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Pharmacognostic, Phytochemical and Physio-Chemical Evaluation of Vana Haridra - An Approach towards it's Standardization

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Abstract: ***Background: Recently, there is an increasing shift in interest of people towards the drugs of natural origin. Therefore, the economic importance of Ayurvedic medicines increased exponentially. A crucial hurdle that is impeding the promotion in the usage of these medications is lack of proper standardization of drug and good quality control measures that are to be taken while preparation of the drug. Many adulterants and cheaper substitutes are being added to the original crude drug to meet the increasing demands and requirements leading to causation of unwanted side effects and adverse effects. Hence the standardization of crude materials is an important prerequisite which is needed in order to prevent the negative outcomes and to ensure a reproducible quality of Ayurvedic medications that helps us to justify its safety and effectiveness. The Pharmacognostic, Phyto chemical, Physio-chemical research of the rhizome of Vana Haridra (Curcuma aromatic Salisb.) has been discussed in this present article to evaluate its safety and efficacy. Aim: To evaluate Pharmacognostic features including Macroscopic, Microscopic features of rhizome of Vana Haridra. To evaluate Physio-chemical and Phytochemical analysis of rhizome of Vana Haridra. Materials and Methods: Free hand section of rhizome was done to identify the microscopic structures of the drug. Physiochemical analysis and Phytochemical analysis were done based on the standard methods. Results: The rhizome is identified as a standard specimen and is devoid of impurities and adulterants.***

Keywords: Vana Haridra, Pharma cognostic, Phytochemical, Physiochemical, Curcuma aromatic Salisb, Ayurveda

1. Introduction

Vana Haridra, commonly known as Wild Turmeric, is an Indigenous Medicinal Plant scattered throughout India especially in South India. It is native to Tamil Nadu and has-been used by many South Indian women and is known to possess numerous health benefits. Description regarding its usage is mentioned widely in classics and is interpreted with various synonyms like Soli, Solika, Aranyahaldi, Vanarishta. It is botanically derived from *Curcuma aromatic* Salisb, a member of the genus *Curcuma* belonging to the family Zinziberaceae. An erect, perennial, rhizomatous herb that has been widely used and is a time-tested medicine which is indicated in treatment of various skin ailments. Classically, it is used in treatment of Kushtha, Vatarakta and is Rucya and Dipaniya. The part used is Rhizome and is taken both internally and externally. The rhizomes are tuberous, large, orange-red and aromatic, normally substituted for turmeric.

Taxonomical Classification:

- **Kingdom**: Plantae
- **Division**: Magnoliophyta
- **Class:** Liliopsida
- **Subclass**: Zingiberidae
- **Order**: Zingiberales
- **Family**: Zingiberaceae
- **Genus**: Curcuma
- **Species**: aromatica

Vernacular Names:

- **Common name:** Wild turmeric, Aromatic turmeric
- **English:** Wild turmeric, Yellow zedoary, Cochinturmeric
- **Hindi:** Janglihaldi
- **Gujarati:** Zedoari
- **Tamil:** Kasturimanjal
- **Malayalam:** Kattumanna
- **Telugu:** KasthuriPasupu
- **Kannada:** KasthuriArishina
- **Mizoram:** ai-eng,Ai-eng-suak
- **Bengali:** Ban-halud
- **Marathi:** Ran-Halada

2. Morphology of Vanaharidra

- **Habit:** The plant is distributed wild throughout India and mainly cultivated in Kerala and West Bengal. Widespread in eastern Himalayan regions and Western Ghats of India
- **Habitat:** It is an annual, erect herb with a characteristic light yellow aromatic rhizome and camphoraceous smell (Anoop, 2015). The plant develops clumps of erect, unbranched leaf stems that on full growth can reach a height of about 1 m from the stout.
- **Leaves:** Leaves appear after the flowers. Leaves are large, green, decorative, oblong-lanceolate / oblong elliptic, with acuminate apex, 38-60x10-20cm size, often variegated above, pubescent beneath, base deltoid with long petioles as long as the blade.
- **Rhizomes:** Rhizomes are large, tuberous, yellow or orange-red inside and aromatic in taste.
- **Root Stock:** Root stock large, of palmately branched, sessile annulated biennial tubers.
- **Stem:** Flowering stem appears with or before the leafing stem, as thick as the fore finger and sheathed.

