



TURMERIC FROM HOME TOWARDS HEALTH: A REVIEW

S B GURUBAXANI^{1*} AND S H GANATRA²

^{1,2}Department of Chemistry, Institute of Science, Nagpur-440001, Maharashtra (India)

*Corresponding Author e-mail: sevakgurubaxani@gmail.com

Abstract:

Ancient scriptures, Ayurveda, Unani medicine documented the use of turmeric in peptic ulcer treatment, wound treatment and its active principles as an anti-inflammatory agent. In the last two decades modern scientists endeavored to study systematically its numerous pharmacological properties as therapeutically potential candidate to be used in the prevention and treatment of chronic diseases such as cancer and HIV. The present article highlights the medicinal properties of turmeric studied previously towards its application as a promising multi targeted future herbal drug.

Key Words: Turmeric, pharmacology, herbal drug.

INTRODUCTION:

Turmeric, the rhizome of *Curcuma longa* L. is widely used as dietary spice and colouring agent belonging to ginger family Zingiberaceae. *C. longa* is also known as Indian saffron, Indian gold due to its colour. It is widely distributed, a native of tropical South Asia and requires an average rainfall of 1000 and 2000mm a year. The plant grows to a height of 0.9 meters and has long stemmed leaves with pale yellow flowers and requires loamy soil. *C. longa* is known by different names in various Indian languages namely, Haldi (Hindi), Halad (Marathi), Harita and Haridra (Sanskrit), Manjal (Tamil), Pasupu (Telugu), Lidar (Kashmiri), Holud (Bengali) [1].

Turmeric constitutes 5% essential oils and up to 5% curcumin, a polyphenol. The phytochemicals of turmeric is of main interest to researchers which could serve as newer leads for modern drug design. The present review aims to signify the therapeutic properties of *C. longa* and its future prospects for further scientific investigation to develop novel drugs with improved efficacy [2].

MEDICINAL PROPERTIES OF CURCUMA LONGA:

Curcuma longa is an important medicinal plant and in recent studies it is reported for array of biological activities.

ANTI-INFLAMMATORY ACTIVITY

The crude methanol extracts of *C. longa* administered on mice showed a potential anti-inflammatory activity with a significance value 0.0001 at a dose of 500 mg/kg of body weight and in 250 mg/kg of the P value 0.0003 [3].

With specific lipoxygenase and cyclooxygenase-2 inhibiting properties it is highly anti-inflammatory. *In vitro* and *in vivo* studies suggest that it decreases both acute and chronic inflammation [4, 5].

Its anti-inflammatory properties are due to its ability to inhibit both biosynthesis of

inflammatory prostaglandins, arachidonic acid and neutrophil function during inflammatory states [6].

ANTIOXIDANT ACTIVITY

Antioxidant activity of turmeric is shown by water and fat soluble extracts. *In vitro* analyses on endothelial heme oxygenase-1, an inducible stress protein was conducted utilizing endothelial cells. Cellular resistance was observed to oxidative damage on incubation with curcumin [7, 8].

ANTIFUNGAL ACTIVITY

Ar-turmerone, a major component in turmeric oil has effective antifungal activity against dermatophytes [9].

Fresh juice of rhizome of *C. longa* is anti-parasitic in many skin infections [10]. Turmeric mixed with cow's urine is taken internally in itching and dermatitis [11].

ANTIFERTILITY ACTIVITY

Aqueous extracts of rhizome of *C. longa* on the seminal parameters of Swiss Albino male mice causes infertility [12].

Alcoholic and aqueous extracts of turmeric is antispermatogenic and is confirmed by reduction in spermatogonia, spermatocytes and spermatids [13].

Antioestrogenic property of curcumin blocks the oestrogen metabolism receptors or diminishes oestrogen synthesis due to reduced metabolism or both [14].

ANTIPYRETIC EFFECTS

Methanolic extract of *C. longa* showed significant antipyretic activity when compared to reference paracetamol. In mice, yeast was administered which increased the rectal temperature 18 hours after yeast injection. The extract showed better pyrexia inhibition than the reference drug at 6th hour [15].

ANTIDIABETIC EFFECTS

Study of the effect of *C. longa* freeze dried rhizome powder with milk in streptozotocin induced mice revealed that the hypolipidemic

and hepatoprotective effects of turmeric could be used as an effective and safe antidiabetic dietary supplement [16].

