

Pharmacognostical analysis of Unani drug Sambhalu; Dried leaf and fruit of *V. negundo* L.

Renjini Haridas^{1*}, Zaheer Ahmed N¹, Rampratap Meena²

¹Regional Research Institute of Unani Medicine, Chennai, Tamil Nadu-600 013

²Central Council for Research in Unani Medicine, M/o AYUSH, Govt. of India, New Delhi

Received: 18.08.2020

Revised and Accepted:
24.10.2021

Key words: : Sambhalu; *V. negundo* L; Medicinal potential, pharmacognostic analysis

Abstract

Vitex negundo L. is an effective herbal medicine with proven therapeutic value, it has been clinically tested to be effective against cold, flu, asthma and pharyngitis. The leaves, flowers, seeds and root of this plant are used as herbal medicine. The present study was undertaken to study the Pharmacognostic parameters for the rapid identification and authentication of the Unani drug Sambhalu, this drug consists of dried leaf and fruit of *V. negundo*. The macroscopic and microscopic characteristics carried out. In the present study the authors analyzed the macroscopical and microscopical features, which are helpful in identification of the authentic plant sample and marketed sample and confirm the reason for the medicinal potential and also reveal specific identification features of each plant part.

1. Introduction

Vitex negundo Linn. (*Verbenaceae*), commonly known as 'Nirgundi' an important medicinal plant used in Unani Pharmacopeia, all parts of the plant, from root to fruit, possess a multitude of phytochemical secondary metabolites which impart an unprecedented variety of medicinal uses to the plant. It is interesting to note that a single plant species finds use for treatment of a wide spectrum of health disorders in traditional and folk medicine (Vishwanathan & Basavaraju, 2010).

Already some pharmacological activities are reported, antihelmintic activity, larvicidal activity, hepatoprotective activity, antisnake venom activity, antipyretic activity, anxiolytic activity, anticonvulsant

activity, histomorphological and cytotoxic effects, effect on reproductive potential, anti-inflammatory (Thangaraj *et al.*, 2011) and analgesic activities, antioxidant activity, antimicrobial activity (Ullah *et al.*, 2012).

The *V. negundo* leaves have been used in Unani Pharmacopeia used against anti-inflammatory, expectorant, tranquilizer, antispasmodic, anti convalescent, rejuvenative, antiarthritic, anthelmintic, anti-fungal and antipyretic and the seeds are recommended for controlling premature ejaculation. The Ayurvedic and Unani Pharmacopoeia of India has documented the use of the leaf, seed and the root to treat excessive vaginal discharge, edema, skin diseases, pruritus, helminthiasis, rheumatism

and puerperal fever (Uzma *et al.*, 2015). In this study we analyzed the pharmacognostical evaluation of Unani drug Sambhalu, this drug

consists of dried leaf and fruit of *V. negundo*.

Table 1: Showing Vernacular names used in different languages.

| Languages | Leaf | Fruit |
|-----------|--|-----------------------------|
| Arabic | Aslaq, Fanjangashi | Uslaq |
| Persian | Banjangasht, Panjangasht, Sisban | Panchaguskt, Sisban |
| Bengali | Nisinda, Samalu, Nirgundi | Nirgundi, Nishinda |
| English | Negundo | |
| Gujarti | Nirgari, Nagoda | Nagod |
| Hindi | Nisunda, Nishinda, Nirgunda, Shiwari, Shambalu | Nirgundi, sinduar, Sambhalu |
| Kannada | Lakki-gida, Lakki, Lakkle | Lakkigida, Nekkigida |
| Kashmir | - | |
| Malayalam | Nocci, Karunocci, Vennocci | Indranee, Nirgundi |
| Marathi | Nirgundo, Nirgur, Nirguda, Marwan, Mawa, Marwana | Nirgundi |
| Oriya | Beyguna, Beguniya | |
| Punjabi | Moraun, Sandbhalu, Mewari, Shiwali | Sambhalu, Banna |
| Sanskrit | Indranika, Indrasurasa, Nilapuspa, Nirgundi, Sindukah, Sinduvarah, Shveta-surasa, Svetavuspah, Vrikshaha, Nocci, Karunocci, Vennocci | |
| Tamil | Nocci, Karunocci, Menocci | Karunochchi, Nocchi |
| Telugu | Tella- vavili, Vavili, Veyali, Vavali-padu | Nallavavilli, Vavilli |
| Urdu | Kumaon- Shiwa, Shiwari, Simali | Sambhalu, Panjangusht |

2. Materials and Methods

2.1 Collection of plant material

Unani drugs Turanj (dried pericarp of *C. medica*) and Sangtara (dried pericarp of *C. reticulata*) were purchased from Chennai Market, Tamil Nadu. The sample was dried under shade and stored at ambient temperature until use.



