EUROPEAN JOURNAL OF BIOMEDICAL AND PHARMACEUTICAL SCIENCES
http://www.ejbps.com

ISSN 2349-8870
Coden USA: EJBPBO
Volume: 13
Issue: 9
Year: 2026

A REVIEW ON AND PHARMACOGNOSTIC PHARMACOLOGICAL ACTIVITIES OF *CURCUMA LONGA* L.

Abhinav Shukla*, Diwakar Shukla, Amit Kumar Agrahari, Vibha Chaudhary, Rudra Pratap, Sanju Yadav, Sonali

Praduman Singh SPS Pharmacy College, Basti.

***Corresponding Author: Abhinav Shukla**

Praduman Singh SPS Pharmacy College, Basti.

DOI: https://doi.org/10.5281/zenodo.22158820

How to cite this Article: Abhinav Shukla*, Diwakar Shukla, Amit Kumar Agrahari, Vibha Chaudhary, Rudra Pratap, Sanju Yadav, Sonali (2026). A Review On And Pharmacognostic Pharmacological Activities Of Curcuma Longa L. European Journal of Biomedical and Pharmaceutical Sciences, 13(8), 5–9.

Article Received on 28/07/2026 **Article Revised on 18/08/2026** **Article Published on 01/09/2026**

ABSTRACT

Turmeric (*Curcuma longa* L.) is a popular natural drug, traditionally used for the treatment of a wide range of diseases. Its root, as its most popular part used for medicinal purposes, contains different types of phytochemicals and minerals. This review summarizes what is currently known on biochemistry, safety, pharmacological activities (mechanistically), and clinical applications of turmeric. In short, curcumin is considered as the fundamental constituent in ground turmeric rhizome. Turmeric possesses several biological activities including anti-inflammatory, antioxidant, anticancer, antimutagenic, antimicrobial, antiobesity, hypolipidemic, cardioprotective, and neuroprotective effects. These reported pharmacologic activities make turmeric an important option for further clinical research. Also, there is a discussion on its safety and toxicity.

KEYWORDS: Pharmacognostic Study Pharmacological Activity.

INTRODUCTION

Introduction Medicinal plants are the fundamental components of any indigenous medicine system. The use of different plant species for the treatment of different kinds of health hazards is the oldest form of health care system acknowledged in human civilization all over the globe (Fransworth, 1994), and presently more than 80% of the world populations, mostly of the third world countries depend on herbal medication for their primary health care (WHO, 1993). The genus Curcuma L. belonging to the family Zingiberaceae, originated in the Indo – Malayan region (Purseglove, 1974)[1] has a wide spread occurrence in the tropics of Asia to Africa and Australia.The genus globally consists of about 80 species of which 40 are reported from India (Sashikumar, 2005). The word Curcuma derived from the Arabic word "Kurkum" which means yellow colour, it is mainly due to the yellow colour of the underground rhizome. Curcuma is known as the golden spies of India. The rhizome is vegetative in nature as well as the propagating part which is traditionally used in medicine and food since ancient times (Srimal, 1997)[2] The use of different Curcuma species has been given in the vedic culture of India, nearly 4000 years back. It reached China before the 7th century, East Africa in the 8th century and West Africa in the 13th century. This multipurpose ancient and sacred spice of India, also known asIndian Saffron‟, finds a place in offerings on religious and ceremonial occasions (Khan et al., 2014). India is the largest producer and exporter of turmeric in the world accounting for more than 50% of the world‟s trade; fulfilling 90% of world's demand (APEDA, 2018; Olojede et al., 2009).[3]

TURMERIC

Synonyms

Saffron Indian; haldi (Hindi); Curcuma; Rhizoma curcumae.

Biological Source

Turmeric is the dried rhizome of *Curcuma longa* Linn. (syn. *C.domestica* Valeton)., belonging to family Zingiberaceae.

TAXANOMICAL CLASSIFICATION

Kingdom: Plantae Phylum: Tracheophyta Class: Liliopsida Order: Zingiberales Family: Zingiberaceae.
Scientific name: Curcuma pseudomontana J. Graham

Common name(s) English: Hill turmeric.

Geographical Source

The plant is a native to southern Asia and is cultivated extensively in temperate regions. It is grown on a larger scale in India, China, East Indies, Pakistan, and Malaya.

