Curcuma longa

TAXONOMIC CLASSIFICATION:[3]

- *Kingdom : Plantae*
- *Subkingdom :Tracheobionta*
- *Superdivision : Spermatophyta*
- *Division : Magnoliophyta*
- *Class : Liliopsida*
- *Subclass: Zingiberidae*
- *Order : Zingiberales*
- *Family: Zingiberaceae*
- *Genus : Curcuma L.*

(https://articlemojo.com/detail/article/health-medical/ayurvedic-and-home-remedies/health-benefits-of-turmeric)

INTRODUCTION:

Indian turmeric is considered as one of the best turmeric in the world because of its high curcumin [3]. Its botanical name is Curcuma longa L. and it is also known as Haridra in Sanskrit and Haldi in Hindi[6]

Turmeric (Curcuma longa Linn) is also used as a spice and grown widely throughout Indian subcontinent. Curcumin is the main chemical compound of Turmeric and proven for its anti-inflammatory, antioxidant, antimutagenic, antidiabetic, antibacterial, hepatoprotective, expectorant and anticancerous pharmacological activities.[1]

Haridra is used in the traditional system of medicine. It is used as an antioxidant and possesses various beneficial properties such as anti-inflammatory, anti-allergic, antiseptic, blood cleansing etc. It is widely prescribed *Ayurvedic* drug and is used in various diseases. The rhizome of the herb, used either fresh or dried, has a host of

medicinal benefits. *Haridra* is *Lekhaneeya, Kushthaghna* and *Vishaghna*. *Haridra's* principal constituent, curcumin, has been extensively studied by western researchers and scientists for its antioxidant activity. *Haridra* is *Katu* and *Tikta* in taste. It is *Ushna* in quality. It is used in many forms and through many routes of administration such as nasal, oral, over the skin etc.[4]

MAJOR CHEMICAL CONSTITUENTS:[5]

It is composed of a number of monoterpenes and sesquiterpenes, including zingiberene, curcumene, α- and β- turmerone among others. The colouring principles (5%) are curcuminoids, 50–60% of which are a mixture of curcumin, monodesmethoxycurcumin and bisdesmethoxycurcumin .

PROPERTIES AND USES:[1]

- Anti-diabetic
- hypolipidemic
- anti-inflammatory
- anti-diarrhoeal
- hepatoprotective
- anti-asthmatic
- anti-cancerous drug.
- widely used in cosmetology
- anthelmintic
- Neuroprotective activity
- Chemoprotective activity
- Anti-oxidant
- Antidermatophytic activity
- Prevents drug resistance

SIDE-EFFECTS OF EXCESS CONSUMPTION:[7]

Turmeric usually does not cause significant side effects; however, some people can experience stomach upset, nausea, dizziness, or diarrhea.

In one report, a person who took very high amounts of turmeric, over 1500 mg twice daily, experienced a dangerous abnormal heart rhythm.

DOSAGE:[8]

The general dosage of Raw Turmeric Powder (Haldi Churna) is as follows.	
Children	500 mg to 1500 mg *
Adults	1 to 3 grams *
Maximum Possible Dosage	12 grams Per Day (in divided doses)
* Twice or thrice a day preferably with black pepper and milk (but it can also be taken with water)	
Best Time to Take: At least 30 minutes before food or an hour After food	

Turmeric (Haldi) Powder

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As mentioned in Ayurvedic Pharmacology, 1gm to 3gm of powder is safe for consumption [13]

RESEARCH:

1. The essential oil containing ar-turmerone, as a major component has been shown to possess anti-inflammatory effect of *haridra*. The free radical scavenging activity as well as inhibition of lipid peroxidation by curcumin has been reported by Kuttan *et al*. The down regulation of transcription factors, inhibiting COX2, LOX, inducible nitric oxide synthase, matrix metalloproteinases 9, cell adhesion molecules along with TNF-α. Curcumin inhibits TNF-α-induced AKT activation whereby levels required for NFkβ gene expression are suppressed. Curcumin suppresses the tumor angiogenesis resulting in regression in the tumor metastatic growth. Goel *et al*. have shown the inhibition of expression of COX2 in human colon tumor cell line . Experimental data suggests that curcumin can act at each stage of promotion, progression, and metastasis of cancer. *Haridra* which has anticancer potential ,can be considered as complementary medicine for cancer treatment as well as prevention.[9]
2. In this study , Hypercholesterolemia was developed in mice fed with hypercholesterolemic diet (HC) made of 1 g cholesterol, 0.2 g cholic acid and 98.8 g standard diet. Mice were fed HC diet for 15, 30, 45 and 60 days, and serum and liver cholesterol, triglycerides (TG) and total lipids (TL) were measured. Cholesterol level increased substantially at 15 days in serum and liver. It increased further at later time points upto 8 weeks. Treatment of 5% turmeric extract (TE) mixed with standard diet to hypercholesterolemic mice significantly decreased serum and hepatic cholesterol, triglycerides (TG) and total lipids (TL) levels. Feeding with 10% TE diet brought the levels comparable to those in normal untreated mice.[10]
3. 50 cases of conjunctivitis studies comparatively with Haridra Eye Drops and with Soframycine Eye Drops, Clinically and bacteriologically observed that Haridra Eye Drops has a definite role on conjunctivitis. Bacteriological study showed that Haridra has a role to act on E. Coli, St. Aureus Klebshella and pseudomonas organisms. 50 cases were selected mainly based on clinical finding and symptoms. Out of them, 15 were male, 12 were female and 23 were children. 25 cases were selected under the Haridra Eye Drops and 25 cases were under Soframycine 5% Eye Drops for comparative study which is non-irritant, and a broad-spectrum antibiotic to all ocular infections. In the Haridra eye

