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PHARMACOGNOSTICAL & PHYTOCHEMICAL ANALYSIS OF HARITAMANJARI (ACALYPHA INDICA LINN)

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ABSTRACT :

The study includes Pharmacgnostical & Phytochemical study where the different procedures were adopted i.e. in The Pharmacognostical study suggests the procedures of organoleptic study, which composes the morphological, microscopical and physical evaluation of the present undertaken official part of *Haritmanjari* (*Acalypha indica* Linn). The medicinal value of drug is attributed on the presence of both active and non-active principles of drug, such as alkaloids, glycosides, sterols, tannins, saponins, flavanoids, triterpinoids, starch, proteins, carbohydrates etc. respectively. In the present study, all the active components of *Acalypha indica* Linn were tested quantitatively by employing specific chemical tests

Key words:: Harita Manjari, Pharamacognostical, Phytochemical Chemical compounds

INTRODUCTION: WHO promotes and encourages the use of herbal products as ¾ of world population relies on traditional system of medicine which is largely medicinal plant based to meet their primary health care. During 4500 to 600 yrs BC the usage of plants has been documented in Vedas. Among the *chatuspadas* in the management of diseases *Bhesaja* stands second place for the successful management of disease/ *dravyaguna vignana* is fundamental branch of Ayurved which deals with study of *dravyas*, their properties, actions,dose,time of administration and various preparations.Later during the British arrival and by this trade many new plant species are brought and grown. They are also found to be useful in therapeutics and as well as substitutes for original drugs which are not available.

Drug Profile:

SYNONYMS AND THEIR INTERPRETATION:

Dadara: Which is used for *dadru vikaras*

Kuppi: Which is useful in *Kaphavikaras*.

Haritamanjari Inflorescence of this plant is green in colour

MORPHOLOGY:

Plant type: It is an annual herb, erect,grows upto 30-100cms height. Branches are numerous, long ascending, angular, finely pubescent. Its stem is thin, straight and angulated, green coloured.

Phyllotaxy: Alternate.

Leaf: Simple, long petiolated, 2.5- 7.5 cm long, ovate or Rhomboid – Ovate shape. Acute or sub obtuse, crenate or serrate margin, glabrous surface. It is thin, cuneate based, three nerved, petioles usually longer than blade, slender, Stipules minute, upper part of leaf is dark green and lower part is light green in colour.

Inflorescence: Terminal and Axillary racemose type of inflorescence is seen.

Flowers: Flowers are numerous, elongated, unisexual, monoecious in axillary spikes

Perianth: Mostly one whorl, green coloured, pointed apex, caudate or obovate shape. It differs from male to female flowers.

Male flowers: Minute, clustered near the summing of spikes. Numerous tiny maroon colored flowers are found on several pendulous stalks, hence common name is "Cat tail".

Female flowers: Scattered, accrescent, 3-5, a shortly pedunculated, large leafy dentate, cuneiform, many nerved bract 6-8mm diameter, ovary hispid.

Fruit: Capsular, small, hispid, quite concealed by the bract, often only one seeded.

Seeds: Ovoid, smooth, pale brown, 1-2mm long, oftenly one in number.

CHEMICAL COMPOSITION: The plant contains a cyanogenetic glucoside and two alkaloids, viz Acalyphine and triacetamine, possibly a degradation product of glucoside.

The other constituents are n- octacosonol, β- sitosterol, Kaempferol, Quebrachitol, Tannin, Resin, and an Essential oil. In addition to Hydrocyanic acid the herb contains other substances which cause intense dark chocolate- brown discolouration of blood and gastrointestinal irritation in rabbits.

Analysis of edible portion of plant showed Moisture 80.5, Protein 6.7, Fat 1.4, Carbohydrates 6.0, Fibre 2.3, Minerals 31mg/ 100gm, Calcium 66.7, Phosphorus 99, Iron 17.3, Vit- C 147 mg/ 100gm, Energy 64Kcal.

