INTERNATIONAL JOURNAL OF PROGRESSIVE RESEARCH IN ENGINEERING MANAGEMENT AND SCIENCE (IJPREMS)

e-ISSN : 2583-1062

Impact Factor : 5.725

www.ijprems.com
editor@ijprems.com

Vol. 03, Issue 11, November 2023, pp : 114-120

REVIEW ON FORMULATION AND EVALUTION OF CLOVE TOOTHPASTE

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ABSTRACT

Cloveare the fragrant flowers of the lilac tree, which belongs to the Myrtle family. They are native to Indonesia's Malu ku Islands (or Moluccas) and are often used as a spice. Since different countries have different harvest seasons, cloves are available all year round. Cloves are used as antioxidants that help prevent cancer, kill bacteria, aid heart health, co ntrol blood sugar, and help with many other health problemsLilac tree is an evergreen tree that can reach a height of 8l eaves and 12 meters and has large dark pink flowers in clusters. Clove contains 72to90% essential oil extract called e ugenol. Clove is an essential oil. Zanzibar and Pemba are currently the world's largest producers of cloves.Clove has a ntiinflammatory properties that reduce gingivitis. Clove strengthens healthy gums by stimulating circulation and prote cts teeth from acid attacks by adding essential minerals to tooth enamel. Lilac Toothpaste is made from high quality, s cientifically proven ingredients.Studies have shown that clove essential oil and eugenol have strong preventive effects on various foodborne diseases, and their mechanisms are associated with reducing migration and adhesion, preventing biofilm formation and various virulence factors. This review highlights the importance of CEO (clove essential oil) in the food industry and how coatings can be used to investigate their use in food preservation

Key Word: syzgium aromaticum, spice,volatile, Antioxidant, Laung.

1. INTRODUCTION

Cloves are used in Ayurveda. It is often called "lavang". Clove (Syzygiumaromaticum) is an important spice belongin g to the Myrtaceae family. Cloves are often used in food preparation. Clove oil has antibacterial, antifungal, antiviral, antiinflammatory and antioxidant properties (1). Syzygium is the largest genus of the family Myrtaceae, containing ap proximately 1200 to 1800 species of flowers,It is widely distributed in tropical and subtropical regions of Asia, Africa, Madagascar, and Pacific and fluvial marine areas[2, 3]. Eugenol, the most important component of clove oil, is recog nized as a food product by China, the United States, the European Union anda other countries and regions[4]. Clove is most typically used direct to the gums for toothaches,pain relief during dental work,and other concerns,however,there is a scarcity of scientific evidence to back up these and other claims.clove is used as a flavor in foods and beverages. Clove is used in toothpaste, soaps cosmetics,fragrances, and cigaretts manufacture. Clove cigarettes (also know as kreteks) typically include 60 to 80 percent tobacco and 20 to 40 percent gramtdt [5].

2. PHARMACOLOGICAL ACTIVITIES

Antioxidant,activity: Antioxidants are essential compounds to treat oxidative stress that causes memory loss. Clove oi l reduces oxidative stress by reducing glutathione levels and helps restore memory. The powerful antioxidant activity of clove is comparable to synthetic antioxidants such as BHA (butylated hydroxyanisole) and pyrogallol[6]. Clove oil has inhibitory activity and reduces lipid peroxidation due to the maximum hydrogen release capacity determined by th e linoleic acid emulsion system. It has also been shown to inhibit hydroxyl free radicals DPPH (2,2-diphenyl-1 picrylhydroxy), ironreducing antioxidant ability,and oxygen radical absorption ability.Deoxyguanosine and xanthine oxidase were also used to determine the antioxidant activity of clove[7].

Antimicrobial activity- Clove oil has proved to be effective against Staphylococcus species of bacteria and Aspergillus niger species of fungi. Germicidal activities against S.aureus, pseudomonas aerugunosa, and Klebseilla pneumonia have been shown by dispensing clove oil in (0.4% v/v) concentrated sugar solution [8] E. coli was used to test the antimicrobial activity of clove oil .

