

A Review Oncurcuma Zedoaria

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ABSTRACT

A perennial herb found in tropical nations like Thailand, Japan and India is called Curcuma zedoaria. Ayurveda and other traditional remedies employ portions of this plant to cure a variety of illness, including dyspepsia, cancer, diarrhoea and flatulence. For their basic medical needs, about 80% of the world's population uses herbal or phytomedicines. Using phytomedicines to treat a wide range of illnesses and conditions is said to be extremely safe and has few to no negative side effects. Curcuma zedoaria, sometimes referred to as white turmeric, is one of the major crude medications that belongs to the Zingiberaceae family and genus curcuma. Because of the extensive spectrum of phytoconstituents, it has historically been known to possess numerous biological activities and be employed for several medicinal acts.

Key Words: Curcuma zedoaria, Botanical description, Phytoconstituents, Cultivation, Research investigation.

I. INTRODUCTION

Zedoaria is a perennial herbaceous and rhizomatous plant with fleshy roots, underground cylindrical branches or rhizomes, an upright pseudo stem, and a corm. Some roots grow terminal storage structures, or "t-root", which are elongated, tuber like roots that are rounded on one end. The third order rhizomes of epical buds and the corms axillary buds emerge above ground as inflorescences between March and April. This about 30 cm tall basal flower spike emerges just ahead of the foliage. A vegetative growth always appears on the node nears the flower spike. More vegetative branches appear, but no more flower

buds open. New aerial shoot corms are the site of the emergence of new branches.^[2]

Curcuma zedoaria has been employed in both the Unani and Ayurvedic Medical Systems since ancient times worldwide. It can be grown in the wild or under cultivation and is endemic to humid woods in tropical and subtropical regions as well as the eastern Himalayas.^[1,21,22]

This study aims to provide thorough analysis of C. zedoaria, covering its phytochemistry, botanical description, morphology, cultivation, general and medicinal uses, research investigation, etc.



Binominal name: Curcuma zedoaria (Christm.) Roscoe

Synonyms:

Amomum latifolium Lam
Amomum latifolium Salisb
Amomum zedoaria Christm
Costus luteus Blanco
Curcuma malabarica Velay
Curcuma pallida Lour
Curcuma speciosa Link

Vernacular names:

Hindi	Kachur Nar Kachur Ban Haldi Gandhmul
English	Round Zedoary White turmeric
Persian	Jadwar
Urdu	Zaranbad
Malayalam	Kachalam
Sanskrit	Karchura
Tamil	Kichili Kilangu
Marathi	Kachora
Telugu	Kachoramu ^[1,7,8]

II. GEOGRAPHICAL DISTRIBUTION

Curcuma zedoaria is commonly grown in China, Japan, Brazil, Nepal and Thailand, yet it is a native to Bangladesh, Sri Lanka and India. Although originally from south and southeast Asia, the plant has since spread to other areas, including the U. S State of Florida. One of the earliest foods plants used by the Austronesian peoples was Zedoary. During the Austronesian expansion (around 5000 BP), they were dispersed over the Pacific islands and Madagascar in prehistoric times.^[4]

III. BOTONICAL DESCRIPTION

The plant has an ovoid root stock, numerous sessile cylindric, and many oblong tubers that terminate long fibres, leaves that are 30 to 60 cm oblong, acuminate, narrowed to the base, and petioles longer than the blades, vernal spikes that are 15 × 7.5-centimetre broad, flowering bracts that are 3.75 cm ovate, green, and frequently slightly tinged with red; bracts that are numerous, spreading bright red, and pale-yellow flowers that are relatively shorter than the bracts.

