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# A REVIEW ON *CANNA INDICA* AND ITS PHARMACOLOGICAL STUDIES

**Harsha Hosur* and Dr. Mukund Handral**

Bangalore Karnataka India 560050.

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***Corresponding Author**
**Harsha Hosur**
Bangalore Karnataka India 560050.

## ABSTRACT

In traditional folk medicine, *Canna indica* is regarded as a valuable medicinal plant. This plant has been shown to have antiviral, anticancer, antimalarial, antipyretic, emollient, treat dysentery and intestinal worms, treat women with irregular menstruation, antibacterial, antioxidant, and antifungal properties, as well as diuretic activity in numerous pharmacological studies. This analysis is a broad overview of *Canna indica*'s pharmacological activities. This plant has a wide range of conventional and pharmacological applications in a number of pathophyisiological conditions. We'll go through the many properties of *Canna indica* in this article, with an emphasis on its medicinal properties. We hope that this will be a compelling subject for more experimental and clinical research.

**KEYWORDS:** *Canna indica*, Phytochemical analysis, Pharmacological actions.

**List of abbreviations**

CI: *Canna indica*

UV-VIS: Ultraviolet-Visible

FTIR: Fourier transform infrared spectroscopy

## INTRODUCTION

The use of medicinal plants for healing is as old as mankind. The connection between man and his quest for drugs in nature dates back thousands of years. Many of the world's cultures now have comprehensive knowledge of herbal medicine as a result of shared learning from previous generations.[1] More than 35,000 plant species are used for medicinal purposes in humans all over the world.[2] Crude drugs are the dried parts of medicinal plants, such as roots, stems, bark, leaves, flowers, seeds, fruits, and whole plants, that are used to make

traditional medicine in a number of medicinal systems, including Ayurveda, Siddha, Unani, and Homeopathy.[3,4] Canna indica L., also known as Indian arrow, is derived from the Greek word for reed or cane.[5] The Canna genus is native to the tropical and subtropical regions of the southern United States, as well as the southern and northern parts of Argentina and the Philippines, where it can be found in waste places and near tikas Canna settlements.[6] It is a horticultural plant that is one of the richest sources of starch on the planet. It is widely used as a nutritive agent and possesses a range of beneficial pharmacological properties.[7] C. indica was the first species of this genus to be introduced to Europe, and it came from the East Indies, despite the fact that the species originated in America.[8]

Most of South America, Central America, the West Indies, and Mexico are home to this species. The southeastern United States (Florida, Texas, Louisiana, and South Carolina), as well as most of Europe, Sub-Saharan Africa, Southeast Asia, and Oceania, have naturalised it.[9] For thousands of years, indigenous peoples of the Americas have grown Canna indica as a minor food crop.[10,11] It is unable to survive in the shade. It necessitates a moist soil climate.[12,13]

