan-18 which was at par with Wan-16 (4.80%), Wan-13 (4.64%), Wan-19 (4.36%), Wan-15 (4.33%) and Wan-14 (4.13%). The minimum ash content of 1.70 per cent was recorded in MB-4 being at par with Nag-6 (1.76%), MB-5 (1.82%), MB-1 (2.20%), Nag-8 (2.20%), Wan-20 (2.21%) and Nag-7 (2.50%)

Similar types of results of ash content in bark, leaves and fruits of *T arjuna* were also reported by Singh and Sharma (2010) and Patil and Gaikwad (2011).

Table 1. Ash content in bark, leaves and fruits of *Terminalia arjuna*

Tree number	Ash content (%) in		
	Bark	Leaves	Fruits
MB-1	18.53	6.75	2.20
MB-2	16.78	6.15	2.93
MB-3	19.33	6.39	3.37
MB-4	17.08	6.97	1.70
MB-5	16.80	9.38	1.82
Nag-6	12.60	9.92	1.76
Nag-7	16.33	8.53	2.50
Nag-8	16.80	9.09	2.20
Nag-9	12.13	7.84	2.80
Nag-10	17.20	8.09	3.23
Wan-11	13.40	8.90	3.13
Wan-12	14.55	7.38	3.50
Wan-13	15.28	5.63	4.64
Wan-14	15.08	8.77	4.13
Wan-15	12.30	8.28	4.33
Wan-16	14.23	6.31	4.80
Wan-17	15.60	7.27	3.87
Wan-18	14.33	9.21	4.82
Wan-19	15.60	7.23	4.36
Wan-20	15.80	5.37	2.21
Mean	15.49	7.67	3.22
SEm±	1.19	0.28	0.29
$CD_{0.05}$	3.41	0.81	0.85

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