



REVIEW ON GINGER POWDER AND CLOVE OIL HERBAL TOOTHPASTE

¹Kedari Punam Nanasaheb

¹Student

¹Dharmaraj shaikshnik Pratishthans college of pharmacy walki

Abstract - The objective of this work is to review on ginger powder and oil of cloves herbal toothpaste. In current scenario in oral tending with use of herbal toothpaste containing natural ingredients are more acceptable publicly belief than chemical based synthetic use thanks to their safety and efficacy in reducing decay, and preventing other dental issues to which this generation is liable to. Cloves are the best medicinal value which are employed in Ayurveda. Oils, dried flower buds, leaves, and stems are wont to produce medication. Clove is that the most typically used on to the gums for toothaches , pain relief during dental work , and other dental concern . oil of cloves contains a chemical called eugenol that will help to decrease pain and fight infection. Zingiber officinale, belonging to the ginger family , may be a popular herb and it's been used as a spice and a drugs . Ginger is a vital plant with several medicinal and nutritional values in Asian and Chinese . Gingerol has long been use as an herbal medicine to treat various symptoms including pain in toothaches, and it's shown anti-inflammatory properties. a very important extension of this early work was the observation that ginger also suppresses leukotriene biosynthesis by inhibiting 5-lipoxygenase.

keywords - Zingiber Officinal , Clove oil , Ginger , Herbal Toothpaste , Medicine , etc .

INTRODUCTION

Herbal Toothpaste - Herbal and Herbal based toothpaste has been used since many years ago in ancient life and is one of the main important components of oral health care. The manufacturing and development of toothpaste began in China and India, as 300- 500 BC. During that period, squashed bone, pulverized egg and clam shells were utilized as abrasives as a part of tooth cleaning . In 19th century modern toothpaste were developed . After the development in the field of medicines, chalk and soap were contain into it. Immediately after the independence, several advancements of different detergents had begun, sodium lauryl sulfate had been used as an emulsifying agent . In the modern era, the focus has shifted towards the release of active ingredients during use in developments to prevent and treat oral illness. Toothpaste is a dentifrice (a paste or powder) used to clean, maintain and improve the health of teeth. Toothpaste is mainly used to promote oral cleanliness andalso acts as an abrasive that helps to prevent the dental plaque and food particles from the teeth, aids in the removing and veiling of halitosis, and releases active ingredients such as fluoride to aid in preventing tooth and gum disease (eg. *Gingivitis*)[4]. The majority of the cleaning is performed by the mechanical involvement of the toothbrush with the help of excipients used help of excipients used in toothpaste. The use of many herbal medicines are very effective as they contain active chemical ingredients such as polyphenols, gums, alkaloids, glycosides etc. These ingredients have also been investigated to have different biological activities. This increases

scope for evaluating new herbal toothpaste. The main aim of this comparative study is to prepared and evaluate ginger extract containing herbal toothpaste.

History And Background Of Ginger :

Ginger (*Zingiberofficinale* Roscoe) belongs to the family Zingiberaceae (Wagner, 1980) and monocot genus.

Other names of ginger are African Jamaican ginger, and Race ginger. Turmeric, cardamom, and galangal

are other notable members of the liliopsid family. the English botanist William Roscoe (1753-1831) gave the plant the name Zingiber, derived from a Sanskrit word singabera which suggests horn-shaped thanks to the protrusions on the rhizome (Katzer, 1999). The genus includes about 85 species of aromatic herbs from East Asia and tropical Australia. Ginger is an erect perennial plant growing from one to 3 feet in height.

The stem sticks up about 12 inches above ground and is surrounded by the sheathing bases of the two-ranked leaves. It produces clusters of white and pink flower buds that bloom into yellow flowers. Ginger grows horizontally, laterally flattened with branching pieces, a configuration called rhizome. the entire rhizome includes a firm, striated texture. it's 5 to 15cm long, 1.5to 6cm wide, 2cm thick and looking on the variability are often yellow, white, or red in color. Warm, humid climate is that the most ideal for ginger cultivation. It grows best in rich soil and shady places. Ginger are often grown both under rain fed and irrigated condition in best rich soil and shady places. Ginger will be grown both under rain fed and irrigated conditions. Ginger is native to Southeastern Asia (Wagner, 1980). it's mentioned in ancient Chinese, Indian, and geographic area periodicals and has long been valued for its aromatic, culinary, and medicinal properties (Langner, 1998).

