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PHARMACOGNOSTICAL-PHYSICO-PHYTO-CHEMICAL ANALYSIS OF

Cassia alata Linn - A FOLKLORE MEDICINE.

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Abstract

Dadrughna commonly referred as ring worm senna. It is botanically identified as *Cassia alata* Linn belongs to family Fabaceae. In Ayurveda, although the classical texts do not directly mention the drug but commentator of Madanapala Nighantu has mentioned it as Bruhat Chakramarda, and it is used in the treatment of fungal infection (ring worm) over the years by folklores. In this study an attempt has made to evaluate the pharmacognostical, physicochemical and phytochemical properties of Dadrughna leaves.

KEY WORDS: Dadrughna, *Cassia alata* Linn, ringworm, Bruhat Chakramarda, Pharmacognostical, Physicochemical and Phytochemical.

Introduction:

Dadrughna is distributed in ranges from India to America. It is having a greater ornamental and medicinal value in southeast Asia, North Australia and African ranges. Dadrugna plant is not mentioned in any classical texts as well as Nighantus but in the commentary of Madanapala Nighantu it is mentioned as Bruhat Chakramarda[1] and commonly called as ring worm senna, botanically identified as *Cassia alata* Linn, belongs to family Fabaceae[2]. It is commonly used by folklores to treat fungal infection, constipation and also

rheumatism. It is a small perennial; shrub grows up to 3-4m in height leaves are obovate and 50-80 Centimetres long. The inflorescence is and looks like a yellow Candle, fruit is straight pod up to 25cm long and it is dehiscent. Its seeds are distributed by water or animals. The seed pods (fruits) are nearly straight, dark brown or nearly black, about 15 cm long, and 15mm wide. On both sides of the pod is a wing that runs the length of the pod. A pod contains 50-60 flattened, triangular seeds[3].

Objectives

To evaluate the pharmacognostical, physicochemical and phytochemical properties of Dadrughna patra (*Cassia alata* Linn).

Materials and methods

A. Pharmacognostical study:

1. Morphological study:

Dadrughna patra was freshly collected from "Siddhavana herbal" Garden of N. K. Jabshetty Ayurvedic Medical College and PG centre, Bidar.

Methods:

i) Organoleptic method: In this method nature of Dadrughna patra like colour, taste, touch, odour, were studied with the help of sense organs.

ii) Extra features: extra features were studied like shape, surface etc.

2. Microscopical study:

A fresh healthy, non-infected leaf of Dadrughna was selected. The sample was hold vertically in between the thumb and fore finger, with the help of new blade, 10 to 15 sufficient thin transverse sections were taken; thick and oblique sections were rejected. Selected thin transverse section of the sample was taken and transferred it on a glass slide with the help of mountain hair brush. Added a drop of water and few drops of chloral hydrate solution and allowed to heat for two to three minutes. Added equal quantity of phloroglucinol and con. HCl, warmed gently on a flame and cool it. Finally added a drop of glycerine and covered the section avoiding air bubble carefully with cover slip. Focused the section under microscope and the arrangements of cells were studied.

B. Physico-chemical study:

Physicochemical parameters were determined as per guidelines of API

a. Total Ash value.

b. Loss on drying or Determination of moisture content.

c. Water soluble extractive.

d. Alcohol soluble extractive.

e. pH value.

a. Determination of Total Ash Value:

Weighed empty silica crucible, powdered drug was weighed and kept into the silica crucible, then silica crucible with drug was placed into muffle furnace at 400^0C for about one to two hours (until all carbon burnt off), after that it was subjected for self-cooling in a desiccator, then weighed the crucible with ash and calculated the percentage of total ash with reference to the air-dried sample of the crude drug.

Formula:

Percentage of ash value = $\frac{\text{weight of crucible with ash - weight of empty crucible}}{\text{weight of crucible with drug - weight of empty crucible}} \times 100$

b. Determination of moisture content or loss on drying:

Powdered test drug was weighed along with petri dish and dried in hot air oven at 100^0C for 1- 2 hours, the samples was then taken out and cooled in a desiccator and loss in weight was recorded. This procedure was repeated till constant weight was obtained.

Formula:

Percentage of moisture content = $\frac{\text{petri dish with drug- petridish with sample after complete dryness}}{\text{petri dish with drug-weight of empty petri dish}} \times 100$

c. Determination of water-soluble extractive:

Weighed about 5gm of Dadrghna patra churna in a beaker and transferred it to dry 250ml conical flask. Then filled a 100ml graduated cylinder to the required mark with water, this water was added to conical flask containing Dadrghna patra churna. Shaked the flask frequently, flask was corked and kept aside for 24hrs. After that it was filtered into 100ml beaker. When sufficient filtrate was collected, transferred 25ml of the filtrate to

the previously weighed Petri dish. The petri dish was kept on the water bath for 2 hours at 80^0C. After complete drying of water content, the petri dish was kept in hot air oven for 10 minutes to achieve total dryness. Then the petri dish was kept in desiccator for about 10 minutes for self-cooling, and the petri dish with the extract was weight again and extractive values were calculated.

