

# A REVIEW ON: TURMERIC – THE GOLDEN SPICE OF LIFE

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**Abstract:** Turmeric, botanically called *Curcuma longa*, Linn, grows in tropical and subtropical areas during the world. Turmeric is an historical spice derived from the rhizomes of *Curcuma longa*, which is a member of the ginger family (*Zingiberaceae*). Also called ‘Golden Spice of India’ turmeric has been utilized in India for medicinal purposes for centuries. It has been utilized in conventional medicine as a family treatment for diverse diseases, along with biliary disorders, anorexia, cough, diabetic wounds, hepatic disorders, rheumatism and sinusitis. Turmeric is a staple family spice used in lots of Indian houses and is best called the yellow ingredient in curry dishes. This vibrant coloured spice is used regular in Southeast Asia to enhance food and to purify the skin. The women of India use it as a facial mask believing it nurtures a beautiful complexion. The brilliant yellow-orange colour is used as a dye for lots foods like American cheese and mustard. It also can be utilized in religious and sacred venues in which it covers the sacred thread, Yajnopavita, worn by Brahmin in India.

**Keywords -** *Curcuma Longa*, Turmeric, *Zingiberaceae*, Curcumin, Haldi, Etc.

## I. INTRODUCTION

An ‘Zingiberaceae’ family member- *Curcuma Longa*, Linn, nicely referred to as Turmeric, is a perennial, erect and leafy plant with very large, lily like leave as much as 1.2 m long. It has oblong, pointed leaves and funnel-shaped yellow flowers. The rhizome, the part of the plant used medicinally, is generally boiled, cleaned, and dried, yielding a yellow powder. Dried *Curcuma longa* is the supply of the spice turmeric, the element that offers curry powder its characteristic yellow colour. Turmeric is used significantly in meals for its flavour and colour, in addition to having the oldest tradition of use within the Chinese and Ayurveda systems of medication; India has the biggest history of the usage of this plant and it's parts for medicinal purposes. Turmeric (*Curcuma longa*) is considerably used as a spice, food preservative and colouring material in India. Turmeric is broadly consumed in the nations of its origin for numerous uses, which includes as a nutritional spice, a dietary pigment, and an Indian people's medication for the remedy of diverse illnesses. It is used within the textile and pharmaceutical industries and in Hindu spiritual ceremonies in a single form or another. Current conventional Indian medication uses it for biliary disorders, anorexia, cough, diabetic wounds, hepatic disorders, rheumatism, and sinusitis.

The antique Hindu texts have defined it as a fragrant stimulant and carminative. Powder of turmeric blended with slaked lime is a family treatment for the remedy of sprains and swelling as a result of injury, implemented regionally over the affected area. Safety assessment research imply that each turmeric and curcumin are nicely tolerated at a completely excessive dose with none poisonous effects. Thus, each turmeric and curcumin have the capability for the improvement of contemporary-day medication for the remedy of numerous diseases. [1,2]

Accounting for approximately seventy-eight percentage of global wide turmeric production, India is the most important manufacturer of turmeric. [3] It is likewise the largest purchaser and exporter of turmeric. Turmeric is taken into consideration as auspicious and is part of spiritual rituals. In antique Hindu medicinal drug, it's far significantly used for the remedy of sprain and swelling as a result of injury. In latest times, conventional India medicinal drug use of Turmeric powder for the remedy of biliary disorders, anorexia, coryza, cough, diabetes, wounds, hepatic disorders, rheumatism and sinusitis, etc. [4]



**Fig 3: -** (*Curcuma Longa*) Turmeric Powder, Turmeric Fruit, Turmeric Leaves

## II. NUTRITIONAL COMPOSITION OF TURMERIC

Constituents Quantity per 100g

1. Ascorbic acid (mg) 150.0
2. Calcium (g) 0.2
3. Carbohydrate (g) 69.9
4. Fat (g) 8.9
5. Food energy (K Cal) 390.0

6. Iron (g) 47.5
7. Niacin (mg) 4.8
8. Phosphorus (mg) 260.0
9. Potassium (mg) 200.0
10. Protein (g) 8.5
11. Riboflavin (mg) 0.19
12. Sodium (mg) 30.0 7
13. Thiamine (mg) 0.09
14. Water (g) 6.0

