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PHARMACOGNOSTICAL EVALUATION OF FRUIT OF *Lagenariasiceraria* (Mol.) Standely

Surabhi Surendran[1], P Y Ansary[2], Shincymol V V [3]

[1]Final Year PG Scholar, [2]Professor & HOD, Department of Dravyagunavijnanam
Government Ayurveda College, Tripunithura

[3]Associate professor, Department of Dravyagunavijnanam Government Ayurveda College, Tripunithura, Kerala University of Health Sciences, Thrissur, Kerala 680596

Email: surabhi2485@gmail.com, dransarypy@gmail.com, vvshincymol@gmail.com

Abstract

Lagenariasiceraria (Mol.) Standley*(Family: Cucurbitaceae) is an annual herbaceous climbing plant with a long history of traditional medicinal uses in many countries, especially in tropical and subtropical regions. The fruit of the plant has been used in different system of traditional medication for the treatment of diseases and ailments of human beings.However systematic information on the fruit of this species is not available. The present study was carried out to provide requisite pharmacognostical detail of the fruit of Lagenariasiceraria* (Mol.) Standley. *The pharmacognostical evaluation was done under three phases i.e. the macroscopical and microscopical evaluation of the fresh drug and powder, and the histochemical evaluation. The observation from the macroscopic evaluation of the fruit was compared with that of the available descriptions in the authentic books. Powder microscopical characters identified include vessel fragments, starch grains, oil globules, parenchyma cells, fruit epidermal cells, calcium oxalate crystals, tracheids and elongated fibre fragments. This study resulted in providing an updated pharmacognosticalprofile for the fruit of Lagenariasiceraria* (Mol.) Standley.

Keywords*: Lagenariasiceraria (Mol.) Standley, Pharmacognostical evaluation, Macroscopic evaluation*

INTRODUCTION

Traditional systems of medicines have always played important roles in meeting global healthcare needs. Among them, Ayurveda has been practiced for thousands of years. Considerable research on the pharmacognosy, chemistry, pharmacology and clinical therapeutics of Ayurvedic medicinal plants has been carried out. *Alabu*is a popular and well known drug discussed in many *Ayurvedic* classics. A detailed description about the properties and action of this drug is given under *Sakavarga* (vegetable fruits) by *Acharyas*like*Charaka, Susrutha, Vagbhata*and *Nighantukaras*like *Bhavamishra* and *Saligrama*. The fruit of *Alabu*is commonly used as vegetable all over India. The authentic publication of Government of India, Ayurvedic Pharmacopoeia of India has botanically identified the sweet and bottle shaped or club shaped variety of *Alabu* as *Lagenariasiceraria* (Mol.) Standely belonging to the family Cucurbitaceae.[1]It is commonly known as Bottleguard.It is a large, softly pubescent, annular, climbing or trailing herb. Geographically it occurs throughout India and is now cultivated worldwide. The fruits are traditionally used for its cardioprotective, cardiotonic, general tonic, diuretic, aphrodisiac, antidote to certain poisons and scorpion stings, alternative purgative, and cooling effects.[2]Pharmacognosy is the tool for identifying genuine drug. In this study the pharmacognostical evaluation of the fruit of *Lagenariasiceraria* (Mol.) Standely has been performed.

MATERIALS AND METHODS

A. Collection of plant material

The plant *Lagenariasiceraria*(Mol.) Standely was positively identified from the cultivated fields in Puthurthy and Minaloor village of Thrissur district. The fruits were collected during the months of October – February when they were matured and washed with water thoroughly to remove physical impurities like soil, mud etc. A part of the fruit was cut into small pieces and dried in sunlight. It was then made into fine powder and sieved through mesh with size-120.

B. Pharmacognostical evaluation

This evaluation consist of three phases

a. Macroscopic evaluation.

b. Microscopic evaluation

c. Histochemical evaluation

a. *Macroscopic* evaluation

It includes macroscopic evaluation of fruit and also the powder of fruit of *Lagenariasiceraria*(Mol.) Standely

Materials: Magnifying lens and dissecting microscope were used for the purpose.

Procedure

The fruit and powder of the fruit were subjected to macroscopic evaluation by observation with naked eyes, by tactile and other sensory inspection. A magnifying lens with a dissecting microscope was used for a better evaluation of surface characters.

b. Microscopic evaluation

Microscopic evaluation was carried out in two phases

i. Histological evaluation
ii. Powder microscopy

i. Histological evaluation

Materials: Sharp blades, Safranine stain, glass slides, water, cover slips, glycerine, petri dishes, watch glass, brushes, needles and digital microscope.

