**ABSTRACT**

*Curcuma caesia* is commonly known as kali haldi and it belongs to the family Zingiberaceae. This herb is available throughout north-east, central India, Papi Hills of East Godavari, West Godavari, and Andhra Pradesh. In the traditional system of medicine, fresh and dried rhizomes of *Curcuma caesia* Roxb are used in treating leucoderma, asthma, tumours, piles, bronchitis, bruises, etc. This review article presents various established facts related to the plant *Curcuma caesia* have been compiled so that proper scientific methods can be initiated to validate its traditional uses and open the door for a source of potential drugs in near future.

**Keywords:** *Curcuma caesia*, traditional uses, bioactivity.

**INTRODUCTION**

India has a long history of using plants for medicinal purposes as mentioned in Ayurveda. The significance of medicinal plants for prevention, mitigation, and cure of diseases is always recognized. History revealed that plants have been a valuable source of natural products for maintaining human health at all times. Their importance is continuously growing nowadays. Most of the people now prefer natural therapies to get rid of serious side effects of some of the present day medication.

*Curcuma* Linn. is a large genus belonging to the family Zingiberaceae. It comprises about 70 species of rhizomatous herbs distributed mostly in Southeast Asia as wild and cultivated plants. *Curcuma* species have a great importance for its medicinal value and *Curcuma caesia* has been used by various tribal communities from long before.

Kali haldi (*Curcuma caesia*) is a perennial herb with bluish-black rhizomannicine to North-East and Central India. Black Turmeric is also sparsely found in Papi Hills of East Godavari, West Godavari, and Khammam Districts of Andhra Pradesh. The rhizomes of kali haldi have a high economical importance because of its putative medicinal properties. The rhizomes are used in the treatment of smooth muscle relaxant activity, haemorrhoids, leprosy, asthma, cancer, epilepsy, fever, wound, vomiting, menstrual disorder, anthelmentic, aphrodisiac, inflammation, gonorrhoeal discharges, etc.

In Madhya Pradesh, the plant is regarded as very auspicious and is stated that a person who possesses it will never experience shortage of cereals and food. The rhizomes of the plant are aromatic in nature. The inner part of the rhizome is bluish-black in colour and emits a characteristic sweet smell, due to presence of essential oil. Traditionally, the rhizomes of *Curcuma caesia* Roxb. are used in treating leucoderma, asthma, tumours, piles, bronchitis, etc. The paste is applied on bruises, contusions, and rheumatic pains in Manipur. In Arunachal Pradesh, Adi tribes use decoction of fresh rhizome as anti-diarrhoeic. The Khamti tribe of Lohit district applied the paste of fresh rhizome in cases of snake and scorpion bite.

**METHODS**

**Botanical description**

**Morphology**

The plant is normally erect with height ranging from 0.5 to 1.0 m. It is divided into underground large ovoid tuberous rhizome often called rootstock and an erect aerial shoot along with leaves (Fig-1) and reproductive part.

**Root**

As the plant propagates with rhizome, the primary roots are not seen; however, yellow brown long fibrous and tapering

---

**KEYWORDS:** *Curcuma caesia*, traditional uses, bioactivity.
adventitious roots are present all over the surface of rhizome.

**Rhizome**
The rhizome is tuberous with camphoraceous sweet odour, about 2–6 cm in diameter, the shape and size is often variable. It is sessile, laterally flattened and covered with adventitious roots, root scars and warts. It shows longitudinal circular wrinkles on the surface giving the look of nodal and intermodal zones to the rhizomes. The surface (cork) of rhizome is dark brown, bluish black, or buff in colour. The branching is more or less sympodral. (Fig.-2).

**Leaves**
The leaves are usually present in the groups of 10–20; each leaf is broad oblong lanceolate and glabrous. A deep tarraginous purple colour is present in the middle region of the lamina. The petiole is ivory in colour and the petiole encircle each other forming pseudoxis. The variation is parallel in nature.

