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Distinctive features of nagadaman (*Sansevieria roxburghiana* Schult. & Schult.f): A pharmacognostic study

Dixit Renu, Sailaja P, Reddy KV Vijaya Bhaskara and Padmaja M

Abstract
Objective: Nagadaman (*Sansevieria roxburghiana* Schult. & Schult.f; Family-Agavaceae) is a herb, distributed all over India from West Bengal to Tamil Nadu and throughout World. Many species of *Sansevieria* are used as Indoor plant ornamental plants and are widely used in the treatment of many diseases in Indian traditional medicine - Ayurveda. The Macroscopic and Microscopic studies of the plant were done for standardization and identification of the drug.
Methods: The standard Pharmacognostical methods used by botanist on the principles of Pharmacognosy.
Results: Nagadaman (*Sansevieria roxburghiana* Schult. & Schult.f) showed distinct characteristic features in the rhizome like Cork cells Raphide crystals, Vascular bundles, externally covered with sclerenchymatous fibrous sheath. Powder analysis of Nagadaman rhizome churna shows the presence of fragments of parenchymatous cells of cortex, fragments of vessels with reticulate and pitted thickenings, bundle of Raphide crystals, simple and compound starch grains of various shapes and sizes.
Conclusion: The Present study of the rhizome of Nagadaman (*Sansevieria roxburghiana* Schult. &Schult.f) is an attempt to identify the drug and to ensure a quality and purity standard as the drug is widely used by tribal and pharmaceutical industries mainly by Ayurvedic physicians.

Keywords: Pharmacognostic, nagadaman, standardizatio and *Sansevieria roxburghiana* schult. & schult.f,

Introduction
Nagadaman (*Sansevieria roxburghiana* Schult. & Schult.f) is a valuable drug belongs to the family Agavaceae [1] widely distributed Eastern Coast of India from West Bengal to Tamil Nadu in the South. The plant is commonly known as Bowstring hemp in English, Hindi-Marul, Tamil-Mottamanji, and Telugu- Chaga. The word '*Sansevieria*' has it origin from New Latin named after Raimondo di Sangro, Italin Scholar and Prince of San Severo [7].
There is lot of Controversy in the identification of Murva and Nagadaman is also one of the drug which is being identified as Murva [6]. The Bengal Kavirajas have also mentioned *Sansevieria roxburghiana* Schult. & Schult.f as Murva [5].

Taxonomocal Classification

Kingdom	-	Plantae
Subkingdom	-	Tracheobionta
Super division	-	Spermatophyta
Division	-	Magnoliophyta
Class	-	Liliopsida
Subclass	-	Lillidae
Order	-	Liliales
Family	-	Agavaceae
Genus	-	Sansevieria Thunb.
Species	-	*Sansevieria roxburghiana* Schult. & Schult.f.

Botanical Description [2]
- A herb with a creeping rootstock occurring wild or as an escape from cultivation on the Eastern Coast of India from West Bengal to Tamil Nadu in the South.
- Leaves: 6 to 25 in a rosette deeply channeled above, narrowly linear – ensiform, 20-60 cm long and 1.3-2.5 cm broad.
- Tapering to a stout subulate point, green faintly clouded with black, transversely marked with darker bars, edges whitish when old.

- Leaves have been the source of a fiber used for bowstrings in India and similar use has been reported for many other related species native to other countries.
- The fiber is plaint, soft and silky, and has been used for making cordage, matting and fine cloth.
- **Flowers:** Flowering stem 30 to 70 cm high, flowers in a spike like raceme, white or pale green.
- **Fruits:** Berries globose, green and yellow when ripen.
- **Seeds:** 1-3 flesh

Rhizome: Mucilaginous sweetish taste but lacks and characteristic smell.
It is used in the form of an electuary for coughs. The juice of tender shoots is administered to children to clear their throats of phlegm [4]. The rhizomes are used as a febrifuge in snake bite and hemorrhoids. Juice from leaves applied topically to ear infections [3].

Pharmacognostic Study

Aims and Objectives

To study the Macroscopic, Microscopic study and Powder Analysis of *Sansevieria roxburghiana* Schult. & Schult.f rhizomes.

Materials and Methods

Drug Collection and Authentication

The fresh rhizomes of nagadaman (*Sansevieria roxburghiana* Schult. & Schult.f) were collected from S.V. Ayurvedic Medical College, Tirupati, Andhra Pradesh. Authenticated by Botanist S. Koteswara Rao, Post graduate teacher in Botany, A.P.Model School and Junior College, Madanapalli, Chitoor Dist. Tirupati.

Observation and Results

Pharmacognosy of *Sansevieria roxburghiana* Schult. & Schult.f. (Rhizome)

Name of the Sample	:	Nagadaman
Scientific Name	:	*Sansevieria roxburghiana*
Shult. & Schult. Family	:	Agavaceace
Plant part	:	Rhizome

Drug description: Freshly collected greenish-light brown colour pieces of Rhizomes, Rhizomes are bearing roots here and there towards lower side. Powder: Brown, Slightly pungent, Slightly sweetish and bitter.

