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MACROSCOPIC AND MICROSCOPIC EVALUATION OF *SUNTHI CHOORNA* (POWDER OF DRIED RHIZOME OF *ZINGIBER OFFICINALE* ROSC.)

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ABSTRACT

Introduction: Pharmacognosy involves the comprehensive analysis of medicinal plants to evaluate their quality, purity, and medicinal potential. This study focuses on the macroscopic and microscopic evaluation of *Sunthi choorna*—the powdered form of the dried rhizome of *Zingiber officinale* Rosc.

Methods: The study was conducted in the Pharmacognosy lab of the Department of Dravyaguna Vigyana, Government Ayurveda College, Tripunithura, and CARe Keralam Ltd, Thrissur. Macroscopic characteristics including color, texture, odor, and taste were assessed using visual and tactile methods. Microscopic evaluation involved preparing slides of the powdered sample treated with chloral hydrate, phloroglucinol, HCl, safranine, and glycerin. Observations were made under digital and compound microscopes at varying magnifications.

Results: Macroscopic analysis revealed that *Sunthi choorna* is yellowish-brown, fine-textured, aromatic, and pungent. Microscopic examination identified significant cellular components, including cork cells (in sectional and surface view), lignified stone cells, trichomes, fibers, and vascular elements such as annular and reticulate vessels. Abundant starch grains, oil globules, sclereids, calcium oxalate crystals, and parenchyma fragments were also noted.

Conclusion: The macroscopic and microscopic evaluation confirms the distinctive physical and cellular features of *Sunthi choorna*, providing valuable insights into its identification and authentication. These findings support its safe and consistent use in traditional medicine.

Key words: *Zingiber officinale* Rosc., Chloral hydrate, Phloroglucinol, Magnification

1. INTRODUCTION

Pharmacognosy is a branch of bioscience that deals with the systematic and detailed examination of medicinal plants or natural substances derived from them to identify, authenticate, and understand their quality, purity, and potential medicinal value.[1] This evaluation typically includes macroscopic and microscopic analysis to ensure the safety, efficacy, and consistency of natural products used in medicine. In the present study, macroscopic and microscopic evaluation of powder of dried rhizome of *Zingiber officinale* Rosc., was performed. *Choorna* has been made according to the sarangadhara samhitha *choorna kalpana*.[2] Macroscopy and microscopy of *choorna* (powder- sieved from mesh size 85) of the rhizome of *Zingiber officinale* Rosc. were conducted to assess the colour, texture, odour and taste. Cell constituents like calcium oxalate crystals, starch grains, and fibres in the powder were observed using powder microscopy. The study has conducted in the Pharmacognosy lab of Department of Dravyaguna Vigyana, Government Ayurveda College Tripunithura and the microscopic evaluation of fresh rhizome and powder of dried rhizome of *Zingiber officinale* Rosc. was done at CARe keralam Ltd, Koratty, Thrissur.

2. MATERIALS AND METHODS:

2.1 Preparation of *Sunthi choorna* (powder of dried rhizome of *Zingiber officinale* Rosc.)

Fresh rhizome of *Zingiber officinale* Rosc. was collected after cultivation and was soaked overnight. Outer skin of the fresh rhizome of *Zingiber officinale* Rosc. was removed by carefully scraping it with bamboo splits.After scrapping, the rhizomes were kept under sunlight for drying and frequent turnings were done for uniform drying. Dried rhizome was obtained after properly drying and then it was subjected to powdering.[3,4] Powdering was done by using pulverizer and obtained *Sunthi choorna* (powder of dried rhizome of *Zingiber officinale* Rosc.) was then sieved using a mesh size of 85. To retain its quality, the powdered medication has been meticulously stored in an airtight container.

2.1. Powder macroscopic evaluation dried rhizome of *Zingiber officinale* Rosc.

a. Aim

To identify the characteristic features of *Sunthi choorna* (powder of dried rhizome of

Zingiber officinale Rosc.) with the help of powder macroscopic features.

b. Materials

Sunthi choorna (powder of dried rhizome of *Zingiber officinale* Rosc.), magnifying lens, white paper, digital camera.