drops group, E.Coli was seen in 10 cases, Staphylococcus aureus in 7 cases, Klebshella in 3 cases, Pseudomonos in 2 cases and sterile in 6 cases. E. Coli and St. aureus infection casse responded well and were completely cured in 4 days except oneeach of Klebshella and Pseudomonos cases did not respond. The results concluded that Haridra and its multifarious actions like Varnya, Kandughna and Vishaghna may be possible to reduce the clinical findings. Soshatva of Haridra quality may be the predominant feature to reduce the excessive secretions.[11]

4. Curcuma longa L. (turmeric) of ginger family (Zingiberaceae) belongs to the group of oldest cultivated spice plants in the south-east Asian countries.The active substance of curcumin (diferuloylmethane) possesses multiple therapeutic properties like anti-inflammatory, antioxidant and cancer preventive properties. Even at the molecular level it has been stated that curcumin inhibits cell proliferation, metastasis creation and apoptosis. Curcumin also acts as a blocker of TNF-s, which are the principal mediators of most inflammation-related disturbances. The main cause of blocking the broadly extended pharmacological and clinical investigations of curcumin is its extremely low solubility in water and in organ fluids. This feature consequently limits its systemic bioavailability and makes use of curcumin as a therapeutic remedy (to date) difficult.[12]
5. Antiviral drug resistance is one of the most common problems in medicine, and, therefore, finding new antiviral agents, especially from natural resources, seems to be necessary. This study was designed to assay the antiviral activity of curcumin and its new derivatives like gallium-curcumin and Cu-curcumin on replication of HSV-1 in cell culture. The research was performed as an in vitro study in which the antiviral activity of different concentrations of three substances including curcumin, Gallium-curcumin and Cu-curcumin were tested on HSV-1. The cytotoxicity of the tested compounds was also evaluated on the Vero cell line. The CC50 values for curcumin, gallium-curcumin and Cu-curcumin were 484.2 µg/mL, 255.8 µg/mL and 326.6 µg/mL, respectively, and the respective IC50 values 33.0 µg/mL, 13.9 µg/mL and 23.1 µg/mL. The calculated SI values were 14.6, 18.4 and 14.1, respectively. The results showed that curcumin and its new derivatives have remarkable antiviral effects on HSV-1 in cell culture.[14]
6. Several studies tested the effect of curcumin on different IAV types *in vitro* and found it to inhibit virus uptake, replication and particle production. Experimental work and

structure-relationship modeling suggested that the inhibition was due to the molecule interfering with binding of the viral glycoprotein hemagglutinin (HA) to its cellular receptor. A subsequent study confirmed this effect and explained it by curcumin's ability to modulate the features of lipid bilayers. Interestingly, curcumin's structural analog monoacetyl-curcumin seems not to act on HA binding, but on Akt phosphorylation required for IAV propagation. The compound alone was as effective in dampening IAV infection as pure curcumin and a synergistic effect of the two analogs was observed.[15]

7. Respiratory disorder such as asthma, bronchitis, and cold coughs rapidly increasing worldwide due to the continuous increasing of environmental pollutants. Currently used drugs in this prospective are not a permanent solution and also causes other adverse complications. Curcumin shows a valuable role in the control of respiratory related complications . A study results demonstrated that curcumin increases the expression of cathepsins K and L in lung which an effect on lung fibroblast cell behavior. Oral administration of curcumin has inhibited bleomycin-induced pulmonary fibrosis in rats and cigarette smoke-induced lung inflammation and emphysema in mice. Study finding suggested that curcumin is a potent anti-inflammatory agent that prevents the release of TNF-α and protects against the pulmonary and cardiovascular effects of diesel exhaust particle**.[16]**

SPECIAL PRECAUTIONS & WARNINGS:[7]

Pregnancy and breast-feeding: During pregnancy and while breast-feeding, turmeric is likely safe when taken by mouth in amounts commonly found in food. However, turmeric is likely unsafe when taken orally in medicinal amounts during pregnancy. It might promote a menstrual period or stimulate the uterus, putting the pregnancy at risk.

Gall bladder problems: Turmeric can make gallbladder problems worse. Do not use turmeric if in cases of gallstones or a bile duct obstruction.

Bleeding problems: Taking turmeric might slow blood clotting. This might increase the risk of bruising and bleeding in people with bleeding disorders.

Diabetes: Curcumin might decrease blood sugar in people with diabetes making blood sugar too low.

