

The Healing Powers of Curcuma Caesia: Traditional Uses and Modern Perspectives

Patil Spoorti¹, Shetti Priya^{*1}, Chougala Ankita², Mesta Shreya², Mane Deepa¹

^{1,*1,2}Department of Biotechnology, Dr. Prabhakar Kore Basic Science Research Center, KLE Academy of Higher Education and Research, Nehru Nagar Belagavi, Karnataka, India

*Corresponding author Email: priya.shetti@yahoo.com

Abstract—Specifically, substantial medicinal plant within Zingiberaceae family is black turmeric also known as *Curcuma caesia*. Wooded area department of India has principally classified this plant as endangered. *Curcuma caesia* is a fantastically unknown and almost unexplored remedy, in spite of the truth that the genus *Curcuma caesia* is used to deal with a selection of illnesses. The intention of this paintings is to expand the pharmacogostic and phytochemical criteria required for assessing the commercially and medicinally useful plant fabric of *C. caesia* the usage of an expansion of factors, including morphology, microscopy, and the physiochemical contents of the rhizome.

Keywords— *Curcuma caesia*; Zingiberaceae; antioxidant; Pharmacological interest; phytochemical constituents; anticonvulsant.

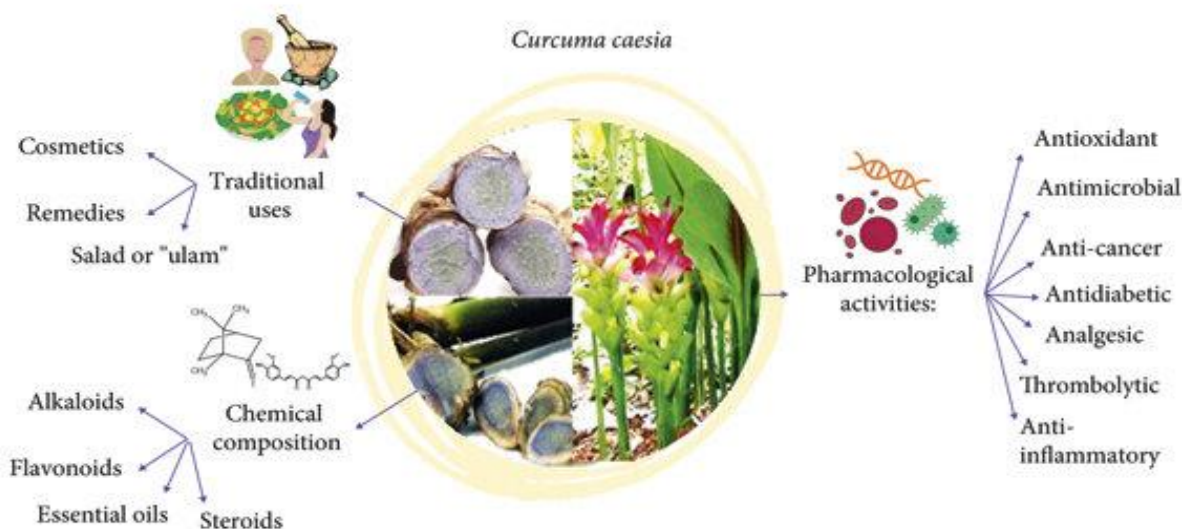


Figure 1: Graphical Abstract

I. INTRODUCTION

The bluish-black rhizome of *Curcuma caesia* Roxb bears pale yellow flora with a red border. In addition to producing a crucial oil and having a aromatic nature, it has lengthy been applied in remedy. It belongs to the 70-species rhizomatous herb family referred to as the ginger family (*Zingiberaceae*)^[1].

Black turmeric's rhizome has amazing therapeutic qualities. Smooth muscle relaxation, hemorrhoids, leprosy, asthma, cancer, epilepsy, fever, wounds, vomiting, menstrual disorders, anthelmintics, aphrodisiacs, inflammation, gonorrheal discharge, and other conditions are among the traditional uses for it^[2,3].