Determination of antifungal activity of clove oil was done by Rana.et.al reporting a sensibility scale of fungi [Mucor sp.>Microsporum gypseum> Fusarium monoliforme NCIM 1100> Trichophytum rubrum> Aspergillus sp.> Fusarium oxysporum MTCC 284][9]. Solid lipid nanoparticles containing eugenol were formulated using acrylic triglyceride, stearic acid & poloxamer 188 by modified hot homogenization ultrasonication method. These nanoparticles were characterized and evaluated for in-vivo antifungal activity using oral candidiasis model. Therapeutic efficacy of eugenol increased and modification in the drug release behavior was observed after administration of nanoparticles[10] .

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Anti-inflammatry activity-The anti-inflammatory substance in clove oil is eugenol Synergistic effects have been observed in animal studies when clove oil extract was added to other anti-inflammatory medications.

such as cod liver oil On the other hand, flavonoids such as rhamnetin, kaempferol and β- caryophyllene improve itsnati- inflammatry property [11].

Antiviral activity -It was observed that the syringe isolated from clove was effective against herpes at a concentration of 10 µg/ml. Syringin works by inhibiting bacterial DNA polymerase[12].Aqueous Extract of S.aromati cum (L.) Merr. et Perry and some additional herbs such asGeum japonicum Thunb.,Rhusjavanica L., and Terminalia c hebula Retzus have been shown to be effective against herpes simplex type 1 when combined with acyclovir (HSV-1). Operationa. A stronger synergistic effect was found in the brain than in the skin and was found to be non toxic to mice [13].

Antinoceptive activity-Eugenol is a common antiallergic compound found in grape juice and has been used since the 13th century to treat toothaches, joint pain, and as an antispasmodic. It works by activating calcium and chlor ide channels in ganglion cells[14]. It also acts as a capsaicin agonist, helping to increase energy levels[15].

3. USES OF CLOVE

Since clove has antibacterial properties, it can be used in toothpastes, mouthwashes, toothpastes, and mouthwashes. It acts as a decongestant, relieving pain in emergency situations, and acts as a carminative by increasing hydrochloric aci d in the stomach to improve peristalsis[16]. It also supports rapid healing of cuts and bites. Inhaling clove oil helps cle ar mucus, relieve colds, coughs and asthma, increases blood flow, helps lower blood sugar in diabetics, and relieves m uscle pain. Inhale its aroma to relieve headaches, dizziness and irritability.

Oral diseases are the main causes of dental plaque, tooth decay and gum disease Although periodontal disease is consi dered a polymicrobial disease, Porphyromonas gingivalis (P. gigivalis) is thought to be one of the most important path ogens of chronic periodontal disease . These bacteria cause a transition from commensal microbiota to dysbiotic micro biota[17] .The pathogenesis of periodontitis results from the expression of many of the virulence factors, such as but n ot limited to cysteine proteases, also known as gingipains, which influence the host protection mechanism and control of side effects and degradation[18]. tissue protein Porphyromonas gingivalis is one of the most common bacteria that causes gingivitis.Clove Toothpaste is believed to have many benefits for oral health. clove antibacterial properties hel p kill bad bacteria in the mouth, while its anti-
inflammatory properties can help cure gum disease. Clove, on the other hand, is thought to have a numbing effect on t eeth and gums[19], effectively reducing teeth and sensitivity. In addition to these benefits, Clove Toothpastemay also help freshen breath and support overall oral hygiene (Acacia arabica) has been used in oral care for centuries. The bar k, leaves and bark of the clove tree contain various compounds that have antibacterial, antifungal and antiinflammator y properties[20].clovetoothpaste has been shown to be effective in reducing plaque buildup, tooth decay and gum dise ase. Its antibacterial properties help kill bad bacteria in the mouth and reduce the risk of oral cancer. clove is also belie ved to have astringent properties that can help tighten gums and reduce the risk of gum disease[21]. extract is used in t oothpaste formulations, mouthwashes and other oral care products. Some studies have shown that toothpaste containin g clove extract is more effective at reducing plaque buildup and gingivitis than toothpaste without clovel extract.In ad dition to its oral care benefits, clovetoothpaste is also used in traditional medicine due to its antibacterial and antiviral properties.Tooth paste is obtain basic in nature to counteract acidity in the mouth. Tooth paste are basic in nature because in our mouth there are certain type of acids which can also causes tooth decay so we brush our teeth the basic nature of toothpaste reacts with the acids present in the mouth and hense it becomes neutral. That is the reason why toothpaste are basic in nature .

