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PHARMACOGNOSTICAL AND PHYTOCHEMICAL SCREENING OF CALOTROPIS GIGANTEA (MADAR, AAK)

[1]*Shivani Suryavanshi, [2]Aman Gupta,[3]Aishwarya Vishwakarma,[3]Ajeet Kumar Sharma,[4]Aliya Parveen,[4]Ajay Kumar Gupta,[4]Akash Jayasval, [5]Dr. Jagdish Chandra Rathi

[1*]Assistant Prof., [2]Student,[3]Student, [4]Student, [5]Principal

1*NRI Institute of Pharmaceutical Sciences, Sajjan Singh Nagar, Raisen Road, Bhopal, MP, 462022, India

ABSTRACT: Calotropis gigantea (madar, aak) is a widely distributed plant in tropical and subtropical regions known for its medicinal properties. In this study, we aimed to perform pharmacognostical and phytochemical screening of Calotropis gigantea to identify its pharmacological potential. Pharmacognostical studies included the examination of the macroscopic and microscopic characteristics of the plant parts. Phytochemical screening was conducted to detect the presence of various secondary metabolites such as alkaloids, flavonoids, tannins, saponins, and glycosides. The findings of this study will provide valuable information on the pharmacological properties of Calotropis gigantea and its potential applications in traditional medicine.

KEYWORDS: Pharmacognosy, Phytochemical, Screening, Calotropis Gigantea, Madar, Aak

INTRODUCTION: Calotropis procera is locally known as Aak or Madar in Hindi, milk weed in English and belongs to the family Apocynaceae and subfamily Asclepiadoideae. Calotropis gigantea Linn is a glabrous or hoary. It is a large shrub or small tree growing 3-4 m tall. Although a wasteland plant, it is of sacred use as its flowers are offered for worshipping Lord Shiva, a Hindu God.Tribes all over the world use the plant in treatment of various diseases like snake bite, body pain, asthma, epilepsy, cancer, sexual disorders, skin diseases and many more.

The chief features: -

- The plant thrives in a variety of soil types and climatic environments.
- It does not require cultivation practices
- It is one of the few plants that grazing animals do not eat .

- Particularly where overgrazing has eliminated competition from natural grasses, it thrives on poor soils Consequently, it is found in tropical India.

Drug Profile:

Botanical Description: A tall shrub reaching 2.4- 3m high; back yellowish white, furrowed; branches stout, terete, more or less covered (especially the younger ones) with fine appressed cottony pubescence. Leaves 1-20 by 3.8-10 cm, sessile or nearly so, elliptic-oblong or abovate-oblong, acute, thick, glaucous-green, clothed beneath and more or less above with fine cottony tomentum; base narrow, cordate. Flowers inodorous, purplish or white. Calyx divided to the base; sepals 6 by 4 mm, ovate, acute, cottony. Corolla 2 cm long or more; lobes 1.3-1.6 cm long, deltoid-ovate, subacute, revolute and twisted in age; lobes of the corona1 3cm long by 5 mm pubescent on the slightly thickened margin, the apex rounded with 2 obtuse auricles just below it. Follicles 9-10 cm Long, broad, thick, fleshy, ventricose, green. Seeds numerous, 6 by 5 mm, broadly ovate, flattened narrowly margined, minutely tomentose, brown coma 2.5-3.2 cm long. cardiac glycosides, seven oxypregnane-oligo glycosides, calotroposides A-G. βamyrin, two isomeric crystalline alcohols, giganteol, isogiganteol, and cardenolides.

Pharmacognostical Study: Calotropis gigantea Linn. is a traditional medicinal plant it belongs to the family of Asclepiadoideae are widely distributed in Asia and Africa. Asian countries that include India, Indonesia, Malaysia, Thailand, Srilanka, and China. It is commonly known as milkweed and laticiferous shrub . The plant grows up to 2-4 m long. It has oral, light green leaves and milky stem. The leaves are very much succulent . Plants contain many biologically active molecules with different medicinal properties . It is popularly known because it produces a large quantity of latex and known as milkweed or swallowwort. Latexes are the source of various biologically active compounds, including glycosides, tannins, and many proteins, among others .

Microscopical characteristics of the leaf: Transverse sections through the midrib showed an upper and lower, single- layered epidermis that was externally covered with a thick, striated cuticle, a few epidermal cells on both lower and upper surfaces, parenchymatous cells that were thin-walled and isodiametric to circular. Intracellular spaces were present in ground tissue and the stele was crescent-shaped and composed of bicollateral and open vascular bundles. The xylem consisted mostly of vessels and tracheids, and a strip of cambium was present between the xylem and phloem tissues.Laticifers were also present along with the phloem and parenchymatous zone. The lamina which was dorsiventral with the mesophyll, was seen to be differentiated into a palisade and spongy tissue. The upper and lower epidermise were covered externally with a thick, striated cuticle. Below the upper epidermis were three rows of elongated, closely arranged, palisade parenchyma.

Moisture Content: Water content or moisture content is the quantity of water contained in a material.The moisture content of the medicinal plants at the end of the herbs drying must be 10–14%. With this moisture content most of the drugs can be storage for a longer period of time without damage of the plants..

Moisture content (%) = W2 - W3 x 100/ W2-W1

W1 = weight of container with lid;

W2 = weight of container with lid and sample before drying; and

W3 = weight of container with lid and sample after dry.

The percentage of active chemical constituents in crude drugs is mentioned in air dried basis, Hence the moisture content of a drug should be determined and should also be controlled. The moisture content of a crude drug

should be minimized to prevent decomposition of crude drugs either due to chemical change or microbial contamination. The moisture content is determined by heating 1gm of drug at 1050 C in an oven to a constant weight. After 30 minutes of heating the moisture content was found to be 12% of the powdered drug.