C. Procedure

The *Sunthi choorna* (powder of rhizome of *Zingiber officinale* Rosc.) was placed on white paper and viewed using magnifying lens and naked eye. The color, texture, odor, and taste of the powder were evaluated through macroscopic analysis. Color was observed with the naked eye, and the texture was assessed by feeling the powder with the fingers to determine its fineness and uniformity. The powder was then smelled and tasted to assess its odor and taste. Photographs of the powdered drug were taken using a digital camera.

2.2 Powder microscopic evaluation of dried rhizome of *Zingiber officinale* Rosc.

a. Aim

To identify the powder characters of *Sunthi choorna* (powder of dried rhizome of *Zingiber officinale* Rosc.) with the help of powder microscopic features.

b. Materials

Sunthi choorna (powder of dried rhizome of *Zingiber officinale* Rosc.), watch glass, glass slide, cover slips (no: 2 thickness), camel hair brush (medium-sized), dropper, spatula, blotting paper, chloral hydrate, glycerine, phloroglucinol, HCl, digital microscope, compound microscope and digital camera.

c. Procedure

i) A pinch of *Sunthi choorna* (powder of dried rhizome of *Zingiber officinale* Rosc.) was taken and placed on glass slide. Then spread the powder evenly over each slide to create a thin layer. Applied a few drops of the chloral hydrate solution onto the powder sample on the slide. Gently heat the slides from below using a Bunsen burner. After the chloral hydrate treatment, remove excess solution from the slides if necessary, using a blotting paper. Then applied a few drops of phloroglucinol solution to slide, covering the powder. Allowed the phloroglucinol

to react with the sample for a few minutes. Applied a few drops of dilute hydrochloric acid (HCl) onto the slide, covering the powder sample. Placed a coverslip gently over the treated powder sample using a needle to avoid formation of air bubbles. Examined the slides under a digital microscope, starting with low magnification (10x) and gradually increasing to higher magnifications(40x) as needed. Images were then taken using digital camera.

ii) A pinch of *Sunthi choorna* (powder of dried rhizome of *Zingiber officinale* Rosc.) was taken and placed on a glass slide. Few drops of water were added to the powder and mixed with a hair brush. This mixture was then spread throughout the glass slide to overcome the overlapping of constituents of various structures. A cover slip was placed on the glass slide and it was then viewed using compound microscope under 10X powers. The presence of cell components in the powder of rhizome were identified under 10X and 40X in powder microscopy. Images were then taken using digital camera.

The same procedure was repeated with safranine and glycerin instead of water.

3. RESULTS AND DISCUSSION:

3.1. Powder macroscopic evaluation of *Sunthi choorna* (powder of dried rhizome of *Zingiber officinale* Rosc.)

Powder macroscopic features such as colour, texture, odour and taste of *Sunthi choorna* (powder of dried rhizome of *Zingiber officinale* Rosc.) were tabulated as follows.

Table No: 1 Powder macroscopy of *Sunthi choorna* (powder of dried rhizome of *Zingiber officinale* Rosc.)

Observations	Powder (*choorna*) features
Colour	Yellowish brown
Texture	Fine
Odour	Aromatic
Taste	Pungent

Picture No:1 *Sunthi* (Dried rhizome of *Zingiber officinale* Rosc.)

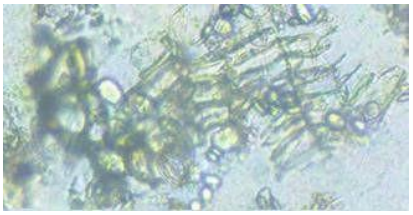
Picture No: 2 Powder macroscopy of *Sunthi choorna* (powder of dried rhizome of *Zingiber officinale* Rosc.)