Anti-inflammatory action of ginger :

The anti-inflammatory properties of ginger are known and valued for hundreds of years. the initial discovery of ginger's inhibitory effects on prostaglandin biosynthesis within the early 1970s has been confirmed repeatedly. This discovery identified ginger as an herbal medicinal product that shares pharmacological properties with non-steroidal anti-inflammatory drugs. Ginger suppresses prostaglandin synthesis through inhibition of cyclooxygenase-1 and cyclooxygenase-2. a crucial extension of this early work was the observation that ginger also suppresses leukotriene biosynthesis by inhibiting 5-lipoxygenase. This pharmacological property distinguishes ginger from anti-inflammatory drug drugs. This discovery before the observation that dual inhibitors of cyclooxygenase and 5-lipoxygenase may have a more robust therapeutic profile and have fewer side effects than non-steroidal anti-inflammatory drugs. The characterization of the pharmacological properties of ginger entered a brand new phase with the invention that a ginger extract. derived from *Zingiberofficinale* (family Zingiberaceae) and *Alpinagalanga*

(family : Zingiberaceae) inhibits the induction of several genes involved within the inflammatory response.

Antimicrobial property :

Ginger shows antibacterial property against such a big amount of gram-positive and therefore the gram-negative bacteria; namely, Escherichia (E) coli, Staphylococcus (St) aureus, St. epidermidis, Klebsiella pneumoniae, Enterococcus (En) faecalis, Salmonella (Sl) typhi, Sl. typhimurium, Pseudomonas (Ps) aeruginosa, Proteus (Pr) sp., Bacillus (Bc) cereus, Bc. subtilis, Bc. megaterium and Streptococcus (S) faecalis. Rampogu et al. studied that gingerenone-A and shogaol have a possible St. aureus encodes a novel enzyme, 6-hydroxymethyl-7,8-dihydropterin pyrophosphokinase inhibitors. Noori et al. indicated that the nanoemulsion-loaded coating solution has potent antimicrobial activity above gentamicin antibiotic. consistent with Mostafa, 2018, oil nanoemulsion was stable and effective on S. mutans. In another study, the ethanol extract showed considerable activity on Ps. aeruginosa, Bc. subtilis with zones of inhibition starting from 7 ± 0.4 mm at a amount of 6.25 mg/ml to 23.0 ± 3.2 mm at 100 mg/ml and MIC starting from 6.25 mg/ml to 12.5 mg/ml against Bc. subtilis and Monilia albicans. The activity of the aqueous extract was very minimal at low concentrations, but marked activity was observed at higher concentrations. In another research, the Antimicrobial potency of fresh, natural, and commercial dried ZO extracts had been investigated against seven local clinical bacterial isolates by the agar disc diffusion method. The result shows that ZO's chloroform and ethoxyethane extracts showed a more significant inhibition zone of tested

pathogens except P. aeruginosa and E. coli. The Methanolic extract of ZO was assayed in vitro for antibacterial activity by using the agar diffusion method.

The zone of inhibition was compared with different standard antibiotics.

Antifungal Properties :

Ginger extract and several other of its constituents exhibit antimicrobial activity in vitro and in vivo and antischistosomal activity. Chemical constituents of ginger such as sesquiterpenes, diarylheptenones, gingerenones A, B and C, and isogingerenone B, have shown antifungal activity in vitro.