Taxonomical classification:

Kingdom	Plantae
Phylum	Streptophyta
Class	Equisetopsida
Subclass	Magnoliidae
Order	Zingiberales
Family	Zingiberaceae
Genus	Curcuma
Species	Curcuma zedoaria

IV. CULTIVATION

Nursery technique:

Creating propagules: The crop is not cultivated in the nursery. Pieces of rhizomes are sown straight into the field. Propagule rate and pretreatment: Planting rhizome propagules at a 40 cm × 20 cm spacing requires 10-12 quintals per hectare. There is no need to apply any special care before seeding.^[17]

Planting in the field:

Land preparation and fertilizer application:

Preparing the land and applying fertiliser for the purpose of conditioning soil, one-disc harrow and 2 to 3 desi ploughings are required. Before planting, the soil is carefully mixed with 150 quintals per

hectare of farmyard manure (FYM) and 100:80:60kg/ hectare of nitrogen, phosphorus, and potassium (NPK).

Planting and optimum spacing: Planting and the ideal distance apart depending on the availability of soil moisture, the crop can be sown at any time between April and June. Rhizome segments are sown straight into the field in rows, 20 cm apart, with a 40 cm distance between rows. When the soil is moist, rhizomes sprout in 10 to 12 days. If not, they stay dormant in the soil and sprout after the first rain. About 1,25,000 propagules per hectare, spaced 40cm apart from each other, are required for planting. A slightly wider spacing, though, might boost the output.^[17]

Intercropping system: System of intercropping for this crop, both a single and a mixed cropping system can be used in the partial shade of trees with a thin canopy.

Interculture and maintenance practice: After planting, the crop needs two to three weeding spaced 3060 and 90 days apart. After that the weeds are suppressed by the plants. It is not necessary to apply anymore organic or inorganic fertiliser.

Irrigation practice: Techniques for irrigation in the summer, the crop needs three to four light irrigations each month; in the winter, it needs two to three irrigation per month. The frequency of irrigation is determined by the soil and weather

Disease and pesticide control: Curcuma zedoaria has not shown any outward sign of sickness, physiological conditions, or other condition during the experimental trials.^[17]

V. COLLECTION

Crop maturity takes place in six to eight months on average. Rhizome harvesting takes place between November and December. After thoroughly washing the rhizomes in water to get rid of any dirt, they are sliced, dried in the sun to get rid of any surface moisture, and then dried once more in the shade. October through November are the ideal months to harvest leaves.^[17]

VI. STORAGE

Four commercial uses, sliced and dried rhizomes are kept in a cold environment. Rhizomes are tilled into sand piles or dirt pits until March in order to obtain planting material.^[17]

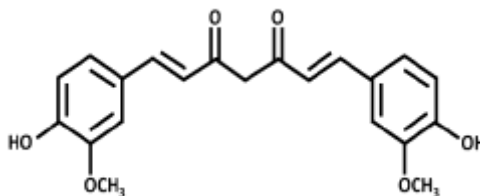
VII. PHYTOCONSTITUENTS

Essential oils such as gums, starch, curcumin, arabin and others are abundant in *C. zedoaria*. More than ten sesquiterpenes were extracted from the rhizome of *C. zedoaria*,

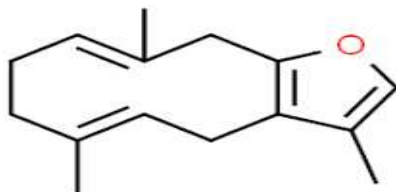
Including, furanodienone, curzerenone, curzeone, germacrone, furan diene, 13-hydroxy germacrone, dihydrocurdione, curcumenone, zedorone, zedoaronediol.^[18,4]

From the aqueous acetone extract of the *zedoaria* rhizome, 36 known sesquiterpenes, 2 diarylheptanoids, and 6 new guaianane or secoguaiane-type sesquiterpenes, namely 4-epicurcumenol, neocurcumenol, Gajutsulactones A and B, and zedoarolides A and B, were isolated. Based on physicochemical and chemical data, their stereo structures were clarified. 2 guaianane derivatives were extracted from *C. zedoaria*'s rhizomes. Zedoalactone A and B's structures were determined via ¹H and ¹³C NMR spectroscopy as well as by comparing them to compounds that were closely related. Zedoarol, 13-hydroxygermacrone, and curzeone were isolated and their structures clarified.