Fig 1 . Clove

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Vernacular names in indian languages.

Table.1

Languages	Names used
Bengali	Lavanga
Gujarati	Lavang
Hindi	Laung, Laumg, Lavang
Kannada	Lavanga, Daevakusuma, Krambu
Malayalan	Grampu, Karampu, Karayampu
Marathi	Lavang
Oriya	Labanga
Punjabi	Laung
Sanskrit	Bhadrasriya, Devakusuma, Devapuspa, Haricandana, Karampu, Lavanga, Lavangaka,
Tamil	Kirampu, KIraambu, Grambu

Synonyms- Clovos, Caryophyllus, Lavang, Laung, Grambu, Grampus, Krambu.

Biological source- It consist of a dried flower bud of Eugenia caryophyllus.

Botanical Classification

Kingdom- Plantae

Sub Kingdom- Tracheobionta

Super Division- Spermatophyta

Division-Magnoliphyta

Class- Magnoliopsida

Subclass- Rosidae

Order-Myrtales

Family- Myrtaceae

Genus- Syzgium

Species- aromaticum

Chemical consitituent

Eugenol makes up 72to90% of clove essential oil and is the chemical that gives cloves their aroma. The extraction tak es 80 minutes in high water at 125 °C (257 °F) to complete. Ultrasonicassisted and microwaveassisted extraction techn ologies provide faster extraction rates while using less energy[2]. Potential toxicity such as acetyl eugenol, beta-caryophyllene, vanillin, maslinic acid, tannins such as dianol, gallotannin, methyl salicylate (inflammation), flavonoid s such as syringin, kaempferol, rhamnetin and eugenol, pensionoids. oleanolic acid, stigmasterol, campesterol and sesq uiterpene eugenol are not yet classified[22].

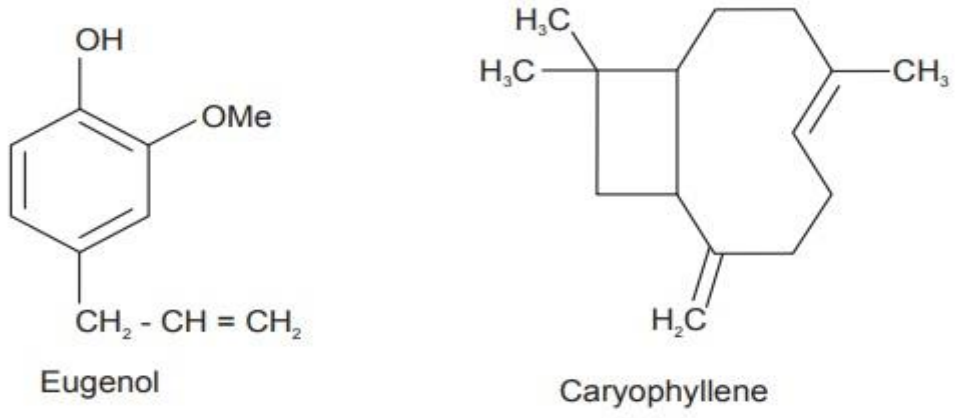

Fig 2.

