



IMPORTANCE OF PHARMACOGNOSTIC ANALYSIS IN IDENTIFICATION OF MEDICINAL PLANTS WITH SPECIAL REFERENCE TO ATIBALA (*ABUTILON INDICUM* (L.) SWEET)

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ABSTRACT

Identification of Medicinal plants has been a great challenge in the present scenario due to fall in its availability. Its seriousness has markedly increased due to adulteration by the vendors thus drastically decreasing the quality of the raw materials that are used in the manufacture of Herbal drugs. Presently Ayurveda uses about 1000 single drugs and 8000 compound formulations of recognized merit are in vogue¹. The adulteration has resulted in the fall of quality in the medicinal preparations of Ayurveda too. Hence it is essential to innovate and develop tools that can help in the proper identification of the medicinal plant source and also the collected raw materials. Pharmacognosy is one such method adopted in the field of Ayurveda today to ensure quality. The present paper tries to highlight its importance with Atibala as an example.

Keywords: Ayurveda, Pharmacognosy, Atibala, *Abutilon indicum* (L.) Sweet,

INTRODUCTION

Medicinal plants have been an indispensable part of mankind. They have supported human populations from time immemorial to combat various disease conditions and also for maintenance of health. The knowledge of our ancestors in its rational and judicious use has resulted in the proper maintenance of its supply. But as the civilization grew along with the population covering large pieces of land for the purpose of fulfilling the basic needs the plants were eliminated. This resulted in short supply of medicinal plants ensuing in their high commercial value. This in its turn became a cause for adulteration and decrease in the quality of the raw materials and the medicinal preparations that have used them. Presently, there are more than 2434 Ayurvedic hospitals with more than 43,614 beds and 4, 78, 754 Ayurvedic physicians (Source: AYUSH, system wise statistics). All of this makes treatments and product prescriptions more readily accessible². It is also true that not all Indian consumers are knowledgeable about Ayurveda. As a matter of fact, mainstream Indian consumers, much prefers conventional allopathic medicines. Sales of the Indian pharmaceutical industry far outpace sales of the Ayurvedic industry which is changing gradually. Traditional and natural medicines are now becoming more popular in India, in part due to fewer side effects as compared to conventional drugs. The retail value of the Ayurvedic products market in India is estimated to be around \$1.2 billion (2005 figures) and is expected to reach \$2.6 billion by 2012³. As a result the Ayurvedic drug industry needs to assure quality of its medicaments such that it generates the desired effect. Thus, to ensure quality there are several tools that have been devised out of which Pharmacognosy is one. Identification of various drugs by their morphological characters is an important aspect of pharmacognostical identification of drugs. It includes morphology (study of the form) along with morphography (Description of the form through the study of macroscopic and microscopic characters) for the specimens

of known crude drugs. Atibala identified as *Abutilon indicum* (Linn.) Sweet is a drug that has been used in Ayurveda for treating various conditions. The inclusion of the same in the Balya⁴ and Brimhaneeya⁵ group by Charaka and under Madhura varga⁶ and Vatasamshamana⁷ group by Sushruta is an example for its profound use since ancient times. The detailed study of the structure of the root of *Abutilon indicum* (Linn.) Sweet which is the main usable part was carried out and its significance in the purpose of identification is noted and taken as an example.

MATERIALS AND METHODS

Collection of sample

The sample of the drug namely *Abutilon indicum* (Linn.) Sweet that was botanically identified to be authentic samples. The sample was obtained from the local fields in and around Moodbidri, Dakshina Kannada of Karnataka, India.

Place of Work

The Pharmacognostical study of the drugs was carried out in the SDM College of Ayurveda Research Laboratory, Udupi, India for the purpose of authentication.

Procedure

The obtained sample was observed macroscopically for its characteristic features and noted. Further, transverse section of the root sample of *Abutilon indicum* (Linn.) Sweet was taken and observed under microscope after staining it with Leishman stain.

RESULTS

Macroscopic Study

Root of *Abutilon indicum* (Linn.) Sweet

Tap roots, fairly long with a number of lateral branches, 1.5-2 cm in diameter, light brown, outer surface smooth with dot like lenticels, bark thin and can be easily peeled off, odour, feeble, taste, astringent and bitter.