### III. PHYTOCONSTITUENTS OF CURCUMA LONGA [46, 50, 51]

1. 1,8-cineole, 2-bornanol, 2-hydroxy-methyl-anthraquinone,4-hydroxybisabola-2
2. Bis-desmethoxycurcumin, Bisabolene, Bixin, Borneol, Boron, Caffeic-acid, Calcium, Caprylic-acid, Caryophyllene, Chromium, Cineole, Cinnamic-acid, Cobalt, Copper, Cuminyalcohol, Curcumene, Curcumenol, Curcumin, Curdione,
3. Eugenol, Epirocumenol; Eucalyptol; Eugenol; Feruloyl-p-coumaroyl-methane, Gamma-atlantone, Germacrone, Germacrone-13- al; Guaicol, Isoborneol, L-alpha curcumene.
4. L-beta-curcumene, Limonene, Manganese, Monodesmethoxycurcumin, Niacin, Nickel, norbixin; O-coumaric-acid, P-coumaric-acid, P-cymene, P-methoxycinnamic-acid, P-tolymethylcarbinol, Phosphorus, Procucumadiol.
5. Acidic polysaccharides: utonan A, B, C, D.
6. 10-diene-9-one;4-methoxy-5-hydroxybisabola;4-hydroxy-cinnamoyl-(Feruloyl)- methane, Alpha-atlantone, Alpha-pinene, Alpha-terpineol, Ar-turmerone, Arabinose.
7. Ascorbic-acid, Ash, Azulene, Beta-carotene, Beta-pinene, Beta-sesquiphellandrene, Bis-(Para-hydroxy-cinnamoyl)-methane.
8. Volatile Oil (4.2%), its main content is turmerone, arturmerone, curcumene, germacrone, ar-curcumene.
9. The herbal classics CHMM (Chinese Herbal Materia Medica).
10. Other Chemicals: campesterol, stigmaterol, beta-sitosterol, cholesterol, fatty acids and metallic elements potassium, sodium, magnesium, calcium, manganese, iron, copper, zinc, the rate of copper/zinc

### IV. SYNONYMS OF CURCUMA LONGA [9]

There are two main techniques involved in the preparation of nanosuspension. [20,21,22,23,24,25]

❖ Marathi	:	Halad
❖ Hindi	:	Haldi
❖ English	:	Indian saffron
❖ Sanskrit	:	Ameshta
❖ Assamese	:	Kordoi/ rohdoi
❖ Bengali	:	Halud
❖ Gujarati	:	Halad, Haldar
❖ Tamil	:	Ameshta
❖ Telugu	:	Haridra
❖ Malayalam	:	Manjal
❖ Sinhala	:	Kaha
❖ Malay	:	Kunyit basah
❖ Indonesian	:	Kunyit
❖ French	:	Curcuma



Fig.: - Flower of Curcuma

### V. HISTORICAL BACKGROUND

The use of turmeric dates before almost 4000 years to the Vedic tradition in India, in which it turned into used as a culinary spice and had some spiritual significance. It possibly reached China through 700 A.D, East Africa with the aid of using in 800 A.D, West Africa with the aid of using in 1200 A.D, and Jamaica withinside the eighteenth century. In 1280, Marco Polo defined this spice, marvelling at a vegetable that exhibited characteristics so much like that of saffron. According to Sanskrit clinical treatises and Ayurvedic and Unani systems, turmeric has extended records of medicinal use in South Asia. Sushruta's Ayurvedic Compendium, dating before the 250 B.C, recommends an ointment containing turmeric to relieve the consequences of poisoned food. [10-13]

### VI. THERAPEUTIC EFFECTS OF TURMERIC

#### 1) Anticarcinogenic Effect

There is diverse research that display the anti-carcinogenic or anti-mutagenic impact of curcumin. Curcumin inhibits carcinogenesis via way of means of performing at the 3 levels of cancer: tumor promotion, angiogenesis and tumor growth. [5, 14, 15] These anticarcinogenic outcomes of turmeric and curcumin are because of direct antioxidant and free-radical scavenging impact with cap potential to not directly increase glutathione levels, and therefore assisting with inside the hepatic detoxing of mutagens and carcinogens, and subsequently inhibiting nitrosamine formation. [16,17]

Cancer isn't always the primary killer withinside the Western World, however lung, colon, prostate and breast cancers are accountable for many deaths. According to Dr. McBarron, in her book, Curcumin, she explains that most effective 2% of cancers are associated with genetics. Therefore, some physicians and researchers are inquisitive about the function of epigenetics and cancer. Epigenetics are the modifications in gene expression that does not contain modifications to the DNA sequence. Instead, epigenetic modifications arise via our lifetime and are maximum encouraged through our consuming habits, workout routines, environmental pollutants and stress. These elements can cause harm to the cells like carcinogens, materials that motive DNA mutations, which harm or extrude a cell and have an effect on normal cell growth and division. It might be fine if those modified cells died due to the fact the