- **Flowers:** Flowers are fragrant, shorter than the bracts, in spikes15-30cmlong
- **Bracts:** Flowering bracts 3.8-5 cm long, ovate, recurved, cymbiform, rounded at the tip, pale green, connate below forming pouches for the flower, bracts of the coma 5-7.5cm long, more or less tinged with red or pink.
- **Calyx:** Calyx 8 mm long, irregular with 3-lobed
- **Corolla:** Corolla tube 2.5cm long with upper half like funnel-shaped, lobes pale rose-colored, the lateral lobes oblong, the dorsal longer, ovate, concave, arching over the anthers.
- **Lip:** Lip yellow, obovate, deflexed, sub entire or obscurely3-lobed.
- **Staminodes:** Lateral staminodes oblong, obtuse and as long as corolla-lobe
- This plant grows rapidly during the summer monsoon months. The rhizomes have characteristic fragrance on attaining maturity. It does not set seeds usually.

1) Pharma Cognostic Studies:

The Pharmacognostic studies were performed on dried rhizome samples collected from local markets in Tirupati and results are evaluated.

Drug description: Dried rhizomes cut into pieces of various sizes and light Orange-Yellow in colour.

2) Macroscopic Properties of Rhizome

Size: Rhizomes cut into pieces of various sizes

Shape: Cut pieces are irregular in shapes (entire rhizomes are in Oblong or conical shape)

Color: Externally Pale Orange- Yellow color and internally deep Orange in color

Odor: Agreeable, aromatic

Taste: Slightly astringent and bitter

Generally entire Rhizomes are large, central rhizomes oblong or conical in shape, about 2-3" in diameter, external surface dark grey, marked with circular rings and bearing thick rootlets at the ends. Laterally orange yellow, almond shaped branches are present. Lateral rhizomes about as thick as the finger with few fleshy roots. The outer surface smooth, scaly leaves are present at the nodal region.

3) Microscopic Properties of Rhizome:

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

Transverse section of cut piece of rhizome shows
a) Epidermis
b) Cork
c) Cortex
d) VascularBundles

a) Epidermis:
- Transverse section of the cut piece of rhizome externally shows epidermis.
- Epidermis made up of rectangular parenchymatous cells.

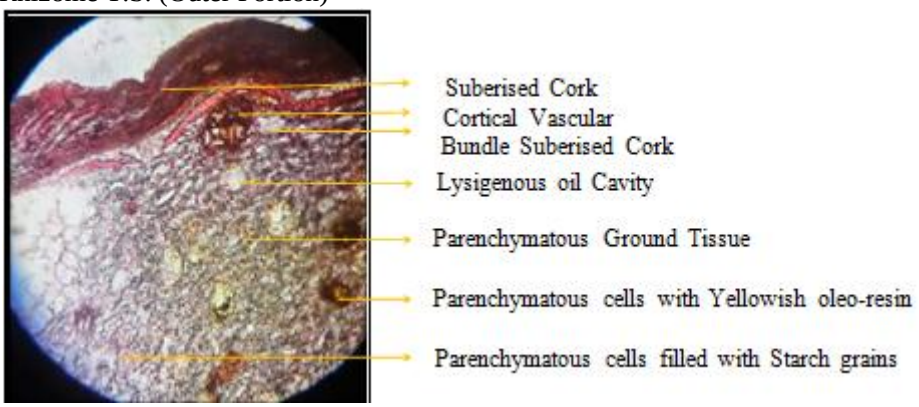
b) Cork:
- Followed by epidermis is the cork which is composed of 10 to 12 layers of thin walled suberized irregularly arranged parenchymatous cells

