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Botanical Standardization of Bone setting Plant – *Lannea coromandelica*.

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Abstract

Lannea coromandelica (Houtt) Merill. from family Anacardiaceae is one of the potent remedial plant. It is known as Modhad or Moi in Vernacular language and is found to be distributed throughout India. It is one of the common plants of deciduous forest and plains. In Maharashtra it is found to be distributed in regions like Kataraj ghat, Varandha ghat, Kalsubai and Harishchandragad wild life sanctuary. The plant is used to cure bone fracture. Due to varied medicinal applications it is recognized as one of the important drug. The plant material was collected in flowering and fruiting condition from Gardani village of Akole taluka from district Ahmednagar (M.S.) India. For authentification and correct botanical identification there is need of standardization of such plant. Medicinal practioners like traditional bone setters and bone healers make use of various medicinal plants to cure bone fracture and bone injury. Research work carried out in the present investigation pertains to Botanical standardization of the selected plant.

Keywords: *Lannea coromandelica, Bone fracture, Drug, Authentification, Standardization,*

1. Introduction

There are many specialized and renowned traditional orthopedic centers in India. These are based on classical knowledge of Ayurveda and Sidda. Rishis and vaidyas has the excellent repository of knowledge to cure bone fracture. Likewise various tribes in Maharashtra state including Bhils, Gonds, Thakars, Mahadeokoli, Vanjari and Katkari are local collectors of plants. Many medicinal plants are collected to prepare various medicines and to cure various diseases. *Lannea coromandelica* is one of such medicinal plants being used by various medicine men all over India. It belongs to family Anacardiaceae and is well known for its wound healing and bone setting application. It is also found to be used along with other plants to prepare various formulations and combinations. Taking this aspect into consideration attempt has made to standardize this drug plant. Research work carried out in present investigation throws light on authentification and consistency of the selected plant.

2. Review of Literature

The genus *Lannea* is named in the honor of the French man Lannes de Montebelio who sent the plant from Japan to France around 1870 and the species *coromandelica* is named behind Coromandel, the coast of southern eastern part of India (Dixit, 1997). The plant is called as Modhal, Moya, Shimti in vernacular language (Patel, 1968). It is found to be distributed all over Maharashtra state. It reaches the height of 40-50 feet, leaves are alternate and crowded at the end of the branches, flowering is observed during the months of February and March and inflorescence exists in terminal panicles (Cooke, 1967; Almedia, 1996; Karthikeyan, 1993 and Singh *et al.*, 2000). It is tall tree with ash colored bark. Traditional healers make use of stem bark of the plant to cure bone fracture (Sunnetha *et al.*, 2011).

Bark of the stem is sweet, hot, acrid and stomachic, allays thirst, and cures skin eruptions and dysentery (Kirtikar *et al.*, 2005). Bark is astringent as used in washing wounds (Chopra et al., 1956). In Konkan region of Maharashtra bark of plant along with *Zizyphus rogusa* and *Radermacera xylocarpa* is taken in equal proportions and crushed together with equal quantity of water for its application on fractured bones (Sharma *et al.*, 2001). Stem bark possesses flavanoids and terpenoids (Venkata et al., 2010). The plant contains polyphenols along with tannins and polysaccharides and is used by tribals all over India to cure various diseases like body pain, bone fracture, tooth ache, stomach ache, ulcers and sexual impotency (Reddy *et al.*, 2011). Paul, 2014 reported various home remedies of *Lannea coromandelica* with respect to bone fracture. Accordingly mixture of *Lannea* was found to be used along with *Alianthus exelsa* bark, *Cocclus hirtus* leaves, *Curcuma longa* rhizome, and *Sterculia villosa* roots. Prepared paste was bandaged on fractured portion and tied with bamboo splints after proper setting of bones

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3. Material and Methods

The plant material was collected in proper flowering and fruiting condition and brought in laboratory. These were identified with the help of standard flora. These were also compared with herbarium specimens of Botanical Survey of India, Pune for its correct Botanical identification.

3.1 Macroscopic evaluation [Fig. I and Fig. II] This is known as organoleptic evaluation of drug which includes the study of external and internal bark, fracture, odor and taste (Gathercoal and Writh, 1949; Wallis, 1967; Trease and Evans, 1980).

3.2 Microscopic evaluation [Fig. III to Fig. 7] For microscopic evaluation transverse section of the stem was taken and passed through various alcoholic grades, stained with 70% alcoholic safranin and light green (Johansen, 1940).

3.3 Phytochemical evaluation (Table II): Plant material was dried in shade. Powder was made using blender. It was used to carry out further phytochemical study. Water extract made out of the drug was used for detection of starch, saponins, proteins, tannins, reducing sugars and anthraquinones and alcoholic extract for detection of alkaloids, flavanoids and glycosides (Wallis 1967; Peach and Tracy, 1955; Trease and Evans, 1972).

