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Preparation And Evaluation Of Herbal Dental Drop From TRIDEX PROCUMBENS

Abhishek Dombe[1], Kiran Ghule[2] Manthan Gaikwad[3], Aklesh Chauhan[4], Rohit Bhusara[5], Jeevan Gawai[6]

College Name : Pune District Education Association's Shankarrao Ursal College of Pharmaceutical sciences and

Reasearch center, Kharadi, Pune -411014 ,Maharashtra

ABSTRACT

The present review focuses on the formulation and evaluation of an herbal tooth drop prepared using Tridax procumbens, a medicinal herb widely known for its antimicrobial, anti-inflammatory, and wound-healing properties. Oral health plays a vital role in maintaining overall well-being, and herbal formulations are gaining attention as safer and more effective alternatives to synthetic dental care products. In this study, Tridax procumbens was explored for its phytochemical composition and pharmacological potential in treating common oral problems such as toothache, gum infections, and bad breath. The herbal tooth drop combines the therapeutic benefits of Tridax procumbens with eugenol, enhancing its antiseptic and analgesic activity. Evaluation parameters such as pH, organoleptic properties, and stability confirmed the product's effectiveness and safety. The review concludes that herbal dental drops represent a promising natural approach to maintaining oral hygiene and preventing dental diseases without harmful side effects

INTRODUCTION

Oral health is a crucial aspect of human health, as the mouth serves as the primary gateway to the body. Poor oral hygiene and bacterial infections often lead to conditions such as cavities, gingivitis, periodontitis, and bad breath. Modern oral care products, though effective, may contain synthetic ingredients that can cause irritation or other side effects with long-term use. This limitation has driven interest toward herbal and Ayurvedic formulations that offer gentle yet effective care through natural ingredients.

Traditional systems of medicine, particularly Ayurveda, have long recognized the value of herbs in promoting oral health. Tridax procumbens, commonly known as "coat buttons" or "ghav pala," is one such plant with multiple therapeutic properties, including antimicrobial, anti-inflammatory, antioxidant, and wound-healing effects. It has been used traditionally to treat infections, wounds, and various inflammatory conditions. In the context of dental care, the use of Tridax procumbens in the formulation of herbal tooth drops provides a natural alternative to chemical-based products.

Herbal dental drops are a convenient liquid form of oral medicine enriched with essential oils and plant extracts. These drops offer multiple therapeutic actions—relieving pain, reducing inflammation, fighting bacterial growth, and freshening breath. Combining Tridax procumbens with eugenol (from clove oil) enhances the formulation's antimicrobial and analgesic activity, providing comprehensive oral protection. The formulation aims to deliver safe, effective, and natural oral care that aligns with traditional Ayurvedic principles.

Oral health:

The use of medicinal plants to treat illnesses has existed from the very start of human history; in other words, since humans have always looked to their surroundings for a means of healing from illnesses, using plants became their only option. (1)

Around the world, traditional medicines are an essential part of health care. Nearly three-quarters of the world's population uses plants and plant extracts for medicinal purposes.(2)

Pharmaceutical and cosmetics products utilize more than a tenth of the plant species (more than 50,000 species). (1)

The general condition of the oral cavity has a significant impact on one's overall health. The main risk factors for the development of many oral diseases include poor oral hygiene practices, smoking, alcohol use, and improper diet. Dental caries, erosion, periodontitis, oral cancer, and a host of other soft tissue problems of the oral cavity are all influenced by diet. In addition to causing dental cavities and periodontitis, poor oral hygiene has been associated with diabetes, cancer, and heart disease. (3)

Different diseases of oral cavity:[4]

1. Bad breath.

2. Gum disease.

3. Tooth sensitivity.

4. Tooth discoloration or yellow teeth.

5. Wisdom teeth.

6. Cavity.

7. Oral cancer.

8. Toothache.

1. Bad Breath

Bad breath (halitosis) is an unpleasant smell from the mouth caused by poor oral hygiene, leftover food, gum disease, or certain foods and lifestyle habits. It can affect any age group.

2. Gum Disease

Gum disease is an infection of the gums caused mainly by plaque buildup, smoking, or genetics. It can progress from gingivitis to periodontitis and advanced periodontitis, affecting the bone supporting the teeth.

3. Tooth Sensitivity

Tooth sensitivity occurs when hot, cold, sweet, or acidic foods cause discomfort. It often results from enamel erosion, grinding teeth, or poor dental care. Prevention and good oral hygiene are key.

