



## Antiallergic activity of curcumin

Shubham Shende\*<sup>1</sup>, Prem Samundare<sup>2</sup>, Surendra Dangi<sup>3</sup>, Shashank Mehorlia<sup>4</sup>, Dr. Neeraj Upmanyu<sup>5</sup>

School of Pharmacy & Research, Peoples University, Bhopal, India.

### Abstract:

Curcumin is the major and active biological compound of *C. longa*. Curcumin suppress the mast cell degranulation and release of histamine as well as curcumin act as immunomodulatory agent by activating T-cell and other mediators. Curcumin can suppress expression of CD80, CD86 and class-II antigens by dendritic cells and blocks the release of inflammatory cytokines like IL1 $\beta$ , IL6 and TNF $\alpha$  from LPS-stimulated dendritic cells. After reviewed we seen that curcumin shows Antiallergic activity by different mechanisms and it also shows wide therapeutic range such as Antiallergic, antiviral (Anti-hiv), Antidiabetic, Antimicrobial etc. Its provides wide area for the research and development in Pharmaceutical science.

### Keywords:

Curcumin, Curcuma longa, Antiallergic activity, Mast cell, Immunomodulatory.

### 1. INTRODUCTION:

*Haridra* (*Curcuma longa* Linn.) of the family Zingiberaceae has esteemed medicinal properties referred in Ayurveda. *Haridra* have great potential to treat allergic disorder and It is used in anticancer therapy. *Haridra* is widely used in the asian countries as well as cultivated in Asia and specially in throughout India. Curcumin is the major and active biological compound of *C. longa*. The major therapeutic effects of *C. longa* were attributed to the curcumin.[1] Curcumin (diferuloylmethane) is a flavonoid derived from the rhizome of *Curcuma longa*. [2] The medicinal history of turmeric is approximately 2500 years old. Ayurveda, Unani, Siddha and Chinese medicine recommend turmeric for a numerous disorders and diseases. According to Susruta's Ayurvedic Compendium, dating to 250 BC an ointment containing turmeric can relieve the effects of poisoned food. In traditional India, curcumin is generally used against biliary disorder, cough, rheumatic disorder, sinusitis and swelling. it help in healing process of smallpox and chekenpox[3]



Figure No.1: Curcumin Powder

Curcumin is a yellow colour compound, which is extracted from the turmeric plant (*Curcuma longa*). Curcumin is the principal curcuminoid of the turmeric (*C. longa*). Curcumin was first isolated in 1815 and its chemical structure was determined by Roughley and Whiting in 1973. Turmeric is safe as a coloring and flavoring agent in food by the US Food and Drug Administration (FDA). As per WHO, 0–3 mg of curcumin can acceptable in a daily use. Curcumin can be administered by three routes as oral, inhalational and topical route. Curcumin has a high lipophilic character, and body fat has a high percentage of bound curcumin. The systemic bioavailability of orally administered curcumin is low in humans. Piperine has been reported to increase the bioavailability of curcumin. [4]

### 1.1 Isolation of curcumin form *Curcuma longa*

Crude Extract Dissolved in alcohol and was filtered. The filtrate was concentrated. The concentrated filtrate was dissolved in benzene. Add Sodium Hydroxide (0.1% W/V) was added to the benzene solution. Using a separating funnel curcumin was partitioned between

the two layers. Sodium Hydroxide layer was taken and Curcumin was precipitated by adding dilute hydrochloric acid solution. The precipitate obtained was filtered using vacuum filtration unit and dried. The isolated curcumin was used for further evaluation. [5]

### 1.2 Identification test of Curcumin (Flavanoid)

**A) Lead acetate test:** Aqueous Extract treated with lead acetate solution formation of yellow precipitate indicated presence of flavanoids.

**B) Ferric Chloride test:** Add few drops of ferric chloride in extract. Develop intense green colour.

**C) Alkaline test:** Extract treated with NaOH formation of intense yellow colour then addition of dilute acid indicated presence of flavanoids.