3.4 Histochemical evaluation (Table III): Histochemical tests were carried out for detection and localization of chemicals such as starch, tannins, saponins, fats, alkaloids and glycosides (Johansen, 1940 and Krishnamurthy, 1988).

Percentage extractives and ash analysis of the drug in powdered form was carried out as per Anonymous, 1955 and fluorescence study was performed according to Chase and Pratt, 1949 (Table IV and V). Quantitative study was carried out on carbohydrates following Nelson, 1941; on proteins following Lowry *et al.*, 1951 and on phenols following Malick *et al.*, 1980 (Table I).

4. Tables and Figures

Table I: Quantitative Estimation of Carbohydrates, Proteins and Phenols *L. coromandelica* stem

S.N.	Test	Result (mg/g Dry Wt.)
1	Carbohydrates	8.64±0.011
2	Proteins	30.56±0.010
3	Phenols	0.40±0.013

[The values are the mean of triplicates (S.E.)]

TableII: Phytotochemical tests of *L. coromandelica* stem

SN.	Tests	Result
(A)	**Water extractives**	
1	Starch	Present
2	Saponins	Absent
3	Proteins	Present
4	Tannins	Present
5	Reducing Sugars	Present
6	Anthraquinones	Present
(B)	**Alcoholic extractives**	
1	Alkaloids (Dragendorff's)	Present
2	Alkaloids (Wagner's)	Present
3	Alkaloids (Mayer's)	Present
4	Flavanoids	Present
5	Glycosides	Present

Table III: Histochemical test of *L. coromandelica* stem

S.N	Tests	Reagent	Location
1	Starch	I_2KI	Medullar rays
2	Proteins	K_3FeCN_6	Hypodermis
3	Sugars (glucose)	Fluickgers	Hypodermis, Cortex
4	Tannins	10% Aq. $FeCl_3$	Epidermis Hypodermis
5	Alkaloids	Dragendorff's	Sclerenchyma, Xylem and Pith
		Wagner's	Xylem, Medullary rays, Pith
		Mayer's	Hypodermis, Cortex Sclerenchyma

Table IV: Percentage Extractives and Ash analysis of *L. coromandelica* stem

S.N.	Solvents	Wt gm (%)
1	Water	0.25±0.017
2	Alcohol	0.64±0.037
3	Petroleum ether	0.44±0.06
4	Solvent ether	0.33±0.027
5	Total ash	0.11±0.01
6	Acid Insoluble Ash	0.106±0.018

[The values are the mean of triplicates (S.E.)]

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Table V: Fluorescence analysis of *L. coromandelica* Stem

Treatment	Powdered stem observed under U.V.	
	254 nm	365 nm
Powder as Such	Flu. Green	Dark Brown
Powder as Such Mounted in Nitrocellulose	Low Fluorescent green	Violet Black
Powder + 1N NaOH in CH_3OH after drying for ½ hour and mounted in Nitrocellulose	Yellowish Green	Dark Purple
Powder + 1N NaOH in CH_3OH	Yellow	Purplish Green

Fig. I
Habit of *Lannea coromandelica*(Houtt) Merill.

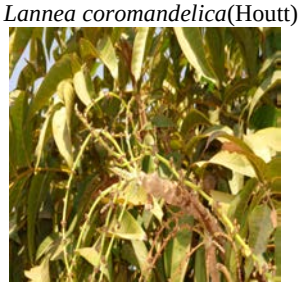


Fig. II Stem Bark

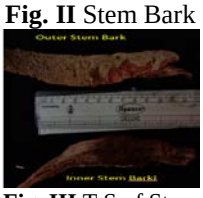


Fig. III T.S of Stem

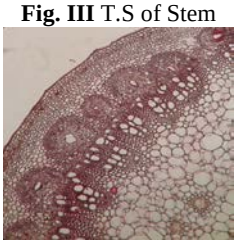


Fig. IV Parenchyma

Fig. V Fiber

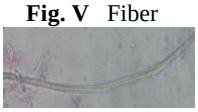


Fig. VI Tracheid

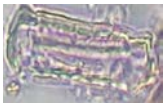
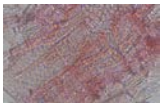


Fig. VII Vessel



5. Conclusions

Macroscopic observations of the drug reveal that outer stem bark is grayish ash colored where as inner bark is purplish. Fracture is short with strong characteristic odor and acrid taste. In microscopic study cross section of stem shows outer cork cells and superficially organized single layered epidermis. Botanical investigation being carried out in the present investigation throws light on some standard parameters by studding macroscopic and microscopic characteristics. Observations made out of macroscopic and microscopic evaluation deals with some remarkable findings which form a key for identification of the said drug. Phytochemical and histochemical findings reveal that the plant possesses optimum amount of primary and secondary metabolites. These active chemicals being identified are well distributed within the respective tissues. Amount of Carbohydrates, Proteins and Phenols quantified with spectrophotometric analysis forms the quality standards. The findings can be beneficial for further detailed phytochemical study and HPTLC study.

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