4. Tooth Discoloration

Yellow or stained teeth can be caused by drinks like coffee and red wine. Stains can be external (on the surface) or internal (within the tooth). Whitening treatments or home remedies may help.

5. Wisdom Teeth

Wisdom teeth are third molars that usually appear between ages 17–25. They can cause pain or damage nearby teeth and often need removal if impacted.

6. Cavities

Cavities form when plaque — made of bacteria, food particles, saliva, and acids — destroys tooth enamel. Dentists treat cavities with fillings, crowns, or root canals.

7. Oral Cancer

Oral cancer can occur anywhere in the mouth. It often appears as a sore that doesn't heal. Risk factors include smoking, chewing tobacco, heavy alcohol use, HPV, family history, and excessive sun exposure.

8. Toothache

Toothaches can result from decay, abscesses, fractures, damaged fillings, teeth grinding, or gum infections.

Therapeutic Potential of Medicinal Plants:[5]

Medicinal Plants	Parts	Pharmacological Action
1. Acacia arabica (Gum Arabic tree)	Flowers	Antidiabetic, antioxidant, restores pancreatic β-cell function, enhances insulin release, glucose tolerance, and plasma insulin, and inhibits excess metabolite (indole) production
2. Aframomum angustifolium (Cardamom)	Pods, seeds, roots and leaves	Inhibits microbial efflux pumps, impairs membrane integrity, exhibits anti-inflammatory and cytoprotective properties, induces apoptosis, disrupts cellular activity, and inhibits β-secretase
3. Allium cepa (Onion)	Bulb, onion skin	Inhibits α-glucosidase activity, lowers postprandial hyperglycemia, blood glucose levels, exerts antioxidant, anti-proliferative activities, and cardiovascular benefits, increases plasma insulin levels, and lowers blood pressure and platelet aggregation
4. Allium sativum (Garlic)	Leaves, roots, and bulb	Lowers blood glucose levels, increases insulin secretion, activates GLUT-4 translocation, decreases cholesterol levels, and exerts antioxidant, anti-inflammatory, anticancer, and antibacterial activities.
5. Aloe barbadensis Mill. (Aloe vera)	The green part of the leaf	Lowers glucose levels,increases insulin secretion,GSH (glutathione),cellmigration,cytokines,andcell proliferation,preventsoxidativestress,impedesbiofilm development,exertsanti-inflammatoryeffects
6. Artocarpus heterophyllus (Jackfruit)	Leaves,stem,roots and bark	Possesses antioxidant, anti-inflammatory, anticarcinogenic, and antineoplastic effects
8. Asparagus adscendes (Asparagus)	Roots, leaves, and fruits	Exerts antibacterial, antimicrobial, neuroprotective, anti-inflammatory, antidiabetic, anticancer, estrogenic and hypolipidemic properties and destroys bacterial cells

9. Azadirachta indica(Neem)	Leaves,flowers,seeds, fruits, roots,and bark	Exhibits anti-inflammatory, anti-arthritic, insecticidal, antitumor, antibacterial and immunomodulatory properties
10. Curcuma longa(Turmeric)	Rhizomes	Reduces gastric mucosal damage and lipid peroxidation, TNF(tumor necrosis factor)-induced NF-κB activation, suppresses activation of activator protein 1(AP-1),improves insulin resistance, reduces glucose levels ,exerts anti-asthmatic, cardioprotective, anticoagulant and antioxidant properties (11)

DRUG PROFILE

A. TRIDAX PROCUMBENS

Tridax procumbens, a flowering plant from the family of Asteraceae, is the most powerful of 30 species. It is commonly considered a herb and pest plant. It originated in the tropics of the Americas and has since spread to tropical, subtropical, and mild temperate climates worldwide. In the US, it is classified as a noxious weed and considered a pest. The Tridax genus includes medicinally significant species such as T. angustifolia, T.serboana, T.bicolor, T. accedens, T. dubia, T. erecta, and T. rosea. Procumbens, often known as coat buttons or tridax daisies, is a flowering plant from the daisy family.