c) Cortex:
- Cork region followed by Cortex region.
- cortex made up of 20 to 30 layers of thin walled, polygonal parenchymatous cells
- Parenchyma Cells in cortex region filled with abundant yellow cell content, simple starch grain and few oil globules.
- Most of the cells consists ovoid and oblong starch grains.
- In the cortex region many cortical vascular bundles are scattered which are Conjoint collateral and closed without fibrous zone.
- Lysogenous cavities are present in the cortex region
- Followed by the cortex is the endodermis which is single layered, thick walled and followed by endodermis is the single layer of pericycle which is made up of thin walled parenchymatous cells.

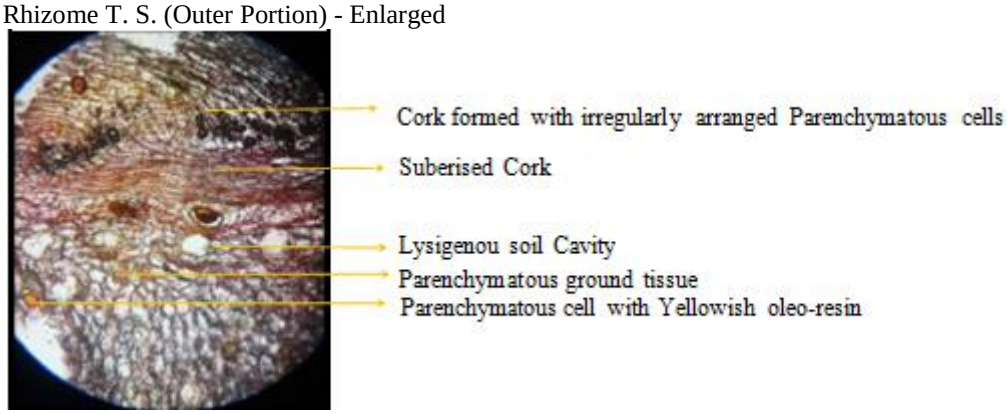
d) Vascular Bundles:
- Vascular bundles distributed throughout cortical and stellar region.
- Small vascular bundles are scattered nearer to the peri cycle are smaller having 2 to 3 xylem elements.
- While those present towards the center show 5 to 6 xylem elements with phloem. The vascular bundles are conjoint collateral and closed.
- Xylem composed of Tracheids, Xylem vessels and Xylem parenchyma
- Vessels mainly spirally thickened
- Phloem composed of Sieve cells, sieve tubes, companion cells and Phloemparenchyma.
- The ground tissue of the stele is composed of thin walled, polygonal parenchymatous cells containing flattened, ovoid or oblong starch grains and yellowish cell content.

4) Microscopic Structure of Vanaharidra:

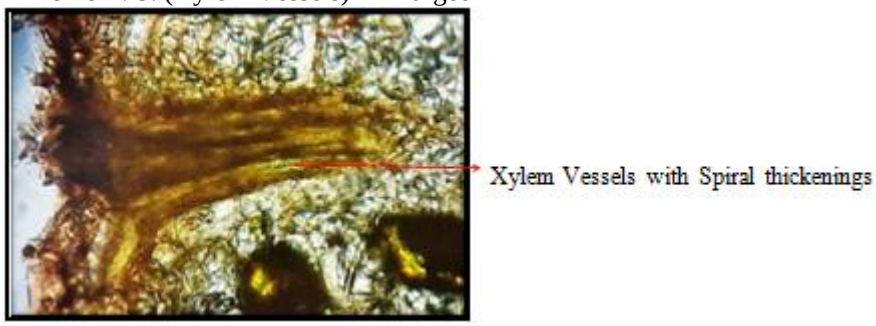
Curcumaaromatica Salisb.
Rhizome T.S. (Outer Portion)



Curcumaaromatica Salisb.
Rhizome T. S. (Outer Portion) - Enlarged



Curcumaaromatica Salisb.
Rhizome T. S. (Xylem Vessels) - Enlarged



Physio-Chemical Analysis:

Powder Analysis: Powder Analysis is carried out by clarifying the powder in chloral hydrate solution and prepared Glycerine mount, Iodine solution mount and Safranin solution mount and the following characters are identified.

