

## Use of curcumin in oral health-a review

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### ABSTRACT

**Background:** Turmeric has been credited with various medicinal properties in the customary arrangement of medication. Turmeric, a rhizome of *Curcuma longa*, is a herb known for its medicinal properties and is an increasingly acceptable and practical choice for a human being. It has demonstrated properties like calming, cancer prevention agent, antimicrobial, hepatoprotective, immunostimulant, germ-free, and antimutagenic. Because of these properties, it is very helpful in dentistry also. **Objective:** The objective of this review is to investigate the adequacy of turmeric herb in support of oral health. **Methods:** Pubmed and Google Scholar were searched for relevant information regarding *Curcumin*, its medicinal uses, and properties. **Results:** A total of 25 articles were selected for review which included information about the uses of *Curcumin* and its effects. **Conclusion:** In oral cavity, curcumin shows the decrease in plaque and calculus, and effective against the microorganisms. It prevents caries. Turmeric is a naturally acquired material that can be used for oral health problems.

**Key words:** *Curcumin longa*, periodontal disease, facewash, mouthwash.

Medicinal plants have been utilized as a customary treatment agent for various human sicknesses since ages in numerous parts of the world. In provincial territories of the inhabiting nations, it had been utilized as the essential wellspring of medication. About 80% of the individuals in inhabiting nations utilize conventional prescriptions for their social wellbeing. Henceforth, the quest for elective items proceeds, and characteristic phytochemicals secluded from plants and utilized as conventional medicines, are considered as a decent elective source. Only 1% of roughly 5,00,000 plant species worldwide have been phytochemically explored until date, there is extraordinary potential for finding novel bioactive compounds [1]. Turmeric (Haladi), a rhizome of *Curcuma longa*, is a flavorful yellow-orange herb. Its plant is 3 feet in height

and has spear molded leaves and spikes of yellow blooms that develop in a meaty rhizome or an underground stem. An orange mash contained inside the rhizome establishes the wellspring of turmeric medicinal powder [2]. Components of turmeric are named curcuminoids, which constitute the maximum portion of curcumin (diferuloyl methane), demethoxycurcumin, and bisdemethoxycurcumin. Curcumin (diferuloylmethane) is a polyphenol gotten from *Curcuma longa* plant, ordinarily known as turmeric. The dynamic constituents of turmeric are the flavonoid curcumin (diferuloylmethane) and different unstable oils including turmerone, atlantone, and zingiberone. Other constituents are proteins and saps. The best-investigated dynamic constituent is curcumin, which contains 0.3-5.4% of crude turmeric. Curcumin has been utilized widely in ayurvedic drugs for quite a long time, as

it is nontoxic and has an assortment of restorative properties including cell reinforcement, pain-relieving, mitigating, and anti-carcinogenic activity [3,4,5].

As a characteristic item, turmeric (curcumin) is nontoxic and is effective in different oral infections. Around 40-85% of oral intake of curcumin goes through the gastrointestinal tract unaltered, with the majority of the consumed flavonoid being utilized in the intestinal mucosa and liver [5,6]. Because of its low pace of ingestion, curcumin is regularly figured with bromelain for expanded retention and improved calming effect [7,8,9].

### Component of curcumin

Curcumin (1,7-bis(4-hydroxy-3-methoxyphenyl)-1,6-heptadiene-3,5-Dione) is the most dynamic polyphenolic constituent, amazing fixing in the conventional home-grown practices [10]. The parts of turmeric are known as curcuminoids contained curcumin (diferuloylmethane), demethoxycurcumin, and bisdemethoxycurcumin [11,12]. Curcumin was first secluded in 1815, the substance structure was found by Roughley and Whiting in 1973. Turmeric is the boiled, dried, cleaned, and polished so that it can be converted to powder. It is dissolvable in ethanol and acetone yet insoluble in water. They likewise exist as keto-enol tautomers. The latest accessible arrangement of curcumin incorporates around 77% diferuloylmethane, 18% demethoxycurcumin, 5% bisdemethoxycurcumin [13,14].