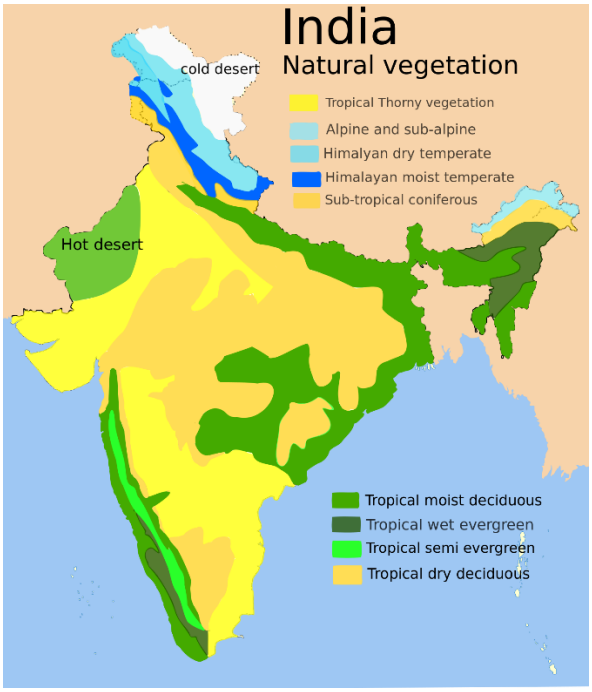


**Fig. 1: geographical distribution of *Canna indica* in india.**

**Botanical Classification**[14]

**Table no. 1.**

| **Kingdom** | **Plantae** |
|---|---|
| Subkingdom | Tracheobiont |
| Superdivision | Spermatophyta |
| Division | Magnoliophyta |
| Class | Liliopsida |
| Subclass | Zingiberidae |
| Order | Zingiberales |
| Family | Cannaceae |
| Genus | *Canna* |
| Species | *Indica L.* |

**Vernacular Names**[15]

**Table no. 2.**

| **Languages** | **Names** |
|---|---|
| English | African arrowroot, Canna lily, Canna Indian shot, Wild canna |
| Hindi | Sarvajjaya, SakaSiri, Devkali |
| Marathi | Kardal |
| Sanskrit | Vankelee, Devakuli |
| Spanish | Chupaflor |
| Andes | Achira |
| French | Balisier comestible |
| Tamil | Puvalaikalvalai |
| Arabic name | Canna Hindi, Muzwardi, & Muzfahal |
| Telugu | Krishna Tamara |
| Konkani | KelePhool |
| Manipuri | Laphoorit |
| Kannada | Kalahu |
| Bengali | Sarbajaya, Kalaboti |

**Fig. 2: *Canna indica* Plant.**

**Fig. 2: *Canna indica* Flower.**

## PHYTOCHEMICAL ANALYSIS

CI dry leaf powder was extracted with ethanol at 60°C to 70°C using a continuous hot percolation process using a soxhlet apparatus. The extracts were filtered and placed in a hot oven for 24 hours to evaporate the extracts. A waxy residue with a greenish black colour was obtained. These extracts were used for qualitative phytochemical analysis using UV-VIS and FT-IR. Standard qualitative methods were used to conduct phytochemical analysis of the plant extract for major phyto constituents, as defined by various authors. Biologically active compounds such as alkaloids, flavonoids, glycosides, carbohydrates, phytosteriods and fatty acids, proteins, phenolics, tannins, and saponins were screened in the plant extracts.[16-21]

## PHYTOCONSTITUENTS OF *CANNA INDICA*

The chemical constituent cannagenins is found in the root. Enzymes, triacontanal, a mixture of stigmasterol, sitosterol, campesterol, lectin, and traces of alkpiels are found in rootstock.[22] Fat, traces of an alkaloid, gum, and starch are all generated by rhizomes. Phenols, sterols, flavonoids, and saponins were discovered through phytochemical analysis. 5,8Henicosdiene, 7- Henicosyne, 3, 15- Dihydroxy-2-octadecene, 6- Hydroxyeicosane, Tricosane, Tetracosane make up the unsaponifiable matter from Canna indica rhizome.[23] Canna leaf extract includes sucrose, amino acids, organic acids, citric, malic, glyceric, succinic, and lactic acids, as well as aspartic, glutamic, glutamine, and alanine. Lignin, furfural, and hemicelluloses are also found in the leaves.[24] Canna indica produces bright red flowers. The presence of flavonoids, phenols, and anthocyanins gives the fruit its red colour. Lutein, carotene, violxanthin, lutein, Zeaxanthin, and cryptoxanthin are all contained in flowers.[25,26]

## USES OF *CANNA INDICA*

**1. Rhizomes** - Fresh rhizome decoction is used to treat jaundice, fevers, dropsy, and dyspepsia. Rhizome decoction is used as a diuretic and antipyretic in the Philippines. Nasal bleeds are treated with macerated rhizomes. Rhizomes have been used in Thailand to treat cancer among other herbs. In Costa Rica, a rhizome infusion is used as an emollient. The rhizomes are used in enemas to treat dysentery and intestinal worms in Gabon.[27,28] Antimicrobial and antioxidant properties. Women with irregular menstruation in Congo drink an aqueous decoction. Cannas rhizome is high in starch and has many agricultural applications.[29]