Organoleptic Properties:

Colour: Yellow
Odour: Characteristic, Aromatic
Taste: Slightly Bitter
Texture: Fine Powder

Physiochemical Analysis of Vanaharidra

Parameter	Results
	VANAHARIDRACURNA
Totalash	5.048%w/w
Acid insoluble Ash	0.776%w/w
Water soluble Extract	22.96%w/w
Alcohol soluble Extract	4.157%w/w
Foreign Matter	Nil

Phytochemical analysis of Vanaharidra:

S. No.	Phytochemical	Test Name	Result	End Point	
I	Alkaloids	Mayer's Test	Present	Yellow precipitate	
II	Carbohydrates	Molisch Test	Present	Reddish color	
III	Reducing Sugars	Benedicts Test	Moderately Present	Orange color	
IV	Proteins	Biuret Test	Present	Violetring	
V	Xantho proteins	Xantho protein test	Mildly Present	Mild orange color	
VI	Amino acids	Ninhydrin Test	Present	Purplecolor	
VII	Starch	Iodine test	Absent	Nil	
VIII	Tannins	Ferric chloride test	Present	Yellow-Greenish color	
IX	Steroids	Salkowski reaction	Present	Brownring	
X	Saponins	Froth test	Present	Foam appearance	
XI	Flavanoids	Dilute NaOH	Present	Absence of color	
XII	Phenols	Ferric Chloride test	Present	Greenish brown color	

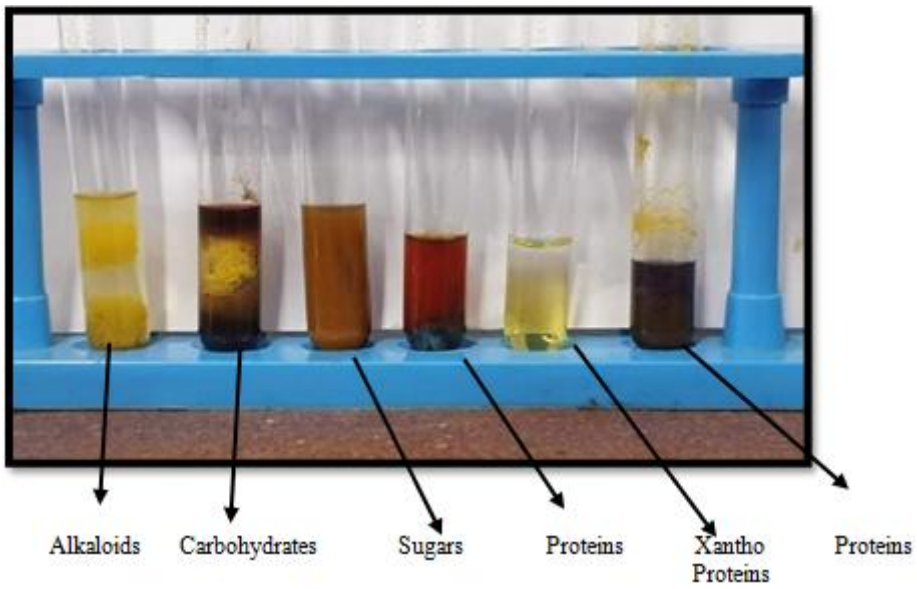
The dried rhizome of Karcurais powdered and sieved. The obtained powder is soaked in Water for 24 hours. Later it is filtered through Whatman's filter paper and the filtrate is used for performing Phytochemical analysis based on standard procedures available and the results are analyzed.