The plant is fairly rich in Nitrogen and can be used as a source of nitrifying material. Root and leaves contain Stegmosterol. Leaves and twigs contain Amide acalyphamide, Tri-o- methyllellergic acid, 2-methyl Anthroquinone, Succinimide, β-sitosterol..

Table-01 RASA PANCHAKA AND PANCHABHOUTIKA COMPOSITION

SL NO	RASA PANCHAKA	PANCHABHOUTIKA COMPOSTION
1	Rasa-Tikta Katu	Vayu , Akasha Vayu , Agni
2	Guna- Laghu, Ruksha	Vayu, Agni,Akasha Prithvi, Agni, VAyu
3	Virya-Ushna	Agni.
4	Vipaka-Katu	---
5	Doshaghnata-Pitta Kaphashamaka	----

Bahya karma:

Twakdoshahara, Krimighna, Dadrughna, Vrunaghna, Vedana shamaka, Kandughna. Dantarujanashaka.

Abhyantara karma:

Emetic, Mridu Virechaka, Krimighna, Mutrala

AIMS AND OBJECTIVES

1. Pharmacognostical study of drug
2. Phytochemical study of the drug

MATERIALS AND METHODS

Aim: The main aim of the phytochemical study was to know the chemical constituent in a trial drug, subjecting it to different tests like extraction, preliminary phytochemical

tests & isolation of extracted fractions characterized by T.L.C and HPTLC method.

Solubility of *Acalyphya indica Linn*:

Materials: Fine powder of leaves of *Acalyphya indica Linn*

Solvents: i) Ethyl alcohol.

Methodology: Taken into the different filter papers in different funnels according to the different solvents. After seeing residue which residue was minimum that solubility of the drug in that solvent is maximum.

1) EXTRACTION

Materials:

Drug: Coarse powder of leaves of *Acalyphya indica Linn*

Equipments: Soxhlet apparatus of 1000 ml, round bottom flask, water condenser with distillation apparatus, Beakers 500 ml, measuring cylinder, thermostat (heater) stand, electronic weighing machine, filter paper, magnetic stirrer, boiling chips etc,

Chemicals: 90% Ethyl alcohol

Methods: The coarse powder of leaves of *Acalyphya indica Linn* Drug was subjected to exhaustive extraction, by soxhlet apparatus by around 18hrs with 90% ethyl alcohol, extraction, was done in three batches of these, one batch of coarse powder with Ethyl alcohol. The extraction process was carried out for about 18 hrs to each batch. After the extraction the solvents were distilled off to obtain semi solid extract and concentrated on magnetic stirrer the weights of each batch extract were recorded.

2) PRELIMINARY PHYTO-CHEMICAL TESTS:

Materials:

Drug: Extractive fraction sample of leaves of *Acalyphya indica Linn*

Equipments: Test tube, Separating funnel test tube holder, test tube stand, spirit lamp, pipette, glass rods, Beaker 50 ml to 250 ml, conical flask, water bath, Burner, stand.

Chemicals: 10% Conc H_2 So_4 chloroform, solution, acetic an-hydride, sulphur powder, soda lime, Million's reagent mercuric sulphate 10%, sulphuric acid 1%, sodium nitrate 5% ,sodium hydroxide 1%, copper sulphate (Cu SO_4),10% tannic acid, acetic unhydride, acetyl chloride, Zinc chloride, Mayer's reagents, Wagner's reagent (iodine in potassium iodide) Hager's reagent (saturated picric acid) soln, Dragendroff's reagent (potassium bismuth iodide), Ammonium Renikate, Molish's reagent, Barford's reagent, Benedict's reagent, saponin, ferric chloride, fragments pieces of magnesium ribbon and concentrated hydrochloric acid, Zinc dust, sodium hydroxide, 10% lead acetate, bromine water, Ferric chloride, lead acetate.

Methods:

i) **Test for sterols:**

a) Salkwoski's test: A few drop of conc. 10% Sulphuric acid was added to the 5ml sample solution, shaken and allowed to stand.

b) Sulphur test: Sulphur when added to the extractive fraction, it sinks in it showing the presence of sterols.