**Inflorescence**
It is 15–20 cm long dense spike, which arises much before the opening of leaf, the bracts are green, and the bracts of coma are deep red, which become crimson after maturation.

**Flower**
Flowers are pale yellow colour with reddish border (Fig.-3).
Calyx: 10-15 mm long, obtuse and 3 toothed. Corolla: long tubular, pale yellow lip-3 lobe semi- elliptic.

**Distribution**
This plant is widely distributed in north-east and central India. Curcuma caesia is sparsely found in Papi Hills of East Godavari, West Godavari, and Khammam Districts of Andhra Pradesh.

**Vernacular names**
Hind: Kali Haldi
Marathi: Kala-haldi
Telugu: NallaPasupu
Bengali: Kala haldi
Mizo: Ailahang, Ailaihan
Assamese: kalahaladhi
Malayalam: Kari manjal
Sanskrit: RajaniNishaa, Nishi, Ratri.

**Phytochemicalconstituents ofCurcuma caesiawas analysed by GC-MS by Pandey et al. that resulted in the identification of 30 components, representing 97.48% of the oil, with camphor (28.3%), ar-tumerone (12.3%), (Z)-Ocimine (8.2%), 1-ar-curcumene(6.8%), 1, 8-cineole (5.3%), element (4.8%), borneol (4.4%), bornyl acetate (3.3%) and curcumene (2.82%) as the major constituents.** (Pandey et al. 2003) Rastogi et al reported linalool as the major component comprising 20.42% followed by ocimine (15.66%), 1-ar-curcumene (14.84%), zingiberol (12.60), 1, 8-cineole (9.06%), and borneol (7.4%) as major constituent. The curcuma caesia rhizome oil was also analysed by Banarjee et al. and reported almost similar composition consisting of (+) linalool (20.42%), ocimine (15.66%), 1-ar-curcumene (14.84%), zingiberol (12.60), 1, 8-cineole (9.06%), anda-borneol (7) d-camphore (18.88) as major constituent.

**Traditional uses of Curcuma caesia**
The fresh and dried rhizomes of curcuma caesia are used for treatment of various diseases.

The following uses have been reported:
1. Dried rhizomes and leaves of curcuma caesia Roxb are used in piles, leprosy asthma, cancer, wounds, impotency, fertility, tooth ache, vomiting, and allergies.
2. Fresh rhizome decoction is used as anti-diarrhoeic and to get relief from stomach ache. The fresh rhizome paste of curcuma caesias applied during the snake bite and scorpion bite. The dried powder used to mixed with seed powder of Andrographis paniculata Wall ex Nees and applied during insect and snake bite.
3. The rhizome is used for the treatment of cough, fever, dysentery, worm infection.
4. The fresh rhizomes are used in leprosy, cancer, epilepsy, anti-helmentic, aphrodisiac, gonorrhoreal discharge.
5. Rhizome of Curcuma caesia is grounded in the form of paste in rheumatic arthritis.
6. The rhizome of Curcuma caesia is grounded and applied in the form of paste in rheumatic arthritis.\(^{16}\)  
7. Crushed rhizome paste is applied against cur or injury to control bleeding and quick healing.\(^{16}\)  
8. The rhizome Curcuma caesia is administered during inflammation of tonsils.\(^{17}\)  
9. The roots of the Curcuma caesia are grounded into powder and used water to treat gastric disorder.\(^{18}\)  