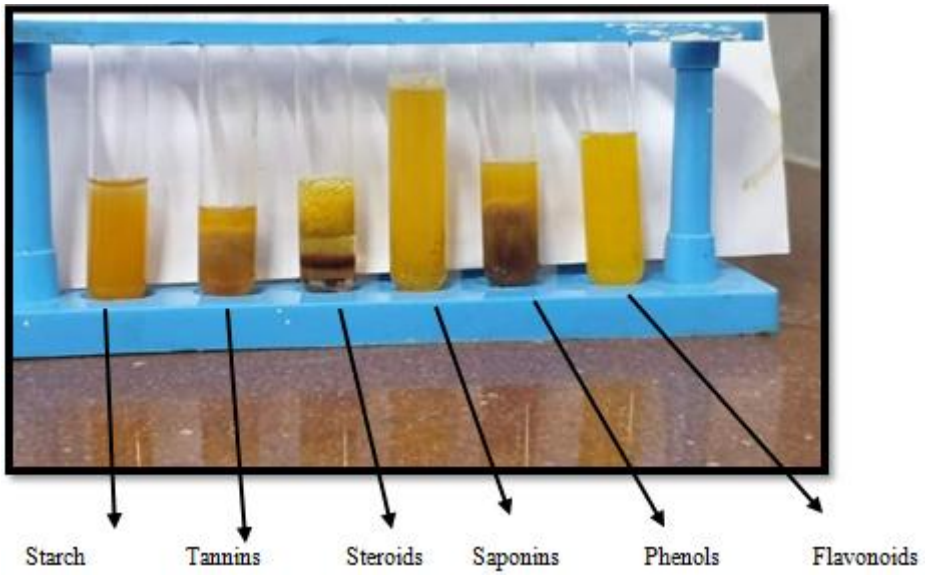
3. Results and Observations

Vana Haridra Curna: It showed the presence of Alkaloids, Carbohydrates, Sugars, Proteins, Xantho-Proteins, Aminoacids, Steroids, Saponins, Tannins, Flavonoidsand Phenols.

pH of Vana Haridra Cūrṇa: 5.7

Images of Phytochemical Analysis of Vana Haridra





4. Discussion

Macroscopically **r**hizomes were large, central rhizomesoblongorconical in shape, about 2– 3" in diameter, external surface dark grey, marked with circular rings and bearing thick rootlets at the ends. Laterally orange yellow, almond shaped branches were present. Lateral rhizomes about as thick as the finger with few fleshy roots. The outer surface smooth, scaly leaves were present at the nodal region.

Microscopically it is presented with Epidermis made of Rectangular Parenchymatous cells followed by 10-12 layers of cork containing thin walled, suberized irregularly arranged Parenchymatous cells. Next, Cortex that was made up of 20-30 layers of Parenchymatous cells which contains ovoid, oblong starch grains and are filled with yellow cell content and few oil globules, Lysogenous cavities. Next there was single layered endodermis followed by single layer of pericycle and Collateral, Conjoint and Closed vascular bundles.

Powder analysis showed presence of a fine powder with Yellow color, Characteristic, aromatic smell and slightly bitter taste. Physicochemical analysis performed for Total ash, Acid insoluble Ash, Water soluble Extract, Alcohol soluble Extract Foreign matter showed the following values of 5.048%w/w, 0.776 %w/w, 22.96%w/w, 4.157%w/w, Nil respectively. On performing **Phytochemical analysis**, Alkaloids, Carbohydrates, Sugars, Proteins, Xantho Proteins, Amino acids, Steroids, Saponins, Tannins, Flavonoids and Phenols were observed.

5. Conclusion

These Pharmacognostic, Phytochemical, Physiochemical studies helps in proper identification and standardization of crude drug. This type of research helps in authentication additionally, ensures reproducibility of herbal merchandise in marketing.

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