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4. CULTIVATION

Lilac tree is an evergreen tree that reaches 15to20 meters in height. For planting, sow the seeds in suitable, welldraine d soil, approximately 25 cm apart. Clove growth requires a climate with balanced rainfall, humidity, warmth and consi stency. When planting, plants need to be protected from pests and diseases. Initially, the seeds cannot withstand full su n, so they should be protected with a house frame about 1 meter high and covered with banana leaves.

Banana leaves are slowly rotting and the sun is shining on the seedlings. The seeds can withstand sunlight when they a re about 9 months old. The frame is then removed and transplanted to a distance of 6 meters at the beginning of the rai ny season when the seedlings reach a height of about 1 meter.Plant bananas on shady trees in the first two to three year s of young lilacs. Wood can be harvested every year from trees between 6 and 70 years old. 3 to 4 kilos of cloves can be harvested per tree per year. New facilities are added every year for continuity and continuity[23]**.**

5. ADULTERATION

Cloves are often classified as waste cloves, clove fruits, machine cloves, and clove stems. Refined cloves are cloves w hose essential oil has been partially or completely removed through distillation. The cloves sent are black in color and can be recognized by their floating appearance in fresh and cold water. Clove fruit is dark brown and contains less oil. These can be identified by the starch in the fruit. Blown Cloves are entirely developed clove flowers from which corol la and stamens get separated. While separation, sometimes the stalks are incompletely removed and the percentage of volatile oil in clove stalk is only 5%. As clove stalks contain prism type of calcium oxalate crystals and thick-walled stone cells which are absent in clove the clove stalk can also be detected[24].

6. APPLICATIONS AND EFFICACY

- Small fissures (anal fissures) are located on the sides of the anus. Preliminary research suggests that using clove o il cream for 6 weeks to treat rectal tears will lead to faster healing than rectal softeners and lidocaine cream**.**
- There is plaque on the teeth.using a toothpaste or mouthwash containing ingredients such as cloves may reduce the buildup of plaque on your teeth according to a preliminary study.
- Get a hangover. Taking clove bud extract before drinking alcohol may reduce hangover symptoms in some people , according to a preliminary study**.**
- Excessive sweating (hyperhidrosis). Applying clove oil to your palms for two weeks may reduce excess smoke, a ccording to preliminary research.
- Mosquito repellent is a product used to kill mosquitoes**.**Preliminary research shows that clove oil or clove oil gel a pplied directly to the skin repels mosquitoes for up to 5 hours**.**
- I can not breathe**.** Leaving ground clove gel on the skin for 5 minutes before acupuncture may reduce needle disco mfort**,** according to a preliminary study**.**
- Prediabetes is a type of diabetes in which blood sugar levels are very high, research first**.** However, since there wa s no control group in the experiment**,** the effect of clove on diabetes is unknown.
- It itches**.** Early research suggests that applying clove oil gel solution to the skin may help reduce itching.
- Toothache is a pain**.** Clove oil and eugenol **(**a compound it contains**)** have long been used to treat tooth decay and gum disease**,** but the FDA recently classified it as eugenol, reducing its effectiveness**.** The FDA believes that there is currently insufficient data to approve eugenol for the treatment of dental caries.
- Gingivitis is a mild inflammation of the gums (gingivitis)
- Bad breath is a problem.
- Coughing.
- Diarrhea is a common ailment.
- Socket that is completely dry(alveuolar osteitis),
- Natural gas.
- Men,s early orgasm.
- Irrtability.
- Nausea and vomiting are common side effects.
- Inside the mouth, there is swelling (inflammation) and sores (oral mucositis)
- Other circumstances. [25]
- **Ideal properties of toothpaste:**
- Good abrasive effect
- Non irritant and non toxic
- Impart no stain in tooth
- Keep the mouth fresh and clean

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- Prolonged effect
- Cheap and easily available

7. FORMULATION OF CLOVE TOOTHPASTE

Using a home blender, dry all the herbal ingredients and grind them into powder. Measure the required amount of ingr edients and put them into the mortar. Calcium is a mineral found in sodium lauryl sulfate, carbonates, methyl water, ce llulose, honey and glycerin. The above mixture was supplemented with gum arabic. Add it dropwise into a mortar cont aining herbal ingredients and grind thoroughly until it reaches a paste consistency[26].

