
Curcuma longa L.

Turmeric

Conor Watters - June 7, 2016



Latin and common name

Curcuma longa L.;

Common names and synonyms: *Curcuma domestica* Val. (Valeton) (botanical synonym) [1] [34], Indian saffron (Engl)[2], Kurkumawurzelstock[3], Gelbwurzel (Ger)[4], rhizome de curcuma[5], safran des Indes (Fr)[6], gorkemeje (Dan)[7], jianghuang (Chin)[8], shati (Sanskrit)[9], common turmeric [31], curcuma [32], yellow ginger [33], yu ji [50]

Family name

Zingiberaceae [35] [36]

Brief Overview and Description

According to Bone and Mills, “the rhizome of *Curcuma longa* L. (turmeric) has been used as a medicine, spice and colouring agent for thousands of years.”[10] It is native to India and South-East Asia, and is cultivated in many countries with India accounting for a large percentage of world production. [11] Turmeric is a key herbal ingredient in Ayurvedic and world medicines. Bone and Mills state that “Turmeric was listed in an Assyrian herbal dating from about 600 BC and was also mentioned by Dioscorides” [12].

Sharol Tilgner ND attributes the following organoleptic and energetic properties to *Curcuma longa* L. [57]:

- Taste/smell: Bitter, pungent, aromatic
- Tendencies: Cooling, stimulating

Brief Botanical Description and Habitat

Bone and Mills give a great botanical description of turmeric:

“Turmeric, a member of the Zingiberaceae (ginger) family, is perennial herb growing up to 1 m high with large tufted leaves. The leaf blade is long and tapers to the base. Pale yellow flowers containing three petals appear close to the ground level. The rhizome is oblong or cylindrical and often short-branched. Its external colour is brown and internally ranges from yellow to yellow-orange. The rhizome consists of two parts: an egg-shaped primary rhizome and several cylindrical and branched secondary rhizomes growing from the primary rhizome. These two parts were once differentiated in the Western trade as *C. rotunda* and *C. longa*. In TCM this differentiation is retained, the primary rhizome being called the ‘tuber’ and the secondary rhizome the ‘rhizome’.” [13].

Part Used: Rhizome [14]

Constituents:

Essential Oil / Volatile oil:

- “Essential oil (0.3% to 5%), containing sesquiterpene ketones (65% including ar-turmerone), zingiberene (25%), phellandrene, sabinene, cineole, borneol.” [15]

● sesquiterpenes: ar-turmerone [37]

Curcuminoid pigments / Yellow pigments (3% to 6%):

● diarylheptanoids or curcuminoids, including curcumin (diferuloylmethane) and demethoxylated curcuminoids.”[15]

● curcumin and derivatives [38]

Polysaccharides [39]: starch, ukonanes.

