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PHARMACOLOGICAL IMPORTANCE OF *COMMELINA DIFFUSA* (COMMELINACEAE): A REVIEW

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ABSTRACT: *Commelina diffusa* is widely known as the climbing dayflower or spreading dayflower, which is an annual herb belonging to the family Commelinaceae that has been used as a medicinal plant for centuries. This plant distributes dispersedly with heavy branches and slowly grows along the soil. The plant can be found in the tropical and subtropical locations worldwide. *Commelina diffusa* has been used for many years to heal swelling, treatment of urinary tract infection and respiratory tract infections, diarrhea, enteritis, and hemorrhoids. The plant has also been used in fever, malaria, insect, bug bites, rheumatoid arthritis, gonorrhea, influenza, and bladder infection, etc. There are some experiments that have been conducted to observe the pharmacological properties of this plant. In this paper, all the reported pharmacological properties of this plant were reviewed such as anti-inflammatory activity, antioxidant activity, antibacterial activity, antifungal activity, nephroprotective activity, hepatoprotective activity, central nervous system (CNS) depressant activity, etc.

Keywords: *Commelina diffusa* Commelinaceae, Pharmacological properties, Phytochemical constituents

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INTRODUCTION: Plants have been used for medicinal purposes for centuries, and the plants that are usually used for such purposes are called medicinal plants. In other words, the term medicinal plant incorporates plants that are used in herbology. According to WHO (World Health Organization), 80% of the world's population depends on herbal medicines as primary health care. It also declared that around 21,000 plant species have the potential of being medicinally used¹.

Medicinal plants are popularly used at the households by the women, at the villages by the tribal shamans or by the practitioners of traditional systems of medicines like Ayurveda, Chinese medicine or the Japanese Kampo system².

Commelina diffusa has been being used as a medicinal plant for centuries. It is a pantropical plant, which is also widely known as climbing dayflower or spreading dayflower. It belongs to dayflower family; Commelinaceae and is an herbaceous plant. In ancient China, the traditional practice of medicine included the use of *Commelina diffusa* leaves to heal swelling. In the topical region, the leaves are crushed and applied on boils, abscesses, wounds and painful joints along with dermatitis, burns, snake bites or insect stings. The plant has also been used for the treatment of urinary tract infection, and respiratory

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tract infections, diarrhea, enteritis, and hemorrhoids in Africa, America and some parts of Asia³. Young leaves of the plant have also been eaten in New Guinea. The plant has also been used in fever, malaria, insect, bug bites, rheumatoid arthritis, gonorrhea, influenza, and bladder infection, etc.⁴

This paper briefly reviews the pharmacological status of *Commelina diffusa*. Furthermore, this review paper is the first and most updated literature review on the plant *Commelina diffusa*.








FIG. 1: *COMMELINA DIFFUSA*

Description: It is an annual herb, which is also perennial in tropics. The plant distributes dispersedly with heavy branches and slowly grows along the soil. The roots at the nodes and the stem are usually up to 1 meter. The foliage of the leaves is of different sizes and ranges, which includes lanceolate to ovate. The proximal leaves tend to be more oblong. In the plants located in North America have smaller leaves, which are usually 1.5 to 5 centimeters in length and 0.5 to 1.8 in width.

The apex of the leaf is acuminate, and the surface is either smooth or has prickles. The flower petals are commonly blue, but lavender petals are also seen seldom. The upper two petals of the flower are 4.2 to 6 millimeters. The flowers bloom from May to November. The fruit has a capsule-like shape with three locules and two valves. It quantifies 4 to 6.3 millimeters in length, 3 to 4 millimeters in width. The fruit contains five brown seeds measuring 2 to 2.8 millimeters long and 1.4 to 1.8 millimeters long. At times, the fruit can be up to 3.2 millimeters long. The lower cell of the fruit has 1 seed; whereas, the dorsal cells have 2 seeds each⁵.

TABLE 1: PLANT DESCRIPTION OF *COMMELINA DIFFUSA*

Part of plant	Description	Pictures
Stem	Stems are thick, cylindrical, glabrous, and can be up to 1 meter	
Leaves	Leaves are glabrous, different in size; from ovate to lanceolate, bright green in color, and 2 to 5 cm long and 0.5 to 2 cm wide	
Fruit	Three-celled capsule-like structure with a length of 4 to 5 mm	

Seeds	Each of the three capsules has 5 seeds, reticulate-ribbed, brownish with a length of 2 to 3 mm	
Flower	Actinomorphic flowers with three fertile stamens and two sterile stamens. Opens in the morning and is blue in color	

Scientific Classification:

Class: Magnoliopsida
 Suborder: Lilianae
 Order: Commelinales
 Family: Commelinaceae
 Genus: *Commelina* L.
 Species: *Commelina diffusa* Burm.

