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ROLES OF *COMMELINA BENGHALENSIS* IN MEDICINE – A REVIEW

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ABSTRACT

Commelina benghalensis is one of the traditional folk medicinal plants that have been used for a long time as diuretic & febrifuge. It has been reported to have a broad range of therapeutic & nutritional value. This article summarizes the medicinal values of *C. benghalensis*. In this article, we reviewed the applications of *C. Benghalensis* as anti-cancer activity, liver treatment,analgesic and anti-inflammatory activity, antibacterial activity,15-Lipoxygenase inhibition activity. The use of *C.benghalensis* as antioxidant, immunomodulatory, cytoprotective and gastro protective activity are also reviewed.

1. INTRODUCTION

Most of the drugs used in primitive medicine were obtained from plants and are the earliest and principle natural source of medicines. There is no doubt that plants are a reservoir of potentially useful chemical compounds which serves as drugs, which provided a newer leads and clues for modern design by synthesis. Herbal & natural products of folk medicine have been used for centuries in every culture throughout the world. Scientists & medical professionals have shown increased interest in this field as they recognize the true health benefits of these remedies. "Let food be your medicine & let medicine be your food" was advised by the father of medicine, Hippocrates over two millennia ago. Among the medicinal plants discovered by the ancestors of Chinese, the herb *Commelina benghalensis* from *Commelinaceae* family is one of the traditional folk medicinal plant that have been used for a long time in china as diuretic & febrifuge. It has been reported to have a broad range of therapeutic & nutritional values.[11]

INTRODUCTION TO PLANT FROM COMMELINACEAE FAMILY

Biological Source: Annual herb *Commelina benghalensis* from *Commelinaceae* family.

Fig.1Whole plant of C*ommelina benghalensis* Fig.2 Flower of C*ommelina benghalensis*

Table 1 Taxonomy

Domain	*Eukaryota*
Kingdom	*Plantae*
Subkingdom	*Viridaeplantae*
Phylum	*Tracheophyta*
Subphylum	*Euphyllophytina*
Division	*Magnoliophyta*
Infraphylum	*Radiatopses*
Superdivision	*Spermatophyta*
Class	*Maqnoliopsida*
Subclass	*Commelinidae*
Superorder	*Commelinanae*
Order	*Commelinales*
Suborder	*Commelinidae*
Family	*Commelinaceae*
Genus	*Commelina*L.
Specific epithet	*Benghalensis* L.
Botanical name	*Commelina benghalensis* L.

Table 2 Vernacular names of *Commelina benghalensis*

Hindi	Kana, Kankawa, Buchna
Kannada	Hittangani
Malayalam	Kanankoai, Kanchatam
Manipuri	Wangdenkhoibi
Marathi	Kena
Nepali	Kane
Sanskrit	Kanchata,kosapuspi,marishajalaja,kanangkozai,adutinnathalai
Telagu	Neerukaassuvu,nirukassuvu

Table 3 Scientific classification of *Commelina benghalensis*

Kingdom	Plantae
(unranked)	Anglosperms
(unranked)	Monocots
(unranked)	Commelinids
Order	Commelinales
Family	Commelinaceae
Subfamily	Commelinoideae
Tribe	Commelineae
Genus	Commelina
Species	C.*benghalensis*

Habitat: Annual herb of *Commelina benghalensis* is often found on forest edges, road sides, agricultural sites and home gardens. Vegetation and flower growth are optimal between 30-35 degrees Celsius but can grow between 20-40 degrees Celsius.

Distribution: Believed to be native only to tropical Asia and Africa & it is a widely distributed herbaceous weed that commonly invades agricultural sites and disturbed areas.

Phenology: Flowering May to October, fruiting July to December.

Ecology: The centre of origin of the herb is said to be the Old World Tropics, although it occurs widely in Southern African,India, and Australia. It occurs from sea level to 1,000 m and grows best in under conditions of high soil moisture and fertility, in sunny or lightly shaded places. It can persist in loamy, sandyor rocky soils.