Formula:

$$\text{Percentage of extractive value} = \frac{\text{weight of dry extract obtained}}{\text{weight of drug taken for extraction}} \times 100$$

d. Determination of alcohol soluble extractive:

Method: Weighed about 5gm of Dadrughna patra churna in a beaker and transferred it to dry 250ml conical flask. Then filled a 100ml graduated cylinder to the required mark with ethyl alcohol, the ethyl alcohol was added to conical flask containing drug. Shaked the flask frequently, flask was corked and kept aside for 24hrs. After that it was filtered into 100ml beaker. When sufficient filtrate was collected, transferred 25ml of the filtrate to the previously weighed petri dish. Then that petri dish was kept on the water bath for 2 hours at 80^0C. After complete drying of water content, the petri dish was kept in hot air oven for 10 minutes to achieve total dryness. The petri dish was kept in desiccator for about 10 minutes for self- cooling, then the petri dish with the extract was weight again and extractive values was calculated.

Formula:

$$\text{Percentage of extractive value} = \frac{\text{weight of dry extract obtained}}{\text{weight of drug taken for extraction}} \times 100$$

e. Determination of pH value:

50ml of distilled water was taken in a beaker, digital pH meter was immersed up to the maximum immersion level. Allowed the reading to stabilize and using a screwdriver turned the pH calibration trimmer to read 7.0. Then, 5gms of Dadrughna churna extracts were added with 50ml of distilled water in beaker and was stirred gently with glass rod. At uniform suspension, digital pH meter was immersed in beaker separately, observed for maximum immersion and readings were recorded in both forms.

C. Phytochemical study:

Materials for Phytochemical Test:

1. Solubility test of Dadrughna patra(Cassia alata Linn)

Solvents: 1) Ethyl Alcohol 2) Chloroform 3) Benzene 4) Distilled water

Methodology: The 2gm of Dadrughna patra churna was added to the different solvents taken in separate test tubes and mixed well and allowed to stand for certain period. Then the mixture was filtered through filter paper kept in different funnels. The filter paper which contains fewer residues, it was considered the drug was more soluble in that solvent.

2. **Extraction:**

Methodology: The coarse powder of Dadrughna patra was subjected to exhaustive extraction by Soxhlet apparatus around 18 hrs with 90% ethyl alcohol. Extraction was done in two batches; the extraction process was carried out for about 18 hours to each batch. After the extraction, the solvents were distilled off to obtain semi solid extracts and were concentrated on magnetic stirrer. The weights of each batch extracts were recorded.

3. **Preliminary phytochemical test:**

Method: Preliminary phytochemical tests like tests for sterols, proteins carbohydrates, alkaloids, tannins, flavonoids and saponins were done from both alcohol soluble and water- soluble extractives by using different chemical reagents like chloroform, acetic anhydride, H_2SO_4, sulphur powder, Millon's reagent, Benedict's reagent, HCl, Mayor's reagent etc[4].

Results

A. RESULTS OF PHARMACOGNOSTICAL STUDY:

1) Morphological study:

Table no 1. Showing Morphological Characters of fresh Dadrughna patra patra (*Cassia alata* Linn)

Sl no	Characters	Dadrughna patra
1	**Colour**	Green both upper and lower surface
2	**Odour**	No specific odour
3	**Taste**	pungent
4	**Touch**	Smooth
5	**Shape**	Oblong-obovate
6	**surface**	smooth

