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PHARMACOGNOSTICAL STUDIES ON *LAGENARIA SICERARIA* (MOL.) STAND LEAVES

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ABSTRACT

Lagenaria siceraria (bottle gourd), belonging to the family cucurbitaceae, *is* a medicinal plant and utilizable species. *Lagenaria siceraria*, considered indigenous to India and its grown throughout the year .The tender bottle gourds are used as a vegetable and are good source of vitamins B and C .The plant is also known to possess purgative, anti-inflammatory, antileprotic, antipyretic and diuretic activities. The proper pharmacognostical studies have not been reported for this plant. Current study was therefore carried out to provide requisite pharmacognostical details. It includes the T.S section of different views, powder microscopically characters, and other proximate analysis data. Phytochemical parameters were determined to identify the diagnostic features of *Lagenaria siceraria* leaves.

Key words: *Lagenaria siceraria*, Pharmacognostical.

INTRODUCTION

Lagenaria siceraria (bottle gourd), belonging to the family cucurbitaceae, *is* a medicinal plant and utilizable species[1]. *Lagenaria siceraria*, considered indigenous to India, is a vegetable and grown throughout the year .The tender bottle gourds are used as a vegetable and are good source of vitamins B and C[2] and other amino acids, carbohydrates The plant is known to possess purgative, anti-inflammatory, antileprotic, antipyretic and diuretic activities[3]. Fruits had been proved to have laxative[1] and antihepatotoxic[2] activities. Seeds have also been tested for their anthelmintic activity[1] and presence of ribosome inactivating proteins[4]. The latter has been investigated for their immunomodulatory, abortifacient and anticancer activities. Although the *Lagenaria siceraria* plant carries high potential uses, the proper pharmacognostical studies have not been reported for the leaves of this plant. Microscopical inspection of medicinal plant material is indispensable for the identification of broken or powdered material[5]. Such studies are essential for the

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establishments of its identity and purity[6]. Current study was therefore carried out to provide requisite pharmacognostical details.

EXPERIMENTAL

Materials and methods

Plant resources and preparation

The leaves of *Lagenaria siceraria* were collected from cultivating land, Mehsana district of North Gujarat (Guj. state) India and it was identified by the Department of Botany, Science College, Mehsana district. The herbarium specimen was submitted to pharmacognosy department of the college (Voucher specimen No - 005/MSN/07). Leaves were taken into shade dried and powdered for microscopical studies and fresh leaves have been taken for the quantitative microscopy studies.

Pharmacognostical studies

Morphological investigation was done to determine the shape, apex, margin, texture and organoleptic characters of the leaves. A thin section of leave was prepared through midrib to perform microscopical studies. The section was cleared with chloral hydrate solution and then stained with phloroglucinol (1% solution in 90% ethanol) and concentrated hydrochloric acid, mounted in glycerin for the identification of lignified cells. Another section was prepared and stained with iodine water for the observation of starch grains. Different cellular structures were noted down[7]. Microscopy of powdered leaves was also done. Powder drug (passed through sieve number 60) was first observed (unstained, unmounted). Further, the powder was treated with phloroglucinol –concentrated hydrochloric acid and iodine water separately to check the presence of lignified cells and starch grains, respectively. For the identification of calcium oxalate crystals, a separate slide of powder was treated with 60% sulphuric acid. Mounted slides were made free of bubbles and cellular structures were observed under microscope[8]. As a part of quantitative microscopy; stomatal index, stomatal number, Vein islet and vein termination numbers (of fresh leaves) were also calculated using camera lucida[7] (Table 1).

Proximate analysis of crude leaves powder

The powdered leaves were subjected to various physicochemical properties, which include, foreign organic matter, ash values, acid insoluble ash values and loss on drying[9], extractive values (in water and in alcohol) (Table 2).

Preliminary phytochemical investigation

The powdered leaves were subjected to qualitative chemical tests to check the presence of different primary and secondary metabolites[10].