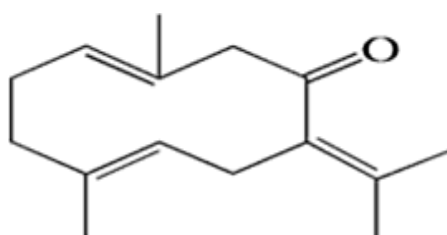
Thirty-seven constituents or approximately 87.7% of the total oil, were identified; The main constituents were curzerenone (22.3%), followed by 18-cineole (15.9%) and germacrone (9.0%). The examination of chemical of the essential oil of *C. zedoaria* rhizomes, conducted by gas chromatography and GC-MS, revealed by the presence of 1,8-cineole (18.5%), cymene (18.42%), α -phellandrene (14.9%) and β -eudesmol (10.6%). Sesquiterpene hydrocarbons (38%) and oxygenated sesquiterpenes (13.5%) were the principal constituents of *C. zedoaria*'s oil. The primary components of the leaf oil were dehydrocurdione (9%), isoborneol (7%) and α -terpinylacetate (8.4%). Using technology, the volatile oil from *C. zedoaria* was analysed chemically, and the main compounds found were β -turmerone (19.88%), 1,8-cineole (8.93%), and zingiberene (7.84%).^[5]



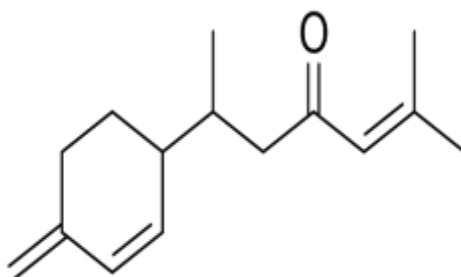
Curcumin



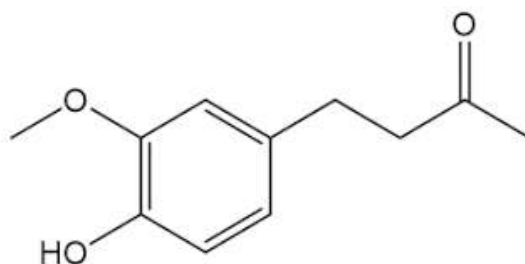
Furano diene



Germacrone



B-turmerone



Zingiberene

VIII. USES

GENERAL USE:

It is generally used for the treatment of menstrual disorders, dyspepsia, vomiting and for cancer. While the root is used to cure fever, cough, dyspepsia, and flatulence, rural residents employ the rhizome for its rubefacient, carminative, expectorant, demulcent and diuretic qualities.^[5]

MEDICINAL USES:

Curcuma zedoaria tuber extracts have antibacterial properties against *Aspergillus Niger*, *Bacillus subtilis*, *Candida albicans*, and *Klebsiella*

pneumonia in addition to acting as digestive stimulants and carminatives. Additionally, it includes sesquiterpene and curcumenol, which have hepatoprotective, neuroprotective, anti-inflammatory, and anti-cancer properties. These substances also help lower nitric oxide generation generated by lipopolysaccharide, which lowers the amount of proinflammatory cytokines. *C. zedoaria*'s rhizomes contain Curcuzedoalide, which includes apoptosis in human gastric cancer cell lines to exhibit antiproliferative activity.^[19]

IX. RESEARCH INVESTIGATION

PHARMACOLOGICAL RESEARCH STUDY INFORMATION

Antimicrobial activity:

Curcuma zedoaria utilizing the agar diffusion method is active against two gram-positive bacteria, namely staphylococcus aureus and bacillus subtilis, two gram-negative bacteria, namely, Enterococcus faecalis, Escherichia coli, and three fungal strains, namely Aspergillus Niger, A. flavus, and a fusarium oxysporum, and one yeast known as Candida albicans. While antifungal efficacy is assessed against different fungal strains using potato dextrose agar, Curcuma zedoaria is grown on nutrient agar media.^[10,11]

Anti-venom activity:

It inhibits activity effect on binding of Anti-cobra antibody venom to antigen, cobra venom, in the modification of enzyme-linked immune sorbent assay (ELISA). Extracts produce toxin activity extending concentration time of diaphragm muscles after envenomation and had a potency to protect cellular proteins from venom degradative enzyme.^[12]