Procedure:

For microscopical evaluation, thin section of fruit of the drug was taken using a razor blade. As per standard procedure staining was done using the safranine stain and the slides were prepared. The prepared slide was then examined under a compound microscope and images were taken at 4x, 10x and 40x magnifications.

ii. Powder microscopy

Materials: Powdered drug, glass slides, cover slips, microscope, glycerine and safranin stain.

Procedure:

For examining characters of the powder, sufficient amount of powder of the fruit was mounted on a glass slide after mixing with glycerine. The slide was then examined

under a compound microscope for examination of powder characters and images were taken at 4x, 10x and 40x magnification.

c. Histochemical evaluation

Handmade sections of fruit of the drug were stained with the reagents for localizing the histochemical constituents. The stains used were Sudan red, Phloroglucinol, HCl, Iodine, Ferric chloride test.

Fig.1 Plant of *Lagenariasiceraria*(Mol.) Standely

RESULTS

A. Macroscopic evaluation

1. Fruit of *Lagenariasiceraria*(Mol.) Standely

The macroscopic evaluation has been done (Fig. 2) and the details are tabulated below.

Table No: 1 Macroscopic characters of fresh fruit of *Lagenariasiceraria*(Mol.) Standely

Size	30 – 60cm long and width 6-8cm
Shape	Bottle shaped, cylindrical with a constriction above the middle
External characters	densely glabrous to hairy, smooth
Colour	faint green
Odour	Nil
Taste	Sweet

Fig. 2 Fresh fruit of *Lagenariasiceraria*(Mol.) Standely

2. Powder of fruit of *Lagenariasiceraria*(Mol.) Standely

The powder macroscopic features including the colour, texture, odour and taste were identified (Fig.3) and the features are tabulated below.

Table No: 2 Powder macroscopy of fruit of *Lagenariasiceraria*(Mol.) Standely

Characters	***Lagenariasiceraria***
Colour	Yellowish brown
Texture	Granular
Odour	Odourless
Taste	Sweet

Fig.3 Fruit powder of *Lagenariasiceraria*(Mol.) Standely

B. Microscopical evaluation

i. Fruit of *Lagenariasiceraria*(Mol.) Standely

In the transverse section, epicarp forms the epidermal layer of the fruit. Epidermis is 20 mm thick. It consists of vertically elongated columnar cells.Mesocarp is differentiated into outer zone and inner zone. Outer zone is 120 mm wide and 10 to 15 layered. The cells are small, tangentially elliptic and compact**.** Inner zone contains large, polygonal compact cells. A few layers of the cells in the peripheral region are thick walled and lignified. The lignified cell zone is gradually transformed into thin walled soft parenchyma cells. Vascular strands are scattered within the thin walled parenchymatous tissue.The vascular strands consist of one or two wide, thick walled metaxylem elements and proto xylem elements. Small groups of phloem elements occur on the outer part of the metaxylem elements. (Fig. 4)

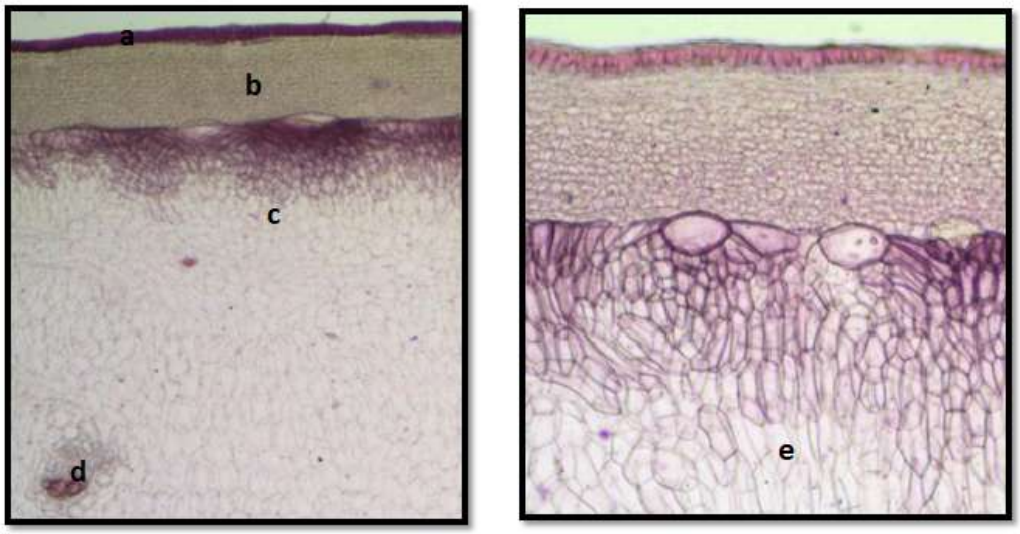

Fig.4 a- Epicarp b-Mesocarp (outer zone) c- Mesocarp (inner zone) d -Vascular bundles e - Parenchymatous cells

ii. Powder microscopy of fruit of *Lagenariasiceraria*(Mol.) Standely

Vessel fragments, starch grains, oil globules, parenchyma cells, fruit epidermal cells, calcium oxalate crystals, tracheids and elongated fibre fragments were identified in the powder microscopy. (Fig.5)