Gastroesophageal reflux disease (GERD): Turmeric can cause stomach upset in some people. It might make stomach problems such as GERD worse.

Infertility: Turmeric might lower testosterone levels and decrease sperm movement when taken by mouth by men. This might reduce fertility. Turmeric should be used cautiously by people trying to conceive.

Iron deficiency: Taking high amounts of turmeric might prevent the absorption of iron. Turmeric should be used with caution in people with iron deficiency.

Surgery: Turmeric might slow blood clotting. It might cause extra bleeding during and after surgery. One should stop using turmeric at least 2 weeks before a scheduled surgery.

INTERACTION WITH MEDICATIONS:[7]

Medications changed by the liver (Cytochrome P450 3A4 (CYP3A4) substrates)Interaction.

Some medications are changed and broken down by the liver. Turmeric might decrease how quickly the liver breaks down some medications. Taking turmeric along with some medications that are broken down by the liver can increase the effects and side effects of some medications. Some medications that are changed by the liver include some calcium channel blockers (diltiazem, nicardipine, verapamil), chemotherapeutic agents (etoposide, paclitaxel, vinblastine, vincristine, vindesine), antifungals (ketoconazole, itraconazole), glucocorticoids, alfentanil (Alfenta), cisapride (Propulsid), fentanyl (Sublimaze), lidocaine (Xylocaine), losartan (Cozaar), fexofenadine (Allegra), midazolam (Versed), and others.

Anticoagulant / Antiplatelet drugs Interaction :Turmeric might slow blood clotting. Taking turmeric along with medications that also slow clotting might increase the chances of bruising and bleeding.Some medications that slow blood clotting include aspirin, clopidogrel (Plavix), diclofenac (Voltaren, Cataflam, others), ibuprofen (Advil, Motrin,

others), naproxen (Anaprox, Naprosyn, others), dalteparin
(Fragmin), enoxaparin (Lovenox), heparin, warfarin (Coumadin), and others.

Sulfasalazine (Azulfidine EN-Tabs)Interaction : Taking turmeric while taking sulfasalazine (Azulfidine EN-Tabs) might increase the effects and side effects of sulfasalazine (Azulfidine EN-Tabs).

Tacrolimus (Prograf)Interaction:

Turmeric might increase the amount of tacrolimus in the body. This can increase the side effects of tacrolimus and even damage the kidneys.

REFERENCES:

1. Krup, V., L. H. Prakash, and A. Harini. "Pharmacological activities of turmeric (Curcuma longa Linn): A review." *J Homeop Ayurv Med* 2.133 (2013): 2167-1206.
2. Manisha, Soni, Patil Shilpa, and Gupta Laxmi Narayan. "Standardization study of sample of Haridra (Curcuma longa Linn.)." *Journal of Pharmacognosy and Phytochemistry* 8.1 (2019): 340-344.
3. https://plants.usda.gov/java/ClassificationServlet?source=display&classid=CURCU
4. Pandey, Jai Prakash. "Classical uses of Haridra (Curcuma longa)." *Journal of Ayurveda and Integrated Medical Sciences (ISSN 2456-3110)* 2.6 (2018): 117-119.
5. https://apps.who.int/medicinedocs/en/d/Js2200e/14.html
6. Sehgal, Hunar, et al. "ISOLATION AND CHEMICAL ANALYSIS OF TURMERIC OIL FROM RHIZOMES."
7. https://www.rxlist.com/turmeric/supplements.htm
8. https://www.ayurtimes.com/turmeric-haldi-curcuma-longa/
9. Buch, Zankhana M., et al. "Interventional role of Haridra (Curcuma longa Linn) in cancer." *Clinical cancer investigation journal* 1.2 (2012): 45.

10. Godkar, P. B., P. Narayanan, and S. V. Bhide. "Hypocholesterolemic effect of turmeric extract on Swiss mice." *Indian Journal of Pharmacology* 28.3 (1996): 171.
11. Srinivas, C., and K. V. S. Prabhakaran. "Haridra (curcuma longa) and its effect on abhisayanda (conjunctivitis)." *Ancient science of life* 8.3-4 (1989): 279.
12. KARŁOWICZ-BODALSKA, K. A. T. A. R. Z. Y. N. A., et al. "Curcuma longa as medicinal herb in the treatment of diabet-ic complications." (2017).
13. Gogte, Vishnu Mahadev. *Ayurvedic pharmacology and therapeutic uses of medicinal plants*. Dravyaganvigyan), I Edn. Mumbai: Bhartiya Vidya Bhavan, 2000.
14. Zandi, Keivan, et al. "Evaluation of antiviral activities of curcumin derivatives against HSV-1 in Vero cell line." *Natural product communications* 5.12 (2010)
15. Praditya, Dimas et al. "Anti-infective Properties of the Golden Spice Curcumin." *Frontiers in microbiology* vol. 10 912. 3 May. 2019, doi:10.3389/fmicb.2019.00912
16. Rahmani, Arshad Husain et al. "Role of Curcumin in Disease Prevention and Treatment." *Advanced biomedical research* vol. 7 38. 28 Feb. 2018.