

**HARIDRA (CURCUMA LONGA LINN.): AN AYURVEDIC REVIEW**Dr. Bindu Ahlawat<sup>1</sup> and Dr. Omprakash Sarswat\*<sup>2</sup><sup>1</sup>PG Scholar Deptt of Dravyaguna, Sriganganagar College of Ayurvedic Science and Hospital, Tanta University, Sriganganagar – 335001, India.<sup>2</sup>Professor Deptt of Dravyaguna, Sriganganagar College of Ayurvedic Science and Hospital, Tanta University, Sriganganagar – 335001, India.**\*Corresponding Author: Dr. Omprakash Sarswat**

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**ABSTRACT**

Turmeric is a ayurvedic medicine which is a member of the ginger family (*Zingiberaceae*). Rhizomes are horizontal underground stems that send out shoots as well as roots. The bright yellow color of turmeric comes mainly from fat-soluble, polyphenolic pigments known as curcuminoids. Curcumin, the principal curcuminoid found in turmeric, is generally considered its most active constituent. Other curcuminoids found in turmeric include demethoxycurcumin and bisdemethoxycurcumin. In addition to its use as a spice and pigment, turmeric has been used in India for medicinal purposes for centuries. More recently, evidence that curcumin may have anti-inflammatory and anticancer activities has renewed scientific interest in its potential to prevent and treat the disease.

**KEYWORDS:** Anti-Inflammatory, curcumin, curcuminoids.**INTRODUCTION**

Curcumin is the principal curcuminoid of the popular Indian spice turmeric, which is a member of the ginger family (*Zingiberaceae*). The other two curcuminoids are desmethoxycurcumin and bis-desmethoxycurcumin. The curcuminoids are polyphenols and are responsible for the yellow color of turmeric. Curcumin can exist in at least two tautomeric forms, keto and enol. The enol form is more energetically stable in the solid phase and in solution. Curcumin can be used for boron quantification in the so-called curcumin method. It reacts with boric acid forming a red colored compound, known as rosocyanine. Curcumin is brightly yellow colored and may be used as a food coloring. As a food additive, its E number is E100.

Curcumin has antioxidant, anti-inflammatory, antiviral and antifungal actions. Studies have shown that curcumin is not toxic to humans. Curcumin exerts anti-inflammatory activity by inhibition of a number of different molecules that play an important role in inflammation. Turmeric is effective in reducing post-surgical inflammation. Turmeric helps to prevent atherosclerosis by reducing the formation of blood clumps. Curcumin inhibits the growth of *Helicobacter pylori*, which causes gastric ulcers and has been linked with gastric cancers. Curcumin can bind with heavy metals such as cadmium and lead, thereby reducing the toxicity of these heavy metals. This property of curcumin

explains its protective action to the brain. It is a common spice, known mostly for its use in Indian dishes as a common ingredient in curries and other ethnic meals. Turmeric has also been used for centuries in Ayurvedic medicine, which integrates the medicinal properties of herbs with food.

This extraordinary herb has found its way into the spotlight in the west because of its wide range of medicinal benefits. Turmeric is a potent antioxidant.

Curcumin, its main active constituent, is as powerful and antioxidant as vitamins C, E and Beta-Carotene, making turmeric usage a consumer choice for cancer prevention, liver protection and premature aging. Several published studies also show that turmeric inhibits the growth of several different types of cancer cells. In addition, turmeric is a powerful anti-inflammatory, easing conditions such as bursitis, arthritis and back pain. Turmeric's anti-inflammatory action is likely due to a combination of three different properties

**Active Constituents**

The active constituents of turmeric are the flavonoid curcumin (diferuloylmethane) and various volatile oils, including tumerone, atlantone and zingiberone. Other constituents include sugars, proteins, and resins. The best-researched active constituent is curcumin, which comprises 0.3–5.4 percent of raw turmeric.

### Pharmacokinetics

Pharmacokinetic studies in animals have demonstrated that 40-85 percent of an oral dose of curcumin passes through the gastrointestinal tract unchanged, with most of the absorbed flavonoid being metabolized in the intestinal mucosa and liver. Due to its low rate of absorption, curcumin is often formulated with bromelain for increased absorption and enhanced anti-inflammatory effect.

### Mechanisms of Action

#### Antioxidant Effects

Water- and fat-soluble extracts of turmeric and its curcumin component exhibit strong antioxidant activity, comparable to vitamins C and E. A study of ischemia in the feline heart demonstrated that curcumin pretreatment decreased ischemia-induced changes in the heart. An *in vitro* study measuring the effect of curcumin on endothelial heme oxygenase-1, an inducible stress protein, was conducted utilizing bovine aortic endothelial cells. Incubation (18 hours) with curcumin resulted in enhanced cellular resistance to oxidative damage.

#### Hepatoprotective Effects

Turmeric has been found to have a hepatoprotective characteristic similar to silymarin. Animal studies have demonstrated turmeric's hepatoprotective effects from a variety of he-patotoxic insults, including carbon tetrachloride (CCl<sub>4</sub>), galactosamine, acetaminophen (paracetamol), and *Aspergillus* aflatoxin. Turmeric's hepatoprotective effect is mainly a result of its antioxidant properties, as well as its ability to decrease the formation of pro-inflammatory cytokines. In rats with CCl<sub>4</sub>-induced acute and subacute liver injury, curcumin administration significantly decreased liver injury in test animals compared to controls. Turmeric extract inhibited fungal aflatoxin production by 90 percent when given to ducklings infected with *Aspergillus parasiticus*. Turmeric and curcumin also reversed biliary hyperplasia, fatty changes, and necrosis induced by aflatoxin production. Sodium curcumin, a salt of curcumin, also exerts choleric effects by increasing biliary excretion of bile salts, cholesterol, and bilirubin, as well as increasing bile solubility, therefore possibly preventing and treating cholelithiasis.

#### Anti-inflammatory Effects

The volatile oils and curcumin of *Curcuma longa* exhibit potent anti-inflammatory effects. Oral administration of curcumin in instances of acute inflammation was found to be as effective as cortisone or phenylbutazone, and one-half as effective in cases of chronic inflammation. In rats with Freund's adjuvant-induced arthritis, oral administration of *Curcuma longa* significantly reduced inflammatory swelling compared to controls. In monkeys, curcumin inhibited neutrophil aggregation associated with inflammation. *C. Longa's* anti-inflammatory properties may be attributed to its ability to inhibit both biosynthesis of inflammatory prostaglandins from arachidonic acid, and neutrophil function during

inflammatory states. Curcumin may also be applied topically to counteract inflammation and irritation associated with inflammatory skin conditions and allergies, although care must be used to prevent staining of clothing from the yellow pigment.

#### Anticarcinogenic Effects

Animal studies involving rats and mice, as well as *in vitro* studies utilizing human cell lines, have demonstrated curcumin's ability to inhibit carcinogenesis at three stages: tumor promotion, angiogenesis, and tumor growth. In two studies of colon and prostate cancer, curcumin inhibited cell proliferation and tumor growth. Turmeric and curcumin are also capable of suppressing the activity of several common mutagens and carcinogens in a variety of cell types in both *in vitro* and *in vivo* studies.

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