Description: The Herb *Commelina benghalensis* is an annual or perennial herb. Leaves are ovate to lanceolate, 2.5-7.5cm long, 1.5-4cm wide, with parallel venation, entire leaf margins, and pubescence on top and bottom. The leaf sheath is covered in red and sometimes white hairs at the apex which is a primary identification factor for this species. Stems can be crawling along the ground rooting at the nodes or climbing if supported, 10-30cm in height, 20-90cm in length, covered in a fine pubescence and dichotomously branched. Flowers are produced in spathes often found in clusters, funnel shaped, fused by two sides, 10-20 mm long, 10-15 mm wide, on peduncles 1-3.5 mm in length. Aerial flowers are staminate, perfect with 3 petals 3-4 mm long. The upper two flower petals are blue to lilac in colour, with the lower petal lighter in colour or white and much less prominent. Seeds are rectangular, 1.6-3 mm in length, 1.3-1.8 mm wide, brown to black in colour, and have a netted appearance.

Table 4 Organoleptic characters of different parts of *Commelina benghalensis*

	Leaf	Stem	Root	Flower	Seed
Colour	Green	Green and reddish at the node	Light brown or white	Blue	Black to brown
Odour	Odourless	Odourless	Odourless	odourless	Odourless
Taste	Mucilaginous	Mucilaginous	-	-	-

Useful Parts: Whole plant

Traditional uses In China – It is used medicinally as a diuretic, febrifuge and anti-inflammatory.

In Pakistan- It is used as an animal fodder, eaten by humans as a vegetable, also used medicinally, including as a laxative and to cure inflammations of the skin as well as leprosy.

In Bangladesh- The plant is used for snakebites, swelling and burns. It is also used for conjunctivitis, night blindness, pain, skin diseases (eczema, abscesses, acne, scabies and warts) respiratory tract.

In India- The plant is used for mouth thrush, inflammation of the conjunctiva, epilepsy, nose blockage in children.[10]

2. CHEMICAL CONSTITUENTS OF *COMMELINA BENGHALENSIS*

Commelina benghalensis showed the presence of phenolic, salicyclic acid, P-coumaric acid, 8-hydroxyquinoline, caffeic acid, quinolones, catechol, resorcinol, tannic acid, chlorogenic acid. While the flower showed the dominant anthocyanin is cyanidin 3,7,3'-triglucoside, acylated with caffeic acid. Acylation with other hydroxycinnamic acids also occurs. The leaf flavonoids of 152 species have been analyzed. The flavones C- glycosides are the dominant compounds, found in 78% of the species examined. Ravonol O-glycosides are present in 28% of the species, Quercetin being the most frequent aglycone.[1]

Table 5 Chemical Constituents present in successive solvent extracts of *Commelina benghalensis*

Sr no	Chemical Constituents	Pet Ether	Benzene	Chloroform	Acetone	Methanol	Water
1	Alkaloids	+	+	+	-	-	+
2	Carbohydrates	-	-	-	-	-	+
3	Phytosteroids	+	+	+	-	+	-
4	Saponins	+	-	+	-	+	+
5	Phenolic Compounds	-	-	-	+	++	++
6	Tannins	+	+	-	+	++	++
7	Flavanoids	-	-	++	-	++	++
8	Glycosides	-	-	-	-	-	-

(++ High amount in Present, + Low amount in present, - Absent)

Table 6 Physico-chemical parameter of *Commelina benghalensis*

Physicochemical parameters	Leaf (%w/w)
Ash values: 1)Total ash 2)Acid insoluble ash 3)Water soluble ash	 25.02 %w/w 9.03% w/w 12.14% w/w
Extractive value(Hot extraction) 1)Petroleum ether soluble extractive 2)Ethanol soluble extractive 3)Water soluble extractive	 2.99%w/w 12.56%w/w 22.33%w/w
Moisture content (Loss on drying at 110ºC)	13.33%w/w

Table 7 Organoleptic characteristics of separated successive solvent extracts of *Commelina benghalensis*

Sr.no	Solvents	Colour of extract	Consistency
1	Petroleum ether	Greenish yellow	Sticky, semisolid
2	Benzene	Dark green	Sticky, solid
3	Chloroform	Dark green	Sticky, solid
4	Acetone	Greenish yellow	Sticky, semisolid
5	Methanol	Greenish yellow	Non sticky, solid
6	Chloroform:Water(1:99)	Dark brownish yellow	Non sticky, solid