Anti-fertility activity:

The ethanolic extract of the C. zedoaria exhibited anti-fertility activity on rat testis seminiferous tubule cells. When White Turmeric rhizome is administered, they have seen reductions in the number of spermatogenic cell layer and mitotic count, with P values less than 0.05. According to this study, curcumin from rhizomes has a strong anti-fertility effect on rats.^[15]

Hypotensive activity:

C. zedoaria has a hypotensive impact on the endothelium of hypertensive rats. The results were compared to captopril, the industry standard.^[12]

Anti-inflammatory activity:

The ethanolic extract of the C. zedoaria exhibited anti-inflammatory properties in rat paw models of inflammation caused by carrageenan. As a standard agent diclofenac sodium was employed and contrasted with the control groups.^[13] The anti-inflammatory properties of petroleum ether and chloroform extract of Curcuma zedoaria rhizomes has been investigated. According to the investigation, test samples' anti-inflammatory effect was $P < 0.001$ when compared to regular medications. Maximum and inflammatory effects

were observed with petroleum ether extract at 200 mg/kg, and chloroform extract at 400 mg/kg.^[14]

Anti-oxidant activity:

Using DPPH, ABTS, and reducing power assay utilizing the scavenging method, exhibited anti-oxidant activity of essential oil extracted from the rhizomes of the white turmeric.^[10] Curcuma zedoaria Rose's antioxidant activity was documented by utilizing the oxygen radical antioxidant capacity assay method with quercetin serving as the standard agent.^[16,18]

BOTANICAL RESEARCH STUDY INFORMATION

MORPHOLOGICAL EVALUATION:

Zedoary is a tall, aromatic, rhizomatous herb that grows annually or biennially. The height is 1.8 metre. Large, pale yellow or whitish rhizomes are inside. The aromatic roots terminate in ellipsoid tubers. The taste of the edible zedoary root is more akin to ginger, with the exception of a fairly shape after taste. Its white interior and mango-like scent are also present. The shoot lacks a definite aerial stem, but it does have a pseudo stem made up of four to six sheathing leaf bases that are long and densely overlapped. Large up to one metre long, oblong deeply veined leaves that frequently have a purplish center and characteristics of this plant. A Spathe that emerges from the rhizome is called Inflorescence. Pale yellow or white flowers with brilliant reddish green bracts are seen. The corolla tube is funnel-shaped and pink in colour. The calyx has large, toothed teeth and is pale. May and June are when flowers bloom, but fruiting happens infrequently. Fruits is a capsule that is oval.^[17]

MICROSCOPICAL EVALUATION:

The Outermost layer of cells in a rhizome have a rectangular shape with tangential elongation. In elder rhizomes, cork takes the place of the epidemic. Cork cells have a 7 to 10 rows and thin walls. In ground tissue, 2 distinct regions have emerged, just below the Cork is the outer cortex, which contain curcumin, a yellowish substance. Inner cortex has unique endodermis divides the inner cortex from the outer cortex. In the ground tissue, starch grains are closely packed into nearly old parenchymatous cells. These grains are flattened, rectangular or ovoid, simple and rather large. They have many striations and a little protrusion at one end. Endodermis consists of elongated, thin-walled cells with radially expanded

walls. Tangentially elongated cells are also seen in the cell layer of the endodermis.^[20]

CONCLUSION

The current analysis comes to the conclusion that one of the most significant traditional herbal remedies is Curcuma Zedoaria. Plants and their extracts have long been used to treat a wide range of human ailments. Complex phytoconstituents such as curcumin, ethyl p-methoxycinnamate, Beta-turmerone, Beta-eudesmol, Zingiberene, Dihydrocurcumin, Furano diene, Alfa-phellandrene, 1-8 cineole, beta-elemene, and germacrone have been reported to be present in various plant sections. Curcuma zedoaria has been shown to have a wide range of biological activities, including anti-inflammatory, wound healing, antioxidant, antimicrobial, antiviral, insecticidal properties, according to reports on scientific validation of its pharmacological and biological effects.

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