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QUALITY OF BAST FIBRE OF *DECASCHISTIA CROTONIFOLIA L*

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Decaschistia crotonifolia is an important multipurpose plant species of Rayalaseema region of Andhra Pradesh, India. The tribal people use this plant for curing different ailments. It also provides good quality fibre. In the present study the physico-chemical characteristics of the fibre were studied and compared with those of *Grewia optiva* and *Cannabis sativa*. The fibre of *D.crotonifolia* was found to be comparable or even better in some features when compared to the other two speices. Domestication of this under-utilized and multipurpose plant would be beneficial.

Key words: *Decaschistia crotonifolia, Cannabis sativa,* quality, *Grewia optiva,* fibre

Decaschistia crotonifolia Wight and Arn (Malvaceae) a medicinal as well as fibre yielding plant, is a tuberous woolly shrub, growing on barren slopes of hilly region among the rocks at 900-1250 MSL (Mathew, 1991). It provides a good quality fibre to prepare ropes, carpets and nets and has a great potential for small scale industry. However little is known about the structure and qualities of fibers *D. crotonifolia*.The tribal people like Chenchus, Yerukalas, Nakkalas, Sugalis and Koyas of Andhra Pradesh, India are using the leaf powder mixed with donkey's dung and applied externally to reduce the hydrocoel. The leaf powder mixed with calcium is applied to skin diseases especially in psoriasis. The leaf paste is applied externally to cure the skin ulcers and boils. Most of the developments in conventional forestry have concentrated on species with major utility, with little attention to the minor, under-utilized species of economic potential (Kernali *et al.*, 1997).

D. crotonifolia is propagated generally through seeds. The present report describes the extraction, structure and physico-chemical characteristics of stem fibres and compares with those of two other fibre yielding species (*G optiva* and *C. sativa*).

MATERIALS AND METHODS

Wild plants were collected from the forest of Seshachalam hill range of Eastern Ghats, when the plants were still in vegetative growth. The fibre of D.*crotonifolia* was extracted from the stem following the method used by local tribal people. The plants were cut at the base and leaves were removed . The shoots were kept under sun light for drying. The dried branches were tied into bundles and put in water. After one month the shoots were taken out from water, the bark was removed and then beaten to extract fibres. The fibres of *G optiva* and *C. sativa* were also extracted in the same manner. Physical and chemical characteristics of the fibres were carried out at the Central Institute of Paper and Pulp Research Industry (CIPPRI), Andhra Pradesh. The length and diameter of fibres were measured microscopically. Analysis of water solubility, lignin and holocellulose was done according to standard procedure following TAPPI (Technical Association of the Pulp and Paper Industry, Atlanta, U.S.A. (1983).

RESULTS AND DISCUSSION

The fibres of *D. crotonifolia* originating from phloem cells are pale yellow. These were thick walled, sclerenchymatous, elongated and tappery at both ends. The plant yields about 40% fibres of the total biomass (dryweight). Which is on the higher side of the reports for some tropical trees 3-45 % (Ghouse *et al.*, 1979). The details of the fibres of

Table 1: Physico-chemical characteristics of the fibre of the three selected Species. The values in paranthesis indicate ± SE of five replications

Plant species	Fibre length (µm)	Total diameter (µm)	Lignin (%)	Water solubility (%)	Holocellulose (%)
D. crotonifolia	1680.00 (±42.50)	13.73 (±1.31)	6.9 (±0.2)	15.0 (±1.0)	94.2 (±0.3)
Grewia optiva	1454.85 (±75.0)	13.22 (±2.11)	7.4 (±0.4)	20.6 (±2.0)	92.8 (±1.4)
Cannabis sativa	1660.00 (±51.10)	13.38 (±1.99)	5.05 (±0.9)	26.3 (±3.2)	85.4 (±2.9)

the three species are compared in Table 1. Bark fibre length of some Indian tropical trees, varies from 0.856 mm to 4.178 mm and the diameter from 10.0-17.4 um (Bhatt *et al.*,1989; Betrabet, 1956). On the basis of total length and diameter and wall thickness, fibre of *D. crotonifolia* is comparable or marginally better when compared to other two species. Lignin content was minimum in *C. sativa* and maximum in *G. optiva* (Table 1). Majumdar (1955) has also reported that the lignin content between 5.0 % and 11.5 % in seven bast fibres. Betrabet (1956) has reported even higher lignin content between 10.16 to 23.08 % in different bast fibres.

The water solubility ranged between 15.0 to 26.3 % in the three species . Holocellulose comprises total carbohydrate (cellulose and hemi cellulose) fraction of lignin-cellulosic raw material. It gives an idea about the quantity and quality of pulp and paper produced. Holocellulose ranged between 85.4 to 94.2 % of total dry weight being minimum in *C. sativa* and maximum in *D. crotonifolia*. Madan and Tandon (1991) have observed the holocellulose ranging from 53.4 to 80.385 % in fibrous raw materials of different agro forestry and social forestry species. The less water solubility indicates the durability of the fiber.

The present study shows that the length, diameter and holocellulose content of the bast fiber was at higher levels in *D. crotonifolia* than that of the other two species studied . As it has a good prospect for small scale industry, the plant can be domesticated and exploited for its multipurpose.

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