It is well recognized as an invasive weed and nuisance plant. This species originated in the tropical Americas and has since spread to other tropical, subtropical, and mild temperate climates worldwide.
Tridax procumbens has been traditionally used in India for wound healing, anticoagulation, and antifungal properties. insect repellant. It treats diarrhea and dysentery. The leaf extracts were used to treat skin infections. in folk remedies. This ayurvedic medication is commonly used to treat liver problems and hepato-protection, as well as gastritis and heartburn.[6]

Tridas procumbens is tolerant to a variety of soil types and may grow in both dry and damp environments. It is commonly found in disturbed regions, including fields, roadsides, and wastelands. Some places consider it a weed because to its rapid colonization of open spaces and competition with natural plants. The plant has been used in traditional medicine for several purposes, including treating fever, digestive issues, and skin diseases. The leaves and flowers are believed to have therapeutic characteristics.[7]

T. procumbens **Leaves & Flower**

INDIAN NAMES:

Hindi :- Ghamra.
Sanskrit :- Jayanti Veda.
Marathi :- Dagadi Pala and GhavPala,
Telugu :- Gaddi Chemanthi.
Tamil :- Thatapoodu.
Malayalam :- Chiravanak

Kingdom	Plantae
Subkingdom	Tracheobionta
Division	Magnoliophyte
Class	Magnoliopsida
Subclass	Asteridae
Clade	Angiosperms
Order	Asterales
Clade	Eudicots
Family	Asteraceae
Tribe	Heliantheae
Genus	Tridax
Species	T.Procumbens
Binomial name	Tridax procumbens

TRIDAX PROCUMBENS CHEMICAL CONSTITUENTS:

1.TANNINS

Water-soluble polyphenols called tannins are naturally present in plants. The antimicrobial, anti-carcinogenic, and anti-mutagenic qualities of tannins may be related to their antioxidant properties. Numerous investigators have reported that T. procumbens contains tannins. Tannins were detected in T. procumbens leaf extracts when acetone and water or chloroform and water were combined. The buds and pedicle of T. procumbens contain tannins.[8]

2. CAROTENOIDS

Carotenoids are fat-soluble pigments that are present in leaves and serve three primary purposes for plants: they absorb light, they protect the plant from photooxidative damage, and they provide color for attracting insects. It has been hypothesized that carotenoids protect DNA from oxidative stress. T. procumbens has yielded a variety of these secondary metabolites, including as beta-carotene, which is essential for the healthy development of epithelial tissues and can be transformed into vitamin A. A lack of vitamin A can cause xerophthalmia, night blindness, and problems with immunity and hematopoiesis. Beta-carotene and lutein are two carotenoids that have demonstrated efficacy in reducing UV-induced erythema. The antioxidant qualities of carotenoids have also been connected to their photoprotective qualities.[8]

3. ALKALOIDS

Tridax procumbens contains nitrogen-containing substances called alkaloids, which greatly affect its pharmacological characteristics. **Tridaxin**, one of the plant's notable alkaloids, has antibacterial and antiinflammatory properties that make it useful for treating infections and lowering inflammation. Tridaxin has been used traditionally to treat infections because of its potent activity against a number of bacterial and fungal diseases.

Betaine, another significant alkaloid, has hepatoprotective qualities leading to potential use in liver health and antioxidant defense. According to studies, betaine may protect liver cells from oxidative stress-related harm. It also enhances the plant's metabolic and anti-inflammatory abilities, which makes it helpful in the treatment of liver-related conditions.[9]

4. ESSENTIAL OILS

Tridax procumbens essential oil contains terpenoids, alcohols, esters, aldehydes, and fatty acids, which influence its aroma and biological activity. A key compound, (3S)-16,17-dihydrofalcarinol, strengthens the plant's therapeutic value with anti-inflammatory and anti-cancer effects. Terpenoids form the largest portion of the oil and provide most medicinal benefits. Monoterpenes like α-pinene and β-pinene offer antioxidant and anti-inflammatory properties and contribute a pine-like scent. Sesquiterpenes such as caryophyllene and β-caryophyllene add further therapeutic support. The diterpene phytol also contributes antimicrobial, antioxidant, and anti-inflammatory effects and assists in vitamin E synthesis and protection against oxidative damage.[9]

PHARMACOLOGICAL ACTIVITIES:

1)Anti-inflammatory properties

The water-soluble extract of *Tridax procumbens* leaves was tested in rat models for foot swelling, skin cell growth, and surgical wound healing. Compared with ibuprofen, the extract did not significantly increase fibroblast numbers, though both ibuprofen and *T. procumbens* groups showed improved wound contraction. The *T. procumbens* group also showed notable epithelialization, while aspirin caused delays in healing. Overall, ibuprofen and aspirin affected healing markers more strongly, while *T. procumbens* showed results similar to the control in fibroblast count, hydroxyproline/DNA ratio, and collagen formation. In the carrageenan-induced oedema model, the enzyme gamma-glutamyl transpeptidase activity and oedema suppression with 200 mg/kg *T. procumbens* were comparable to 50 mg/kg ibuprofen, and closely matched the effects of both ibuprofen and aspirin treatments.[10]

