IJAYUSH
International Journal of AYUSH
AYURVEDA, YOGA, UNANI, SIDDHA AND HOMEOPATHY
http://internationaljournal.org.in/journal/index.php/ijayush/

International Journal
Panacea
Research library
ISSN: 2349 7025

Original Research Article | Volume 13 Issue 12 | December 2024

POWDER MACROSCOPIC AND MICROSCOPIC CHARACTERISTICS OF DIFFERENT SOURCES OF *NIRGUNDI*

***Aiswarya K V[1], Dr Shincymol V V[2], Dr Ansary P Y[3]**

[1]Research Scholar, [2]Associate Professor (vvshincymol@gmail.com), [3]Professor & HOD (dransarypy@gmail.com),

Department of Dravyaguna Vigyana, Government Ayurveda College Tripunithura

Corresponding Author's Email ID: aishwaryac2020@gmail.com

Abstract

Introduction: Pharmacognosy is the study of unrefined pharmaceuticals derived from plants and animals using microscopic and macroscopic analysis for quality assurance and certification. Plays a key role in plant identification. Ayurveda is a science enriched with a wide variety of plant-based medications which are effective in curing diseases and our wellness. Even though herbal medicines possess these qualities and are in high demand there remains controversy in the identity of some plants. *Nirgundi* a reputed drug used in Ayurveda is an example for having controversy in identity due to differences in synonyms mentioned in classical textbooks and lexicons and also due to differences found in botanical sources and regional varieties.

Materials and Methods:

Dried, powdered leaves were utilized for both powder macroscopic and microscopic examinations. Plant sources selected for study are represented with botanical names and sample codes namely *Vitex negundo* Linn var *negundo* (V1); *Vitex negundo* Linn var *purpurascens* Sivar & Mold (V2); *Vitex trifolia* Linn (V3); and *Vitex negundo* Linn from North India (V4)—were assessed.

Result and Discussion

Powder macroscopy of Samples V1, Sample V2, Sample V3, and Sample V4 showed similar characteristic features in terms of taste and odour all four were found to be bitter and have characteristic order. Sample V1 and Sample V2 are dull green and Sample V3 and Sample V4 are olive green in colour

Conclusion

Powder microscopy analysis showed distinctive characteristics in the samples. These included fragments of both lignified and non-lignified fibers, fragments of parenchyma cells, and starch grains

Keywords: *Vitex negundo* Linn var *negundo* (V1); *Vitex negundo* Linn var *purpurascens* Sivar & Mold (V2); *Vitex trifolia* Linn (V3); and *Vitex negundo* Linn from North India (V4)

Introduction

Inorder to assure the quality of herbal drugs and for standardisation purpose evaluation of powdered characteristics of plant material through powder macroscopy and microscopy is very essential. *Nirgundi* is an essential drug mentioned in Ayurveda classics with wide range of therapeutic utility. Source plant has distinct varieties, sub species and regional varities *Vitex negundo* Linn var *negundo* (V1); *Vitex negundo* Linn var *purpurascens* Sivar & Mold (V2); *Vitex trifolia* Linn (V3); and *Vitex negundo* Linn from North India (V4) . Each source may exhibit distinct morphological and microscopic features, which serve as diagnostic tools for their identification and differentiation. Powder macroscopy helps examine the physical characteristics of plant material under the naked eye or low magnification microscope. Characteristics such as color, texture, particle size, and identifiable fragments such as veins, trichomes, or fibers can be observed. Cellular and structural components of plant material

viewed under a compound microscope is known as Powder microscopy. Features like trichomes, stomata, xylem vessels, starch grains, calcium oxalate crystals, and fibers can be observed and analyzed through this. These procedures provide valuable insights for identifying subtle differences between closely related species or varieties of *Nirgundi*. Powder macroscopic and microscopic evaluation was conducted in the Department of Dravyaguna Vigyana, Government Ayurveda College, Tripunithura and Care Keralam Ltd Koratty, Thrissur.

Materials and methods

I. Preparation of *Patra churna* (powdered leaves)

Fresh leaves from four *Nirgundi* sources were visually examined for any foreign objects and then properly cleaned with water on their own to remove any real contaminants, such as mud, soil etc. Then, each of them was dried individually in the shade. After they had thoroughly dried, they were each independently processed with a machine grinder to a fine powder and filtered over a 120-mesh screen. For additional examination, the powdered leaves were kept separately in sterile, airtight containers. [1,2]

II. Powder macroscopic evaluation of the leaves of different sources of *Nirgundi*

a. Aim

To recognize and contrast the macroscopic powder characteristics of the leaves from various *Nirgundi* sources.