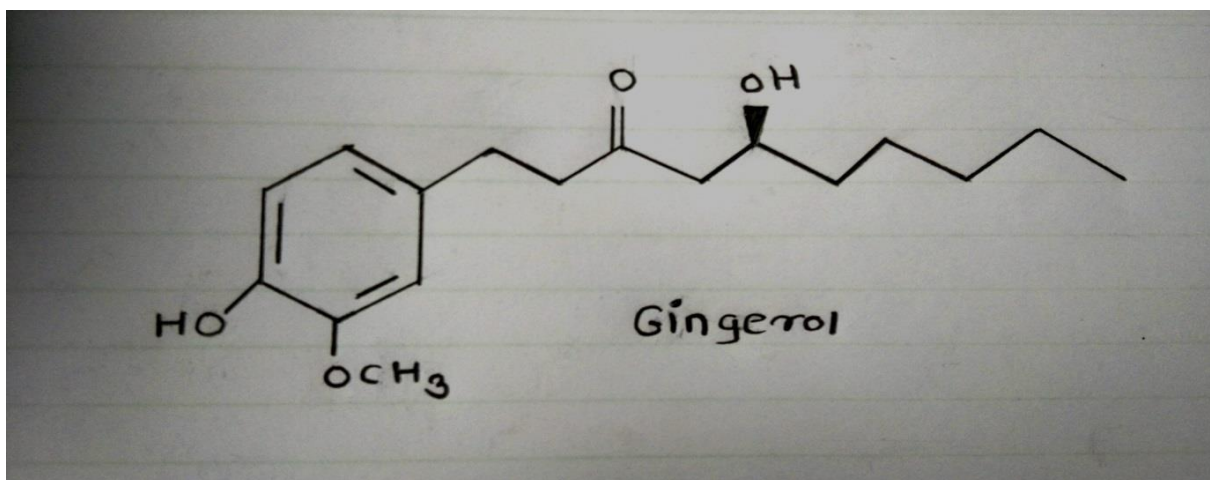
The chemical components of ginger

Fig No. 1. Gingerol

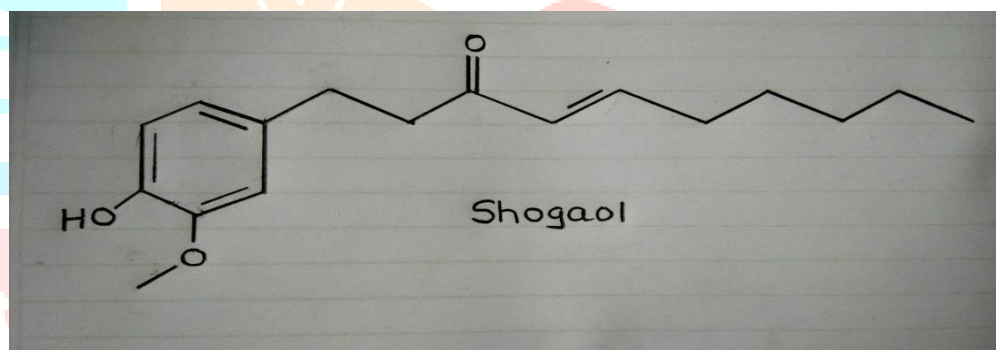


Fig No.2. Shogaol

Some of the main volatile identified by connell in 1970 are “the sesquiterpene hydrocarbon : (-) – alpha – *zingiberence* , (+) -ar-curcumene, beta – bisabokene , beta – sesquiphellandrene , farnesene , gamma – selinene , beta – elemene and beta – *zingiberene*. The non – volatile known to be responsible for the pungency of ginger are the gingerols and shogaols.(6)- gingerols was first identified by lapworth in 1917 ; in 1969 , connell and sutherland established the s- configuration for the hydroxyl group. Gingerols undergo dehydration readily due to the thermally labile beta – hydroxy – keto group, there by forming the corresponding shogaols.

Remedies For Toothpaste :

The compound in ginger can even help reduce the oral bacteria that ends up in cavities and to gum diseases making it a generally effective ally to your oral health regimen.

-Ginger can help to stop cavities and take away plaque.

-Ginger can strengthen the gum tissues around your teeth.

-Ginger may also prevent inflammation.

-Ginger naturally has anti-inflammatory properties in it which help's you while feeling discomfort

Objective :

- To see herbal toothpaste containing natural ingredient like ginger powder ,neem powder ,cloveoil , aloe vera gel, etc which were traditionally used for tooth cleaning.
- To reduce inflammation and pain types nausea and vomatting
- To increase energy levels
- To relieves tooth ache's
- To Improves digestion and reduces the persistence of nausea
- Fight bacterial infections
- To keep Cavities away
- To reduce muscle pain , tension and tenderness

Material And Methods

Herbal toothpaste is ready by using different ingredients like Ginger powder for its Antiinflammatory, essential oil as a Dental Analgesic, Neem Powder which has Antimicrobial property, Aloe vera gel to forestall infections for its Antifungal, Anti-Viral and Anti- inflammatory etc.of this mixture is ready and other preparation used and base containing, carbonate as abrasive, salt as anti caries agent, Sorbitol as humectant, Sodium Lauryl Sulphate as a detergent and foaming agent, Sodium CMC as a binding agent, Methyl Paraben and benzoate used as a preservative, Sodium Saccharine as a sweetening agent, Menthol as a flavoring agent. Review on ginger powder and oil of cloves herbal toothpaste. a way used for the herbal toothpaste is homogenization by using mortar and pestle for formation base of toothpaste.[4]

Instrument : Mortar and pestle , sieve no. 80 , beaker , stirrer , etc.

