WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 7.523
Volume 6, Issue 3, 242-249. Review Article ISSN 2277– 7105

A REVEW ON CLEOME ASPERA

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Article Received on
08 Jan. 2017,

Revised on 28 Jan. 2017,
Accepted on 18 Feb. 2017

DOI: 10.20959/wjpr20173-7865

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ABSTRACT

Herbal medicine is the oldest form of health care system known to our mankind. Herbs are the potential source of chemical constituents which have high therapeutic value. Herbal medicines are now in great demand in the developing world for primary health care not because they are inexpensive but also for their better cultural acceptability, better compatibility with the human body and minimal side effects. It is estimated, that approximately one quarter of prescribed drugs contain plant extracts or active ingredients obtained from plant substances. This review summarizes the research carried out on Cleome aspera. Cleome aspera belongs to the family, Cleomaceae. Cleome aspera is known to possess anti diabetic activity. The anti diabetic effect of methanolic extract of whole plant of Cleome aspera showed a dose dependent hypoglycemic effect and prevented rise in blood glucose levels in diabetic rats. Leaf paste of Cleome aspera is used to cure eczema and other skin disorders.

KEYWORDS: Cleome aspera, Cleomaceae, anti diabetic, eczema, pharmacological activity.

INTRODUCTION

Cleome aspera is a medicinal plant that belongs to the family cleomaceae. This is an annual, prostrate plant.[1] It is commonly found on sandy fields, waste land and rocky crevices.[2] It grows as a weed in most tropical countries. In India it is not cultivated but grows spontaneously everywhere. Different species of cleome can be found in all states of India. This is the herb having yellow colour and capsules which are long and cylindrical containing seeds. The colour of seeds of cleome aspera is brown.[1]

It is locally called as Nela vominta, Nakka dhoruvu.[2] Ethnic tribes in Tamilnadu use the leaf paste to cure eczema and other skin disorders.[3] It also used in treatment of type 2 diabetes. This is an attempt to compile and document information on different aspects of Cleome aspera and highlights the need for research and development. This study summarizes the chemical constituents, uses and pharmacological activities of Cleome aspera.

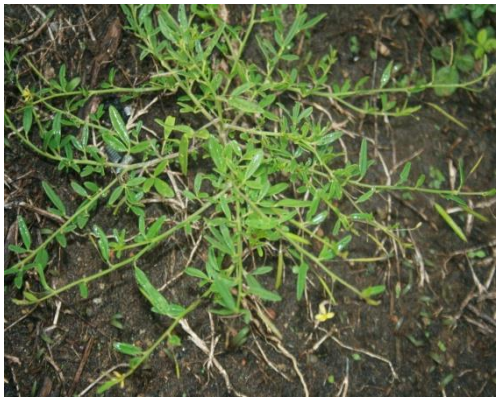

Fig no.1 Plant of Cleome aspera.[4]

SCIENTIFIC CLASSIFICATION[5]

Kingdom Plantae
Phylum Tracheophyta
Class Magnoliopsida
Order Brassicales
Family Cleomaceae
Genus Cleome
Species aspera

VERNACULAR NAMES IN INDIA

Common name- Rough spider flower
Synonyms- Cleome diffusa, Cleome prostrata[5]
Telugu- Nela vominta, Nakka dhoruvu
Tamil- Karumpoondu[3], Malayvarinai-poondu[6]

MORPHOLOGICAL FEATURES OF CLEOME ASPERA[1,2,6]

Habit- Cleome aspera is an annual prostrate herb that climbs or mounts on ground.

Stem and branches- Stems ribbed with scattered short compressed hooked soft minute prickles.

Much branched, branchlets glandular, softly prickled.

Leaves- leaves of Cleome aspera are apically simple, basally trifoliate, petioles 2-10mm long (rarely up to 2cm long in basal leaves), almost absent in uppermost leaves. Leaflets are obovate, sub sessile, linear, oblong or lanceolate, cuneate at base, sub obtuse to retuse and mucronate at apex; central leaflets up to 2.5x0.5cm, lateral leaflets up to 1.5x0.4 cm, scabrid and ciliate along margins with tubercule-based hair; lateral nerves 4-9 pairs.

Flowers- Solitary, in axils of higher leaves, often forming up to 2.5 cm long leafy racemes, pedicels filiform, and 3-5mm long, elongating to 1.5cm in fruits, puberulous.

Sepals of Cleome aspera are four in number, linear-lanceolate, obtuse, 1-2mm long, thinly glandular pubescent.

Petals of Cleome aspera are four in number, elliptic or oblanceolate, rounded at apex, 2.5-4x0.8-1.5mm, yellow or creamy yellow in colour.

Stamens are 6 in number, filaments ca 2.5mm long; anthers linear ca 1mm long. Gynophore ca 1mm long, elongating to 3mm in fruits; ovary linear, 2-2.5mm long, ovules numerous, parietal, styles slender ca 1mm long.

Capsules- Sub sessile or on up to 3mm long stalk, cylindrical, narrow at both ends, swollen and constricted at intervals, beaked, 2-3cm long, 1.5-2mm thick.

Seeds- Many seeded, sub orbicular, curved with a closed cleft, 1.7-2x1.5mm, with prominent cross ribs and joined by obtuse concentric ribs yellow to brown.

Flowering and fruiting- Throughout the year**,** peak period July-Jan.