Fig 1. Image of *V. negundo*.

2.2 Pharmacognostic study

Compound microscope, glass slides, cover slips, watch glass and other common glassware were the basic apparatus and instruments used for the study. Microphotographs were taken using a microscope attached with camera. Dried galls were taken for microscopic studies, transverse sections were prepared and stained as per standard procedure and powder microscopy was performed.

3. Results & Discussion

The drug Sambhalu consists of dried leaf and fruits of *V. negundo* L. (Family. *Verbenaceae*); a large aromatic Shrub or a small tree, upto 5 m in height, common throughout the country ascending to an altitude of

1500 m in the outer Himalayas. It is common in waste places around villages, moist localities and in the deciduous forests. on road side, on the bank of streams or in moist places near deciduous forest and also cultivated in garden as a hedge plant.

3.1 Macroscopic:

Leaf: Leaves palmately compound, petiole 2.5:3.8 cm long; mostly trifoliate, occasionally (pentafoliate) five foliate; in trifoliate leaf, leaflet lanceolate or narrowly lanceolate, middle leaflet 5-10 cm long and 1.6:3.2 cm broad, with 1-1.3 cm long petiolule, remaining two sub-sessile; in pentafoliate leaf inner three leaflets have heart shaped petiolule and remaining two sub-sessile; surface glabrous above and tomentose beneath; texture leathery. Odour agreeably aromatic when bruised, taste astringent.

Fruit: a drupe about 3mm in size, ovoid, light brown to black in colour, tough, shiny and slippery. Having four vertical ridges, dividing fruit in four halves; calyx pamossepalous, persistent, whitish brown, 5 sepals; pungent, aromatic odour and no specific taste.

3.2 Microscopic:

Petiole:

Shows single layered epidermis having a number of thin walled cubical to oval cells. unicellular, bicellular and uniseriate multicellular covering trichomes and glandular trichomes with uni to tricellular stalk and uni to bicellular head; cortex composed of outer collenchymatous tissue and inner 6:8 layers of parenchymatous tissue; collenchyma well developed. In basal region petiole shows the absence of

pericyclic fibres which start developing towards the apical region and form discontinuous ring surrounding the central horse shoe-shaped vascular bundle. shows and gradually decreases in middle and apical regions; pericycle fibres in basal region of petiole present in the form of a discontinuous ring in apical region surrounding central horse shoe shaped vascular bundle; a few smaller vascular bundles present ventrally between arms of central vascular bundle and two, or rarely three, bundles situated outside the arms. Phloem consists of sieve tubes, companion cells and phloem parenchyma and xylem consist of vessels, tracheids and xylem parenchyma (Fig 1).

Petiolule:

The petiolule has a single layer of epidermis and is covered eternally with lesser number of hairs as compared to petiole. The epidermis is followed by a wide zone of collenchyma with prominent angular thickenings. The basal and middle region show absence of collenchyma near the ventral groove. Below the collenchyma is 6-8 cells wide parenchyma. At different regions from base to apex, the development of pericyclic fibres and vascular bundles follow more or less the same pattern as in the petiole. However, the petiolule shows a group of fibres between the arms of the central vascular bundle, just below the collenchyma on the ventral side.

Midrib:

The Midrib shows a single layered epidermis composed of thick-walled cubical cells. The lower epidermis composed of thick-walled

cubical cells. The lower epidermis bears a large number of hairs than the upper epidermis. The distribution, shape and size of the hairs are the same as seen in the petiole. The epidermis is followed by 6-10 layers of collenchymatous cells in the ventral groove and petiolule, the basal region of the midrib shows a discontinuous ring of fibres, capping phloem on the dorsal side. These fibres gradually diminish towards the epical region, the vascular bundles of the midrib have more or less similar structure and distribution as in the petiole and petiolule except that the two vascular bundles lying opposite to the arms of the central vascular bundle are absent. However, like petiolule, a group of fibres is present below the collenchyma of the ventral side.

Lamina:

Shows single layered epidermis having mostly unicellular hairs bi and multicellular and glandular trichomes being rare; hypodermis 1:3 layered interrupted at places by 4-8 palisade layers containing chlorophyll; a large number of veins enclosed by bundle sheath transverse mesophyll; Anomocytic stomata present only on the lower epidermis, covered densely with trichomes; vein-islet and vein termination number of leaf are 23-24 and 5-7 respectively.