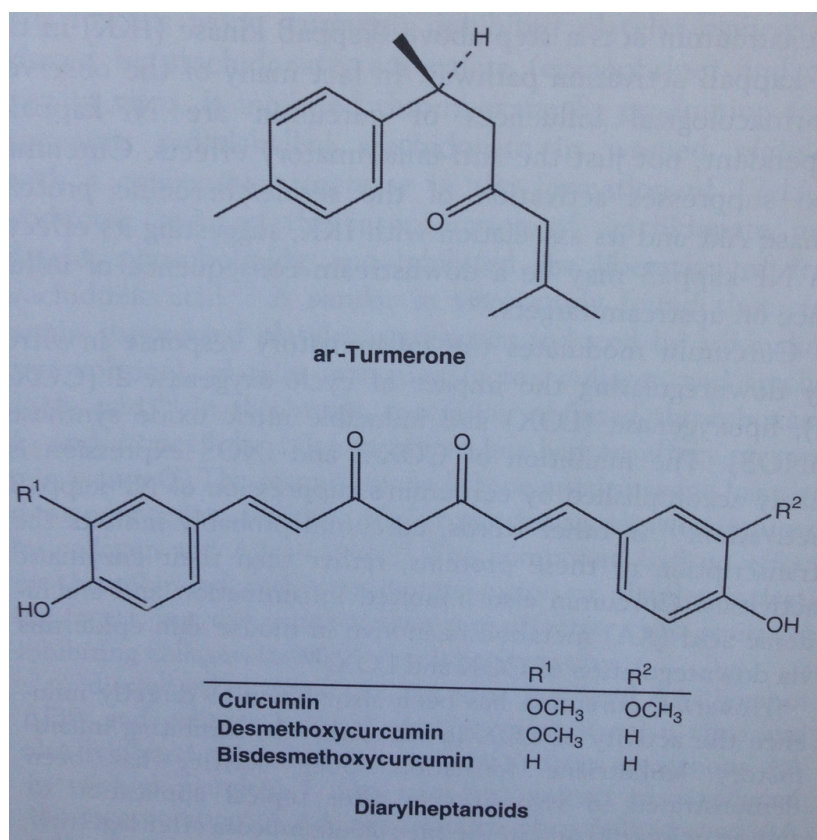


Image 1: Structures of ar-Turmerone and Diarylheptanoids (Curcumin, Desmethoxycurcumin, and Bisdesmethoxycurcumin) [16]

David Hoffmann classifies curcumin as a derivatives of phenylpropanoids (phenolic compounds that have an aromatic ring to which a 3-carbon side chain is attached) and writes that “curcumin and the other curcuminoids have been found to have antioxidant and anti-inflammatory activities and have been entered into Phase I clinical trials by the National Cancer Institute to investigate their cancer-preventative activities.” [61]

¹⁷Kawamori T, Lubet R, Steele VE, et al. Chemopreventive effect of curcumin, a naturally occurring anti-inflammatory agent, during the promotion/progression stages of colon cancer. *Cancer Research* 1999; 59:597-601.

Main Actions and Indications

Summary of Actions from Bone and Mills: “Anti-inflammatory, antioxidant, hypolipidaemic, choleric, cholagogue, antimicrobial, carminative, depurative, anticarcinogenic, antitumour, radioprotective, neuroprotective, hepatoprotective, nephroprotective, cardioprotective, vasoprotective.” [17]

Summary from Gazmend: “Aromatic, bitter tonic, choleric, cholagogue, antispasmodic, carminative, antioxidant, cholesterol reducing, liver protective, anti-inflammatory and analgesic (NSAID-like effect by inhibiting biosynthesis of prostaglandins), antibacterial, antiviral, immunomodulant, antitumoral,. The effects are due to in large part to curcuminoids and the volatile oil. The immunomodulant effect may be due at least in part to ukonanes.”

Suggested Pathophysiological Effects mentioned in Schiborr et al. study paper: “Curcumin was suggested to act on multiple molecular and cellular targets in the pathophysiology of cancer, diabetes mellitus, cardiovascular, neurological diseases, multiple sclerosis, and rheumatism.” [48]

Schiborr et al. suggest that “the mechanisms implicated include anti-inflammatory, antioxidant, immunomodulatory, proapoptotic, and antiangiogenic activities, and the prevention of mitochondrial dysfunction.” [49]

Traditionally has many uses across cultures.

Ayurveda / traditional Indian medicinal systems: stomachic, tonic and blood purifier, poor digestion, fevers, skin conditions, vomiting in pregnancy and liver disorders. Externally applied for conjunctivitis, skin infections, cancer, sprains, arthritis, haemorrhoids and eczema. Indian women also apply it to their skin to reduce hair growth. Another common use is to promote wound healing. [23]

TCM: different applications are attributed to the ‘rhizome’ and ‘tuber’. [24]

- ‘rhizome’ is a *Blood* and *Qi* (vital energy) stimulant with analgesic properties.
 - used to treat: chest and abdominal pain and distension, jaundice, frozen shoulder, amenorrhoea due to blood stasis and postpartum abdominal pain due to stasis. Applied to wounds and injuries.
- ‘tuber’ has similar properties, but is used in hot conditions, as it is considered to be more cooling.
 - an example is use for viral hepatitis.

Traditional Thai medicine [25]: gastrointestinal ulcer, anal haemorrhage, vaginal haemorrhage, skin disease, ringworm, insect bites, and to prevent gonorrhoea and the common cold.

Early Western herbal medicine [26]: used as an aromatic digestive stimulant and as a cure for jaundice.⁷

*7 Grieve M. *A Modern Herbal*, vol 2. New York: Dover Publications; 1971. pp. 822-823.