2)Anti-Diabetic activity

Diabetes is a group of disorders marked by high blood sugar, causing sugar to appear in urine, sweat, and other body fluids. Because it is widespread, effective herbal treatments are needed. *Tridax procumbens* shows strong anti-diabetic activity in its ethanolic, methanolic, and aqueous extracts, significantly reducing blood glucose levels in alloxan-induced diabetic rats after seven days of oral administration. Alloxan destroys pancreatic beta cells, but the plant extracts help repair these cells by improving glucose regulation and peripheral glucose use. While petroleum extracts show weak activity, the hexane extract—containing dihydroxy-olide—reduces glucose absorption and lowers post-meal blood sugar in Type II diabetes. The plant also enhances capillary function, antioxidant defenses, and lipid metabolism. Its methanolic extract inhibits alpha-amylase, whereas petroleum and chloroform extracts show weaker inhibition. Additionally, the ethanolic extract contains quercetin, which is linked to reduced alpha-amylase activity. [11]

3)Anti-cancerous activity:

The MTT method was used to assess the essential oil extracted from T. procumbens leaves' in vitro anticancer activity for the MCF-7 cell line. The results showed that the essential oil exhibited strong anticancer activity, which could be explained by the presence of significant terpenes like α-pinene and β-pinene. Prostate epithelial malignant cells PC3 were also subjected to the crude aqueous and acetone extract of the herb Tridax procumbens, and cell viability was assessed using the MTT assay. Based on the ability

of live cell mitochondrial enzymes to convert the yellow soluble salt MTT into a purple-blue insoluble formazan precipitate, which was then measured spectrophotometrically at 570 nm, the assay was developed.[12]

4)Wound Healing Activity

The whole plant extract (WPE) of *Tridax procumbens* showed the strongest wound-healing activity in infected rat wound models, evidenced by increased tensile strength and higher lysyl oxidase activity. Ten-day-old granuloma tissue was analyzed to measure biochemical markers, and while the aqueous extract also improved lysyl oxidase activity, it was less effective than WPE. Fumaric acid may contribute to the plant's healing effects. Both aqueous and ethanolic extracts enhanced wound repair, with the ethanolic extract producing greater wound contraction and significantly higher tensile strength compared to the aqueous extract and the standard drug cipladine. Both extracts also increased hydroxyproline, granulation, and hexosamine levels, indicating rapid collagen formation. Overall, *Tridax procumbens* appears to be a promising natural agent for wound healing.[12]

B. EUGENOL

Eugenol is a bioactive substance that has been well investigated and well-characterized. It was initially identified in 1929 as a volatile component of Eugenia caryophyllata, and in 1940 it was commercially produced in the United States.[13]

Figure 1. clove oil

Characteristics:

A phenylpropanoid chemical (Figure 1), eugenol ($C_{10}H_{12}O_2$) is an aromatic molecule that belongs to the phenol group. The essential oils of many plant species from the Lamiaceae, Lauraceae, Myrtaceae, and Myristicaceae families are its main source. Eugenol, which is derived from Syzygium aromaticum, is the main bioactive component of clove oil among these sources.[13]

EUG was deemed a nonmutagenic substance and generally regarded as safe (GRAS) by the WHO. This naturally occurring chemical is also widely used in the food and fragrance industries. Because of its analgesic, antiseptic, and pain-relieving qualities, the antiseptic property was used in mouthwashes as a disinfectant and also complexed with tooth fillings.[14]

The clove tree's blossom buds are used to make the spice clove. It is indigenous to Indonesia's Maluku Islands and is frequently used in cooking due to its fragrant aroma. But clove is also well-known for its therapeutic qualities, especially its analgesic and anesthetic effects.[15]

Eugenol is an oily liquid with a distinct spicy scent that ranges from clear to pale yellow. Although it is well soluble in a variety of organic solvents, it has poor solubility in water.[16]

Eugenol has been reported to exhibit a wide spectrum of biological activities, including antioxidant, analgesic, antimutagenic, antiplatelet, antiallergic, anti-edematous, and anti-inflammatory effects.[16]

