Review Article

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The Versatile Plant: Curcuma Longa

Namrata Dwivedi[1] Jayshree Gaur[2] Vasudha Bhasin[3*] Priyam Jyoti Das[4]

[1]Post Graduate Student, Department of Periodontology and Oral Implantology, ITS CDSR, Muradnagar, Uttar Pradesh, India.
[2]Post Graduate Student, Department of Periodontology and Oral Implantology, ITS CDSR, Muradnagar, Uttar Pradesh, India.
[3]Post Graduate Student, Department of Periodontology and Oral Implantology, ITS CDSR, Muradnagar, Uttar Pradesh, India.
[4]Private Consultant, Muradnagar, Uttar Pradesh, India.

ABSTRACT

Background: A natural cure for versatile diseases which is frequently used in dentistry since bygone times. Its chemical constituents explain for its various biological activities. This paper is an attempt to show the medley of constituents of curcumin, proving its high demand as a healer for numerous oral diseases.

Keywords: Curcuma Longa, plant, dentistry.

INTRODUCTION

Since golden era medicinal plants aids in curing diseases and is used worldwide. Frequent use of therapeutic agents has led to reinforcement of resistant strains of common pathogens along with various side effects associated with their prolong use. Thereby , there is an utmost need for alternative source of medicines. Curcuminoids are extracted from the roots of curcuma spp. (Zingiberaceae). Its recurrent use in western culture drawn attention to this classical remedy. Various clinical trials revealed that curcumin has an unexpected range of health promoting properties [1-5]

History of Turmeric

Turmeric is widely known for its fragrance , colour, treatment of jaundice, menstrual difficulties, hematuria, hemorrhage, and colic. Due to its multiple uses it is officialy used in countries like China, Japan, Korea as well as in Asia.[6,7] The world of spices and ayurvedic medicine would be incomplete without curcumin.It came into existence in India and paved its way to China(700 AD), East Africa(800 AD) and West Africa (1200 AD)and gradually to the rest of the world. Eventually, it was avowed by 'Indian saffron'[8].

The primary pigment of turmeric was first isolated by Pelletier in 1815 obtained in crystalline form in 1870 by Daube and its structure was determined in 1910 by Lampe. Studies concluded polyphenols to be the most essetial compound[7].

Chemistry and Pharmacokinetics of curcumin

Chemically, it is a diferuloyl methane molecule [1,7-bis (4-hydroxy-3- methoxyphenyl)-1,6- heptadiene-3,5-dione)] having two ferulic acid residues joined by a methylene bridge [9].

This chemical structure holds three important functional groups:

- an aromatic o-methoxy phenolic group,
- α, β-unsaturated β-diketo moiety and
- a seven carbon linker.

The o-methoxyphenol group and methylenic hydrogen are accountable for the antioxidant activity of curcumin. It donates an electron/ hydrogen atom to reactive oxygen species. This manifests the biological property of curcumin[10,11]

Mechanism of Action of curcumin

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*Correspondence Dr. Vasudha Bhasin.
Department of Periodontology and Oral Implantology, ITS CDSR, Muradnagar, Uttar Pradesh, India.
Email: vasudha6@gmail.com

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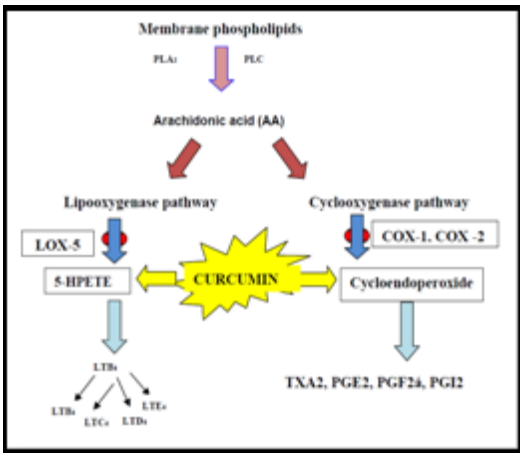
The following mechanisms is proposed[12].

Fig 1: Flow Chart Showing Inhibitory Effect Of Curcumin On Arachidonic Acid Pathway[12]



COX: Cyclooxygenase; HPETE: Hydroperoxyeicosatetraenoate; LOX: Lipooxygenase; LT: Leukotriene; PL: Phospholipase; PG: Prostaglandin; TX: thromboxane

Therapeutic applications in dentistry

Relief from dental problems; Following ways of obtaining relief from dental problems by using turmeric have been reported in the literature

As a mouth wash:

- boil 5 g of turmeric powder
- two cloves
- two dried leaves of guava

Mixing the above contents in 200gm of water for quick relief .

As a paste:

- 1 tsp of turmeric
- ½ tsp of salt
- ½ tsp of mustard oil.

Massaging the teeth and gums with this paste twice daily helps in preventing periodontitis.[13]

Prevention of plaque formation and gingivitis:

Bhandari & Shankwalker conducted a study and revealed its potentiality against various bacterial infections.[14] A study conducted by Mali Amitha unveiled sufficient potential in curtailment of gingival inflammation.[15]

As a pit and fissure sealant:

A sealant composed of a polymerizable resin system containing acrylic monomer and at least one colorant selected from the group consisting of Annatto extract, turmeric extract and L-Apo-8-Carotenal is very efficient .[16]

As an anti-cairogenic agent

In a study conducted by Nagpal M and Chaturvedi TP et al. it was found that growth and acid production of streptococcus mutans at concentrations from 0.5 to 4 mg/mL was degraded when curcumin was used. Furthermore,It also degraded adherence of this bacteria to saliva coated hydroxyapatite crystals[17,18]

Curcumin in surgical wound healing

Wound healing is accelerated as curcumin is able to create a barrier against H2O2 damage in human keratinocytes and fibroblasts [17,18]

Curcumin as a chemopreventive agent:

It aids by :

i. Interrupting the NF-KB signaling at multiple levels.

ii. Induce cell cycle arrest and apoptosis

iii. Inhibit tumor invasion and angiogenesis.

iv. Inhibit deregulated cellular proliferation, de-differentiation and progression[19,20,21]

Role of curcumin in Oral lichen Planus

By stimulation of host macrophages, natural killer cells and inflection of lymphocyte mediated function curcumin plays a key role in the management of oral lichen planus .[22,23]

Role of curcumin in OSMF

Myofibroblast is a potential fibroblast which executes a chief role in wound healing and fibrosis. Thereby, it is an important feature of oral submucous fibrosis. Furthermore, it is used in the management of OSMF because :

- It inhibits cell proliferation in fibroblasts and myofibroblasts
- Inhibit cell cycle arrest in myofibroblast.
- Decreases the Bcl-2/Bax ratio in myofibroblasts and so induces apoptosis in myofibroblast.
- Decreases the generation of type I and type III collagen in myofibroblasts.[24]

Curcumin in Recurrent Apthous Stomatitis

People suffering from recurrent aphthous ulcer have found significant relief in pain along with decreased outbreaks on usage of curcumin gel.[25]

Safety of Turmeric

Chainani-wu Nita et al. concluded that there is no or very minimal toxicity from curcuminand daily use can be recommended[26]

CONCLUSION

Turmeric has salient therapeutic features and numerous health promoting factors. It is a very competent substitute. Therefore, more clinical trials are required to unveil curcumin's tremendous potential to benefit mankind.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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