Result – Moisture content of calotropis powder was found to be 9.6%.

Ash value determination: Ash value refers to the amount of residue left behind after the complete combustion of a substance . Ash content represents the incombustible component remaining after a sample of the furnace oil is completely burned. The ash content of petroleum products is generally low.

Ash values are helpful to determine the quality as well as purity of a crude drug, especially when the drug is present in powdered form.

The object of ashing crude drugs is to remove the traces of organic matter which may be interferes in an analytical determination. Calculation-weight of the crude drug=3.88gm Weight of the crude drug after charring=2.95gm ASH VALUE= (3.88-2.95) gm=0.93gm % of ash value= (0.93/3.88)%=0.23% The Acid Insoluble Ash (AIA) content is the proportion of a sample that is not hydrolyzed by 72% sulfuric acid and is not subsequently volatilized upon the incineration of this Acid Insoluble Residue

$$\% \text{ of ASH} = \frac{\text{Weight of ASH}}{\text{Weight of Sample}} \times 100$$

Result: Total ash : 6.5 %.
Acid-insoluble ash: 1.6%.
Water-soluble ash : 1.9%

Extraction

Maceration method: Maceration is one of the simplest extraction techniques. It is one of the popular and inexpensive techniques used for the extraction of different bioactive compounds from plant material .This is an extraction procedure in which coarsely powdered drug material, either leaves or stem bark or root bark, is placed inside a container the menstruum is poured on top until completely covered the drug material .The container is then closed and kept for at least three days.The content is stirred periodically, and if placed inside bottle it should be shaken time to time to ensure complete extraction. At the end of extraction, the micelle is separated from marc by filtration or decantation. Subsequently, the micelle is then separated from the menstruum by evaporation in an oven or on top of water bath.This method is convenient and very suitable for thermolabile plant material.

Procedure:

1. 500gm of C. gigantea leaves were taken and dried under shade for 10-15 days until the leaves were completely dried.
2. The dried Plant leaves were taken and crushed into fine powder with the help of grinder or pestle motar and were sieve mesh no.40&80.
3. 5gm of the leaves powder was dissolved in container in 45ml of solvent (petroleum ether, Methanol, Ethanol, Chloroform, Distilled water & Ethyle acetate).
4. The container was covered and left for alteast 2-3 days.
5. After that, the extract were filtered with the help of whatsmann filter paper no.4 .
6. The extract were collected and used for phytochemical analysis .

Phytochemical Screening

The microscopic and phytochemical studies are essential to authentify this Ayurvedic preparation Considering this requirement powdered microscopy, preliminary phytochemical tests , physicochemical parameters i.e. ash value, extractive value, moisture content of a drug given an idea of the earthy inorganic or earthy matter composition and other impurities presence all along with the drug.

A Preliminary study has reported the leaves extracts contains large number of bioactive secondary molecules like alkaloids, tannins, saponin, flavonoids, glycoside . The presence of these components in this species is an indication that it may have some medicinal potential. The leaves of Calotropis gigantea are used traditionally for treatment of abdominal tumors, boils, syphilis, leprosy, skin diseases, piles, insect bites and elephantiasis. Different parts of the plant have immense potential to cure various diseases and disorders . It is used in various polyherbal preparations. Calotropis is used alone and sometimes with other plants to cure variety of human and animals ailments .

The tests were done to find the presence of the active chemical constituents such as alkaloids, glycosides, terpenoids and steroids, flavonoids, reducing sugar and tannin .

Alkaloidal tests

- **Ferrous Sulphate Test.**
- **Hagers test.**
- **Wagners test.**
- **Murexide test.**

Fluorescence test .

- **Terpenoid test**
- **Salkowaskis test**

Steroid test

- **Acetic anhydride**

Flavonoid test

- **Lead acetate test.**
- **Zinc Hydrochloride Test.**

Tannin test

- **Ferric chloride test**
- **Gelatin test**

Saponin test.

- **Frothing test**

Result Of Phytochemical Screening

Phytochemical Screening of Camellia Sinensis

Phytoconstituent	Test performed	Result
Alkaloidal tests	• Ferrous Sulphate Test. • Hagers test. • Wagners test. • Murexide test.	(+) (+) (-) (+)
Fluorescence test .	• Sulphuric acid. • Nitric acid.	(+) (+)
Terpenoid test	• Salkowskis test	(+)
Steroid test	• Acetic anhydride	(-)
Flavonoid test	• Lead acetate test. • Zinc Hydrochloride Test.	(+) (-)
Tannin test	• Ferric chloride test • Gelatin test	(+) (+)
Saponin test.	• Frothing test	(+)

RESULT:

The microscopic and phytochemical studies are essential to authentify this Ayurvedic preparation Considering this requirement powdered microscopy, preliminary phytochemical tests , physicochemical parameters i.e. ash value, extractive value, moisture content of a drug given an idea of the earthy inorganic or earthy matter composition and other impurities presence all along with the drug.

Ash value of powdered Leaf of *C. gigantea* .

Total ash % :- 6.5%

Moisture Content value of powdered Leaf of *C. gigantea* .

Percentage of Loss of Drying :- 9.6%

Extractive value of powdered Leaf of *C. gigantea* .

Percentage of Extract :- 7.4%

SUMMARY & CONCLUSION :-

The various specific pharmacognostic and physiochemical analysis of C. gigantea can be used as diagnostic tools for the correct identification of the plant drug and also to detect the authenticity, adulteration of this medicinally helpful plantand presence in various bioactive compounds.

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