Chemical Composition of Formulation

Table.2

Ingredients	Quantity in (gm)
Clove	2
Calcium Carbonate	20
Glycerine	5
Sodium Louryl Sulphate	1
Acacia Gum	0.5
Sodium Chloride	0.5
Sodium Saccharin	0.5
Para Hydroxide Benzoic Acid	1
Distilled Water	60-80 ml

Procedure:

- In a Mortar-pestle, 2 gm of clove extract were triturated with 1 gm of para hydroxyl benzoic acid and 0.5 gm of sodium chloride (as a preservative).
- As a foaming agent, 1 gm sodium lauryl sulphate is used, and sodium saccharin is used as a sweetener.
- Glycerine was added as a humectant, and acacia gum was employed as a binder. The mixture was triturated well, and 80 ml of distilled water was added to bring the total weight to 100gm.
- A solution of sodium hydroxide is used to alter the pH. Clove oil is used to mask the bitterness of the taste[26].

8. EVALUATION OF TOOTHPASTE

A. Evaluation:

- **Colour:** Colour of the prepared toothpaste was evaluated for its colour. The colour was checked visually.
- **Odour:** Odour was found by smelling the product.
- **Taste:** Taste was checked manually by tasting the product.

B. Physical characterization test:

a. Determination of Ph:

Put 1 g of toothpaste in a 150 ml beaker and add 10 ml of freshly boiled and cooled water (27°C). Mix well to obtain a complete suspension. Determine the pH of the suspension within 5 minutes using a digital pH meter. The results are st ated**.**

b. **Foamability**:

Measure the foaming ability of the product by taking a small sample, add water to the graduated cylinder, fill the initia l volume, and then shake 10 times. Record the final volume of foam[.

C. Study of rheological properties:

i. Spreadability:

Spreading time refers to how easily the cream spreads to the application area. One of the criteria for a good paste is tha t it has a good spread. Weigh out approximately 1g of toothpaste and place it in the center of a glass plate (10 x 10cm), then carefully place another glass glass on top. A 1 kg weight is placed in the middle of the board (to prevent the boar d from slipping). Diameter of the paste in centimeters after 15 minutes.

Spreadability (S) can be calculated by the formula S = m.l/t, where S-spreadability. m -
weight added to the upper slide. l-long moving glass slide. t - time.

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ii. Tube extrudability:

Clear, painted aluminum collapsible oneounce tube with 5 mm nose opening in study design and use finger pressure to tube. The extrudability of the tube is then determined by measuring the amount of paste that comes out of the tip when pressure is applied to the tube paste.

iii. Viscosity:

Paste viscosity measurement was evaluated using a Brookfield digital viscometer (LV D-II Ultras Programmable Remoter, USA) using axis 3 with increasing shear rate to demonstrate the flow behavior of the paste. All viscosity measurements were made at a temperature of 300°C.

9. CONCLUSION

Cloves (cloves) have been shown to have the ability to prevent diseases. Antibiotic resistance of various antibiotics ha s been shown to be important for all diseases tested. This finding suggests that the activity is due to many botanicals in the extract. The results show that the antibacterial activity of the toothpaste is determined by the presence of active in gredients in the extract and therefore the activity is well controlled when added back into the toothpaste.

Studies show that herbal toothpastes are more effective and accepted in dental research, contain fewer harmful chemic als and are safer than synthetic ones. Antibacterial properties of toothpastes designed to prevent bacteria can be found in toothpastes and oral care products. When the model is compared to the business plan, it becomes clear that it shows the same pride and passion that was shown in the introduction of the model (Colgate, Dabour Red and Dantkanti). The developed toothpaste has a bright future in naturopathic research and public health.

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