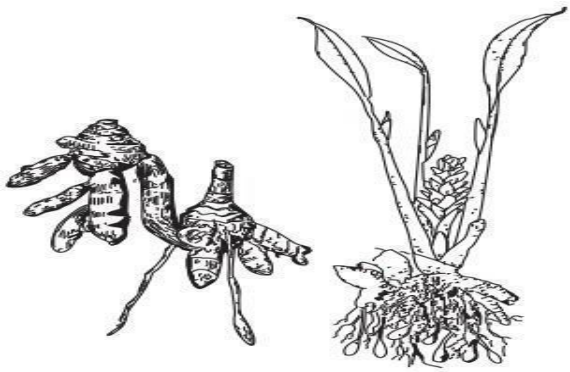
Cultivation

Turmeric plant is a perennial herb, 60–90 cm high with a short stem and tufted leaves; the rhizomes, which are short and thick, constitute the turmeric of commerce. The crop requires a hot and moist climate, a liberal water supply and a well-drained soil. It thrives on any soil-loamy or alluvial, but the soil should be loose and friable. The field should be well prepared by ploughing and turning over to a depth of about 30 cm and liberally manured with farmyard and green manures. Sets or fingers of the previous crop with one or two buds are planted 7 cm deep at distance of 30–37 cm from April to August. The crop is ready for harvesting in about 9–10 months when the lower leaves turn yellow. The rhizomes are carefully dug up with hard picks, washed, and dried.[4]

Cultivation of turmeric

Characteristics

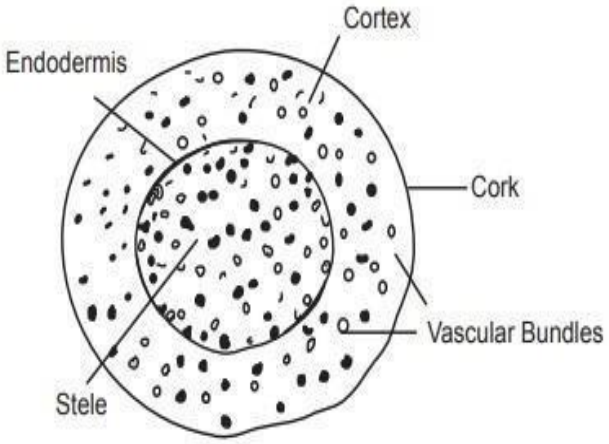
The primary rhizomes are ovate or pear-shaped, oblong or perform or cylindrical and often short branched. The rhizomes are known as 'bulb' or 'round' turmeric. The secondary, more cylindrical, lateral branched, tapering on both ends, rhizomes are 4–7 cm long and 1–1.5 cm wide and called as 'fingers'. The bulbous and finger-shaped parts are separated and the long fingers are broken into convenient bits. They are freed from adhering dirt and fibrous roots and subjected to curing and polishing process. The curing consists of cooking the rhizomes along with few leaves in water until they become soft. The cooked rhizomes are cooled, dried in open air with intermittent turning over, and rubbed on a rough surface. Color is deep yellow to orange, with root scar and encircling ridge-like rings or annulations, the latter from the scar of leaf base. Fracture is horny and the cut surface is waxy and resinous in appearance. Outer surface is deep yellow to brown and longitudinally wrinkled. Taste is aromatic, pungent and bitter; odour is distinct.[5]



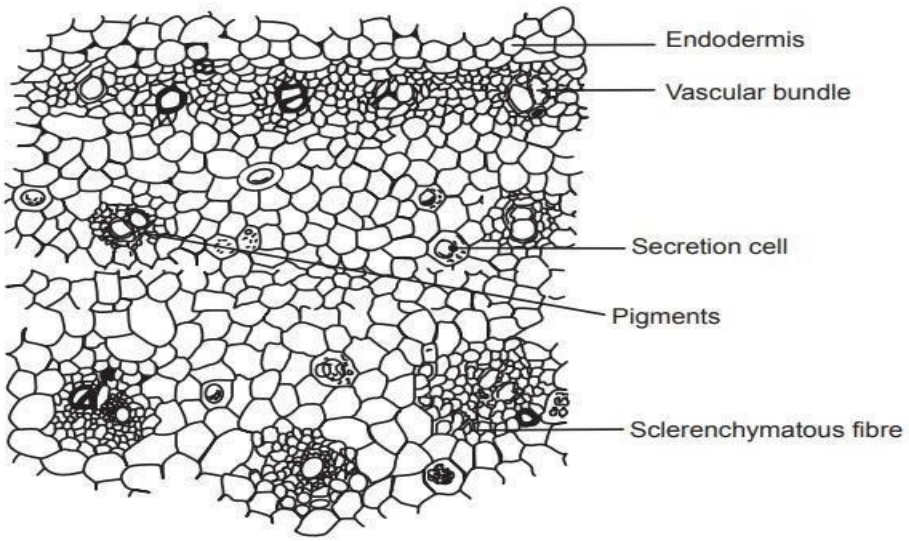
Rhizomes and whole plant of turmeric.