The plant is considered extremely auspicious in Madhya Pradesh, where it is thought that a person who possesses it will never run out of food or cereals. The plant is used at Kali Puja

in West Bengal. In Manipur, rhizome paste has long been used to treat rheumatic pain, contusions, and bruises^[4].

Fresh rhizome decoction is used by Adi tribes in Arunachal Pradesh as an anti-diarrhea remedy and to relieve stomach aches. Fresh rhizome paste is used by the Khanti tribe in Lohit district to treat snake and scorpion bites. Fresh rhizome decoction is used by Adi tribes in Arunachal Pradesh as an anti-diarrhea remedy and to relieve stomach aches^[5].

Fresh juice from rhizomes mixed with mustard oil is given to cattle in Assam when they suffer from dysentery^[6].

Natural products, which have been utilized for thousands of years for a variety of purposes such as foods, traditional remedies, and ritual activities, are primarily derived from plants. Plants produce specialized metabolites as natural defenses against infections, diseases, and predators. These metabolites have the potential to be used to create new medications. The World Health Organization (WHO) reports

that more than 80% of people worldwide use natural and herbal remedies as a form of medicine^[7].

Furthermore, numerous studies have demonstrated the beneficial therapeutic effects of different herbal plants and their extracts. In addition to some unpleasant side effects, long-term use of contemporary synthetic drugs can have negative effects on the liver and/or kidney. One of the oldest herbs used as a spice, turmeric has pharmacologic effects that have been demonstrated in both in vitro and in vivo research. People's lifestyles changed as a result of urbanization, which increased the prevalence of many diseases. The medicinal qualities of *Curcuma* species have been the subject of numerous investigations; the ones listed here are only a sample. Beneficial elements in *Curcuma caesia* can be used as natural supplements and substitutes for medications to treat illnesses, particularly^[8].

Distribution

The species is found in humid deciduous woods between 200 and 1000 meters above sea level, primarily in Bengal, northeast, and central India. In subtropical to temperate regions, it develops as ground cover in woodland areas. This plant is frequently found in northeastern and central India, and it is a rare species that is mostly grown. *Curcuma caesia* is found in small amounts in the Andhra Pradesh districts of Khammam, West Godavari, and East Godavari's Pali hills^[10].

The Study of Morphology

Rhizome: The rhizome is tuberous, 2–6 cm in diameter can vary in size and shape, and has a camphoraceous, fragrant smell. Sessile and laterally flattened, it has warts, adventitious roots, and root scars all over it. Nodal and internodal zones are indicated by the rounded surface wrinkles. The surface of rhizomes is either buff, bluish black, or dark brown; the scaly leaf remnants' circular patterns resemble growth rings. Approximately sympodial branching is present.

Root: At the propagation stage, the rhizome has not yet taken root. The long, tapered, fibrous roots of rhizome leaves are yellow-brown on the surface and are found in clusters of 10 to 20.

Leaves: A bunch contains 10–20 leaves. The leaves are large, oblong, lanceolate, and glabrous. The center portion of the lamina features bright, ferruginous purple clouds. When they are not in their sheath, the ivory-colored petioles surround each other in a pseudo-axis. Variable in appearance, the inflorescence is a dense spike that emerges well before the leaf opens and is 15 to 20 cm long. As the coma ages, its bracts turn crimson from their original deep red color. Smaller than bracts, the flower has a border of reddish and pale yellow. Obtuse, three-toothed, and 10–15 mm long is the calyx.

Corolla: is a long, semi-elliptic, tubular, three-lobed creature with a pale-yellow lip.

Flower: Smaller than bracts, reddish-bordered, pale yellow. The corolla is a long, tubular, pale yellow lip that is three-toothed, and the calyx is obtuse and 10 to 15 mm long.