Table 1

S. No.	Parameters	Values (%)
1.	Stomatal number	
	Upper Epidermis	Nil
	Lower Epidermis	145 to 200 to 254
2.	Stomatal index	
	Upper Epidermis	Nil
	Lower Epidermis	12 to 13.3 to 15.4
3.	Vein islet number	25 to29.5
4.	VeinTermination Number	25.9 to 32.8

*N = Average values of 3 times

Table 2

S. No.	Parameters	Values (%)
1.	Foreign organic matter	2.5
2.	Total ash	14.5
3.	Acid insoluble ash values	10
4.	Ethanol-soluble extractive values	19
5.	Water-soluble extractive values	27
6.	Loss on drying	4

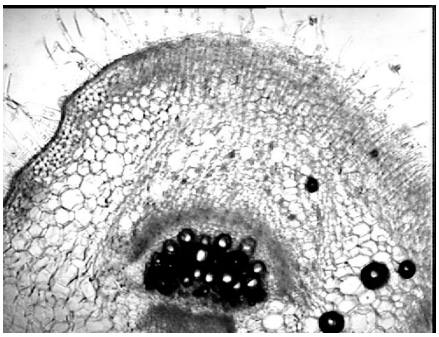
*N = Average values of 3 times

RESULTS AND DISCUSSION

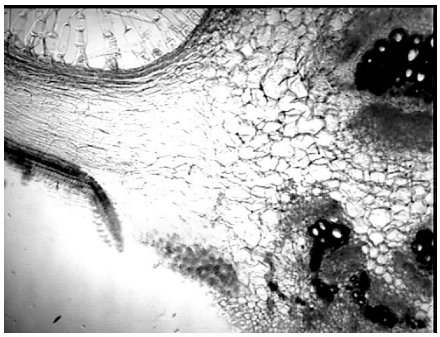
A study of the anatomy of the leaf revealed the basic structural pattern. Leaves were large, cordate, five lobed hairy (both the surfaces), simple, long petioled with dentate margin and somewhat tapered apex. In the organoleptic studies, leaves were found to be light green with acrid odors and mucilaginous taste.

In the microscopical studies, mesophyll showed dorsiventral leaf structure. In the section, leave showed the presence of; upper and lower epidermis with wavy walls, numerous uniseriate covering trichomes (one to four celled) with pointed edge, throughout the upper and lower epidermis, anomocytic stomata on lower epidermis, midrib with collenchymatous cells below the upper epidermis and a few layer of the same above the lower epidermis. Few branched and collapsed trichomes were also observed on upper epidermis.

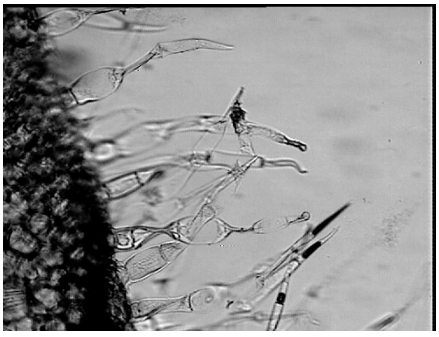
Fig. 1



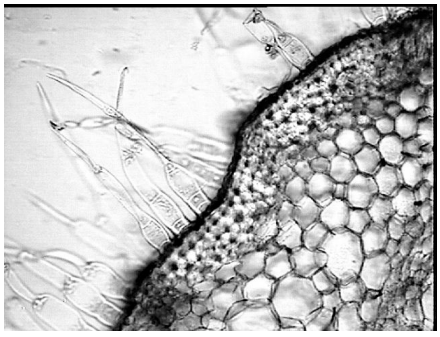
(a) Transverse section internal view dorsal



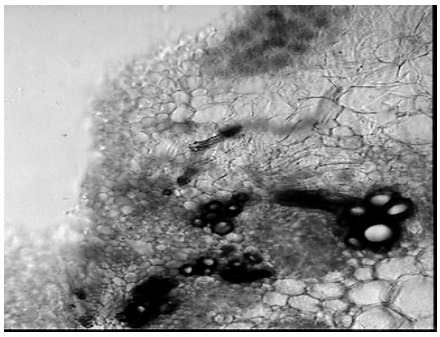
(b) Transverse section ventral view



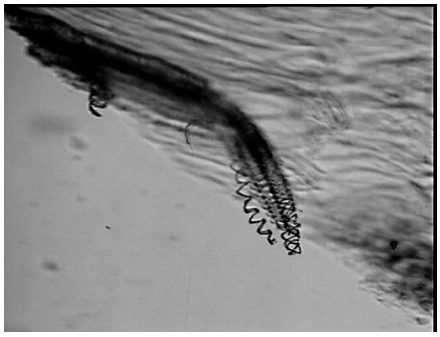
(c) Collapsed trichomes with pointed apex