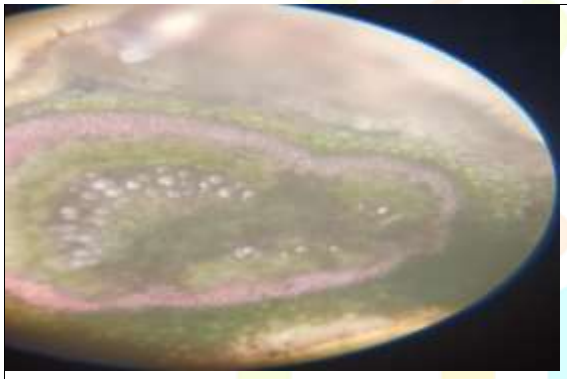

Dadrughna (Cassia alata Linn) patra

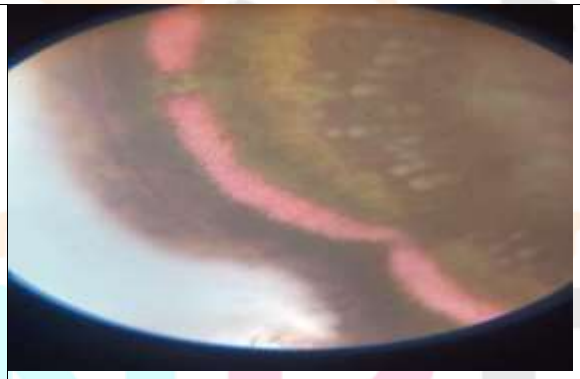

Leaf kept for drying

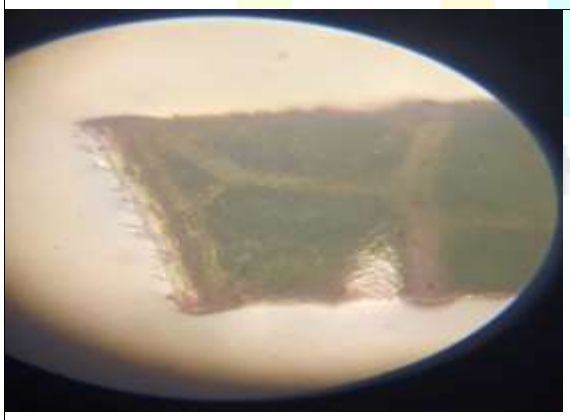

Dried patra churna

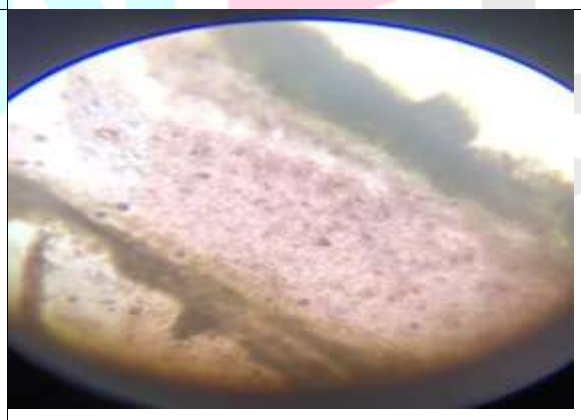
2) Microscopical study:

Transverse section: TS of Dadrughna patra (*Cassia alata* Linn) shows the presence of large pentagonal to heptagonal cells with slightly wavy walls epidermal layer, numerous trichome bases are noted. Both epidermises were perforated by rubiaceous stomata but more in the lower surface parenchymatous cells. Trichomes are unicellular, short with blunt ends. The presence of large collateral vascular bundle surrounded by sclerenchymatous cells was observed along with that the prism of calcium oxalate crystals can be seen.


Vascular bundle along with sclerenchyma


Xylem and phloem


Presence of Trichomes


Presence of Stomata

B. RESULTS OF PHYSICO-CHEMICAL STUDY:

Table no 2. Showing physicochemical test results of Dadrughna patra (*Cassia alata* Linn)

Sl no	Name of the test	Results
1	Total Moisture content	94%
2	Total Ash value	9%
3	Alcohol soluble extractive	41.6%
4	Water soluble extractive	51.2%
5	pH value	5.8

Drug kept in hot air oven for moisture content evaluation

Alcohol and water soluble extractives

Total ash value evaluation(ash)

pH value

C. RESULTS OF PHYTOCHEMICAL STUDY:

a) Solubility test:

Table no 3. Showing result of solubility test for Dadrughna patra(*Cassia alata* Linn)

Sl no	Solvent	Solubility	Percentage
1	Distilled water	Soluble	60%
2	Benzene	Soluble	53%
3	Chloroform	Soluble	51%
4	Ethyl alcohol	soluble	63%

Result: 63% ethyl alcohol

Distilled water and Ethyl alcohol solubility

b) Extraction:

Table no 4. Showing obtained extract of Dadrughna patra(*Cassia alata* Linn)

Dadrughna patra(*Cassia alata* Linn)	**solvent**	**Extract obtained**
ɔwder of Dadrughna patra 90gm	550ml ethyl alcohol	45gm

c) Preliminary phytochemical tests:

Table no 5. Showing results of preliminary phytochemical tests in Dadrughna patra(*Cassia alata* Linn)

Sl no	**Tests**	**Observations**
1	Test for sterols	+ve
2	Test for proteins	+ve
3	Test for triterpenoids	+ve
4	Test for alkaloids	-ve
5	Test for carbohydrates	+ve
6	Test for saponins	-ve
7	Test for tannins	-ve
8	Test for flavonoids	+ve

Phytochemical evaluation

Phytochemical evaluation

Discussion and Conclusion:

Dadrughna (*Cassia alata* Linn), is a folklore drug belongs to Fabaceae family. It is used for the treatment of ringworm infection, rheumatic arthritis and purgative by folklores. Microscopically it has shown the presence of epidermal layer, vascular bundles, sclerenchyma cells, trichomes, calcium oxalate crystals and stomata. It wassoluble in both alcohol and distilled water. It has shown the PH of 5.8 and has the presence of different phytochemicals like sterols, proteins, carbohydrates, flavonoids, alkaloids and triterpenoids.

Alkaloids and Triterpenoids present in the drug which has potential to exhibit antifungal activity. Flavonoids exhibit anti-inflammatory property, Sterols are antifungal and anti- inflammatory which may help to reduce inflammation due to pruritis of ring worm infection, and also helps to reduce inflammation in arthritis. Due to all these properties, it may be used in arthritis and fungal infection by folklores.

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