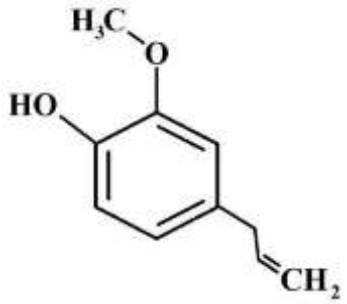

Figure 2. Chemical structure of Eugenol

- **Synonym:-** Clove flower, Clove bud, Caryophyllum.
- **Biological Source:-** Clove consists of dried flowers of buds of Eugenia Caryophyllum.
- **Family:-**Myrtaceae.
- **Chemical constituents:-**Clove contains 15-20% of volatile oil and 10-13% of tannins, (gallotannic acid) volatile oil contains 70-90% eugenol, which is colourless liquid. It contains eugenol acetate (3%) and 5- 8% □-caryophyllene. The characteristic aroma of clove is due to the presence of methyl amyl ketone, which is in trace amounts.[17]

Plant	Part	Concentrartion (mg /g)
Clove, Clovetree	Flower, Leaf, Steam	1809
Clover pepper	Fruit	36
Betel pepper	Leaf	17.85
Tulsi	Leaf	4.2-4.97
Ceylon Cinnamon, Cinnamon	Bark	3.52
Turmeric	Leaf, Eseential oil	2.1

Table. Occurance of eugenol and its concentration in particular parts of palnts.

Antioxidant activity:

Eugenol's neuroprotective benefits stem from its strong antioxidant properties and function as an inhibitor of monoamine oxidase (MAO). It efficiently scavenges free radicals and stops reactive nitrogen species (RNS) and reactive oxygen species (ROS) from forming. Eugenol also protects microbial proteins and DNA from oxidative damage and strengthens cellular antioxidant defenses.[13]

By scavenging or removing ROS, antioxidants shield the organism from the damage caused by free radicals. Numerous human disorders, including AIDS, cancer, and Parkinson's disease, are caused by needless populations of free radicals.[14]

Antimicrobial activity;

Eugenol has exhibited significant antibacterial activity against a broad range of microorganisms, including *Staphylococcus aureus*, *Pseudomonas aeruginosa*, and *Escherichia coli*. This antimicrobial potential is largely attributed to the presence of the free hydroxyl (–OH) group in its molecular structure.[16]

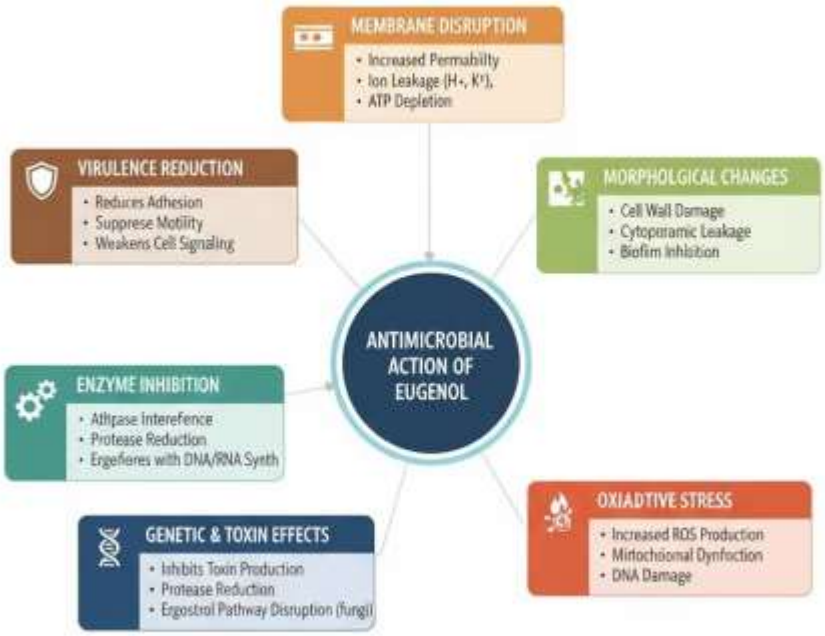

Figure 3. Antibacterial and antifungal activity of eugenol

When EUG and vancomycin are combined, their antibacterial activity is increased because EUG damages half of the bacterial membranes, which makes it easier for vancomycin to enter the membrane. Compared to EUG applied alone, the combination impact of EUG with gentamicin or ampicillin produced a significantly greater killing rate in an hour.[14]

Anti-inflammatory and Analgesic activity:

As an analgesic, clove oil has been utilized extensively in dentistry. Eugenol, clove oil's active component, is what gives it its analgesic properties. It has been used to treat a number of pain conditions, such as joint, dental, and spasmodic pain.[15]

Eugenol's anti-inflammatory properties are associated with its capacity to suppress the production of inflammatory mediators like prostaglandins and leukotrienes, inhibit neutrophil and macrophage chemotaxis, and eugenol dimers have shown chemopreventive potential by downregulating macrophage cytokine expression.[13]

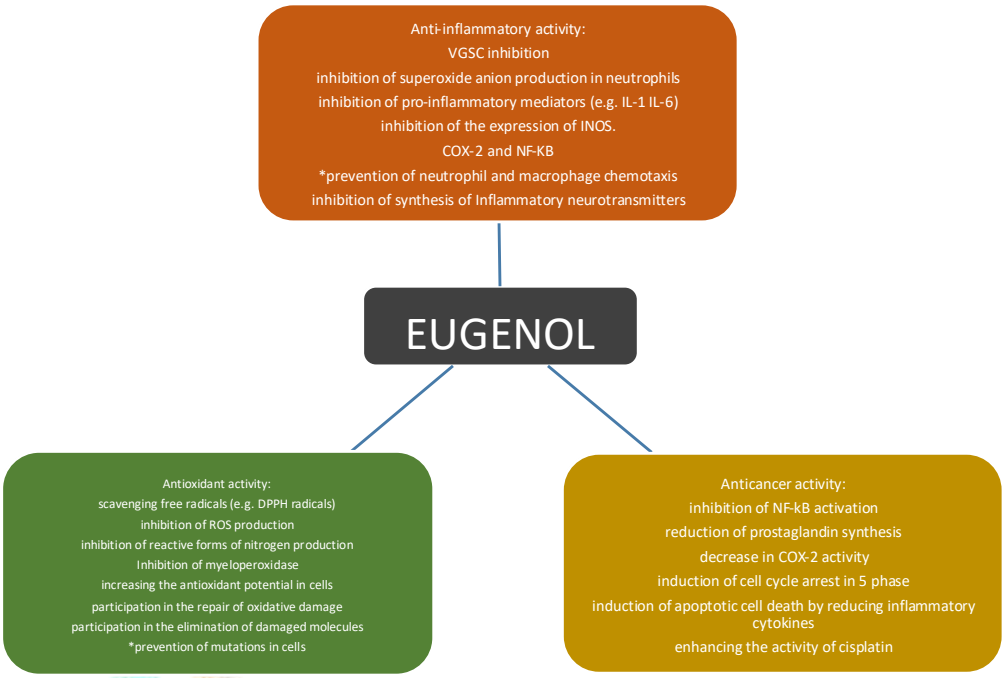

Figure 4. The anticancer, anti-inflammatory, and antioxidant of action of eugenol

Anticancer activity:

Leukemia, lung cancer, colon cancer, colorectal cancer, skin cancer, gastric cancer, breast cancer, cervical cancer, and prostate cancer are among the cancer types against which eugenol has demonstrated anticancer activity.[16]

Cancer typically involves unchecked cell division and cell accumulation to develop tumors. With a death rate of 6 million per year, it ranks as the second leading cause of death globally. Inflammation may lead to cellular aggregation as a result of improper signaling pathway function. Although the primary purpose of chemotherapy is to kill cancer cells, it also targets healthy cells found in bone marrow, hair follicles, and other tissues. As a result, EUG and other chemopreventive natural medicines are recommended for tumor treatment. Even at large dosages, these medications do not cause cytotoxicity in healthy cells. The US Food and Drug Administration has determined that EUG is not carcinogenic or mutagenic.[14] (Fig.5)