3. MEDICINAL APPLICATIONS OF *COMMELINA BENGHALENSIS*

Analgesic and Anti-Inflammatory Activity

Ethanol extract of *C. benghalensis* roots was pharmacologically investigated to evaluate peripherally acting analgesic activity by acetic acid-induced writhing in Swiss Albino mice and centrally acting analgesic activity by hot-plate and tail-fick tests in mice. Anti-inflammatory activity was also evaluated using the carrageenan-induced mice paw edema model. In all the experiments, the extract was administered orally at the doses of 250 and 500 mg/kg body-weight. The ethanol roots extract demonstrated a significant ($P<0.0001$) inhibition of writhing as compared with the control group in acetic acid-induced writhing test in mice. The extract also significantly ($P<0.0001$) raised pain threshold level in both hot-plate and tail-fick tests in mice. Analgesic activity was in dose dependent manner in all the experimental models. The extract exhibited significant inhibition of paw edema at both doses after carrageenan administration, which revealed potential anti-inflammatory activity of the extract in dose dependent manner. The experimental results demonstrated that the ethanol extract possesses potential analgesic and anti-inflammatory activities.[6]

Antibacterial activity

In this study the plant was evaluated for antibacterial activity and the extracts (ethanolic, petroleum etheric,diethyl etheric, methanolic and aqueous) were found to possess maximum potency against infectious pathogens *Staphylococcus saprophyticus, Staphylococcus aureus,*

Enterococcus faecalis, Staphylococcus pyogenes, Streptococcus agalactiae, Salmonella typhi, Escherichia coli, Shigellaboydii, Shigelladysenteriae and Pseudomonas aeruginosa. The zone of inhibition was observed with almost all bacteria with some exceptions. Minimum inhibitory concentrations of the extracts were found to be significant.[4]

Anticancer activity

The study was aimed to investigate possible molecular mechanisms that are associated with the potential anti-carcinogenic property of *C. benghalensis* . Jurkat T cells were exposed to different concentrations (0-600 µg/ml) of the crude methanolic extract of *C. benghalensis* to evaluate their growth inhibitory and apoptosis inducing effects. The extract elicited a dose- and time-dependent inhibition of cell proliferation, followed by a concomitant decrease in cell viability. The observed cytotoxicity was linked to the induction of apoptosis as determined by morphological and biochemical features known to be associated with the advent of apoptosis. Real time quantitative RT-PCR and Western blot analyses of *Bax*, *Bcl*-2 and p53 exhibited aberrant expression profiles of these genes under various treatment conditions. Taken together, the data suggested that the crude methanolic extract of *C. benghalensis* contains bioactive compounds that may be beneficial in the treatment of malignant growths, and that this apparent antineoplastic activity is a consequence of dysregulated expression of apoptosis-responsive genes. These observations could provide a credible scientific justification upon which the ethnopharmacological utilisation of *C. benghalensis* is founded.[8]

15-Lipoxygenase inhibition of *Commelina benghalensis*

C benghalensis methanol leaf extract gave significant lipoxygenase inhibition activity. The extracts showed positive results for the presence of flavonoids. Flavonoids have been shown to inhibit lipoxygenase activity and the presence of such constituents may be responsible for the inhibitory activity of the extract.15-Lipoxygenase inhibitory assay was based on the procedure done by Wangensteen with slight modifications. Briefly, theactivity of 15-lipoxygenase is observed as it catalysed the reaction between oxygen and linoleic acid. The increase in absorbance at 234nm was due to the formation of the product 13-hydroperoxyoctadecadienoic acid from the reaction of oxygen and linoleic acid. The spectrophotometric assay was performed using a UV-Vis double-beam spectrophotometer (Schimadzu model 1800). For the blank solution, 10 µL solvent controls (50 µL DMSO in 200 µL phosphate buffer) was placed in a test tube with 200 µL linoleic acid and2790 µL phosphate buffer. A blank was left in the blank sample cuvette holder throughout the assay. A

total of 50 µLlipoxygenase was transferred to a test tube with 2740 µL phosphate buffer, and then 10 µL of the test solution was added. The resulting mixture was then incubated for 5 min. After which, 200 µL linoleic acid was added to the mixture and then the absorbance read at 234 nm a minute at 30 seconds interval.The inhibitory activity was evaluated using a spectrophotometric observing the increase in absorbance at 234 nm due to the formation of the product 13-hydroperoxyoctadecadienoic acid. The *C benghalensis* methanol leaf extract inhibited the action of 15-lipoxygenase at a concentration of 0.2 µg/mL.[2]