Macroscopic properties of rhizome

Size: Length- 5 to 10 cm long cut pieces Diameter- 1 to 1.5 cm
Shape: Cylindrical
Colour: Greenish towards upper side
Brownish towards lower side
Taste: Mucilagenous and slightly bitter.
Stem modified in to a underground perennial Rhizome, Rhizome cylindrical in shape with prominent Nodes and inter nodes, runs horizontally underground and produce fibrous roots here and there in to the soil; the portion of the rhizome that exposes towards the light greenish in colour and the remaining brownish in colour; Rhizomes are mucilaginous and fibrous.

Microscopic properties of rhizome

1. Transverse Section of Rhizome: Transverse Section of Rhizome is done by Free hand
Section cutting and simple staining procedure and findings are as mentioned below.

A. Cork

- Externally the Rhizome is covered with cork.
- Cork is composed of 7 to 8 stratified layers of horizontally elongated, polygonal cells that are arranged without any intercellular spaces.
- Cork cells are thick walled and stratified.
- Cuticle and stomata are absent.

B. Cortex

- The region in between the cork and the stele is called as cortex.
- Cortex is composed of several layers of parenchymatous ground tissue.
- Cells of Outer cortex are having green colour chlorophyll pigment and appears green in colour i.e. chlorenchymatous.
- Cells of Inner cortex are not having chlorophyll and appears colourless. But, most of the cells are having bundles of needle like Raphide crystals of calcium oxalate.
- Cortex cells are arranged loosely and showing intercellular spaces.

C. Stele

- Below the cortex Steler region is present.
- Cortex region and steler regions are not distinctly separated.
- In this region conjoint collateral and closed type of vascular bundles are randomly scattered.
- Vascular bundles towards periphery are bigger than the vascular bundles towards the centre.
- Vascular bundles externally covered with sclerenchymatous fibrous sheath.
- Inside the vascular bundle Xylem present towards inner side and Phloem towards outer side. But, cambium is absent in between them.
- Cells of Xylem parenchyma also having Raphide bundles.

Pith

- Central part of the stele is called pith. It is composed of several layers of parenchymatous cells filled with starch grains and bundles of raphide crystals.

Microscopic study of Nagadaman (Sansevieria roxburghiana Schult. & Schult.f)

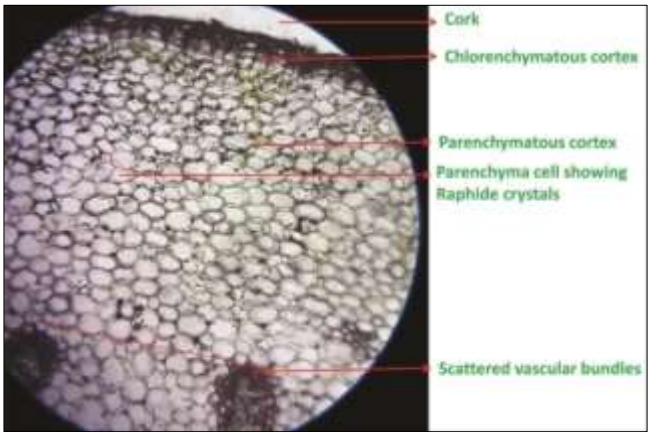

Image 1: Transverse section of Nagadaman Rhizome

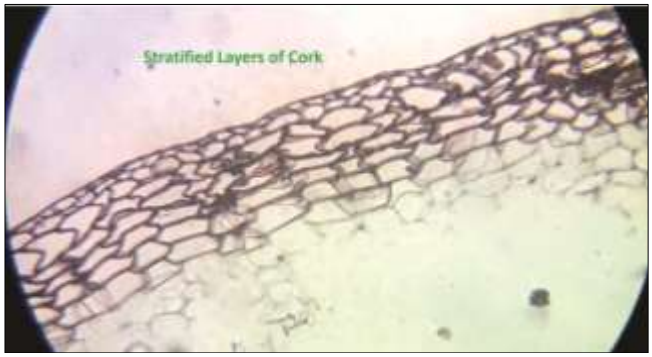

Image 2: Transverse section of Nagadaman Rhizome (Cork region enlarged)

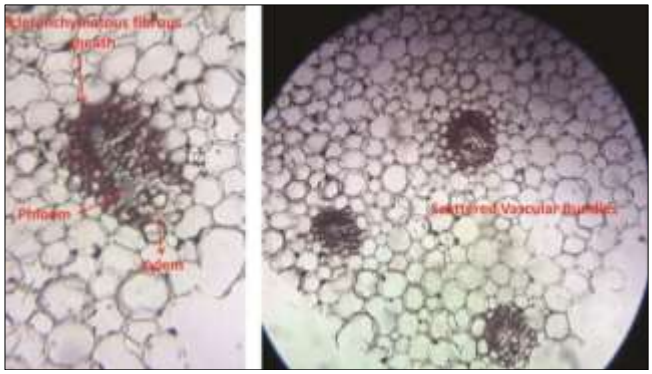

Image 3: Transverse section of Nagadaman Rhizome (Stelar Region enlarged)