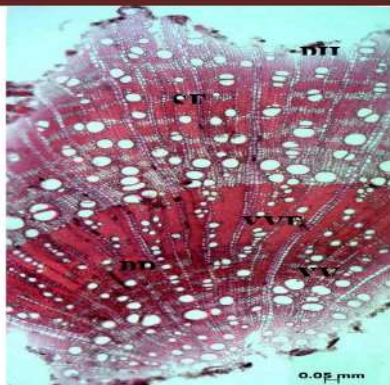


Figure 1: Detailed TS of xylem

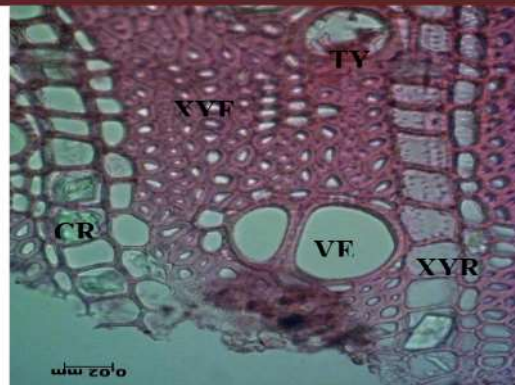


Figure 2: Pitted xylem ray and crystals

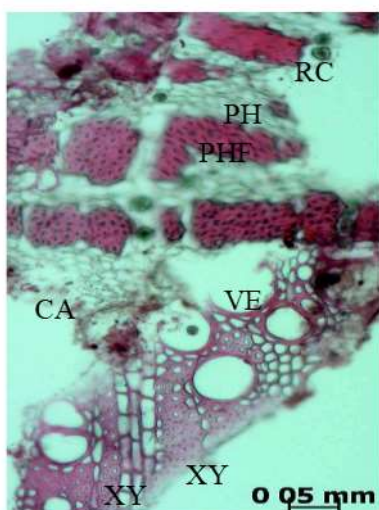


Figure 3: Detailed TS of phloem-xylem union

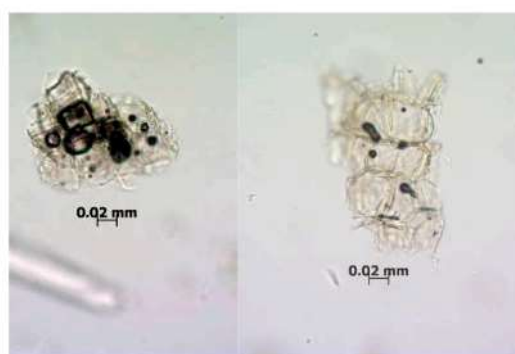


Figure 4: Cork cells with rosette prismatic crystals



Figure 5: Crystal fibres



Figure 6: Thick and thin-walled fibres

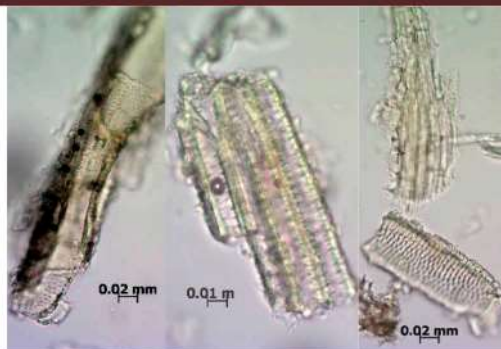


Figure 7: Fragment of tracheid group

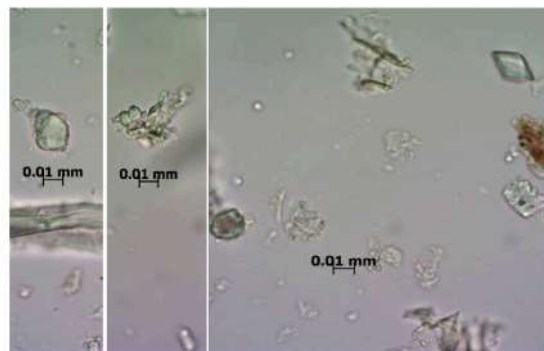


Figure 8: Starch, prismatic and rosette crystals

Microscopic Study

T. S of Root of *Abutilon indicum* (Linn.) Sweet

Transverse section of root (Figure 1) shows a thin cork of 4-7 or more tangentially elongated rectangular cells, cork cambium, single layered, and at the lenticel regions followed by 2-3 layers of secondary cortex of thin-walled, almost cubical or rectangular cells, containing small clusters of calcium oxalate in most of cells, phellogen followed by 3-4 layers of thin-walled cells of cortex, some cells of cortex which are above the conical strands of bast, crushed, small starch grains, 6-9 μ in diameter, present in some of the cells, phloem forms the major portions of bark and present as conical strands with their bases towards the wood and with dilate distal ends of the primary medullary ray in between them, fibres, present in groups of 10-12 in these conical strands, in tangential rows, alternating with thin-walled phloem elements, towards wood fibre groups, element in between the fibres mostly consists of phloem parenchyma, Some cells contain cluster crystals of calcium oxalate and a few others have starch grains, some phloem cells towards periphery appear compressed and crushed, inner to phloem, a cambium present, consisting of 1-2 rows of narrow, thin-walled rectangular cells, wood composed of vessels, wood fibres, wood parenchyma and medullary rays vessels vary in diameter and arranged in radial groups of 2-4, also occur in singles, some cells show tyloses formation, parenchyma thick-walled and slightly wider than fibre cells, but less thickened, single or rarely compound starch grains present, tetrarch bundle or primary xylem present at the centre of wood, medullary rays uni or biseriate widen much towards distal ends, most of the ray cells contain starch grains and some contain cluster of calcium oxalate, starch grains present in wood larger than those of bark region, a few ray cells at centre of the root contain rhomboidal crystals.