### 1.3 Chemistry:

Curcuma longa are the rich sources of polyphenolic curcuminoids, like curcumin, bisdemethoxycurcumin and demethoxycurcumin. Curcuminoids contain curcumin the principal curcuminoids (about 80%), and other two curcuminoids are demethoxycurcumin (about 12%) and bisdemethoxycurcumin. [6] Curcumin is Lipophilic polyphenol which is quite stable in acidic pH and insoluble in water. [3]

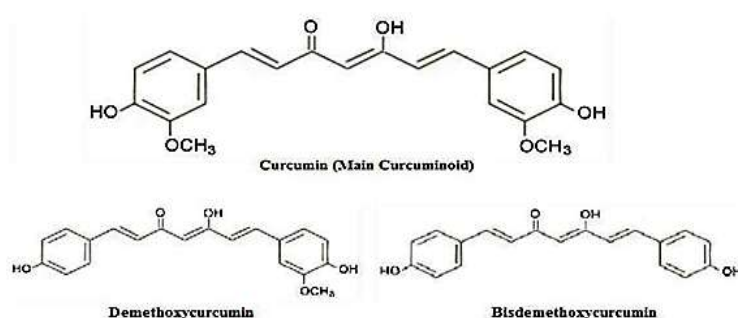


Figure No.2: Structure of Curcumin and its derivatives

## 2. PHARMACOLOGICAL ACTIVITY OF CURCUMIN:

Curcumin is wide range of therapeutic activity such as Anti allergic activity, antitumor, antifungal, antibacterial, antidiabetic, antiinflammatory, anticoagulants, antifibrotic and antiviral etc.

### 2.1 ANTI-ALLERGIC ACTIVITY OF CURCUMIN:

Mast cells participate in allergies and inflammation by secreting a variety of pro-inflammatory mediators. Curcumin, the active component of turmeric, is a polyphenolic phytoconstituent (Flavonoid category) responsible for anti-allergic property. The effects of curcumin on compound 48/80-induced mast cell activation and passive cutaneous anaphylactoid reactions are unknown. Researchers are investigating the influences of curcumin on the passive cutaneous anaphylactoid response *in vivo* and compound 48/80-induced mast cell activation *in vitro*. The mechanism of action was examined by calcium uptake measurements and cAMP assays in mast cells. Curcumin significantly attenuated the mast cell mediated passive cutaneous anaphylactoid reaction in an animal model. In agreement with this *in vivo* activity, curcumin suppressed compound 48/80-induced rat peritoneal mast cell (RPMC) degranulation and histamine release from RPMCs. Moreover, compound 48/80-elicited calcium uptake into RPMCs was reduced in a dose-dependent manner by curcumin. Furthermore, curcumin increased the level of intracellular cAMP and significantly inhibited the compound 48/80-induced reduction of cAMP in RPMCs. These results show that curcumin may have anti-allergic activity. [7]

Curcumin is recognized as a potent modulator of the immune system exerting immunomodulatory effects on several cells and organs of the immune system. Studies showed that curcumin can modulate the proliferation and activation of T-cells. It reduces the proliferation of T-cells induced by compound concanavalin A (Con A). Lymphoma B-cell proliferation is inhibited by curcumin via down-regulation of c-MYC, BCL-XL and NFκB activities. Further curcumin is shown to modulate macrophage activities and inhibit generation of ROS in macrophages. Curcumin is also effective against natural killer T-cell, where it promotes apoptosis by regulating the NFκB pathway and blockage of BCL-XL, Cyclin D. Curcumin can suppress expression of CD80, CD86 and class-II antigens by dendritic cells and blocks the release of inflammatory cytokines like IL1β, IL6 and TNFα from LPS-stimulated dendritic cells. Curcumin was shown to modulate phosphorylation of MAPK and nuclear translocation of NFκB in dendritic cells. [8]

## 2.2 OTHER PHARMACOLOGICAL ACTION OF CURCUMIN

Curcuma longa plays very vital role in reducing inflammatory swelling. Oral administration of curcumin was found to be as effective as cortisone in acute inflammation. Anti-inflammatory properties of C. longa may be endorsed to its skill to restrain both biosynthesis of inflammatory prostaglandins from arachidonic acid and neutrophil function during inflammatory states. Curcumin also shows anticoagulant activity. Its mechanism of action is to inhibit collagen and adrenaline induced platelet aggregation in vitro as well as in vivo in rat thoracic aorta. The methanol extract of turmeric showed antifungal activity against Cryptococcus neoformans and Candida albicans with minimum inhibitory concentration (MIC) values of 128 and 256 µg/mL, curcumin shows the antiviral activity against HIV. It is an effective compound to inhibit the HIV-1 LTR-directed gene expression without any major effects on cell viability.[6]