(d) Collenchyma's with parenchymatous cells



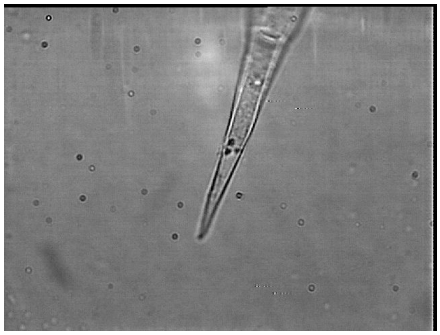
(e) Vascular bundles with lignified vessels



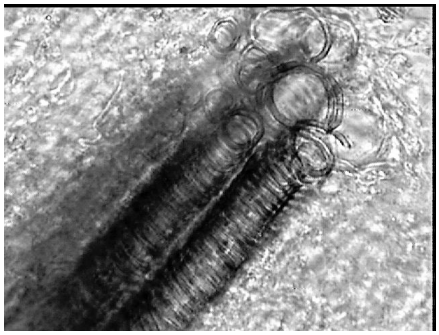
(f) Lignified spiral vessels

Powder microscopy revealed the presence of trichomes (same as observed in transverse section), epidermis (with wavy walls) with anomocytic stomata and vascular strand (xylem vessels with spiral thickening). Calcium oxalate and starch grains were not observed (Fig. 2).

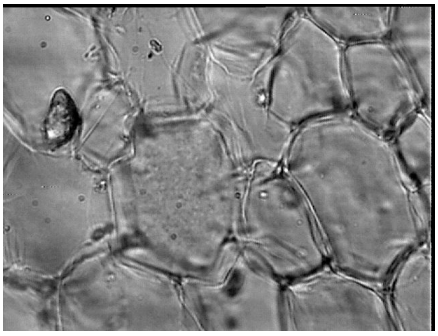
Fig. 2



(a) Trichomes as pointed apex



(b) Spiral vessels



(c) Double walled parenchyma unlignified

Quantitative microscopy showed the presence of stomata only in lower epidermis. Total ash and acid insoluble ash values were found to be 14.5% and 10%, respectively. Ethanol and water-soluble extractive values were found to be19% and 27%, respectively. Loss on drying was found to be 4%. The qualitative chemical test of different alcoholic solvent extracts revealed the presence of flavonoids, saponins, tannins, triterpenoid and carbohydrates. Aqueous extracts showed that saponins, tannins, and carbohydrates. Petroleum ether extracts showed the presence of steroids. Current study was therefore carried out to provide requisite pharmacognostical details.

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REFERENCES

1. M. K. Baranowska and W. Cisowski, Natural Drugs, **52**, 137 (1995).
2. A. Shirwaikar and K. K. Sreenivasan, Indian J. Pharm. Sci., **58**, 197 (1996).
3. K. R. Kirtikar and B. D. Basu, Indian Medicinal Plants, **Vol. II**, 3rd Edn., International Book Distributors, Dehradun, (1999) p. 1142.
4. H. X. Wang and T. B. Ng, Life Sci., **67**, 2631 (2000).
5. Quality Control Methods for Medicinal Plants Material, WHO. Geneva, (1998) p. 10.
6. A. E. Ahire, K. S. Laddha, and A. B. Pandit, Indian Drugs, **42**, 623 (2005).
7. T. E. Wallis, Textbook of Pharmacognosy, 5th Edn., CBS Publishers and Distributors, New Delhi, (2002) p. 578.
8. S. P. Dhanabal, B. Suresh, E. Sheeja and E. Edwin, Indian J. Nat. Prod., **21**, 9 (2005).
9. Indian Pharmacopoeia, Vol. II, 4th Edn., Ministry of Health and Family Welfare, Govt. of India, Controller of Publication, New Delhi, (1996) p. A-53.
10. S. S. Handa, and V. K. Kapoor, Textbook of Pharmacognosy, 2nd Edn., Vallbh Prakshan, Delhi, (2003) p. 26.

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