Vernacular Names: English: climbing dayflower, creeping-spiderwort, dayflower, spreading dayflower, wandering Jew, watergrass, pond grass, French weed; Bangladesh: Manana; Chinese: Jie Jie Cao; Hawaiian: honohono, honohono wai, mākolokolo; Cuba: Canutillo; Indonesia: Brangbangan; Fijian: ai rongorongono, ai rongorongono, ai rorongono, cobulabula, Drano, duludauwere, kabocola, luna, matembulambula, ndrano, ndulundauwere, rongomatailevu, rorogo, the nggalonggalo, thombulambula, wa cobocola; Japan: Shima-tsuyu-kusa; Philippines: Alibangon; Thailand: Phak-prap; Spanish: carutillo, chiriyyuyo, cohitre, empanadilla, flor de Santa Lucia, Siempre viva, suelda⁶.

Phytochemical Constituents: Literature study revealed that till now, no secondary metabolites from *C. diffusa* had not been isolated and identified.

Pharmacological Properties:

Anti-inflammatory Activity: The leaves of *Commelina diffusa* has been used in inflammatory diseases for years. It has also been used as a healing agent on wounds³. A study was done to determine the anti-inflammatory effect of the plant.

It used the ethanolic leaf extract (ECD) of the plant on chick carrageenan-induced foot edema model. The obtained result indicated that the leaf of *Commelina diffusa* has the property to inhibit edema induced by carrageenan in the chick footpad. This study deduced to the conclusion that the anti-inflammatory activity is 1.1 times lower than diclofenac and dexamethasone⁷. *In-vitro* studies that were conducted before this study indicated that the leaves of the plant are unable to inhibit NF-Kb⁸. This study was proved otherwise by another *in-vivo* study done later⁹.

Antioxidant Activity: Extract of the leaves of the plant *Commelina diffusa* was examined to determine whether it has antioxidant properties. As antioxidant properties of medicinal plants need to be examined by more than one method, several studies were done before reaching to a conclusion¹⁰. Leaf extract of this plant exhibits elevated antioxidant property, which can be due to the high phenolic content of 193.7 mg/g of tannic acid per mg of extract. Secondary metabolites such as reducing sugar, alkaloids, phytosterols, flavonoids, triterpenoids can also be liable for the plant's antioxidant property and as well as anti-inflammatory properties⁷. Antioxidant property of this plant also supports its anti-inflammatory properties¹¹.

Antibacterial Activity: The crude extract of the plant *Commelina diffusa* was used to perform its antibacterial assay. Methanol was used as it is proved to be a better solvent for the extraction of bioactive ingredients of medicinal plants. The

result from the study don has also shown that aqueous methanolic crude extract of the leaves of the plant is a better extraction solvent compared to water¹². The extract was oven-dried at 40 °C. It showed a zone of inhibition of 13 mm in *Staphylococcus aureus*, which is better than other antibiotics used as positive control in the study¹³.

Anti-Fungal Activity: Methanol extract of the leaves of the medicinal plant, *Commelina diffusa* was used to perform the anti-fungal assay. Oven-dry at 40 °C or shade, dry methods are better drying methods, as these show a clear zone of inhibition. The study reveals that the leaves of this plant posse's anti-fungal activity, which can be used to treat various skin problems¹³.

Nephro-Protective Activity: A study was done with ethanolic leaf extract of *Commelina diffusa* at 200 and 400 mg/kg, which was administered to Albino rates for 20 days and they were treated with doxorubicin concurrently. The rats that were pretreated with the extract exhibited regular kidney stroma with Bowman's capsule, glomerulus and renal tubules in the study, which indicates the positive nephroprotective activity of the plant¹⁴.

Hepato-Protective Activity: *Commelina diffusa* is reported to exert hepato-protective activities. Studies have shown that the liver secretions, collected from albino rats that were treated with doxorubicin, showed infiltration of neutrophils with spotty inflammation. Rats, those were pretreated with the leave extract of the plant 200 and 400 mg/kg, had improved cell integrity, which was proved by normal hepatic stroma with hepatocytes, sinusoid and central vein¹⁴.

Central Nervous System (CNS) Depressant Activity: To determine the CNS depressant activity of the *Commelina diffusa*, methanolic extract of the plant was evaluated in mice models by classical models of depression such as open field, hole cross, forced swimming, tail suspension, and thiopental sodium-induced sleeping times tests. 50, 100, and 200 mg/kg plant extracts were given to the mice models orally and distilled water (0.1 mL/mouse, p.o.).

Diazepam (1 mg/kg) was considered a standard drug. The plant extract reduced the locomotor activity in the open field and hole-cross tests

comparing to the controlled group; whereas, increased the time of immobility in forced swimming and tail suspension tests. Moreover, it also elongated the sleeping time contrary to the control group. The study depicts the possibility of CNS depressant in mice models¹⁵.

CONCLUSION: The detailed information as presented in this review on its various biological properties of the extracts might provide an incentive for proper evaluation of the use of the plant in medicine. So, the plant is a good candidate for further studies to isolate the bioactive principle to identify leads for drug development.

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