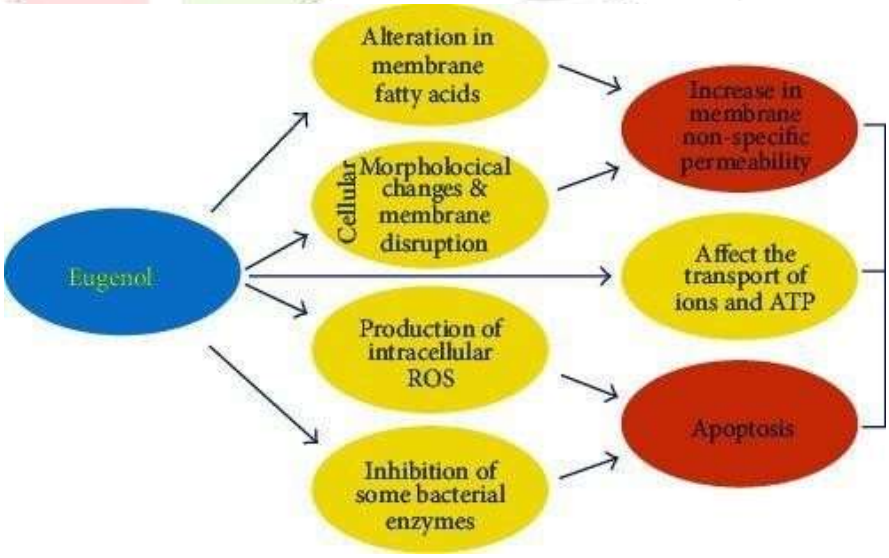

Figure 5. Cellular mechanism of eugenol on cancer cells.

Anti -viral activity

Eugenol has a strong inhibitory effect on a range of viruses, according to mounting data. Tobacco mosaic virus, yellow leaf curl virus, hemorrhagic septicemia virus, feline calicivirus, influenza A virus, herpes simplex virus, hepatitis virus, virus that causes transmissible gastroenteritis, human immunodeficiency virus, severe acute respiratory syndrome coronavirus 2, Ebola virus, and West Nile virus are among the viruses that have been studied the most.[18]

Derivative:[13]

Plant essential oils and the bioactive components they contain have drawn a lot of interest recently as potential biopesticides. In agriculture, they are now acknowledged as good substitutes for traditional synthetic pesticides. High efficacy, biodegradability, low toxicity, various modes of action, and widespread availability of natural sources are only a few benefits of essential oils. However, a number of issues, chief among them being their high volatility and low water solubility, restrict their use in plant protection.

The rapid growth of the global population has significantly increased the demand for food, prompting the agricultural sector to adapt its strategies for sustainable production. Effective prevention and control of plant diseases and pests remain critical components of crop protection. Currently, the predominant approach involves the use of conventional pesticides, the majority of which are synthetic compounds, including insecticides.

Introduction to Herbal Dental Drops

Oral health is an essential component of general well-being, as the oral cavity serves as the primary gateway to the body. Diseases such as dental caries, gingivitis, periodontitis, and oral ulcers are widespread and often result from microbial infections, poor oral hygiene, and inflammation of the gums or mucosal tissues.

Conventional oral formulations—like mouthwashes, gels, and toothpaste—provide temporary relief but may contain synthetic. chemicals that can cause side effects such as mucosal irritation, altered taste, or tooth discoloration after prolonged use.

In recent years, there has been a growing demand for **herbal and natural-based oral care formulations** due to their **safety, efficacy, and minimal side effects**. Among these, **Herbal Dental Drops** have emerged as a novel and convenient dosage form.[19]

Dental drop is the Ayurvedic formulation available in the form of drop. The drops are enriched with natural herbs and natural tinctures. The formulation is indicated to be used for the treatment of toothache and associated pain and sensitivity·

Classification of Herbal Dental Drops:

1. Based on Therapeutic Action:

- **Analgesic Drops**: Clove (Eugenol), Peppermint, Ginger [19,20]
- **Antiseptic/Antimicrobial Drops**: Neem, Tulsi (Holy Basil), Tea Tree Oil, Mint [19,20,21]
- **Anti-inflammatory Drops**: Turmeric, Licorice, Aloe vera, Chamomile[19,20,21]
- **Healing/Regenerative Drops**: Aloe vera, Calendula, Myrrh [19,21]
- **Anti-halitosis Drops**: Fennel, Cardamom, Mint, Clove [19,22]
- **Teething Relief Drops**: Chamomile, Lavender, Clove [20,22]

2. Based on Formulation Base:[22]

Formulation Type	Description	Notes
Oil-Based Drops	Herbal extracts dissolved in oils	Longer-lasting, good for localized pain relief.
Water/Alcohol-Based Drops	Extracts in water or alcohol solvents	Fast absorption, common in tinctures.
Glycerin-Based Drops	Sweet and mild base, child friendly	Often used in teething drops.