Fig.5a - Vessel fragments

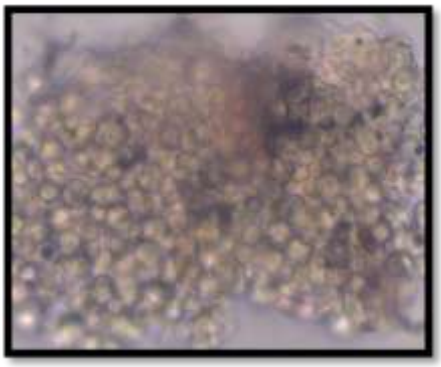

Fig.5b - Starch grains

Fig.5c - oil globules

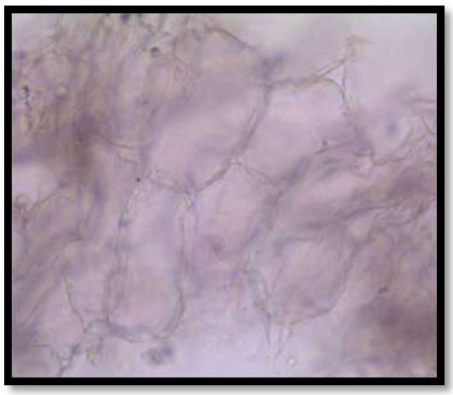

Fig.5d - parenchyma cells

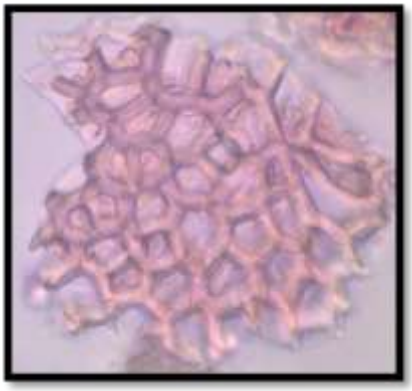

Fig.5e - fruit epidermal cells

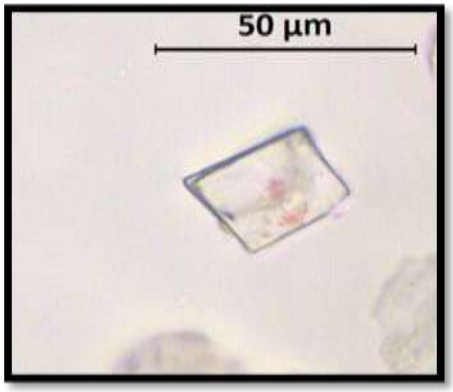

Fig.5f - calcium oxalate crystals

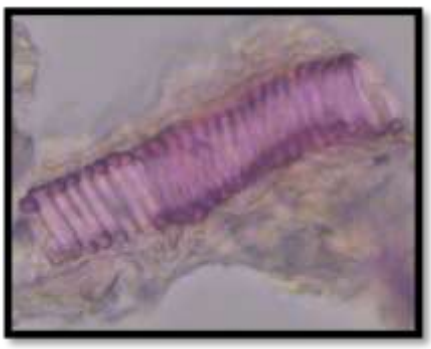

Fig.5g - tracheids

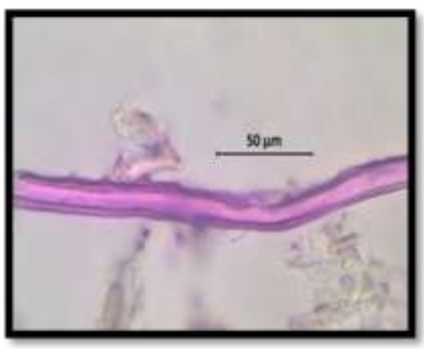

Fig.5h - elongated fibre fragments

C. Histochemical Evaluation

The phytochemicals like lignins, oils, starch grains and tannins were identified in the histochemical evaluation of fruit of *Lagenariasiceraria*(Mol.) Standely. Lignin was present in the periphery of inner zone of the mesocarp of T.S of fruit. Oils, starch grains and tannins were present in the outer and inner zone of the mesocarp of T.S of fruit of *Lagenariasiceraria*(Mol.) Standely. (Fig. 6)