Hepatoprotective Activity

The investigation of the protective effect and possible mechanism of alcoholic (AlE) and aqueous extract (AqE) from *Commelina benghalensis* root (CB) on EtOH-induced hepatic injury in Wistar rat was performed. Hepatotoxic parameters studied *in vivo* include serum transaminases (AST, and ALT), ALP, bilirubin, protein, lipid profile (Cholesterol**,** triglyceride, VLDL and HDL) and level of antioxidants together with histopathological examination. Liv 52® was used as a reference hepatoprotective agent (5ml/kg-1b.w.). AlE and AqE (200 mg/kg-1b.w.) on oral administration decreased the level of AST, ALP, ALT, bilirubin, cholesterol**,** triglyceride, VLDL, MDA and increased the level of protein, HDL and antioxidants (SOD, GSH and CAT) in rats being treated with ethanol (EtOH). Pentobarbitone -induced sleeping time study was carried out to verify the effect on microsomal enzymes Histopathological observations confirmed the beneficial roles of MF against EtOH-induced liver injury in rats. Possible mechanism may involve their antioxidant activity. Phytochemical investigation of the Commelinabenghalensis showed it contains several types of compounds such of alkaloids, steroids, terpenoids, iridoids, flavonoids saponin, tannin. Hepatoprotection offered by Commelinabenghalensis extracts could be attributed to these constituents, since antioxidants have been reported to possess hepatoprotective activity.[3]

4. CONCLUSION

Research in medicinal plants has gained a renewed focus recently. The prime reason is that other system of medicine although effective come with a number of side effects that often lead to serious complications. Plant based system of medicine being natural does not pose this serious problems. Though *Commelinabenghalenesis* has various medicinal applications, but it is the need of hour to explore its medicinal values at molecular level with help of various biotechnological tools and techniques. Further studies should be conducted to elucidate the molecular mechanism of interaction of various plant based drugs with human body in different diseases.

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6. REFERENCES

1. http://w.w.wzipcodezoo.com/plants/c/commelina_benghalensis/
2. Cean Socorro M. Alaba, Christine L. Chichioco-Hernandez.15-Lipoxygenase Inhibition of Commelinabenghalensis, Tradescantiafluminensis, Tradescantia zebrine.Asian Pacific Journal of Tropical Biomedicine. 2014; 4(3): 184-188.
3. SambrekarSudhir N, Patil Suhas A. Protective effects of Commelinabenghalensislinn (root) extract on ethanol induced acute hepatotoxicity in rats. IJSIT. 2013; 2(3):172-183.
4. Sharma MC, Sharma. Preliminary phytochemical and antimicrobial investigations of the aqueous extract of *Ixoracoccinea*Linn and *Commelina benghalensis* L. on Gram-positive and Gram-negative microorganisms. Middle-East J Sci Res. 2010; 6:436-439.
5. Raquibul SM, Mokarram H, Raushanara A, Mariam J, Ehsanul HM. Sedative and anxiolytic effects of the *Commelinaceae*family plants. Journal of Medicinal Plants Research.2009; 3(11): 875-879.
6. Hasan SMR, Hossain MM, Akter R, Jamila M, mazumder MEH, Rahman S. Sedative and anxiolytic effects of different fractions of the *Commelina benghalensis* Linn. Drug Discov Ther.2009;3:221-227.
7. Mbazima VG, Mokgotho MP, February F, Rees DJG, Mampuru LJ. Anticancer activity of methanolic extract of *Commelina benghalensis* (*Commelinaceae*). Afr J Biotech. 2008; 7: 3569 -76.
8. Vusi G, Matlou P, Mokgotho S, Leseilane J. Alteration of Bax to-Bcl-2 ratio modulates the anticancer activity of methanolic extract of *Commelina benghalensis* (*Commelinaceae*) in Jurkat T cells. African Journal of Biotechnology. 2008; 7 (20): 3569-3576.
9. Rahman GMS, Haque N, Rashid A. Cytotoxic activity of *Commelina benghalensis* Linn. using brine shrimp lethality bioassay. Bangladesh J PhysiolPharmacol. 1999; 15:62-65.
10. Maria AD, Tony S. Flavonoids and Chemotaxonomy of the *Commelinaceae*. Biochemical Systematic and Ecology. 1985; 13(4): 391-402.
11. Stirton JZ, Harborne JB. Two Distinctive Anthocyanin Patterns in the *Commelinaceae*. Biochemical Systematics and Ecology. 1980; 8: 285 – 287.