The isopropanol and acetone extract of *C. longa* is responsible for maximal inhibition of the enzyme Human Pancreatic Amylase which causes reduction in starch hydrolysis that leads to lowered glucose levels [17].

CARDIOVASCULAR EFFECTS

Prevention of coronary and heart problems is possible with turmeric as it reduces the uptake of cholesterol from the gut thus increases high-density lipids (HDL) and decreases low-density lipids (LDL). It also inhibits the peroxidation of serum LDL which leads to atherosclerotic lesions [19].

The ingestion of curcumin-containing spices in diet rich in fat could have a lipid-lowering effect [18].

ANTI-CARCINOGENIC EFFECTS

An extract of *C. longa* and ointment containing curcumin produces marked symptomatic relief in patients with external cancerous lesions [19].

Turmeric and curcumin can inhibit cancer at the initiation, promotion and propagation stages of TPA (12-O-tetradecanoylphorbol-13-acetate)-induced tumor promotion in mouse skin [20].

Curcuminoids have the anti-cancerous property due to their radical-scavenging property [21].

ANTI-HIV EFFECTS

Curcumin was found to inhibit HIV-1 and HIV-2 protease with IC of 100 μ M and 250 μ M respectively [22].

The clinical trial of clear liquid soap containing 0.5% w/v ethanol extract of *C. longa* rhizome on HIV patients reduced the wound infections and 100% decrease in itching symptom and it also affected the abscess to convert to dryness scabs (78.6%) within 2 weeks [23].

ALZHEIMER'S DISEASE

A neurodegenerative condition in which insoluble plaques, death of brain cells in patient's brain was observed and its fibrils was thought to compose of beta-amyloid ($A\beta$) peptide which clump together to form plaques that disturb normal brain cells. Curcumin is found to possess an ability to destabilize $A\beta$ plaque formation with phagocytosis of $A\beta$ [24]. Curcumin deduced the amount of plaque deposition when administered to aged mice with advanced plaque deposits as in the case of Alzheimer's disease [25].

Regular use of turmeric in diet increases the Quality of Life (QOL) and Activities of daily

living (ADL) of patients suffering from Alzheimer's disease. It impairs cognitive function and safe to use for the treatment of the behavioral and psychological symptoms of the dementia (BPSD) [26].

CONCLUSION:

Turmeric is used as folk medicine in many parts of the world and considered as spice of life for old age diseases with age old solution. Diet rich in turmeric keeps the disease away. It is traditional anti-inflammatory, antiseptic and herbal skin tonic. Also a home based remedy for gastrointestinal upset and arthritis. Its phytochemicals have a profound effect on many dreadful diseases. Preliminary studies are not sufficient for the development of the bioactive components of turmeric as pharmaceutical drug. Due to low bioavailability and low solubility of its main component curcumin, limits its use to be administered clinically. Exploratory researches with deep insight only can assure enhancement in its activity along with safety with multi target and multi spectrum of uses. Hence further scientific investigations, intensive preclinical trials and extensive clinical studies are needed to evaluate the efficacy and toxicity of these naturally inspired products so as to reach from kitchen shelf to clinic cupboard.

ACKNOWLEDGMENT:

We deeply acknowledge Head, Department of Environmental sciences, Department of Chemistry and Director Institute of science, Nagpur for providing necessary facilities. A Special thanks to Rashtasant Tukadoji Maharaj Nagpur University for the fund support.

REFERENCES:

1. www.epgp.inflibnet.ac.in
2. www.indianspice.com
3. Khan BM, Md. Atai Rabby, et al. (2013): Investigation of anti-inflammatory activity of *Curcuma longa*, Int J Pharm Sci Res, 4(3):Pp.1105-1109.
4. Mukhopadhyay A, Basu N, Ghatak N, et al. (1982): Anti-inflammatory and irritant activities of curcumin analogues in rats, Agents Actions, 12:Pp.508-515.
5. Arora R, Basu N, Kapoor V, et al. (1971): Anti-inflammatory studies on *Curcuma longa* (turmeric), Indian J Med Res, 59:Pp.1289-1295
6. Chandra D, Gupta S. (1972): Anti-inflammatory and anti-arthritis activity of volatile oil of *Curcuma longa* (Haldi), Indian J Med Res, 60:Pp.138-142.