3.Based on Active Herbal Ingredients:[19,20,21]

Herb / Extract	Main Properties	Example of Use
Clove Oil (Eugenol)	Analgesic, antiseptic	Toothache relief drops
Neem	Antibacterial, anti-inflammatory	Antiseptic oral drops
Tulsi (Holy Basil)	Antimicrobial, anti-inflammatory	Gum infection treatment
Turmeric (Curcumin)	Anti-inflammatory, antioxidant	Gingivitis relief drops
Licorice Root	Soothing, anti-inflammatory	Ulcer healing drops
Aloe Vera	Healing, anti-inflammatory	Oral wound healing drops
Peppermint Oil	Cooling, antimicrobial	Breath freshening, pain relief

Evaluation of Herbal Dental Drops:[23]

1.Organoleptic Evaluation:

Organoleptic properties such as colour, odour, taste were studied.

2.pH of formulated Herbal Dental Drops:

0.5% of formulated herbal dental drops was prepared and pH was determined using digital pH meter.

3.Stability study:

The product was maintained in different temperature conditions to check its stability.

Preliminary phytochemical screening :[23]

(A).Test for Carbohydrates

1.Mollusc's test:

To 2-3ml of sample solution, added few drops of Mollusc's reagent shake and added Con.H2SO4 from sides of the test tube. A violet ring was formed at the junction of two liquids.

2.Fehling's test:

Mixed 1ml of Fehling's A and 1ml of Fehling's B solutions, boiled for one minute. Added equal volume of test solution. Heated for 10- 15 minutes in a simmering hot water bath. First a yellow, then brick red precipitate was observed.

(B).Test for Proteins and Amino acids

1.Biuret test: To 3ml of sample solution 1ml of 4% Nao and few drops of 1% CuSO4 solution added. Violet or pink colour appears.

2.Xanthus-protein test: 3ml of sample solution mixed with 1ml Con.H2SO4. White precipitate turns yellow on boiling.

(C).Test for Lipid

1.Spot test or Filter paper test: Press the sample solution between filter paper. Formation of permanent oily stain.

(D).Test for Alkaloids

1.Mayer's test:

2-3 ml of sample solution treated with few drops Mayer's reagent, gives creamy white precipitate.

2.Hager's test:

2-3 ml of sample solution treated with few drops Hager's reagent gives yellow precipitate.

(E).Test for Tannins

1.Ferric chloride test:

About 0.5g of the sample solution were boiled in 20ml of water in a test tube and then filtered. A few drops of 0.1% ferric chloride was added and observed for brownish green or a blue-black coloration.

2.Lead acetate test: To the 1ml of sample solution, 1ml of lead acetate solution added. It gives a creamy gelatinous precipitate.

(F).Test for Resins

1.Acetone water test: Treat sample solution with acetone and added to water. Turbidity appears it indicates that presence of resins.

(G).Test for Glycosides

1.Ballet test (Steroidal glycosides):

The sample solution showed yellow to orange colour with sodium picrate.

2.Born Trager's test (Anthraquinonoid): To 3ml sample solution added dil.H2SO4. Boil and filter to the cold filtrate added equal volume benzene or chloroform, shake well separate the organic solvent. Adding ammonia turns the ammonia layer pink or red.

(H).Test for Cyanogenic glycosides

1.Grignard test:

Soak the filter paper strip first in 10% picric acid then in 10% sodium carbonate, dried. In conical flask place sample solution, the above filter paper strip is placed the slit in cork. The filter paper turns brick red or maroon.

(I)Test for Coumarin

1.Alkali test:

Sample solution when made alkaline, shows blue or green fluorescence.

(J)*Test for Siporin*

1.Foam test:

Shake drug sample solution or dry powder vigorously with water. Persistent foam observed.

(K)*Test for Flavonoids*

1.Shinoda test:

Sample solution were treated with magnesium turnings and conc. HCl Formation of magenta colour.

2.Lead acetate test:

Mix sample solution with lead acetate solution. Formation of yellow precipitate.

CONCLUSION

The review highlights that Tridax procumbens is a potent medicinal herb with remarkable benefits for oral health management. When formulated into an herbal tooth drop along with eugenol, it offers significant antimicrobial, anti-inflammatory, and healing effects suitable for treating common dental issues such as toothache, gum inflammation, and oral infections. The evaluation studies confirmed that the developed formulation maintained an appropriate pH, stability, and organoleptic quality. Compared to conventional products, herbal tooth drops are safer, more biocompatible, and free from synthetic additives. Therefore, the formulation and evaluation of Tridax procumbens-based herbal dental drops present an effective, natural, and holistic solution for maintaining oral hygiene and overall dental wellness.

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