b. Materials

Nirgundi leaf powder, a magnifying lens, white paper, and a digital camera

c. Procedure

The dried leaf powder was spread out on white paper and examined with a magnifying glass and the unaided eye. The color, taste, and smell were evaluated. With fingers, the powder's texture was evaluated. It was noted how homogeneous and fine the particles were. A digital camera was used to take a picture of the powder.[1,2]

III. Powder microscopic evaluation of the leaves of different sources of *Nirgundi*

a. Aim

To recognize and contrast the powder microscopic characteristics of the leaves from various *Nirgundi* sources.

b. Materials

Nirgundi leaf powder, watch glass slide, cover slip (No.2 thickness), camel hair brush (medium-sized), dropper, spatula, phloroglucinol, HCl, digital microscope, compound microscope and digital camera

c.Procedure

On a glass slide, a pinch of fine powder was applied. Using a hairbrush, combine the powder with 1-2 drops of safranin. This mixture was then equally dispersed over the glass slide to avoid the overlapping of different structures' components. After adding glycerine and placing a cover slip on the glass slide, the object was examined using a compound microscope with a 10X magnification. Digital cameras were used to take pictures.

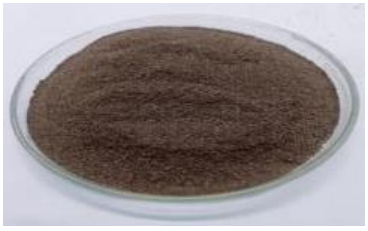
RESULTS

A.Powder macroscopy of leaves of different sources of *Nirgundi*

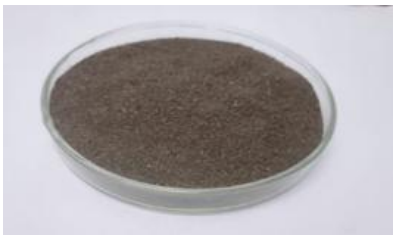
The powder macroscopic features of leaf of different sources of *Nirgundi* V1 (*Vitex negundo* Linn var *negundo)*, V2 (*Vitex negundo* Linn var *purpurascens* Sivar & Mold), V3 (*Vitex trifolia* Linn), and V4 (*Vitex negundo* Linn from North India) were done separately and the observations are tabulated below

Table No: 1 Powder macroscopy of leaves of different sources of *Nirgundi*

Sources of *Nirgundi*				
	Sample V1	**Sample V2**	**Sample V3**	**Sample V4**
Colour	Dull green	Dull green	Olive green	Olive green
Odour	Characteristic	Characteristic	Characteristic	Characteristic
Texture	Fine	Smooth	Fine	Fine



Picture no 1: Powder macroscopy of Sample V1



Picture no 2: Powder macroscopy of Sample V2

Picture no 3: Powder macroscopy of Sample V3

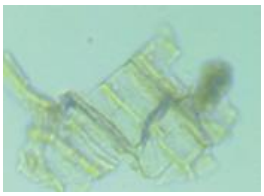
Picture no 4: Powder macroscopy of Sample V4

B. Powder microscopy of different sources of *Nirgundi*

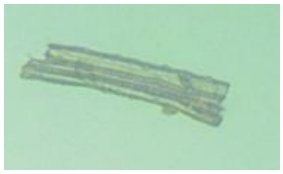
The powder microscopic features of leaf of different sources of *Nirgundi* V1 (*Vitex negundo* Linn var *negundo),* V2 (*Vitex negundo* Linn var p*urpurascens* Sivar & Mold), V3 (*Vitex trifolia* Linn), and V4 (*Vitex negundo* Linn from North India) were done separately and observations are as follows:

I. Powder microscopic evaluation of *Patra churna* (leaf powder) of Sample V1

Epidermal cells, tracheid fragments, multicellular trichomes, lignified sclereid fragments with pitted and wide lumen, spore, lignified spiral and reticulate vessel fragments, mesophyll cell fragments, and simple round starch grains are all visible in powder microscopy of Sample V1