MICROSCOPY

The transverse section of the rhizome is characterized by the presence of mostly thin-walled rounded parenchyma cells, scattered vascular bundles, definite endodermis, few layers of cork developed under the epidermis, and scattered oleoresin cells with brownish contents. The epidermis is consisted of thick-walled cells, cubical in shape, of various dimensions. The cork cambium is developed from the sub-epidermal layers and even after the development of the cork, the epidermis is retained. Cork is generally composed of four to six layers of thin-walled brick-shaped parenchymatous cells. The parenchyma of the pith and cortex contains grains altered to a paste, in which sometimes long lens shaped unaltered starch grains of 4–15 μm diameter are found. Oil cells have suberised walls and contain either orange-yellow globules of a volatile oil or amorphous resinous masses. Cortical vascular bundles are scattered and are of a collateral type. The vascular bundles in the pith region are mostly scattered and they form discontinuous ring just under the endodermis. The vessels have mainly spiral thickenings and only a few have reticulate and annular structure.[60]



T.S. (schematic) of turmeric rhizome.



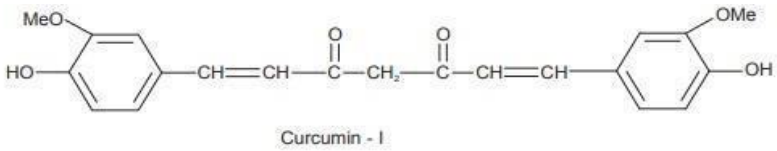
Transverse section of turmeric rhizome.

Morphological Character

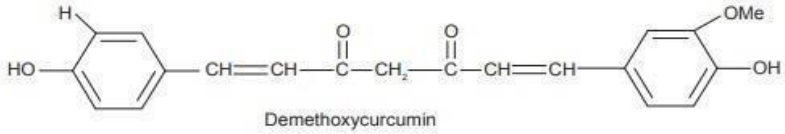
Perennial herb up to 1.0 m in height; stout, fleshy, main rhizome nearly ovoid (about 3 cm in diameter and 4 cm long). Lateral rhizome, slightly bent (1cm _2–6cm), flesh orange in colour; large leaves lanceolate, uniformly green, up to 50cm long and 7–25cm wide; apex acute and caudate with tapering base, petiole and sheath sparsely to densely pubescent. Spike, apical, cylindrical, 10–15cm long and 5–7 cm in diameter. Bract white or white with light green upper half, 5–6 cm long, each subtending flowers, bracteoles up to 3.5 cm long. Pale yellow flowers about 5cm long; calyx tubular, unilaterally split, unequally toothed; corolla white, tube funnel shaped, limb 3-lobed. Stamens lateral, petaloid, widely elliptical, longer than the anther; filament united to anther about the middle of the pollen sac, spurred at base. Ovary trilocular; style glabrous. Capsule ellipsoid. Rhizomes orange within.[7,21]

Chemical Constituents

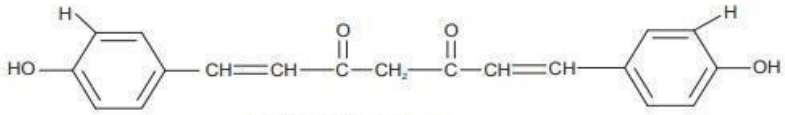
Turmeric contains yellow colouring matter called as curcuminoids (5%) and essential oil (6%). The chief constituent of the colouring matter is curcumin I (60%) in addition with small quantities of curcumin III, curcumin II and dihydrocurcumin. The volatile oil contains mono-and sesquiterpenes like zingiberene (25%), α-phellandrene, sabinene, turmerone, arturmerone, borneol, and cineole. Choleretic action of the essential oil is attributed to β-tolylmethyl carbinol. The volatile oil also contains α- and β-pinene, camphene, limonene, terpinene, terpinolene, caryophyllene, linalool, isoborneol, camphor, eugenol, curdione, curzerenone, curlone, AR-curcumenes, β-curcumene, γ-curcumene. α- and β-turmerones, and curzerenone.[8,20]