7. Mortellini R, Foresti R, Bassi R, Green CJ. (2000): Curcumin, an antioxidant and anti-inflammatory agent, induces heme oxygenase-1 and protects endothelial cells against oxidative stress, *Free Radic Biol Med*, 28: Pp.1303-1312.
8. Menon VP, Sudheer AR (2007): Antioxidant and anti-inflammatory properties of curcumin, *Adv Exp Med Biol*, 595: Pp.105-125.
9. Mukda Jankasem, Mansuang Wuthiudomlert, Wandee Gritsanapa (2011): Antidermatophytic properties of artemerone, turmeric oil and *Curcuma longa* preparations, *ISRN Dermatology*, 14(1): Pp.3-6.
10. Pranjape P. (2001): Herbs of beauty, 1st ed. New Delhi, India, Chaukhamba Sankrit Pratisthan. Pp.95-96.
11. Dhiman AK (2004): Common Drug Plants and Ayurvedic Remedies, 1st ed. New Delhi, India, Reference Press. Pp.286-287.
12. Hembrom Anita, Raj Verma, Aarti, et al. (2015): Antifertility effects of rhizome of *Curcuma longa* on seminal parameters of Swiss Albido male mice, *Research J of Pharma and Tech*, 8(4): Pp.404-406.
13. Bhagat M (2001): Antifertility effects of various extracts of *Curcuma longa* in male albino rats, *Indian Drugs*, 38(2): Pp.79-81.
14. Amit kumar ghosh, Anup kumar das, Kajal kumar patra (2011): Studies of antifertility effect of rhizome of *Curcuma longa* L., *Asian J of Pharma and Life Sci*, 1(4): Pp.349-353.
15. Neelam Arya, Om Prakash, et al. (2015): Anti-inflammatory and antipyretic activity of *curcuma longa* L., *Int J of Development Research*, 5(1): Pp.2914-2917.
16. Rai PK, Jaiswal D, Mehta S, Rai DK, et al. (2010): Effects of *Curcuma longa* freeze dried rhizome powder with milk in STZ induced diabetic rats, *Indian J Clin Biochem*, 25: Pp.175-181.
17. Ponnusamy S, Ravindran R, Zinjarde S, Bhargava S, Ameet R (2011): Evaluation of traditional Indian antidiabetic medicinal plants for human pancreatic amylase inhibitory effect *in vitro*, *Evidence-based complementary and alternative medicine: Pp.1-10*.
18. Arafa HM. (2005): Curcumin attenuates diet-induced hypercholesterolemia in rats. *Med. Sci. Monit*, 11(7): Pp.228-234.
19. Anonymus (2001): Wealth of India. National Institute of Science Communication, Council of Scientific & Industrial Research.
20. Aggarwal BB, Kumar A, Bharti AC. (2003): Anticancer potential of curcumin: preclinical and clinical studies, *Anticancer Research*, 23 1: Pp.363-398.
21. Kohli K, Ali J, Ansari MJ, Raheman Z. (2005): Curcumin: A natural anti-inflammatory agent. *Indian Journal of Pharmacology*, 37(3): Pp.141-147.
22. Sui Z, Salto R, Li J, Craik C, Ortiz de Montellano PR. (1993): Inhibition of the HIV-1 and HIV-2 proteases by curcumin and curcumin boron complexes, *Bioorganic & Medicinal Chemistry*, 1(6): Pp.415-422.
23. Ungphaiboon S, Supavita T, Singchangchai P, Sungkarak S, Rattanasuwan P, Itharat A. (2005): Study on antioxidant and antimicrobial activities of turmeric clear liquid soap for wound treatment of HIV patients, *Songklanakar J of Sci and Tech.*, 27(2): Pp.269-578.
24. Edward C. Yao, Lei Xue (2014): Therapeutic effects of curcumin on Alzheimer's disease, *Advances in Alzheimer's disease*, 3: Pp.145-159.
25. Rao R, Descamps O, John V, Bredesen DE (2012) Ayurvedic medicinal plants for Alzheimer's disease: a review, *Alzheimer's Res Ther*, 4: Pp.1-22.
26. Nozomi Hishikawa, Yoriko Takahashi, et al. (2012): Effects of turmeric on Alzheimer's disease with behavioral and psychological symptoms of dementia, *Ayu*, 33(4): Pp.499-504.