TABLE 1: Taxonomical classification of *Curcuma caesia*

1	Kingdom	Plantae
2	Phylum	Tracheophytes
3	Class	Liliopsida
4	Order	Zingiberales
5	Family	Zingiberaceae
6	Genus	<i>Curcuma</i>
7	Species	<i>Curcuma caesia</i> Roxb

Traditional Uses

- Crushed rhizome paste is applied to wounds and injuries to halt bleeding and encourage quick healing^[14].
- The roots of curcuma cassia are ground into a powder and mixed with water to treat stomach issues^[15].
- Dried rhizomes and leaves of *Curcuma cassia* are used to treat allergies, leprosy, cancer, wounds, impotence, fertility, toothaches, vomiting, and piles^[16].
- A decoction of fresh rhizomes is used to heal stomachaches and prevent diarrhea^[17]. Fresh *Curcuma cassia* rhizome paste is applied to snake and scorpion bites.^[18]
- When tonsils are inflamed, the rhizome of *Curcuma cassia* is applied^[19].

Medical Uses

- Children's colds, coughs, and pneumonia are commonly treated with grass rhizomes. Cc is used to treat asthma and fever in adults. therapies for *cassia*. A face pack made from rhizome powder is used in northern India. HIV/AIDS, cancer, epilepsy, and albinism can all be effectively treated with the rhizome. In order to relieve migraines or to treat sprains and bruises, fresh rhizomes can be crushed and applied as a paste to the forehead. Rhizome paste is believed to help treat menstrual problems and relieve stomach gas in small amounts.
- The aromatic, essential oil-containing rhizomes of this plant have several uses. Rhizomes have a distinctly potent scent that is mostly caused by the presence of essential oils that are high in camphor and starch.
 - This plant's rhizomes have long been used as an anthelmintic and to treat infections, inflammation, gonorrheal discharge, leprosy, and hemorrhoids. sores, fever, and vomiting. Rhizome extracts of *Curcuma c* have also been used as a smooth muscle relaxant, antioxidant, and anticancer agent.
 - On sores and wounds that are hard to heal, fresh black turmeric rhizomes are applied to ease pain and promote healing. Kali Haldi's rhizome and leaves are used as a tonic for the brain and heart. Patients with epilepsy, enlarged spleen, cancer, albinism, and tuberculous glands in the neck are commonly treated with the rhizomes^[20, 21].

Pharmacological Activities

Bioactive substances, such as curcuminoids, support wound healing, hypoglycemia, anticoagulant, antimicrobial, and antioxidative and anti-inflammatory qualities. Free radical scavenging and antioxidant qualities are demonstrated by curcuminoids. The key bioactive substances found in the rhizomes are curcumin and demethoxycurcumin along with bisdemethoxycurcumin, which are two related demethoxy compounds. Widely found in plants, flavonoids and phenolic compounds have been shown to have a variety of biological effects. Among these effects are anti-inflammatory, anti-

carcinogenic, antioxidant, and free radical scavenging benefits.

1 Antioxidant

Crude methanol extracts of the rhizomes of eleven species, including *C caesia*, are an antioxidant. *Caesia's* antioxidant qualities are well-known. Using curcumin as a reference indicator, its capacity to inhibit sulfur-free radical reactivity has been investigated. A significant degree of radioprotection was provided by *Caesia*. The methanolic extract of *C. cassia* rhizomes' antioxidant capacity is being investigated. Using the DPPH free radical scavenging assay, *Cassia* was assessed. In a 2 ml volume with a 500 µM concentration of DPPH, the extract's and butylated hydroxytoluene's IC 50 values were found to be 862.35 µg and 46.25 µg, respectively. This showed that, in comparison to butylated hydroxytoluene, methanolic *Cassia c* extract had a moderate IC50 value [22, 23].