Material

The weight of every each ingredient was decided by review previous study of ginger herbal toothpaste. The combination of percentage by weight of all the ingredients of this is 100% , which means the sum of quantity of toothpaste . The ingredients of all toothpaste are given in table 1. [14]

Table No. 1 List of the Indian herbal plants used in tooth cleaning[2]

Name	Biological Source	Geographical source	Uses
Ginger	Ginger consists of the rhizome of <i>zingiber officinale</i> , <i>Roscoe</i> and dried in the sun.	Indigenous to tropical areas such as Asia, (India and China), west Africa, Jamaica.	Reduce inflammation pain
Neem	Been consist of the fresh or dried leaves and seed oil of <i>Azadirachta Indica</i> .	India is native of <i>Azadirachta</i> . It is also cultivated in Nepal, Pakistan, Bangladesh and Sri-Lanka.	Anti – Bacterial Active Ingredients
Aloe vera	Dried latex of leave of it. It is also known as Curacao aloe, cape aloe and socotrine aloe.	Aloe is the indigenous to eastern and southern africa and grown in cape colony, Zanzibar and island of socotra.	Anti- Viral Anti- fungal
Clove	Clove is the dried flower buds of <i>eugenia caryophyllus</i> . <i>Sprague</i> and evergreen tree.	Indigenous to amboyna and molucca islands	Antiseptic Dental analgesic

Table No. 2 List of chemical and their function [2]

Sr No.	Chemical Name	Function
1	Calcium carbonate	Abrasive
2	Sodium fluoride	Anti – caries agent
3	Sorbitol	Humectant
4	Sodium lauryl Sulphate	Detergent and foaming agent
5	Sodium CMC	Binding agent
6	Methyl paraben	Preservative
7	Sodium benzoate	Preservative
8	Sodium saccharine	Sweetening agent
9	Menthol	Flavoring agent

Method of formulation:

There are two types of methods for formulation of toothpastes, viz.

1. Dry gum method

2. Wet gum

method Dry

Gum

Method:

Preparation of base:

1. The solid ingredients carbonate, salt, SLS, sodium CMC, methyl paraben, benzoate of soda, sodium saccharine were weighed accurately as mentioned within the formula and sieved with sieve no.80 so on maintain the particle size.

2. Further, these chemicals were subjected to mixing in mortar and pestle and triturated with accurately weighed sorbitol until semisolid mass formed. Addition of herbal ingredients.

3. Accurately weighed herbal extract in sort of powders were sieved and added to the bottom together with aloe gel , ginger powder and oil of cloves. 4. Menthol was added as a flavoring at the tip

About The

Plants

1.Ginger



Fig No.3. Ginger Plant

Kingdom :

Plantae.

Order :

Zingiberales

Family

:Zingiberaceae

Genus

:Zingiber

Species

:Z.Officinale

Binomial Name *:Zingiber Officinale* **Synonyms** : *zingiber , zingiberis , sunthi*[3]

1.1 Chemical Constituents :

Chemical analysis of ginger shows that it contains over 400 different constituents in ginger rhizome. The major constituents include gingerol, shogaol, and α -curcumene, while phenolic compounds include gingerol, paradols, and shogaol. [18]

1.2 Mechanism Of Action :

1.2.1 Anti-inflammatory action of ginger :

The anti-inflammatory properties of ginger have been known and valued for centuries. The original discovery of ginger's inhibitory effects on prostaglandin biosynthesis in the early 1970s has been repeatedly confirmed. This discovery identified ginger as an herbal medicinal product that shares pharmacological properties with non-steroidal anti-inflammatory drugs. Ginger suppresses