body does now no longer need them, however alternatively they grow. And frequently they develop right into a mass of tissue known as a tumour. Yet, in contrast to a faulty gene wherein we cannot make alterations, epigenetic studies are suggesting that we are able to preserve our genes healthy with our way of living life, and we can also be capable of reverse a number of the negative epigenetic changes. Dr. Goel, from the Gastrointestinal Cancer Research Laboratory on the Baylor Research Institute at Dallas, explains that each one of our cells have a finite existence span and a number of those cells move right into a “deep slumber” as opposed to die. Curcumin has been scientifically tested to “wake up” those cells and guide them to their cell dying procedure referred to as apoptosis. [25] Another observe through Su who investigated pancreatic cells additionally discovered that curcumin suppressed cell growth and caused cell apoptosis. [26]

McBarron sums up curcumin’s most cancers combating capabilities as blocking off carcinogens, stopping the spreading of most cancers cells through slowing down or inhibiting the needed enzyme metalloproteinase, decreasing angiogenesis which feeds the tumors and subsequently encouraging apoptosis of the most cancers cells. Once again, curcumin demonstrates warrior-like characteristics at the same time as combatting most cancers and earns its name, The Golden Knight. [27]

## 2) Peptic Ulcer Disease

Curcumin performs a massive function with inside the healing of gastric/peptic ulcers without a considerable adverse reactions or abnormalities. [18]

## 3) Antioxidant

Curcumin is a strong and best antioxidant and therefore protects towards free radical damage. The extracts of turmeric (each water and fats soluble) and its curcumin element had been located to show off sturdy antioxidant activity that is corresponding to that of vitamins C and E. [19, 20]

## 4) Anti-depressive Property

Around 18 million U.S. adults be afflicted by predominant depression, a DSM diagnosis, which differs from the occasional “blues” or disappointment from a loss. According to Dr. Cass, an integrative health practitioner with an area of expertise in psychiatry, remarks that humans with predominant depression are deficient in those neurotransmitters: serotonin, noradrenaline and tryptophan. Studies are displaying precise consequences indicating that curcumin together with piperine, an alkaloid in black pepper, are beneficial herbal merchandise displaying antidepressant activity. [21] Again, curcumin is proving to be as powerful as pharmaceutical preparations like Prozac and without the bad aspect consequences related to the pharmaceutical preparations. In addition, turmeric has been observed to beautify nerve growth with inside the frontal cortex. This is a part of the brain is in which human beings manage critical cognitive features such as emotional expression. [22]

## 5) Anti-Inflammatory

Turmeric use facilitates to lessen infection through decreasing histamine ranges and also probably through growing the manufacturing of herbal cortisone through the adrenal glands. [23] Oral administration of curcumin became determined to be as powerful as cortisone or phenylbutazone, in instances of acute infection, however half as effective in cases of continual inflammation. This anti-inflammatory property is attributed to its capacity to inhibit the biosynthesis of inflammatory prostaglandins from arachidonic acid and additionally inhibition of neutrophil characteristic for the duration of inflammatory states. [24]

## 6) Cardiovascular Effect

Turmeric has been discovered to have useful and shielding effect on the cardiovascular system. This consists of lowering the cholesterol and triglyceride levels, reducing the susceptibility of low-density lipoprotein (LDL) to lipid peroxidation, [28] and additionally inhibits platelet clumping or aggregation. [29] The lowering impact on cholesterol has been attributed to reduced cholesterol uptake withinside the intestines and increase conversion of cholesterol to bile acids withinside the liver. [30] Heart disorder is the primary killer withinside the Western global and is a common trouble of diabetes. Turmeric is accountable for many movements which shield the coronary heart, the circulatory system and blood. More specifically, curcumin facilitates maintain the arteries clean with the aid of using increasing HDL cholesterol and purifies the blood, so it isn't always sticky. As well, it reduces the homocysteine withinside the blood. When this amino acid starts offevolved to accumulate withinside the blood stream, it damages the arterial walls. “Curcumin facilitates to loosen up those arterial wall cells, reduces the hardening of the arteries and permits the blood to flow extra freely, dissolving clots and preventing or even reversing plaque build-up.” When those outcomes are reduced, then there may be reduced hazard for a coronary heart attack, stroke, and coronary heart sickness. [25]