Modern Clinical Trials Support These Uses [27]:

- curcumin (extracted): rheumatoid arthritis (small, uncontrolled), postoperative inflammation, osteoarthritis, precancerous conditions (internal use, uncontrolled), tropical pancreatitis (with piperine), induction of gallbladder contraction, stabilisation of inflammatory bowel disease, HIV-associated chronic diarrhoea (uncontrolled), idiopathic orbital inflammatory syndrome (uncontrolled), chronic anterior uveitis (uncontrolled), psoriasis (topical, uncontrolled), monoclonal gammopathy.
- turmeric: osteoarthritis (and in combination), elevated blood lipids (uncontrolled), precancerous lesions (topical or internal, uncontrolled), irritable bowel syndrome (uncontrolled).

Bones and Mill describe the Pharmacodynamics pertaining to: Anti-inflammatory activity of curcumin, Anti-inflammatory activity of turmeric extracts and essential oil, Antiplatelet activity, Antioxidant activity, Hepatoprotective and nephroprotective activities, Neuroprotective activity, Hypolipidaemic activity, Effects on the digestive system, Antimicrobial activity, Antiparasitic activity, Cancer prevention, Antitumour activity, Activity in cystic fibrosis models, Antidepressant activity, Skeletal muscle activity, Pulmonary activity, Radioprotective activity, Antiallergic activity, and Other activity. [28].

Bones and Mill describe the Pharmacokinetics. [29]

Bone and Mills describe the Clinical trials relating to: Anti-inflammatory activity, Hypolipidaemic activity, Anticancer or preventative activity, Digestive tract, HIV/AIDS, Eye disorders, Genetic diseases, Clinical antioxidant activity, Alzheimer's disease, Skin conditions, and Other conditions.[30]

A flavor and coloring ingredient in food industry (in curry powder, etc.) [40]

Internally:

- as a tea [41] for:
 - non-ulcer dyspepsia (with fullness, flatulence, etc.)
 - associated with:
 - hepatobiliary disorders
 - impaired bile secretion and flow
 - chronic cholecystitis and cholangitis
 - nonobstructive gallstones
- rheumatic complaints:
 - rheumatoid arthritis
- combined with other herbs (celandine, peppermint, etc.) to alleviate complaints following:
 - cholecystectomy.
- may be helpful for primary dysmenorrhea:
 - painful menstruation without pathology
 - taking 24-48 hours prior to menstrual flow
 - continuing through 1-2 days of the cycle.
 -

Sharol Tilgner ND provides a mental picture of *Curcuma longa* L. as indicated for “mental dullness or confusion, mania, congestion in the pelvis, liver or gastrointestinal tract.” [51]

Sharol Tilgner ND states that it can be used for [52]:

- Anti-inflammatory
- Antiarthritic
- Antioxidant
- Topical antibacterial and antifungal
- Antifertility action
- Hypotensive
- Anti-atherosclerotic
- Tumor-preventing activity
- Cholagogue
- Choloretic
- Emmenagogue
- Lowers cholesterol
- Stimulates digestive enzymes
- Carminative
- Hepatoprotective
- Vulnerary
- Anticoagulant
- Cardioprotective

Sharol Tilgner ND states the following conditions that *Curcuma longa* L. can be applied to help [53]:

- Platelet aggregation (inhibits)
- Cataracts (prevents)
- Gastric ulcers
- flatulence
- jaundice
- menstrual difficulties
- gallstones
- hemorrhage
- toothache
- bruises
- colic
- irritable bowel
- rheumatoid arthritis
- sprains
- wounds
- anticancer agent

David Hoffmann confirms *Curcuma longa* L. is a “hepatic herb”. [59].

David Hoffmann describes *Curcuma longa* L. as among “other herbs reputed to have cholesterol-lowering properties” alongside *Medicago sativa* (alfalfa) and *Panax ginseng* (Korean ginseng). [60]

From an Ayurvedic clinical perspective, Karta Purkh (“K.P.”) Khalsa describes *Curcuma longa* L. as a mildly warming blood mover that can alleviate acute inflammation (and pain) in 8-10 hours.[62]

Dr. Virender Sodhi MD (Ayurveda) ND describes *Curcuma longa* L. as useable in treatment of colorectal cancer. He describes a study where 15 patients with drug-resistant colorectal cancer were given 440-2200 mg/day of curcumin and that a follow up study demonstrated that the oral dose of 3,600 mg/day of curcumin was required to attain the most effective therapeutic dose in cancerous tissue. He describes *Curcuma longa* L. as having research base to support that it has a wide-range of anti-tumor activity.[65].