Fruit:

T.S of pedicel: Single layered epidermis having a number of unicellular, bicellular and uniseriate multicellular covering trichomes. Cortex composed of large parelichymatous tissue; central heart-shaped bicollateral vascular bundle. T.S of sepal consisting uni and multicellular trichomes;



parenchymatous contiguous epidermis (Fig 3).

Pericarp consists of a single layered epidermis, with wavy cuticle; epicarp 2 to 4 layered, parenchymatous slightly elongated cells, mesocarp parenchymatous, 10 to 12 layered; starch grains present at definite intervals; calcium oxalate crystals present in epicarp and mesocarp. Endocarp sclerenchymatous 2 to 6 layers fused with testa of the seed, the fruit wall encloses 3 seeds and seeds are separated by a false septum which is parenchymatous and is filled with calcium oxalate crystals. The seed is covered by testa and tegmen which are fused with each other. The outer cells of the testa are single layered elongated parenchymatous and inner cells are collenchymatous, whereas, the cells of tegmen are made up of single layered elongated cells. The cells of testa and tegmen contain cluster of starch grains; cotyledons filled with aleurone grains.

Powder:

Leaf: Shows number of pieces or whole, uni-bi and multicellular covering trichomes, glandular trichomes, palisade tissues with hypodermis, and upper and lower epidermis, xylem vessels with pitted walls and long fibre (Fig 2).

Fruit: Calcium oxalate crystals are rhomboid, cuboid, hexagonal or prismatic in shape; starch grains which are simple spherical, having hilum at the center, size up to 10 μ ; Fragments of cotyledons with aleurone grains; group of stone cells, stone cells up to 70 μ ; long parenchyma cells, elongated parenchymatous tissue, fibre up to 1500 μ , multicellular trichome (Fig 3).

In the present study an attempt has been made to analyse the macroscopical and microscopical features which are helpful in identification of the authentic plant sample and marketed sample and confirm the reason for the medicinal potential. The anatomical studies of these plants are really helpful for the correct identification of the plants and also a great contribution in the field of Plant anatomy (Silvy *et al.*, 2014; Beemaet *et al.*, 2019; Liji and Vasudevan, 2017). This study has also formulated pharmacopoeial standards for these medicinal plants. The microphotographs on different magnifications which were carried out in the present study reveal specific identification features of plant parts.

4. Conclusion

Pharmacognostical analysis of leaf and fruit of the *V. negundo* provides substantial information for the proper identification, authentication and scientific evaluation. It is to be noted that the transverse sections and powder of the plant parts show its characters and they play an important role in the proper identification of species. From the above discussion it may be concluded that *V. negundo* species are used for its various properties in Unani Pharmacopeia.