DISCUSSION

The pharmacognostical study includes the macroscopic and microscopic study of the trial drug. Even though the same is already established by the earlier researchers, the experimentation and analysis of the trial drug pharmacognostically is essential as the drugs are always in the apprehension of being adulterated or substituted. Thus, it is quite important to establish the identity and negate it from the substituted or adulterated ones. On profound literary review it is to be noted that for proper identification, a plant when observed microscopically exhibits certain characters that are quite specific to it. With respect to the plant *Abutilon indicum* (L.) Sweet or Atibala, it is to be noted that the characters like number of conical or wedge shaped strands of bast, several lenticels openings in the cork, cells of the medullary rays at their distal dilated end have both starch grains and crystals, Crystals are present in the ray cells, etc., are mentioned as key identification features in text books of Pharmacognosy⁸ which are necessary for the establishment of correct samples. From the observations we can see that sample that was botanically identified as *Abutilon indicum* (L.) Sweet is seen presenting these characters. Especially the characters like pitted xylem rays (Figure 2), the presence of Rosette crystals at the region of phloem-xylem junction (Figure 3) are the notable feature in the TS of root which aid in the purpose of identification. But the main aspect of identification of an Ayurvedic drug industry is Powder microscopy. The characters namely Cork cells with rosette prismatic crystals (Figure 4), Crystal Fibers (Figure 5), Thick and thin-walled fibers (Figure 6), Fragment of the tracheid group (Figure 7) and Starch, prismatic and rosette crystals (Figure 8) are notable and exclusive tools for identification of Atibala. These characters are then cross checked with the literary references available which confirmed the identity. The microscopic character of the sample matches with that of

the description present in Ayurvedic Pharmacopoeia of India Volume 1 page 34. Similarly, the characters of a plant are mapped and these lead to the correct identification ensuring quality and effective medicine.

CONCLUSION

From the above discussion, it is concluded that the pharmacognostic study is a necessity for ensuring the identity of the herbal drugs. They are important for ensuring quality and effectiveness of medicinal preparations that use herbal source as raw materials. Systems like Ayurveda, Tibetan, Siddha, etc which have medicines that are mainly manufactured from herbal source are of greater necessity to have the raw materials checked through pharmacognostic means.

REFERENCES

1. Anonymous. Ayurvedic Formulary of India. New Delhi. Ministry of Health and Family Welfare. Government of India; 1989. p. xxvii
2. Department of Ayush [homepage on internet]. New Delhi: Infrastructure; system wise statistics. Ayurveda. <http://indianmedicine.nic.in/>; 2011.

3. Dave PK. A new era of Ayurvedic Herbs: Nutraceuticals World, [http://www.nutraceuticalsworld.com/issues/2008-05/view_features/a-new-era-in-ayurvedic-herbs/](http://www.nutraceuticalsworld.com/issues/2008-05/view_features/a-new-era-in-ayurvedic-herbs/http://www.nutraceuticalsworld.com/issues/2008-05/view_features/a-new-era-in-ayurvedic-herbs/).
4. Shastri Rajeshwaradatta, *et al*, editor. Commentary Vidyotini of Pandey Kashinatha and Chaturvedi Gorakhanatha on Charaka Samhita of Charaka. Sootra Sthana. 25th ed. Varanasi: Chaukhambha Bharati Academy; 1995. p. 72.
5. Shastri Rajeshwaradatta, *et al*, editor. Commentary Vidyotini of Pandey Kashinatha and Chaturvedi Gorakhanatha on Charaka Samhita of Charaka. Sootra Sthana. 25th ed. Varanasi: Chaukhambha Bharati Academy; 1995. p. 77.
6. Shastri Ambikaadatta, editor. Sushruta Samhita of Sushruta. Sootra Sthana. 11thed. Varanasi: Chaukhambha Sanskrit Sansthan; 1997. p. 148.
7. Shastri Ambikaadatta, editor. Sushruta Samhita of Sushruta. Sootra Sthana. 11thed. Varanasi: Chaukhambha Sanskrit Sansthan; 1997. p. 158
8. Iyer Narayana K and M Komalamma. Pharmacognosy of Ayurvedic Drugs. Thiruvananthapuram. Pharmacognosy unit. Ayurveda College; 1993. p. 105-107.

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