2 Analgesics

The plant extracts' analgesic and antipyretic properties were investigated in rats with Brewer's yeast-induced hyperthermia and a chemical model of acute pain. Fever and writhing were observed in rats given dosages of 250 and 500 mg/kg body weight. The plants were analgesic and antipyretic [24].

3 Antifungals

The essential oil of *C. rhizomes* is an antifungal. *Caesia Roxb* is well known for its antifungal qualities [25].

4 Antimicrobials

Curcuma cassia's rhizome had strong antibacterial and antioxidant properties, and it also inhibited gram-positive (*S. B* and *aureus. subtilis*), as well as gram-negative (*E. coli*) microorganisms. *Staphylococcus aureus* was significantly inhibited by the ethanolic extract of *Curcuma cassia* (EECC). Phenolic compounds have also been found to have antibacterial properties [26].

5 Anti-Inflammatorie

Proteins that were separated from the rhizome of *Curcuma cassia* using aqueous Soxhlet extraction demonstrated significant antioxidant activity and demonstrated heat resistance. Additionally, when tested using the carrageenan rat paw model system, it showed notable anti-inflammatory effects at a dosage of 100 mg/kg [27].

6 Antiemetic Activity

In a chick emetic model, the ethanol extract of *Curcuma cassia* rhizome showed significant antiemetic effects that were similar to those of domperidone.

7 Depressant and Hypnotic Activity

Curcuma cassia has both hypnotic and depressant properties, which suggests that it may be useful as a treatment for depression. The CNS depressant properties of *Curcuma cassia* (MECC) rhizome methanol extract were evaluated. Tannic acid, flavonoids, and saponins have been shown to have antidepressant properties and to protect brain function from central nervous system disruptions [28].

8 Antiasthmatic

C cassia has antiasthmatic properties as part of its medicinal properties. *Cassia* in the trachea of guinea pigs, as well as when different enzyme inhibitors and receptor antagonists are present. The pre-contractions caused by

carbachol (1 µM) were relaxed by the concentration of *Cassia* extract. In the relaxation response curves based on the concentration of cumulative C, the presence of antagonists such as propranolol, glibenclamide, 2', 5'-dideoxyadenosine, α-chymotrypsin, L-NNA, and methylene blue had no effect. Pre-contraction (1 µM) is induced when switching from *Cassia* extract to carbachol [29].

9 Neuropharmacological Activity, Locomotor Depressant, Anticonvulsant, And Muscle Relaxant Effects

In male Swiss albino mice, the study investigated the analgesic, locomotor, anticonvulsant, and muscle relaxant effects of *Curcuma c* rhizome. *Curcuma Cassia* methanol extract significantly increased the mice's tail-flicking reaction time and significantly decreased writhing in a dose-dependent manner. The methane [30]

10 Anthelmintic Activity

Of the genus *Curcuma*, two of the most common species are *C. Cassia* has demonstrated effective anthelmintic qualities. In this investigation, four excerpts viz. The anthelmintic properties of petroleum ether, dichloromethane, ethanol, and the aqueous extract of *C. amadaand* and *C. cassia* rhizomes were investigated at three distinct concentrations. Each extract was tested at three different concentrations: 50 mg/ml, 100 mg/ml, and 150 mg/ml. This required tracking the earthworms' periods of paralysis and death. Every extract from both plants exhibited dose-dependent activity. The findings demonstrated that the 150 mg/ml ethanol extract of *C. Cassia* was very successful at paralyzing earthworms. Earthworms were effectively killed by the ethanol extract (150 mg/ml) and dichloromethane extract (150 mg/ml) of both *Curcuma* species [31].