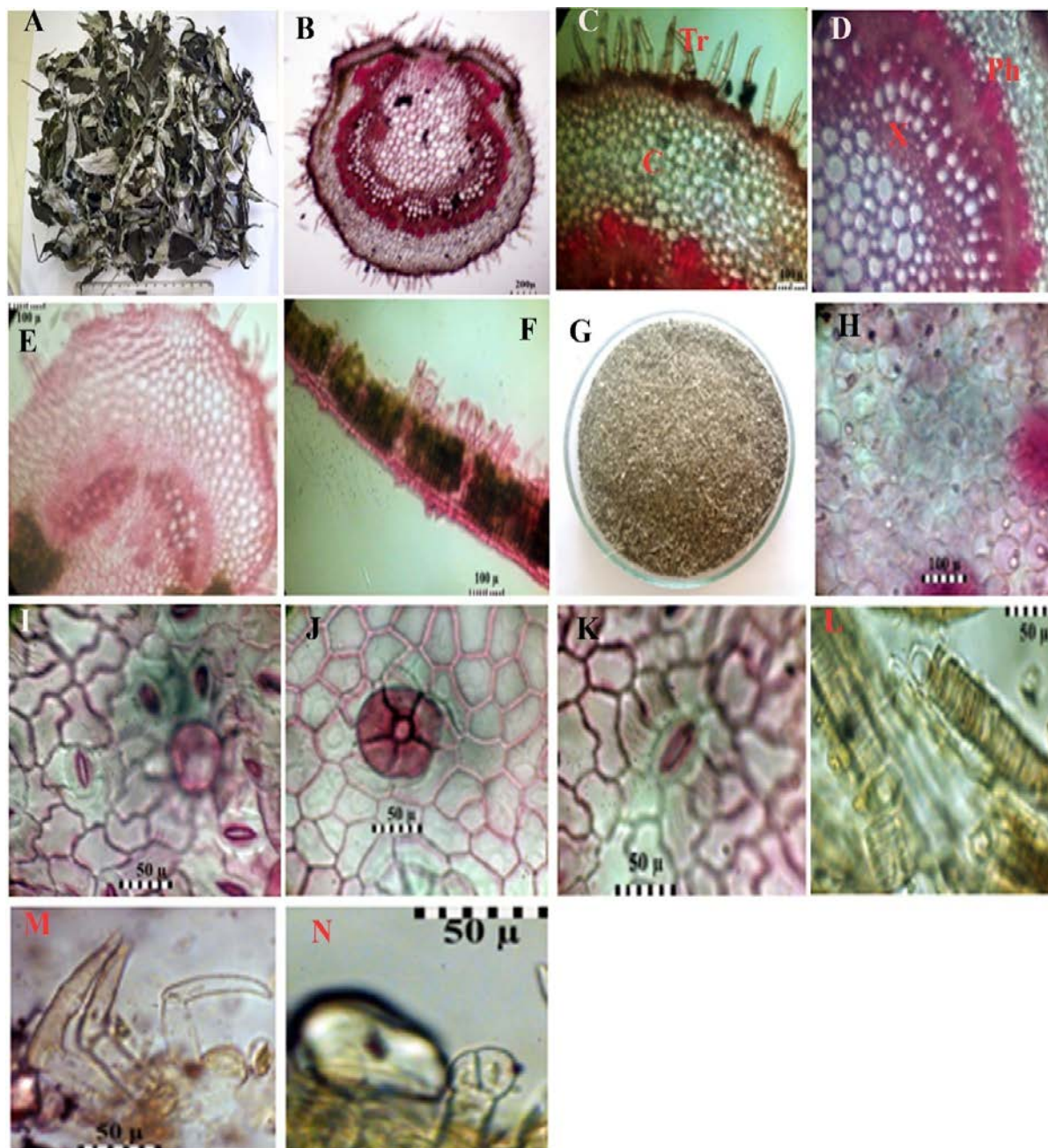


Fig 2. Leaf T.S and Powder; A:Sambhalu (Dried Leaf), B: T.S of petiole, C: T.S of petiole-upper view, D: T.S of petiole- inner view, E: T.S of midrib, F: T.S of lamina, G: Powder, H:Oil globules present in spongy parenchyma cells,I: View of upper epidermis, J:Glandular trichome in lower epidermis, K:Single stomata, L:Spiral vessel from petiole, M:Non glandular trichome, N:Glandular trichome.(Tr: Trichomes, C: Cortex, Ph: Phloem, X: Xylem,)