### Use of curcumin in oral health

Turmeric can be utilized in the following manners to offer help for dental problems.

**Periodontal issues:** Topical application -Applying a massage using 1 teaspoon of turmeric with a half teaspoon of salt and a half teaspoon of mustard oil gives relief from gum disease and periodontitis. It is prescribed to rub the teeth and gums with this paste twice daily [15].

**Mouth wash:** In an investigation by Waghmare *et al.* [16], around 100 subjects were randomly chosen. Both the gingival index and plaque index were recorded at 0, 14, and 21 days. It was reasoned that chlorhexidine gluconate with turmeric mouthwash can be viably utilized as a mechanical plaque control technique for the treatment of plaque and gum disease. Turmeric mouthwash which is the most frequently utilized chlorhexidine mouthwash is prepared by dissolving the proportion of curcumin (10 mg) in distilled water (100 ml) and peppermint oil (0.005% of mixture). The pH adjusted to 4 [16]. Despite the fact that chlorhexidine gluconate has been seen as increasingly

powerful when anti-plaque activity was considered. The impact of turmeric wash might be a direct cause of its mitigating activity. The decrease in overall microbial infection was observed among study population [16].

**Local drug delivery:** In an investigation done by Behal *et al.* [17], 30 subjects with summed up periodontitis with probing pocket depth (PPD) of 5-7 mm were taken on a split-mouth study structure in a split-mouth study design which finally exhibited a factually huge decrease in plaque index, gingival record, sulcus draining file, examining pocket profundity, and increase in periodontal ligament health. Control subjects got Scaling and Root Planning (SRP) alone, while trial subjects got SRP in addition to 2% entire turmeric gel. There was a huge decrease in the trypsin-like chemical action of "red complex" microorganisms. The more noteworthy decrease was observed in all parameters in the experimental group in contrast with those in the benchmark group. In this way, the neighborhood tranquilizes framework containing 2% entire turmeric gel can be utilized as an assistant to scaling and root planing [17].

**Subgingival irrigant:** In an examination done by Suhag *et al.* [18], periodontal problems/subjects were treated on day 0 (standard) by a solitary scene of scaling and root planning. In this way chosen destinations/subject were flooded (triple water system routine) with either saline (0.9%), chlorhexidine (0.2%), curcumin (1%), or served as non-irrigated control subjects on day 0 (standard) quickly following instrumentation. Triple water system routine was rehearsed for the consecutive 5 days and on days 15 and 21. Clinical parameters recorded were testing PPD, bleeding on probing (BOP), and redness in 200 subjects including 20 patients with ceaseless periodontitis. The outcomes demonstrated that the inundated subjects' destinations had a huge improvement in all parameters in contrast to non-irrigated subjects on days 2,3, 4, and 5. The curcumin bunch demonstrated a critical decrease in the BOP (100%) and redness (96%) when compared and the chlorhexidine group and saline group on day 5. Nonetheless, the distinction between bunches was not noteworthy at the following review visits. Mean PPD decrease was essentially more noteworthy for the curcumin bunch than every other group on all post-treatment days. Subsequently, 1% curcumin application can give preferred result can replace chlorhexidine and saline water system as a subgingival irrigant [18].

**Pit and fissure sealant:** In order to reduce the incidence of dental caries tinted pit and fissure sealant is applied on tooth surfaces. Pit and fissure sealant is the material that is introduced into the pits and fissures of caries susceptible teeth, thus forming a micro-mechanically bonded protective layer cutting the access of caries-producing bacteria from their source of nutrients. This sealant can be

prepared from a composition having polymerizable resin containing acrylic monomer and at least one colorant chose from the group comprising of annatto extract, turmeric separate, and  $\beta$ -Apo-8'- Carotenal [19].