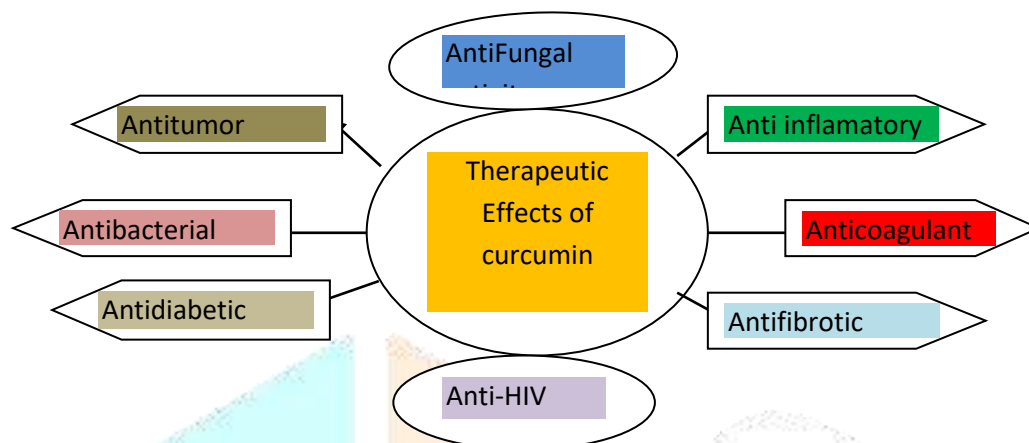


Figure No.3: Pharmacological activity of curcumin

## 3. Marketed Products Of Curcumin

Sr.No.	Composition	Brand name / marketed Product
1	Turmeric essential oil + ar-turmerone	Curamed
2	Turmeric extract( curcumin C3 complex)	Curcumin-95
3	DL-phenyl alanine+ boswellia serrata + Curcumin	Curamin tablet
4	Curcumin (curcuma longa)_	Theracurmin-hp

## 4. CONCLUSION:

After reviewed we seen that curcumin shows Antiallergic activity by different mechanisms and it also shows that wide therapeutic range such as Antiallergic, Antiviral (Anti-hiv) , Antidiabetic ,Antimicrobial etc. Its provides wide area for the research and development in Pharmaceutical sciences.

## 5. ACKNOWLEDGEMENT

The authors are thankful to Principal of School of Pharmacy & Research, People's University, Bhopal (Madhya Pradesh) ,India for providing to necessary facilities to carry out this work.

**REFERENCES:**

- 1) Verma, R., Kumari, P. and Maurya. R. 2018. Medicinal properties of turmeric (*curcuma longa* L.): a review. International journal of chemical studies, 6(4): 1354-1357.
- 2) Schneckeburger, M. and Diederich. M. 2015. Nutritional epigenetic regulators in the field of cancer: new avenues for chemopreventive approaches. Epigenetic cancer therapy ,393-425.
- 3) Dave, S., Sarvesh. V. and Keswani. H. 2017. Curcumin- a magical medicine: a comprehensive review. International ayurvedic medical journal,5(2):458-467.
- 4) Agrawal, S., Kumar, R. and Goel R. 2016. Curcumin and its protective and therapeutic uses. National journal of physiology, pharmacy and pharmacology, 6(1),1-8.
- 5) Pawar, H., Karde. K. and Mundle. N. 2014 .Phytochemical evaluation and curcumin content determination of turmeric rhizomes collected from bhandara district of maharashtra(india). Medicinal chemistry ,4(8):588-591.
- 6) Ashraf,K. and Sultan.S. 2017, A comprehensive review on curcuma longa linn.: phytochemical, pharmacological, and molecular study. International journal of green pharmacy,11 (4): s671-s685.
- 7) Choi,y., Yan. G. and Chai. O. 2010, Inhibitory effects of curcumin on passive cutaneous anaphylactoid response and compound 48/80-induced mast cell activation .anatomy and cell biology,43:36-43.
- 8) Nair,D., Krishnakumar K. and Krishnan.B. 2017, pharmacological profile of curcumin: a review. Journal of bio innovation, 6(4), 533-541.