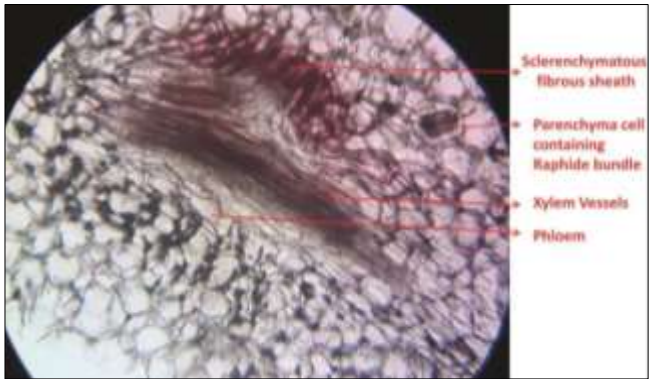

Image 4: Lateral section Nagadaman Rhizome (Vascular Region Enlarged)

Powder Analysis of Rhizome

Powder analysis is carried out by clarifying the powder in chloral hydrate solution and prepared Glycerin mount, Iodine solution mount and Saffranin solution mount and the following characters are identified.

1. Organoleptic properties

Colour: Light-Brown
Odour: Slightly pungent but not characteristic Taste : Slightly sweetish and bitter
Texture: Fine powder

2. Microscopic Characters

- Fragments of parenchymatous cells of cortex
- Fragments of vessels with reticulate and pitted thickenings
- Bundles of Rhapide crystals and scattered needles like isolated raphides
- Simple and compound starch grains of various shapes and sizes. Mostly oval in shape with a hilum.
- Lignified xylem fibres in bundles and also isolated

Microscopic Study of Powder of Nagadaman (*Sansevieria roxburghiana* Schult. & Schult.f

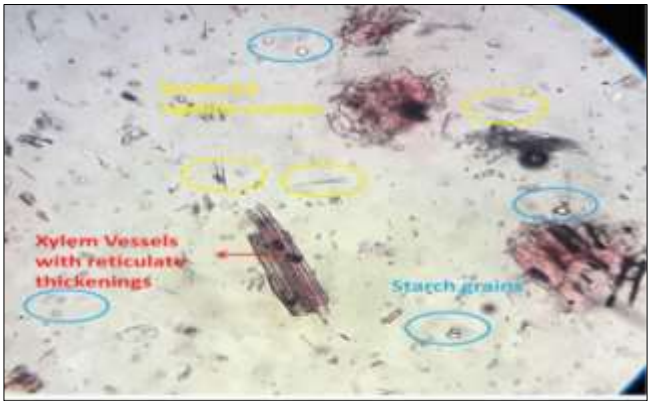

Image 5: Powder analysis of Nagadaman rhizome churna

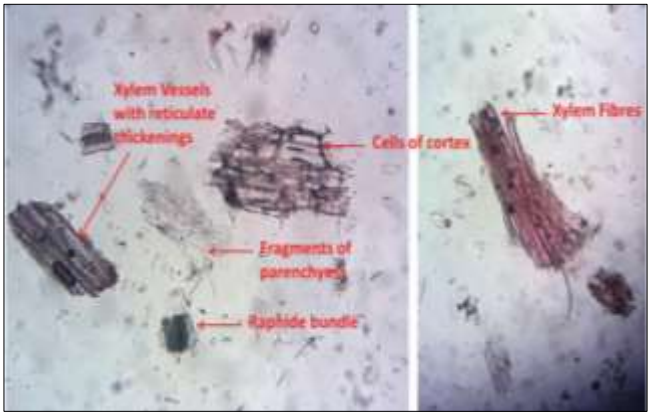

Image 6: Powder analysis of Ngadaman rhizome churna

Discussion

Pharmacognostic study of Nagadaman rhizome showed following description-Macroscopic study reveals stem modified in to a underground perennial Rhizome, Rhizome cylindrical in shape with prominent Nodes and inter nodes, runs horizontally underground and produce fibrous roots here and there in to the soil; the portion of the rhizome that exposes towards the light greenish in colour and the remaining brownish in colour, Rhizomes are mucilaginous and fibrous. Microscopic study shows Cork, Cells of Cortex having bundles of needle like Raphide crystals of calcium oxalate, Stele has Cells of Xylem parenchyma with Raphide bundles, Vascular bundles are externally covered with sclerenchymatous fibrous sheath, Pith has Cells of Xylem parenchyma having Raphide crystals, Inside the Vascular bundle Xylem present towards inner side and Phloem towards outer side. But cambium is absent in between them. Powder analysis of Nagadaman rhizome churna shows the presence of fragments of parenchymatous cells of cortex, fragments of vessels with reticulate and pitted thickenings, bundle of Raphide crystals, simple and compound starch grains of various shapes and sizes.

Conclusion

The Pharmacognostic study-Macroscopic and Microscopical character of *Sansevieria roxburghiana* Shult. & Schult.f provided the data helpful for the correct identification,

authentication of raw drug and also in laying down Pharmacopeial standards.

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