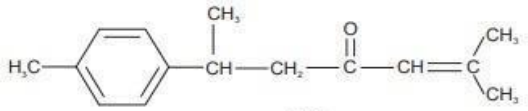
Curcumin - I



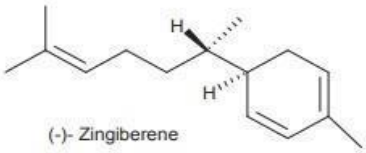
Demethoxycurcumin



Bis-demethoxycurcumin



AR-turmerone



(-)- Zingiberene

Chemical Tests

1. Turmeric powder on treatment with concentrated sulphuric acid forms red colour.
2. On addition of alkali solution to Turmeric powder red to violet colour is produced.
3. With acetic anhydride and concentrated sulphuric acid Turmeric gives violet colour. Under UV light this colour is seen as an intense red fluorescence.
4. A paper containing Turmeric extract produces a green colour with borax solution.
5. on addition of boric acid a reddish-brown colour is formed which, on addition of alkalies, changes to greenish-blue.
6. A piece of filter paper is impregnated with an alcohol extract, dried, and then moistened with boric acid solution slightly acidified with hydrochloric acid, and redried. Pink or brownish-red colour is developed on the filter paper which becomes deep blue on addition of alkali.[9]

Uses

- Turmeric is used as aromatic, anti-inflammatory, stomachic, ureic, anodyne for billiary calculus, stimulant, tonic, car minative, blood purifier, antiperiodic, alterative, spice, colouring agent for ointments and a common household remedy for cold and cough. Externally.[10]
- it is used in the form of a cream to improve complexion.
- Dye-stuff acts as a cholagogue causing the contraction of the gall bladder.
- It is also used in menstrual pains. Curcumin has choleretic and cholagogue action and is used in liver diseases.
- Curcumin is a nontoxic authorized colour, heat resistant and sensitive to changes in pH. Curcuminoids have antiphlogistic activity which is due to inhibition of leukotriene biosynthesis. ar-Turmerone has antisnake venom activity and blocks the haemorrhagic effect of venom.[15,16]
- Bone cancer Dennis and coworkers demonstrated a novel skylight in amalgamation treatment by exploiting a synthetic analogue of natural compound pancratistatin with the curcumin, for the management of osteosarcoma Although curcumin has strong antiproliferative and anti-inflammatory properties, its low water solubility limits its uses. One controlled study described the preparation and characterization of nanocurcumin using poly-lactic-co-glycolic acid. It seems that water solubility and antitumor activity of the mentioned nanoparticulate formulation significantly improved.[11,12]
- Lung Cancer *C. longa* is presently labeled to own tumor inhibiting gears not only in vitro but also in vivo. It has been testified that curcumin can progress the tumor hindering efficiency of docetaxel in lung cancer. Likewise, synchronized administration of curcumin and docetaxel results in slight toxicity to normal tissues as well as the bone marrow and liver.
- Blood and Other Cancers-Additionally, curcumin is able to repress the growth of a variety of malignant cell types together with the lymphoma cells. The treatment of Burkitt's lymphoma cell lines with curcumin in combination with ionizing radiation (IR) indicates that curcumin application increases the sensitivity of lymphoma cells to IR-initiated apoptosis and improves G2/M phase arrest in the cell cycle.[14]
- Antioxidant and Anti-Inflammatory Activity Recently, especial attention has been paid to turmeric due to its antioxidant activities which are carried through direct scavenging of oxygen radicals and stimulating antioxidant responses by nuclear factor erythroid 2-related factor 2 (Nrf2) activation. That feature, besides the favorable outcomes on the endothelial function and the inflammatory state of the tissue and plasma, indicated that it was helpful for the treatment of

diabetic microangiopathy potentially.[13]

Adulteration

The genuine drug is adulterated with the rhizomes of *Acorus calamus.*

Marketed Products

It is one of the ingredients of the preparations known as J.P. Nikhar oil, J.P. Kasantak (Jamuna Pharma), Diabecon, Purian (Himalaya Drug Company), and Respinova (Lupin Herbal Laboratory).