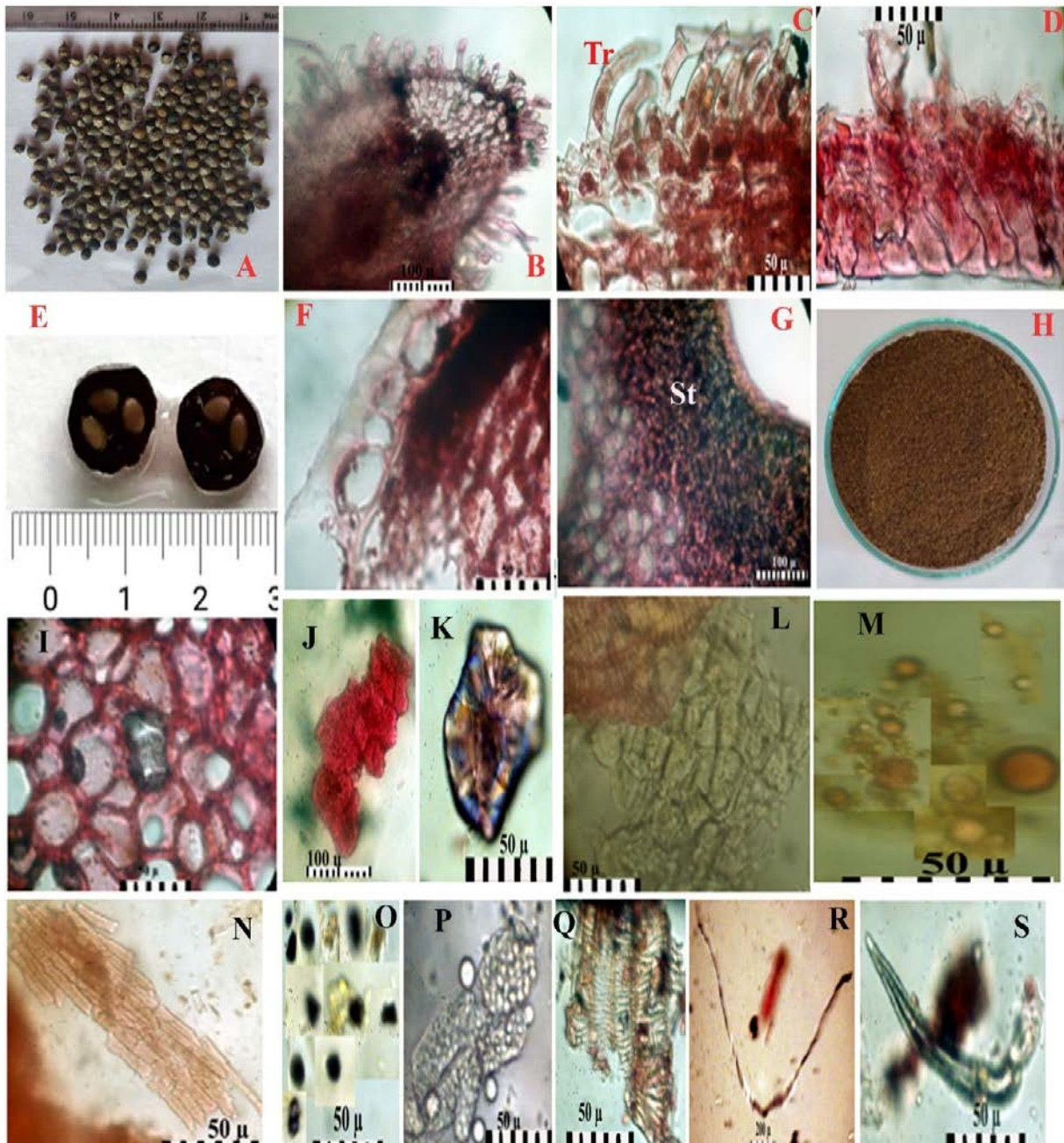


Fig 3. Fruit T.S and Powder: A:Sambhalu (Dried Fruit),B:T.S of pedicel, C: Upper view of pedicel, D:T.S of Sepal, E:T.S of fruit- outer view, F: T T.S of fruit- enlarged outer view, G: T.S of fruit- enlarged inner view, H:Powder,I: T.S of fruit- enlarged middle view, J:Group of stone cells, K:Stone cell, L:Seed testa, M:Aleurone grains, N:Long parenchyma cells,O: Starch grains, P: Fragments of cotyledons, Q: Single layered elongated cells, R: Fibre, S: Trichome, (Tr: Trichomes, St: Stone cells)

5. Acknowledgements

The authors are thankful to the Director General, CCRUM, New Delhi for providing necessary financial assistance, facilities and consistent encouragement to complete the study successfully.

6. References

- BeemaJainab, S., Mary Kensa, V. and Amzad Basha K. (2019).** Bark anatomy of *Vitex negundo* L. *Adalya J.*, **8(9):** 216-231.
- Gautam K. and Kumar P. (2012).** Evaluation of phytochemical and antimicrobial study of extracts of *Vitex negundo* Linn *Int. J. Drug Develop. Res.*, **4(4):** 192-199.
- Liji, K.O. and Vasudevan, C.N. (2017).** Comparative Pharmacognostic and Phytochemical Studies of *Ocimumtenuiflorum* L. and Its Substitute *Vitex negundo* L *Int. J. Ayurved. Pharma Res.*, **7:** 9-19.
- Silvy Mathew, S. John Britto and Sinjumol Thomas (2014).** Anatomical Studies on *Vitex Leucoxyton* and *Vitex negundo* (Verbenaceae) *Int. J. Res. Rev.*, **1(3):** 7-11.
- Thangaraj V., Kaliya, P.K., Samuthirapandian, R. and Devadasan, V. (2011).** Active compound from the leaves of *Vitex negundo* L. shows anti-inflammatory activity with evidence of inhibition for secretory Phospholipase A2 through molecular docking *Bio Information. Bio Lif.*, **7(4):** 199-206.
- Uzma Bano, Azhar Jabeen, Asrar Ahmed, M. and Akhtar, Siddiqui (2015).** Therapeutic uses of *Vitex nigundo* *World J. Pharmaceut. Res.*, **4(12):** 589-606.
- Vishwanathan, A.S and Basavaraju, R. (2010).** A Review on *Vitex negundo* L. - A Medicinally Important Plant. *J.Biol. Sci.*, **3(1):** 30-42.
- Zahoor U., Riaz, U., Azhar-ul-Haq Ali, S., Ijaz, A. and Sajjad, H., 2012.** Phytochemical and Biological Evaluation of *Vitex negundo* Linn: A Review *Int. J. Pharm. Sci.*, **24:** 21-31.