## 7) Antimicrobial Activity of Turmeric

Turmeric extract and the vital oil of *Curcuma longa* inhibit the growth of numerous microorganisms, parasites, and pathogenic fungi. The aqueous extract of turmeric rhizomes has antibacterial results. [31] Both curcumin and the oil fraction suppress growth of numerous bacteria like *Streptococcus*, *Staphylococcus*, *Lactobacillus*, etc. [32] Ether and chloroform extracts and oil of *C. longa* have antifungal results. Crude ethanol extract additionally possesses antifungal activity. [33] Turmeric oil is likewise active in opposition to *Aspergillus flavus*, *A. parasiticus*, *Fusarium moniliforme*. The ethanol extract of the rhizomes has anti-*Entamoeba histolytica* activity. Curcumin has antileishmanial activity in vitro. [34] Several artificial derivatives of curcumin have anti-*L. amazonensis* effect. Anti-*Plasmodium falciparum* and anti-*L.* are fundamental results of curcumin have also been reported. [34, 35] Turmeric has been proven to have antiviral activity.

It acts as an efficient inhibitor of Epstein-Barr virus (EBV) key activator Bam H fragment z left body 1 (BZLF1) protein transcription in Raji DR-LUC cells. [36, 37] EBV inducers including 12-0-tetradecanoylphorbol-13- acetate, sodium butyrate and remodeling growth factor-beta increase the extent of BZLF1 m-RNA at 12–48 h after treatment in those cells, that's efficaciously blocked with the aid of using curcumin. [38] Most importantly, curcumin additionally indicates anti-HIV (human immunodeficiency virus) activity through inhibiting the HIV-1 integrase needed for viral replication. [39] It additionally inhibits UV light triggered HIV gene expression. Thus, curcumin and its analogues may also have the capability for novel drug development in opposition to HIV. [40]



**Table:** - Pharmacological Activities of Turmeric (*Curcuma Longa*) [41-47]

Pharmacological Activity	Pharmacological actions of turmeric with its mechanism of action
Anti-diabetic	- It prevents galactose induced cataract formation at very small or low doses.
Anti-oxidant	- It inhibits the generation of reactive oxygen species (ROS) like superoxide anion, H <sub>2</sub> O <sub>2</sub> and nitrite radicle generation.
Anti-coagulant	- It inhibits collagen and adrenaline induced platelet aggregation.
Anti-microbial	- It inhibits the growth of forms of bacteria, parasite and pathogenic fungi.
Anti-ulcer	- An open, phase II trial became executed on 25 sufferers with endoscopically-recognized gastric ulcer.
Anti-fertility	- It inhibits 5 $\alpha$ -reductase, which converts testosterone to 5 $\alpha$ -dihydrotestosterone, thereby inhibiting the growth of flank organs in hamster.
Wound healing	- Its mechanism concerned an increase withinside the stages of beta transforming growth factor plus an increase withinside the activity of the enzyme nitric oxide synthase.
Anti-inflammatory	- Inhibit lipoxigenase and COX-2 inhibitor

## VII. SIDE EFFECTS, CONTRAINDICATIONS AND PRECAUTIONS

The affected person dealing with gall bladder is usually recommended now no longer to consume turmeric. If any affected person had bleeding problems, it is encouraged to steer clear of turmeric. High doses of turmeric cause uterine contraction in pregnant women. Turmeric would possibly decrease testosterone levels and reduce sperm motility while taken through mouth by men. Turmeric would possibly slow blood clotting, so prevent using it as a minimum week earlier than a scheduled surgery. Taking excessive quantities of turmeric would possibly prevent the absorption of iron. So, it needs to be used with caution in patients with iron deficiency. [48,49]

## VIII. CONCLUSION

It is a wonder that a herbal yellow pigment, turmeric, which has been ingesting in India from the second one millennium BC in each medication and meals has come to be one of the maximum referred to herbal molecules in terms of its ability to supply a large number of health guarding outcomes as studied and established with the aid of using current clinical network across the globe. For the previous couple of decades, enormous work has been carried out to set up the organic activities and pharmacological actions of turmeric and its extracts. It has been utilized in ayurvedic remedy in view that historic times, with diverse organic applications. Various research is in development for the usage of turmeric in drug-development. Although the crude extract has several medicinal applications, clinical applications may be made simplest after significant studies on its bioactivity, mechanism of action, pharmacotherapeutics and toxicity research. Turmeric represents the historical elixir with its outstanding restoration properties. Turmeric has wide spectrum useful utilization which indicates Anti-inflammatory, Anti-allergic, Antihypertensives, Anti-septic, Anti-oxidant, Anti-coagulant, Anti-diabetic, Anti-microbial, Anti-ulcer, Anti-fertility and Wound recovery activities. A unique expertise of effective dose, safety, and mechanism of action is needed for the rational use of turmeric with inside the treatment of human diseases. More studies and research and cognizance are should be created focus of its medicinal properties to be used by the human race.

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