REFERENCE

1. Hooker JD. The flora of British India. J AOAC, 1882; 32: 291-4.
2. Cook T. The Flora of the Presidency of Bombay. Vol. I-III. Calcutta: Sri Gouranga Press Pvt Ltd.; 1903.
3. Cooke T. The Flora of Presidency of Bombay. Vol. 2. London: Taylor & Francis, 1908; p. 750.
4. Duthie JF. Flora of the Upper Gangetic Plain and of the Adjacent Siwalik and Sub Himalayan Tracts. Calcutta, India: Government Printing Press, 1911.
5. Bamer CJ. Plants of Punjab, Superintendent. Lahore, Pakistan: Government Printing, 1916.
6. Fischer CE. Flora of Anamalai Hills: Records of the Botanical Survey of India, IX, (I), Superintendent. Calcutta, India: Government Printing Press, 1921.
7. Babu CR. Herbaceous flora of Dehradun. New Delhi, India: CSIR, 1977.
8. Mathew KN. The Flora of Tamil Nadu, Carnatic III, Part III. Monocotyledons. Tiruchirapalli, India: The Ranipat Herberium, 1981-3.
9. Ugemuge NR. Flora of Nagpur District, Maharashtra. Nagpur, India: Shree Prakashan, Shankarnagar, 1986.
10. Panal SB, Ramakrishna H, Devender R. Ethnomedical studies for endemic diseases by the tribes of Munchingiputtu Mandal, Visakhapatanam district, Andhra Pradesh, India. Int J Med Arom Plants, 2012; 2: 453-9.
11. Ramarao N, Rajendran A, Henry AN. Increasing the secretion of breast milkindigenous practices in Andhra Pradesh. Ancient Sci Life, 2000; 19: 1-4.
12. Patil MV, Patil DA. Some wilder edible plants of Nasik district (Maharashtra). Ancient Sci Life, 2000; 19: 102-4.
13. Bhosle SV, Ghule VP, Aundhe DJ, Jagtap SD. Ethnomedical knowledge of plants used by the tribal people of Purandhar in Maharashtra, India. Ethnobotanical Leaflets, 2009; 13: 1353-61.
14. Ruby A. J., Kuttan G., Dinesh Babu K., Rajasekharan K. N., Kuttan R. Anti-tumour and antioxidant activity of natural curcuminoids. Cancer Letters, 1995; 94(1): 79–83. doi: 10.1016/0304-3835(95)03827-
15. Aggarwal B. B., Kumar A., Bharti A. C. Anticancer potential of curcumin: preclinical and clinical studies. Anticancer Research, 2003; 23(1/A): 363–398.
16. Gul P., Bakht J. Antimicrobial activity of turmeric extract and its potential use in food industry. Journal of Food Science and Technology, 2015; 52(4): 2272–2279. doi: 10.1007/s13197-013-1195-4.
17. Miquel J., Bernd A., Sempere J. M., Díaz-Alperi J., Ramírez A. The curcuma antioxidants: pharmacological effects and prospects for future clinical use. A review. Archives of Gerontology and Geriatrics, 2002; 34(1): 37–46. doi: 10.1016/s0167-4943(01)00194-7
18. Selvi N. M. K., Sridhar M., Swaminathan R., Sripradha R. Efficacy of turmeric as adjuvant therapy in type 2 diabetic patients. Indian Journal of Clinical Biochemistry, 2015; 30(2): 180–186. doi: 10.1007/s12291-014-0436-2.
19. Srimal R. Turmeric: a brief review of medicinal properties. Fitoterapia, 1997; 68: 483–493.
20. Mehrabani D., Farjam M., Geramizadeh B., Tanideh N., Amini M., Panjehshahin M. R. The healing effect of curcumin on burn wounds in rat. World Journal of Plastic Surgery, 2015; 4(4): 29–35
21. Tyag DK. Pharma Forestry A Field Guide to Medicinal Plants. New Delhi, India: Atlantic Publishers & Distributors, 2005.