Figure 2: Leaf



Figure 3: Rhizome

Biological Activities

Sno	Activity	Methods	Reference
1	Antiasthmatic	Petroleum ether, ethanol, and water extracts from <i>Curcuma caesia</i> rhizomes were injected into the abdomen in doses between 25 and 100 mg per kilogram of body weight. The potential of inducing eosinophilia in mice using milk was being assessed.	32
2	Analgesic	The acetic acid-induced writhing and tail flick tests were used to check the pain-relieving effects of the methanol extract from <i>Curcuma caesia</i> .	33
3	Antitumor	The antitumor potential was assessed in mice with Ehrlich's ascites carcinoma [EAC]. The antitumor effectiveness was assessed in the living organism following the daily administration of EAC cells for nine days, with results measured after 24 hours. On the tenth day, Half of the mice were euthanized, while the rest were kept alive to observe if they could survive longer. The antitumor impact of MECC was evaluated through the analysis of various factors such as Measurements included tumor weight, tumor volume, counts of living and dead cells, blood parameters, and biochemical tests.	33
4	Antioxidant	A DPPH free radical scavenging assay was used for assessing the <i>Curcuma caesia</i> extract. By plotting the percentage of inhibition against concentration The IC ₅₀ (the concentration of the sample required to neutralize 50% of DPPH free radicals) was calculated. Butylated hydroxytoluene was used as a standard antioxidant.	34
5	Antifungal	The agar cup method was used to measure the antifungal activity. Testing was done on an isolated sample to determine its antifungal qualities against three plant pathogenic fungi: <i>Rhizopus oryzae</i> , <i>Botrytis cinerea</i> , and <i>Fusarium oxysporum</i> .	33
6	Locomotor Depressant	The amount of methanol extract from <i>Curcuma caesia</i> was measured using an actophotometer.	33
7	Muscle Relaxant	A rota-rod apparatus was used to assess the muscle-relaxing effects of <i>Curcuma caesia</i> methanol extract at doses of 50 and 100 mg per kilogram of body weight.	33
8	Anticonvulsant	Methanol extract was evaluated for its effectiveness in reducing the adverse effects of pentylenetetrazol convulsions in mice.	33
9	Antibacterial	The crude extracts were tested against bacteria including <i>Bacillus cereus</i> , <i>Bacillus subtilis</i> , <i>Staphylococcus aureus</i> , <i>Staphylococcus epidermidis</i> , <i>Escherichia coli</i> , <i>Proteus vulgaris</i> , <i>Pseudomonas aeruginosa</i> , and <i>Klebsiella pneumoniae</i> using the agar-well diffusion method.	35
10	Hepatoprotective	Rats with liver damage caused by paracetamol were used to study the liver-protective effects of an ethanolic extract from <i>Curcuma caesia</i> rhizomes. Silymarin served as the standard. Various biochemical tests were conducted to assess the hepatoprotective effects, focusing on markers such as total bilirubin, unconjugated bilirubin, ALP, SGOT, SGPT, total protein, and additional tests.	35
11	Antiulcer	<i>Curcuma caesia</i> ethanolic extract was examined for its effectiveness in treating ulcers using Goyal RK's (2002) method in an experimental animal model. To find the ulcer index, the rats' dissected stomachs were opened slowly along their bigger curvature. Keep away of the glandular area of the stomach. Ulcer index = 10/x, where x is the ratio of the total area of the mucosa to the total area of the ulcer, is the formula for determining the ulcer index.	36
12	Thrombolytic	To assess the clot, an in vitro thrombolytic model was used. dissolving properties includes an ethanolic extract made using the rhizomes of <i>Curcuma caesia</i> . Distilled water was used as the unfavorable control, while Streptokinase performed as the study's positive control.	37
13	Anthelmintic	Three separate extracts from <i>Curcuma caesia</i> rhizomes—ethanol, chloroform, and aqueous—at different concentrations (25 mg/dl, 50 mg/dl, and 100 mg/dl) were tested on their anthelmintic properties. Albendazole (20 mg/dl) was taken as per the usual routine. The examination of anthelmintics involves determining the timeframe within which earthworms exhibit paralysis and subsequently perish when test samples are available. The most effective choice is thought to be the ethanolic extract.	38

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