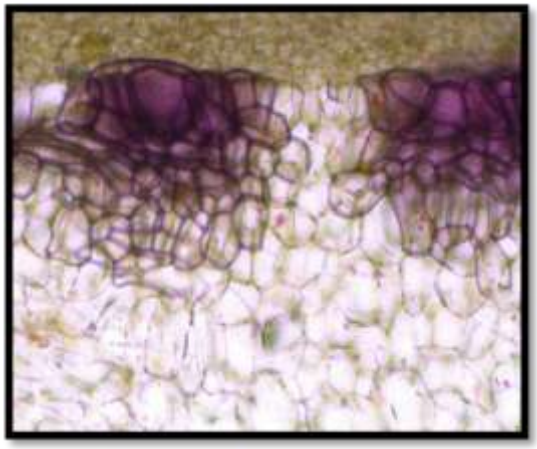

Fig.6a- Lignin

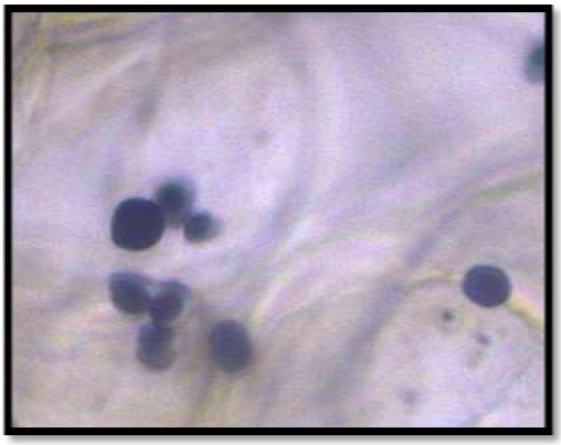

Fig.6b – Starch grains

Fig.6c – Tannins

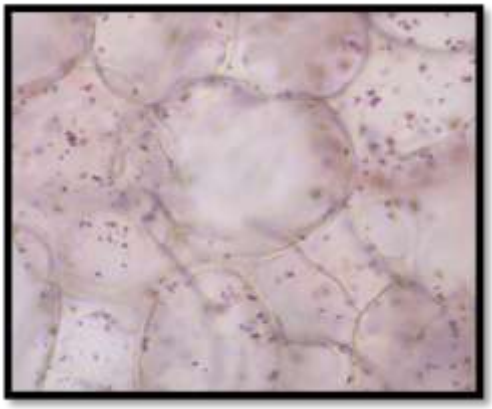

Fig.6d – Oil globules

DISCUSSION

Pharmacognostical evaluation can be done by means of macroscopical and microscopical evaluation. Organoleptic evaluation includes studying the drug by virtue of its size, shape, colour, texture, fracture, odour and taste. Microscopical evaluation includes the detailed study of histological aspects of the officinal part and histochemical analysis. It also includes the study of drug in powder form. The fresh fruit of

Lagenariasiceraria(Mol.) Standely was large, bottle shaped. It had a size of 30-60cm in length and 6-8cm in width with cylindrical shape having a constriction above the middle. The surface was smooth and hairy. The fruit had a faint green colour with sweet taste and was odourless. The taxononomic features of fruit was compared with the description of Ayurveda Pharmacoepoeia of India and authentic botany text books like Indian Medicinal Plants-Kritikar and Basu and andfound to be similar.[3]

The microscopic features of fruit of the drug observed from the study was compared with that of the descriptions obtained from a research journal and found to be similar.[4] The histochemical localization of lignins, oils, starch and tannins in the cells of fruit of the drug was done. Lignin was present in the periphery of inner zone of the mesocarp of T.S of fruit. Oils, starch grains and tannins were present in the outer and inner zone of the mesocarp of T.S of fruit of *Lagenariasiceraria*(Mol.) Standely.The descriptions regarding the histochemical evaluation were not available from any previous research papers. The powder macroscopical evaluation of the fruit revealed that the powder was yellowish brown in colour, granular in texture, sweet in taste and had no odour.

The microscopical evaluation of powder showed the presence of vessel fragments, starch grains, oil globules, parenchyma cells, fruit epidermal cells, calcium oxalate crystals, tracheids and elongated fibre fragments. The descriptions about the powder macroscopic and microscopic evaluation of the fruit of *Lagenariasiceraria*(Mol.) Standely was compared to that obtained from the previous thesis work of Remya V.[5] The powder macroscopy was found to be similar and in the powder microscopy additional features like oil globules, fruit epidermal cells, calcium oxalate crystals and tracheids were also found in the present study.

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