MICRO MORPHOLOGICAL CHARACTERS[7]

In flowering plants, idioblastic cell elements are of several kinds and they have been often of taxonomic importance eg: the trichosclereids in Monstera; secretory cells in euphorbiaceae; lithocysts in cucurbitaceae, acanthaceae and urticaceae and mucilage cells in lythraceae, euphorbiaceae and chenopodiaceae. T.Rajagopal and N.Ramayya have observed cavity like structures in the leaves of Cleome aspera. They explained that, the idioblastic cell-sacs are visible when seen with a pocket lens and hence the species is readily distinguished in the field

merely by its leaves from the allied members of Cleome viscosa, Cleome monophylla, Cleome chelidonii and Cleome felina.

Due to the taxonomic value of these cavities Rajagopal and Ramayya studied their structure and development, which they described as follows:

The cavities are ovoid to oblong in outline (0.05-0.15x0.01-0.03mm), rounded at both ends and appear as dark green spots under pocket lens. They are distributed with their longitudinal axis oriented mostly parallel to midrib and are confined to only the leaf lamina. The other parts like mid-rib, veins, stem and flowers are devoid of them.

In sectional views, they appear like large cavities and show granular contents. The cavities are epidermal in their position, but intrude into the mesophyll due to their thickness.

The granular contents take up red colour when treated with ruthenium red indicating their pectinate nature. Lignin is absent in the wall as it is negative to aniline sulphate and phloroglucin tests.

DISTRIBUTION

India (Orissa, Gujarat, Maharashtra, Goa, Andhra Pradesh, Karnataka, Tamilnadu, Pondicherry, Kerala), Sri Lanka, Java, Madura, Bali.[5]

CHEMICAL CONSTITUENTS OF CLEOME GENUS

This review focuses on the chemical constituents present in the entire Cleome genus along with species aspera. Following are the list of chemical constituents in the Cleome genus;

Essential oils and fatty acids[8,9]

Many plants of this genus are rich in their essential oil in herb or seeds.

Linoleic acid,

Palmitic acid,

Oleic acid,

Arachidic acid,

Eicosenoic acid.

Terpenes and sterols[10,11,12]

Beta sitosterol,

17-alpha-hydroxylcabraleactone,

Amblyone

Cleomaldeic acid

Paradoxenoic acid.

Flavonoids[13]

The flavonoids are found in a number of plants of Cleome genus either in aglycone or glycosidic form.

Kaempferol-7-*O*-rhamnoside,

Kaempferol-3-*O*-rutinoside,

Kaempferol- 3, 7-*O*-dirhamnoside,

Kaempferol- 3-*O*-glucoside-7-*O*-rhamnoside,

Kaempferol- 3-*O*-rhamnoside-7-*O*-glucoside,

Quercetin-7-*O*-rhamnoside,

Quercetin-3-*O*-rutinoside,

Quercetin-7-*O*-rutinoside,

Quercetin- 3, 7-*O*-dirhamnoside,

Quercetin- 3-*O*-glucoside-7-*O*-rhamnoside,

Isorhamnetin 3-*O*-rutinoside,

Isorhamnetin 3, 7-*O*-dirhamnoside,

Vicenin-2

Alkaloids[14, 15]

Dipyridodiazepinone

Asparadoxonine

Paradoxenoline

Anthocyanins[16]

Cyanidin3-(2″-(6‴-caffeoyl-β-glucosyl)-6″-(*p*-coumaro-yl)-β-glucoside)-5-β-glucoside, Cyanidin 3-(2″-(6‴-sinapoyl-β-glucosyl)-6″-(*p*-coumaroyl)-β-glucoside)-5-β- glucoside, Cyanidin 3-(2″-(6‴-feruoyl-β-glucosyl)- 6″-(*E*-*p*-coumaroyl)-β-glucoside)-5-β-glucoside, Pelargonidin 3-(2″-(6‴-sinapoyl-β-glucosyl)-6″-(*p*-coumaroyl)-β-glucoside)-5-β-glucoside, Pelargonidin 3-(2″-(6‴-*p*-coumaroyl-β-glu-cosyl)-6″-(*p*-coumaroyl)-β- glucoside)-5-β-glucoside together with one monoacylated and four diacylatedcyanidin 3-sophoroside- 5-glucosides.

Other compounds[9]

Along with the above said chemical constituents, Cleome aspera also contains some amino acids like

Trodox,

(+) Catechin,

P-coumaric acid

Gallic acid

USES OF CLEOME ASPERA

- Whole herb is used in the treatment of type 2 diabetes.
- Native ethnic tribes in Tamilnadu use the leaf paste to cure eczema.

RECENT RESEARCH ON MEDICINAL USES OF CLEOME ASPERA

The anti diabetic activity of methanolic extract of whole plant of cleome aspera was investigated in Streptozotocin induced type 2 diabetic rats. Cleome aspera showed a dose dependent hypoglycemic effect and prevented rise in blood glucose levels in diabetes**.** The methanolic extract of Cleome aspera reduced blood glucose levels of the normal rat and also significantly lowered blood glucose levels in streptozotocin induced diabetic rats. The antihyperglycemic activity of Cleome aspera was compared with glibenclamide, an oral hypoglycemic agent. The results suggested that Cleome aspera has a potent anti diabetic activity.[17]

CONCLUSION

In this review, an attempt has been made to compile the reported phytochemical status, therapeutic and traditional uses of cleome aspera. It may be useful to the health professionals, scientists, scholars working in the field of pharmacology and pharmacognosy to develop evidence-based alternative medicine to cure different kinds of disease in man and animals without any toxic effects and also provide the basis for future research on the application of traditional medicinal plants. Based on the available evidence, present review suggests the use of cleome aspera for pharmacological functions like anti hyperglycemia.

ACKNOWLEDGEMENTS

The authors are thankful to authorities of P. Rami Reddy Memorial College of Pharmacy for providing support to the study and other facilities like the internet, library and other technical support to write a review article.

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