**Biological activities**  

i) Neuropharmacological assessment of Curcuma Caesia Rhizome in experimental animal models  
The ethanol extract of Curcuma caesia exhibited an important neuropharmacological activity. The study was conducted by Karmakaret al. in adult male Swiss albino mice to evaluate the methanol extract of C. caesia rhizome for some neuropharmacological activities. Methanol extract Curcuma caesia at 50 and 100 mg/kg body weight was evaluated for analgesic activity against acetic acid-induced writhing and tail flick tests. Locomotors activity was estimated by means of an actophotometer. Anticonvulsant effect was assessed against pentylentetrazol-induced convulsion in mice and muscle relaxant effect was evaluated by using rota-rod apparatus. The methanol extract of Curcuma caesia showed significant inhibition of writhes in a dose dependent manner and also exhibited significant increase in tail flicking reaction time of mice but the effects were not dose dependent. Peak analgesic effect was increase up to a maximum. The methanol extract of Curcuma caesia significantly depressed the locomotors activity in mice in a dose dependent fashion and the methanol extract of Curcuma caesia pre-treatment exhibited significant and dose dependent protection from PTZ-induced convulsions in mice by delaying the onset of convulsions. The methanol extracts of Curcuma caesia significantly and dose dependently decreased the fall off time in mice demonstrating its muscle relaxant property.\(^{19}\)  

ii) Scavenging activity of Curcuma caesia rhizome against reactive oxygen and nitrogen species  
Methanol extracts of rhizome of Curcuma caesia was investigated by Karmakaret al. for their in vitro antioxidant studies with reactive oxygen species (ROS) and reactive nitrogen species (RNS) because they are responsible for all the above diseases. Effect of MECC on ROS and RNS were evaluated in different in-vitro methods like 1,1 diphenyl-2-picrylhydrazil radical, hydroxyl radicals, superoxide anions, nitric oxide, hydrogen peroxide, peroxynitrite and hypochlorous acid. Lipid peroxidation, total phenolic content was also measured by standard assay method. The extract showed significant antioxidant activities in a dose dependent manner. The result obtained in the study indicated that the methanol extract of C. caesia rhizome is a potential source of natural antioxidant.\(^{20}\)  

iii) Comparative antioxidant activity of non-enzymatic and enzymatic extracts of Curcuma zedoaria, Curcuma angustifolia and Curcuma caesia  
A study was conducted by Dhal et al. to compare the efficacy for antioxidant activity of both the crude (non-enzymatic) and enzymatic extracts of three important medicinal plants Curcuma zedoary, Curcuma caesia and Curcuma angustifolia respectively. Both the enzymatic and crude extracts of the rhizome and leaves of these plants were analyzed for their free radical-scavenging activity in different in vitro systems, e.g. DPPH radical scavenging activity, hydroxyl radical scavenging activity and different antioxidant enzymatic assay. The hydroxyl scavenging activity of C. Caesia was found to be 55.32±0.2 at 200μg/ml of crude extract. The hydroxyl radical scavenging activity of C. caesia was found to be 40.26±0.01 of the crude extracts as compared to ascorbic acid (standard), which was found to be 52.33 ± 0.40 at the concentration of 50 μg/ml. In case of enzymatic extracts DPPH scavenging activity of C. caesia was found to be 31.2±0.8 at 200μg/ml and maximum antioxidant activity was found in catalase, superoxide dismutase and glutathione peroxidase enzyme.\(^{21}\)  

iv) Anti-oxidant and antimicrobial activity of essential oils from nine starchy Curcuma species  
The essential oils of nine rhizomes of Curcuma species were isolated by hydro distillation and analysed by G R et al for total phenols, DPPH scavenging activity and reducing power. Antibacterial activity was determined against Bacillus subtilis, Staphylococcus aureus and E.coli. Nine tuberising Curcuma species which were consider for the study were namely C. aeruginosa, C.amada, C. aromatica, C. brog, C. caesia, C. malabarica, C. rakhakanta, C. sylvatica and C. zedoary. The results showed that total phenolic content in the oils ranged from 4 – 83 μg gallic acid equivalents (GAE)
/µl oil. Most of the oils possessed high antioxidant activity, which was moderately correlated with phenolic content. Oils from C. Caesia exhibited maximum antibacterial activity against B. Subtilis22.

v) A comparative study of phenol content and antioxidant activity between non-conventional Curcuma caesia Roxb. and Curcuma amada Roxb.