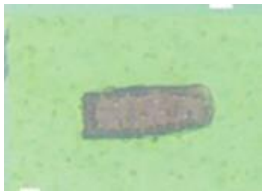
Epidermal cells



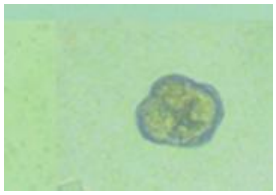
Tracheid

Multicellular trichomes

Non-lignified fiber



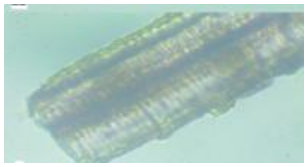
Sclereids



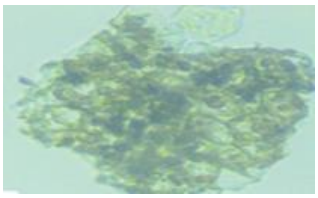
Spore

Epidermal cells with stomata

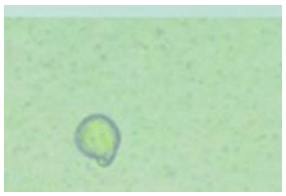
Spiral vessel



Reticulate vessel



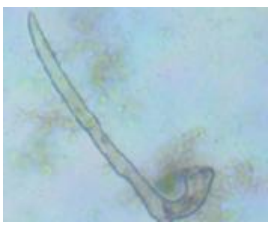
Mesophyll cells



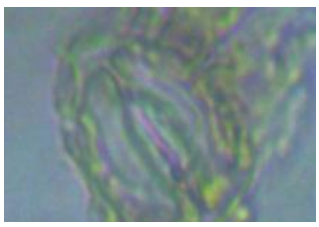
Starch grains

II. Powder microscopic evaluation of *Patra churna* (leaf powder) of Sample V2.

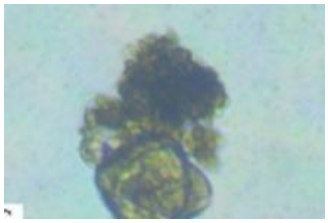
Multicellular trichomes, stomata, glandular trichomes, pieces of lignified annular vessels, non-lignified fiber with narrow lumen, and fragments of epidermal cells with glandular trichome surface view are all visible in the powder microscopy of sample V2.



Trichomes

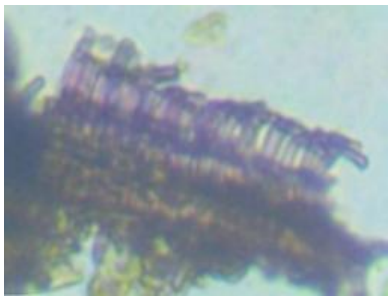


Stomata

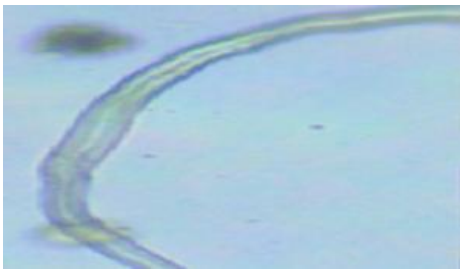


glandular trichomes

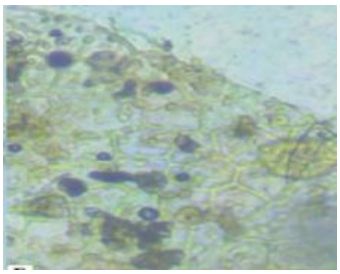
Picture No 5: Powder microscopy of Sample V1



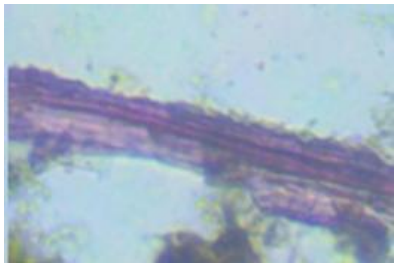
Annular vessel



fibre



surface view of epidermal cells with glandular trichome

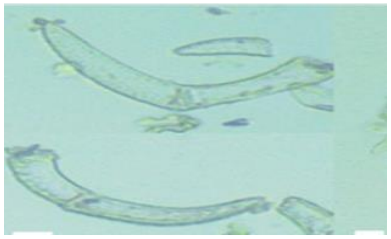


lignified fibre

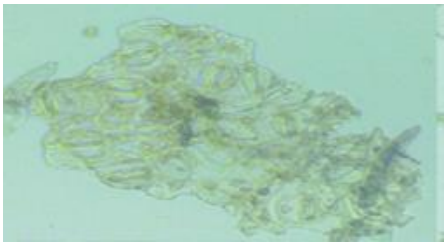
Picture No 6: Powder microscopy of Sample V2

III. Powder microscopic evaluation of *Patra churna* (leaf powder) of Sample V3.

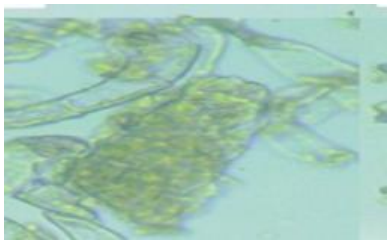
Multicellular trichomes, remnants of epidermal cells with stomata in surface view, fragments of mesophyll cells, lignified fiber with a large lumen, lignified vessel components, and non-lignified fiber are all visible in powder microscopy of sample V3.