3.2. Microscopic evaluation of *Sunthi choorna* (powder of dried rhizome of *Zingiber officinale* Rosc.)

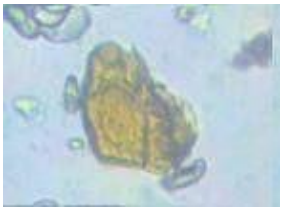
Powder microscopy of *Sunthi choorna* (powder of dried rhizome of *Zingiber officinale* Rosc.) shows fragments of cork cells in sectional and surface view, yellow and brown colored content, trichomes, fragments of non-lignified fibers with narrow lumen. The powder also contains lignified stone cells, fragments of parenchyma cells, fragments of

lignified annular and reticulate vessels, calcium oxalate crystal, and sclereids. Fragments of tracheids and vessel elements are seen in the powder. Simple round to oval starch grains are present abundantly in the powder.

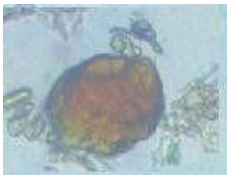
Annular vessels



Cork in sectional view



oil globules

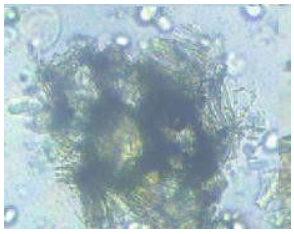


Oil globules

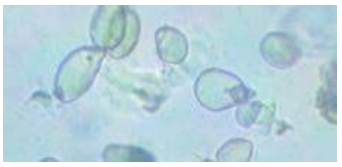
reticulate vessels

Stone cells

Trichome

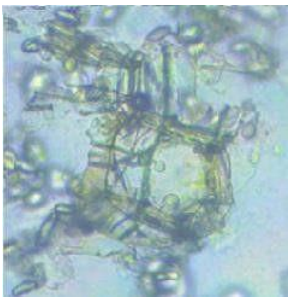


Cork

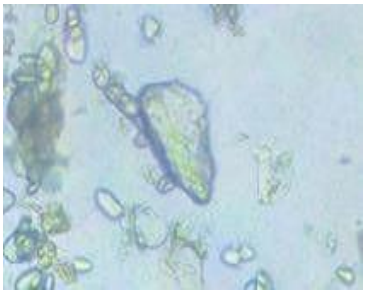


Starch grains

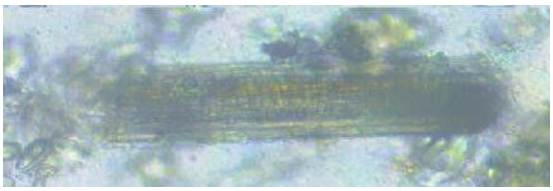
Sclereids



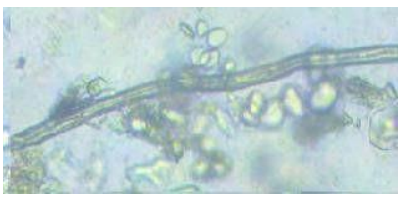
Parenchyma cells



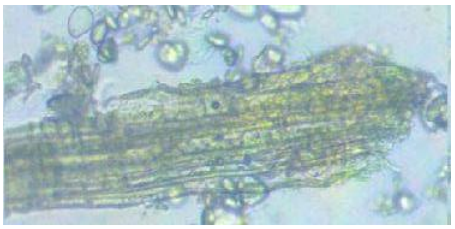
Calcium oxalate crystal



Vessel elements



Fibre



Tracheid

Picture no.3 : powder microscopy of rhizome of *Zingiber officinale* Rosc.

4. CONCLUSION

The detailed macroscopic and microscopic evaluation of *Sunthi choorna* (powder of dried rhizome of *Zingiber officinale* Rosc.) highlights its characteristic features essential for identification and authentication. The macroscopic analysis provided insights into its physical attributes, such as color, texture, odor, and taste, while the microscopic evaluation revealed cellular structures, including cork cells, starch grains, fibers, trichomes, and vascular elements. These findings underscore the importance of comprehensive pharmacognostical studies in ensuring the quality, purity, and efficacy of herbal products. The study contributes to the scientific validation of *Zingiber officinale* as a reliable component in traditional medicine**.**

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AUTHORS CONTRIBUTIONS

All the authors contributed equally in design and execution of the article.

CONFLICTS OF INTEREST

Nil

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