Krisnanaraj et al. studied to investigate the phenol content and antioxidant activity of a nonconventional Curcuma sp. namely, Curcuma caesia in comparison with another species, Curcuma amada. The reducing power and superoxide, ABTS and DPPH radical scavenging activities were determined to compare the antioxidant activity. The total phenol content of methanol extracts of rhizomes was found to be 37.64 and 44.33 mg TAE/g dry materials, respectively. These phenolic compounds are generally responsible for antioxidant activity. The reducing power of C. caesiawas more than the C. amada, similarly superoxide, ABTS and DPPH scavenging ability of C. caesiarhizomewas more than the C. amada23.

vi) Preliminary mechanistic studies on the smooth muscle relaxant effect of hydroalcoholic extract of Curcuma Caesia

Methanol extract of Curcuma caesia exhibited a significant smooth muscle relaxation activity. To evaluate the smooth muscle relaxing activity, Arulmozhi et al. used Guinea pig and Rabbit as animal model. Methanolic extract of Curcuma caesia at a dose of (50-800 µg/ml) produce relaxation in trachea tissues precontracted with carbachol. It also showed a smooth muscle relaxation effect in presence of various receptor antagonists e.g. such as propranolol, glibenclamide, 2,5'-dideoxyadenosine, α-chymotrypsin, L-NNA and methylene blue. Curcuma caesiaata concentration of 30µg/ml exhibited inhibitory effect on Ca²⁺-induced contraction in isolated rabbit aorta.

vii) Anxiolytic and CNS depressant activities of methanol extract of Curcuma caesia rhizome

Curcuma caesia Roxb is proved to be a significant anxiolytic and depressant herb. The study was conducted by Karmakaret al., the methanol extract of Curcuma caesia produced significant and dose dependent reduction in the prolongation of sleep induced by the pentobarbitone. The methanol extract at dose of 50 and 100mg/kg, i.p. showed a significant prolongation of sleep duration whereas methanol at higher dose 100mg/kg, i.p is more effective than 50mg/kg body weight24.

viii) Study of the anti-ulcerogenic activity of the Ethanolic extracts of rhizome of Curcuma Caesia against gastric ulcers in experimental animals

Curcuma caesiahas significant anti-ulcer activity. The ethanol extract of Curcuma caesia exhibited significant anti-ulcer activity in the experimental animal model studied by Swarnamoni et al. The albino rats of either sex were used to evaluate the anti-ulcer activity. The treatment of rats with ethanol extract of Curcuma caesia (EECC-500mg/kg) produced significant reduction of ulcer index, gastric acid volume, pepsin, free and total acidity along with increased production of gastric mucus in Aspirin induced ulceranimal model. Aspirin treatment caused a significant increase in the ulcer index, pepsin activity, free and total acidity, volume of gastric juice and decreased mucus production. Curcuma caesia extract decreased the gastric volume and gastric acid secretion significantly by pretreatment with aspirin25.

ix) Effect of Curcuma Caesia leaves on rice seed germination and seedling establishment

Curcuma caesia Roxb leaves exhibited a significant effect on rice seed germination and secondary root formation. The maximum radical growth as well as secondary root formation was shown by rice seed treated with the presence of C. caesia leaves placed above and below the seed in comparison with the distilled water treated, and leaves extract in water 5%(w/v). The experimental plant did not exhibit such stimulation effect in rice seed treated with extract because during grinding and filtration, the essential oil get volatised and escaped. While that of cut leaves gradually escaped and spread inside the patridishes giving stimulation to the germination of the seeds. The result obtained in this study indicated that C. Caesia leaves have potential rice seed germination activity due to the presence of volatile oil26.

CONCLUSIONS

The present study emphasizes the knowledge on the plant Curcuma caesia Roxb. The rhizomes of the plant have enough bioactive properties as shown in the different animal model. The phytoconstituents are also proved to be identified. This data may signify the investigations of different bio-active compounds from the plant Curcuma caesia Roxb and the requisite level of activity.


REFERENCES


5. Sarangthem K and Haokip MJ.