**Anticancer properties:** Curcumin has been found to have anticancer action due to its impact on an assortment of natural pathways engaged with mutagenesis, oncogene articulation, cell cycle guideline, apoptosis, tumorigenesis, and metastasis. Besides, curcumin has been proven to be pharmacologically safe. Clinical trials have not identified a maximum tolerated dose of curcumin in humans yet. Clinical studies have been administering up to 8,000 mg/day of curcumin to patients and have concluded that curcumin is non-toxic and poses minimal adverse effects on humans. In an, study it was shown that curcumin down-regulates IKK- $\beta$  kinase action of the salivary cells prompting the hindrance of cytokine articulation in some disease patients. The inhibitory impact of curcumin was profoundly observable in repetitive tumours of the tongue. [20]. One of eight pancreatic cancer patients receiving the oral curcumin showed remission, indicating the usefulness of curcumin in some cancer patients. Turmeric has shown some anti-tumour effects in oral squamous cell carcinoma (OSCC ), curcumin's lack of systemic toxicity and broad-reaching mechanism of action may make it best suited as adjuvant therapy for head and neck cancers therapies. It potentiates the impact of chemotherapy and goes about as an enhancer of radiotherapy. Likewise, it is found to capture carcinomatous cells in the G2/M period of the cell cycle, in which cells are increasingly defenseless to cytotoxic impacts of radiotherapy [21].

**Precancerous lesions:** It effects in the treatment of different precancerous conditions like oral submucous fibrosis, leukoplakia, and lichen planus has additionally been examined. Turmeric concentrate and turmeric oil have shown onco-preventive action in in-vitro and in-vivo tests. On consuming it torment was diminished and the incomplete opening of the mouth was additionally improved [22].

#### Adverse effects

Generally considered safe, can cause gastric irritation, stomach upset, nausea, diarrhoea, allergic skin reaction, and has antithrombosis activity [23]. Turmeric can cause gallbladder problems worse. Do not use turmeric if you have gallstones or a bile duct obstruction [23]. Taking turmeric might slow down blood clotting. This might increase the risk of bruising and bleeding in people with bleeding disorders. Curcumin, a chemical in turmeric, might decrease blood sugar in people with diabetes. Use with caution in people with diabetes as it might make blood sugar too low [23]. Turmeric can cause stomach upset in some people. It might make stomach problems

such as gastroesophageal reflux disease (GERD) worse [23].

#### Novel coronavirus (COVID-19)

Coronavirus can be prevented not treated by curcumin. Curcumin has demonstrated brilliant antiviral properties against different viral maladies. Inosine monophosphate dehydrogenase (IMPDH) chemical because of rate-constraining movement in the new combination of guanine nucleotides is recommended as a remedial objective for antiviral and anticancer mixes [24]. With all the antiviral properties curcumin shows antihistaminic, calming, and bronchodilator impacts in this manner diminishing the respiratory difficulties brought about by a coronavirus. It additionally reinforces the insusceptible framework to battle against the disease. Curcumin, whenever used as prophylaxis, would help deflect potential disease. Curcumin accompanies certain issues like low dissolvability, poor ingestion, enterocyte digestion, and liver first pass. The US Patented definition Self Nano Emulsifying Curcumin 30 mg (SNEC 30) cases contain Curcumin which is the most bio-available type of Curcumin to date because of the innovation that goes behind its development [25].

#### CONCLUSION

Turmeric is observed as a sheltered, nontoxic, and compelling option for some ordinary medications because of its recognized restorative properties and different impacts on different parts of the body. Its role in the treatment of malignancies is promising. There is scarcity of data and research in this field. In the oral cavity, it has promising results, there is a decrease in plaque and calculus, used for scaling and root planning, and effective against the microorganisms. It is also used at pit and fissure sealant which is very important to prevent caries, this is done by forming a micro-mechanically bonded protective layer cutting the access of caries-producing bacteria from their source of nutrients. So finally, to conclude turmeric is a naturally acquired material that can be used for oral health problems.

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