Preparation of test solution.

Dissolve 0.5ml test solution in 100 ml water by heating using this solution for following tests.

ii) **Test for proteins**:

a) Test solution + Soda lime and heat

b) Test solution + Million's reagent mixed and allowed to stand

c) 1 ml test solution + 1 ml 10% Mercuric sulphate in 10% sulphuric acid. Boiled gently for 30 sec. added 2 drops of 1% sodium nitrite solution.

d) Biuret test: 3 ml test solution + 1 ml 5% sodium hydroxide with + 2 drops of 1% $CuSo_4$ solution mixed and allowed to stand.

e) Test solution + few drops of 10% tannic acid mixed and allowed to stand

iii) **Test for Triterpenoids:**

a) Liebermann's- Burchardt test: The sample solution mixed with few drops acetic unhydride. Where conc Sulpuric acid (H_2SO_4) is added from the sides of the test tube.

b) "Tschugajew test" : where excess of acetyl chloride and a pinch of Zinc chloride is added to the sample solution containing kept aside warmed on water bath .

iv) Test for Alkaloids:

a) Mayer's Test: The sample solution with Mayer's reagents (potassium mercuric iodide) mixed and allowed to stand.

b) Wagner's test: sample solution with Wagener's reagents (iodine in potassium iodide) mixed and allowed to stand.

c) Hager's test: sample solution with Hager's reagents (saturated picric acid) mixed and allowed to stand.

d) Dragendroff's test: sample solution with Drangendroff's reagent (potassium Bismuth iodide) mixed and allowed to stand.

v) **Test for Carbohydrates**:

a) Molisch test: sample solution with few drops of molish reagent and 2ml of concentrated 10% H_2 SO_4 added slowly to the sides of the test tube.

b) Barford's test: The sample solution with Barford's reagents boiled on a water bath.

c) Benedict's test: Sample solution with Benidict's reagents and boiled on a water bath.

vi) **Test for saponin's** :

a) Foam test: sample solution mixed with saponins and shaken, shows formation of froth.

b) Heamolysis test: 2 ml of 18% sodium chloride solution in two test tubes was taken to one test tube added distilled water and to the other test tube 2 ml of sample solution was added few drops of blood is added to both the test tubes

vii) **Test for Flavonoids**:

a) Ferric chloride test: sample solution with few drops of Ferric chloride solution mixed and allowed to stand.

b) Schinoda test: sample solution with few fragments (pieces) of magnesium ribbon and 10% concentrated hydrochloric acid mixed and allowed to stand.

c) Zinc-HCl reduction test: Sample solution with zinc dust and few drops of Hcl mixed and allowed to stand

d) Alkaline reagent test:Sample solution mixed with sodium hydroxide.

e) Lead acetate test: Sample solution mixed with few drops of 10% lead acetate.

f) Bromine water test: Sample solution mixed with bromine water and allowed to stand.

viii) **Test for tannins**:

a) 1 ml of sample solution when mixed with Ferric chloride and allowed to stand.

b) Sample solution mixed with 10% lead acetate and allowed to stand.

c) Sample solution mixed with bromine water shows yellow colour.

OBSERVATIONS

Observation of solubility test: The residue was very minimum in ethyl alcohol, so it has taken as solubility of the test drug in that solvent is maximum.

Observations of extractions: During extraction following things were observed such as

- By appropriate technique the coarse powder of Haritamanjari patra put inside the round fold of filter paper in soxlet apparatus, so that it can not obstruct any pathways of soxlet apparatus. By thermostat mantle uniform temperature is maintained, that means the heat is gradually increased from 20^{o} c to 80^{o} c.
- Observed the changes in the colour of the solvent, from dark green to light green.
- After extraction solvents were distilled off. Observation was done so as to see whether solvent get completely distilled off from total extraction.

Extract was taken in a clean china dish and put over the magnetic stirrer for concentration of extraction. It should not be in liquid form or completely dried, that means it should be semisolid.