**2. Leaves** - A diuretic infusion of leaves is used in Costa Rica. Leaves are used to treat malaria in southwest Nigeria.[30] Paper is made from a fibre derived from the leaves. Insecticides are said to be present in the smoke produced by burning leaves.[31]

**3. Flowers** - A decoction of flowers is used to avoid bleeding from an external wound. The flower is said to have antibacterial, antioxidant, and antifungal properties.[32]

**4. Root** - In the treatment of gonorrhoea and amenorrhoea, a decoction of the root with fermented rice is used. In Nigeria, the powdered root is used to treat diarrhoea and dysentery.[33] The root is used in India as a diuretic, diaphoretic, stimulant, and demulcent, and is used to treat fevers and dropsy. It also has molluscicidal, acrid, and stimulant effects. The roots have a starchy texture. Indochina has a limited amount of starch extraction. They are consumed in Asia and have been eaten in West Africa during the drought.

**5. Seeds** - Considered as cordial & vulnerary. The seeds used as beads in jewellery also used in mobile element. Musical instruments. A purple dye is obtained from the seed.[34,35]

**6. Whole plant** - In Bangladesh, paste of plant used for tonsillitis. Aerial parts of Canna indica shows hepatoprotective activity, antioxidant activity. In more remote regions of India, Cannas are fermented to produce alcohol. The plant yields a fibre from the stem. Young shoots used as a vegetable.[36]

## PHARMACOLOGICAL STUDIES OF *CANNA INDICA*

1. CI was one of the medicinal plants used to treat AIDS that was tested for its ability to suppress HIV type 1 reverse transcriptase.[37]

2. Snail morality was improved by cannagenin, which had a strong synergistic effect with chlorophyll. The fish Colisafasciatus, which shares the same environment as the snail L acuminata, was found to have time and dose based molluscidal activity in CI at a dose that was not toxic.[38]

3. A study found that a methanol extract of CI aerial parts protects the liver from carbon tetrachloride-induced hepatotoxicity.[39]

4. Two pure compounds, stigmasterol and 6- beta-hydroxystigmasta-4, 22-diene-3-one, and two other toxic minor components were found in the study. They were found to be cytotoxic to P388 dfleukemia cells.[40]

5. The results of the study show that the aerial sections of CI are good at scavenging free radicals and could be a strong antioxidant.

6. Anthocyanins were isolated from red flowers of CI. Quercetin and lycopene were used to isolate four anthocyanin pigments. The compounds were found to have high antioxidant activity. The findings point to a potential pigment source for food applications.

7. Studies on antioxidant enzymes revealed that the dry weight of the leaves and roots were natural, suggesting that the CI plant is resistant to copper-induced oxidative stress.

8. Rumen cultures improve the anaerobic acidogenesis of Canna indica L. with surfactants.[41]

9. Polyphenolic Compounds from CI Root Differentially Activate Glucose Transport in Cultured Muscle Cells.[42]

10. Antinociceptive and anthelmintic activity of CI.[43]

11. Anti-inflammatory, analgesic and immunomodulatory effects.[44]

12. In castor oil-induced diarrhoea, charcoal meal transit, and acetylcholine-induced contractions of the isolated rat ileum models, the anti-diarrheal effect of CI methanolic extract was evaluated.[45]

13. Mice were used to test CI's hemostatic effect. The bleeding time (BT), clotting time (CT), and abdominal capillary permeability were all calculated. Canna indica significantly reduced BT, CT, and abdominal capillary permeability, according to the findings.[46]

14. CI leaves and flowers methanolic extract had antibacterial activity against B subtilis.[47]

## CONCLUSION

The primary purpose of this review was to decode and examine *Canna indica* 's pharmacological and medicinal properties. Antidiabetic, antioxidant, antipyretic, hepatoprotective, antiviral, antifungal, anticancer, and antimalarial activity of the plant was discovered in preclinical studies. The phytoconstituents found in the roots, stem, bark, leaf,

flower, and seeds of CI are thought to be responsible for these behaviours. CI have a lot of value and can be used as a foundation for drug supplementation. It may also be used as an alternative medicine to treat a variety of diseases.

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