Safety Concerns / Contraindications

Bone and Mills summarize the Commission E findings as stating that “turmeric is contraindicated in biliary tract obstruction and should be used only after seeking professional advice if gallstones are present.²⁷⁶ Allergic reactions are possible, but are considered to be rare.” [18]

²⁷⁶ German Federal Minister of Justice. *German Commission E for Human Medicine Monograph*. Bundes-Anzeiger [German Federal Gazette], no. 223, dated 30.11.1985; no 164, dated 01.09.1990.

Gazmend recommends not taking *Curcuma longa* L. in amounts greater than as a flavoring in cases of obstructive gallstones and during pregnancy. [42]

May cause gastrointestinal irritations (nausea, vomiting) [43] [44] (diarrhea, yellow stool) [45], especially when taken at higher doses.

Gazmend cites that consumption of excessive amounts of *Curcuma longa* L. for prolonged periods of time may cause fatty liver, but he does not line this claim to a specific source and rather cites a long list of references at the end of his *Curcuma longa* L. monograph. [46]

Sharol Tilgner ND states that *Curcuma longa* L. is “contraindicated during pregnancy due to the uterine stimulant effect or if a woman is trying to become pregnant.” She also supports *Curcuma longa* L. as contraindicated in bile duct obstruction, as she attributes a cholagogue activity to the plant. [56]

David Hoffmann states that the *Botanical Safety Handbook* lists *Curcuma longa* L. among the herbs that are “not to be used during pregnancy unless otherwise directed by an expert qualified in the appropriate use of this substance.” He adds that the authors make it unclear as to “whether inclusion in this safety category is based on actual clinic records or on theoretical extrapolation from in vitro studies on constituents.” [58]

Preparations and Dosage

Curcuma longa L. is often prepared from dried root as a decoction, liquid extract, tablets, capsules, oleoresin, or essential oil; all are made for either internal or external use. [19]

Curcuma longa L. can be prepared from powdered rhizome or as 1:1 liquid extract.

The powdered rhizome is dosed as a heaping teaspoon (about 4 grams) that is mixed with water or milk to form a slurry that can be drunk with a straw. This slurry is to be consumed 1-2 times a day. A teaspoon of lecithin added will improve absorption. The preparation from powdered rhizome may be desirable for anti-inflammatory effects, as aqueous extracts that are devoid of essential oils or curcumin have shown such activity.[20] [54]

Curcuma longa L. 1:1 liquid extract is prepared using 45% or higher ethanol and is dosed as 5 to 14 mL/day (best as 4-5 equal doses throughout the day).[21]. [Alternatively, Sharol Tilgner ND writes that a 1:0.85 fresh strength liquid extract can be used as 10-40 drops 1-4 times per day] [55].

Curcuma longa L. extracts should be stored in dark glass away from direct sunlight so as to protect from decomposition of curcumin on exposure to light.[22].

Research suggests that micellar curcumin is 185x times more bioavailable than native whole plant extracted curcumin. [63]

My Experience with *Curcuma longa*

I consumed *Curcuma longa* in a variety of ways during my multi-week experience with the herb. I did this to maintain general health by keeping my liver happy amid stress and by helping to reduce inflammation in my system.

I took the Megafood brand Daily Turmeric Nutrient Booster powder on a daily basis for a period of time. I found that it was really easy to take and that it tasted quite good. I was impressed that it had a therapeutic dose of curcumin in it (500 mg).

I also made tea by slicing the *Curcuma longa* rhizome into small pieces (about an inch of it) and boiling it in 16 ounces of water (covered). I thought that this tasted pretty good. It was effective and refreshing, especially when mixed with sucanat sweetener and with a little bit of coconut oil and crushed black pepper, which I've heard increases absorption.[64].

I also cooked a moderate amount with *Curcuma longa* L. powder, including on chicken, in turmeric milk (Golden milk), and in a restorative drink with saffron and dates.

I purchased a *Curcuma longa* L. plant from the Bastyr garden sale. It has been growing on my patio and has been doing well, despite the far northern latitude. I've found that I will likely need to bring the plant inside during the summer to protect it from the winter elements, as Lake Forest Park / Seattle is in a Zone 8b and *Curcuma longa* L likes a hardiness zone of 10 or above to be a perennial outdoor plant. [66] [67] [68]

At the end of the month, I would say that my liver felt fine and my body felt like it was metabolizing stress hormones and inflammatory cytokines fairly well. I didn't feel much inflammation and I recovered quickly from aches and sprains. Despite the hot weather, I would say that I maintained a fairly cool feeling and disposition. I would say that my original goal of maintaining general health was achieved.



References

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