Multicellular trichomes

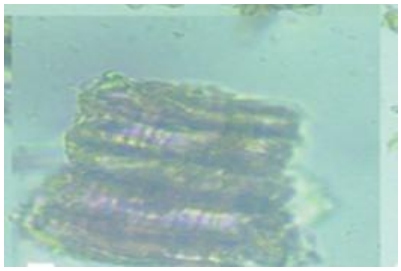


epidermal cells with stomata

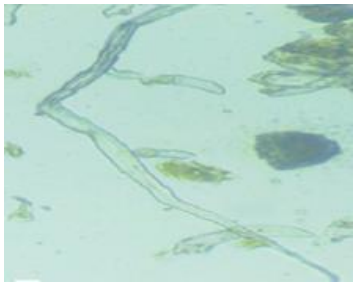


mesophyll cells

lignified fiber



Lignified vessels elements



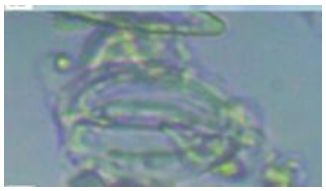
Non-lignified fibre.

Picture No 7: Powder microscopy of Sample V3

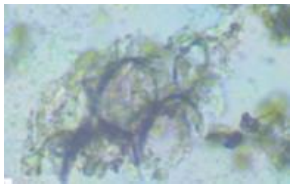
IV. Powder microscopic evaluation of *Patra churna* (leaf powder) of Sample V4.

Multicellular trichomes, stomata, fragments of parenchyma cells, lignified fibre with a wide lumen, fragments of lignified spiral vessels, surface view of epidermal cells, and fragment of hairy epidermal cells are all visible in powder microscopy sample V4.

Trichome

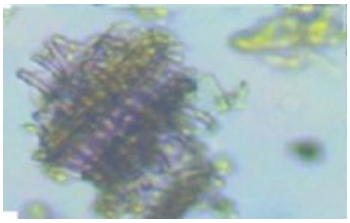


Stomata

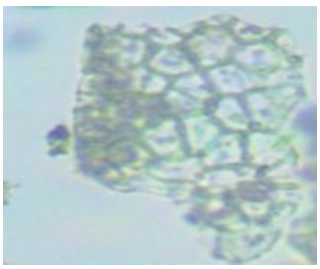


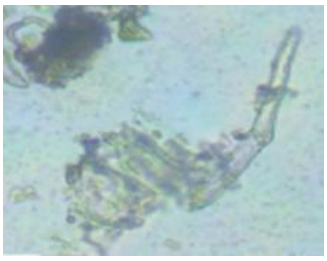
parenchyma cells

Lignified fibre



Spiral vessels





Epidermal cells surface view **Fragment of epidermal cells with hair**

Picture No 8: Powder microscopy of Sample V4

Discussion

Powder macroscopy of leaves of different sources of *Nirgundi*

Powder macroscopy involved evaluating the colour, odour, taste, and texture of Samples V1, Sample V2, Sample V3, and Sample V4. The powder macroscopical features reveal similar characteristic features in terms of taste and odour all four samples were found to be bitter and have characteristic order. Sample V1 and Sample V2 are dull green and Sample V3 and Sample V4 are olive green in colour. A notable difference was noted in the texture of Sample V2 it is found to be smooth and the other three were fine in texture.

C. Powder microscopy of leaves of different sources of *Nirgundi*

Powder microscopy analysis showed distinctive characteristics in the samples. These included fragments of both lignified and non-lignified fibers, fragments of parenchyma cells, and starch grains. Multicellular trichomes are found evenly in all 4 samples. In sample V1 lignified sclereid fragments, spore, lignified spiral and reticulate vessel fragments, and simple round starch grains were found which was not seen in sample V2, sample V3 and Sample V4. In Sample V2 non- lignified fibers were seen. In sample V3 presence of lignified vessel components and non-lignified fibres was seen. In sample V4 lignified fibres were seen. Sample V1 presented with spiral vessels, reticulate vessels, and pitted vessels. In sample V2 annular vessel elements were seen, in sample V3 lignified vessel elements were seen and in sample V4 spiral vessel elements were seen. These characteristics show potential variations among the species.

Conclusion

The study of powdered leaf samples from different sources of *Nirgundi* provides critical data for their botanical authentication, helping to detect adulterants and ensure the purity and efficacy of herbal formulations. Additionally, comparing microscopic features across various sources aids in understanding variations in phytochemical composition, which can influence therapeutic activity.

References

1. Evans, W. C. (2009). Trease and Evans Pharmacognosy (16th Edition). Saunders/Elsevier.P.563
2. Kokate, C. K., Purohit, A. P., & Gokhale, S. B. (2019). Pharmacognosy (50th Edition). Nirali Prakashan.P.98