Table No-02 OBSERVATIONS OF PRILIMNARY PHYTOCHEMICAL TESTS

Tests	**Observations.**
1) Tests for sterols:	
a) Salkowiski's test	Chloroform layer-Red, Acid-Greenish yellow observed
b) Sulfur test	Sinks down word
2) Test for protiens:	
a)Million's reagent	White precipitate by warming white ppt turns to brick red
b) Biuret test	Violet colour observed.
c) Zantho Protein	White Precipitate By boiling white turns to Yellow Precipitate
3) Test for Triterpenoids:	
a) Liberman's Burchardt test	Upper layer turns green
b) Tschegajew test	Zinc Chloride sinks and settles down
4) Test for Alkaloids:	
a) Mayer's test	White colored precipitate
b) Wagner's test	Reddish brown precipitate
c) Hager's test	Yellow precipitate
d) Dragon droff's test	Orange Brown precipitate
5) Test for carbohydrate	
a) Molisch test	Violet ring is formed at the junction of two liquids.
b) Bar ford's test (monosachrides)	Red precipitate
c) Bendict's test	No precipitate

6) Test for sapanins	
a) Foam test	Pesistant foam observed
7) Test for Flavonoids	
a) Ferric chloride test b) Schinoda test c) Zinc-Hcl rediction test d) Alkaline reagent test e) Lead acetate test f) Bromine water test	No Precipitate Pink Precipitate Zinc dust sinks and settles down Yellow Precipitate Yellow Precipitate No Precipitate
8) Test for Tannnins	
a) Ferric chloride b) Lead Acetate c) Bromine water	Deep blue Precipitate White Precipitate Discoloration of bromine water.

Results Table No-03 **1) Solubility test:**

Sl. No.	Solvent	Soluble	Sparingly Soluble	Insoluble
1	Distilled water	-	+	-
2	Solvent ether	-	-	+
3	Petroleum ether	-	+	-
4	Acetone	-	-	+
5	Benzene	-	+	-
6	Toluene	-	-	+
7	Chloroform	-	+	-
8	**Ethyl alcohol**	+	+	-
9	Xylene	-	-	-
10	Carbon tetrachloride	-	-	+

90% Ethyl alcohol

Table No-04 2) Extraction:

Leaves of Acalypha indica linn	Solvent	Extract
Coarse leaves powder 80 gm	Ethyl alcohol 700 ml	40gms

Table No-05 **3) Preliminary phytochemical tests.**

TEST	RESULTS
1) Tests for sterols:	
a) Salkowiski's test	+ Ve
b) Sulphur test	+Ve
2) Test for protiens:	
a) Test sln + million's reagent	- ve
d) Biuret test	- ve
c) Zantho Protein	+ve
3) Test for Triterpenoids:	

a) Liberman's Burchardt test b) Tscheugajew test	+Ve -Ve
4) Test for Alkaloids:	
a) Mayer's test b) Wagner's test c) Hager's test d) Dragon droff's test	-Ve +Ve +Ve +Ve
5) Test for carbohydrate	
a) Molisch test b) Bar ford's test c) Benedict's test	+Ve -Ve -Ve
6) Test for saponins	
a) Foam test	-Ve
7) Test for Flavonoids	
a) Ferric chloride test b) Schinoda test c) Zinc-Hcl rediction test d) Alkaline reagent test e) Lead acetate test f) Bromine water test	+ve +ve +ve -ve +ve -ve
8) Test for Tannnins	
a) Ferric chloride b)Lead Acetate c)Bromine water	+Ve +Ve -Ve

DISCUSSION & CONCLUSION: The medicinal value of drug is attributed on the presence of both active and non-active principles of drug, such as alkaloids, glycosides, sterols, tannins, saponins, flavanoids, triterpinoids, starch, proteins, carbohydrates etc. respectively.

In the present study, all the active components of *Acalypha indica* Linn were tested quantitatively by employing specific chemical tests. According to study, this drug contains sterols, triterpenoids & flavanoids.

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