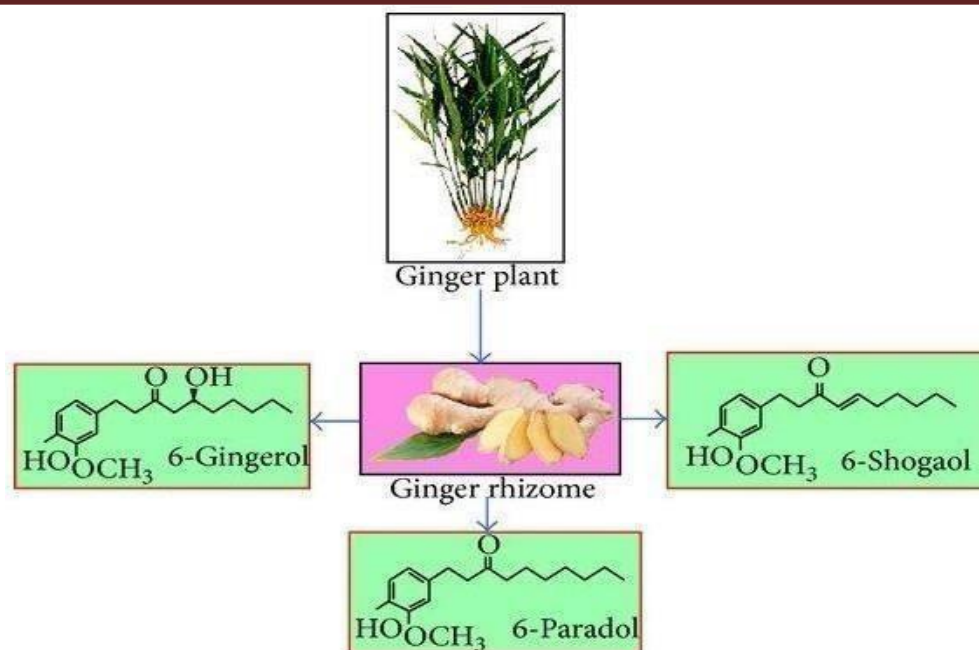
prostaglandin

synthesis through inhibition of cyclooxygenase-1 and cyclooxygenase-2. An important extension of this early work was the observation that ginger also suppresses leukotriene biosynthesis by inhibiting 5-lipoxygenase. This pharmacological property distinguishes ginger from nonsteroidal anti-inflammatory drugs. This discovery preceded the observation that dual inhibitors of cyclooxygenase and 5-lipoxygenase may have a better therapeutic profile and have fewer side effects than non-steroidal anti-inflammatory drugs. The characterization of the pharmacological properties of ginger entered a new phase with the discovery that a ginger extract derived from *Zingiber officinale* (family *Zingiberaceae*) and *Alpinagalanga* (family *Zingiberaceae*) inhibits the induction of several genes involved in the inflammatory response. These include genes encoding cytokines, chemokines, and the inducible enzyme cyclooxygenase-2. This discovery provided the first evidence that ginger modulates biochemical pathways activated in chronic inflammation. The earlier report suggested that in Rheumatoid arthritis (RA) and Osteoarthritis (OA) patients, use of powdered ginger for 3-month to 2.5-year period, reduce pain and inflammation in 75% patients without any adverse effect and suggested ginger is an anti-inflammatory agent. 6-gingerol acts as an anti-inflammatory compound that may be useful to treat inflammation without interfering with antigenpresenting function of macrophages.[8][20]

1.3 Cultivation and collection :

The plant of ginger may be a perennial herb about 1 metre high sympodial branching rhizome. For cultivation the rhizome is take away pieces and every piece containing a bud is planted into trenches in well-drained and loamy soil in March or April. The plant requires about 80 cm rainfalls p.a. and if rainfall is insufficient water could also be supplied by irrigation. Collection is completed in December or January when the plants wither after flowering period. Rhizomes are carefully dug out, aerial stems, fibrous roots and buds are removed. They are washed in remove mould and clay attached to them. Rhizome is peeled on flat surface also as between the fingers and thoroughly washed in running water. If moisture is present, drug may become moldy, after drying it loses about 70% of its weight.

Figure.4: Ginger, ginger rhizome, and its major active components: 6-gingerol, 6- shogaol, and 6-paradol.



1.4 Uses :

- Ginger is used as a stomachic, an aromatic a carminative, stimulant and flavouring agent , used in mouth washes, ginger beverage and liquors.
- Ginger powder has been reported to be effective in motion stickness.
- *Z. Officinale* (methanolic extract) has molluscicidal effects, possessing efficacy to control the parasitic infection viz. Schistosomiasis is owns food and drug administration has included ginger as product that is generally regarded as safe (GRAS).
- Reduce inflammation and pain . [3]

2. Neem



Fig No. 5. Neem

Kingdom :

Plantae

Order :

Sapinales

Family :

Meliaceae

Genus

Azadirachta

Species :

Alindica

Bionomical Name : *Azadirachta Indica*[3]

2.1. Habitat :

Neem is likely native to the Indian subcontinent and to dry areas throughout South Asia. It has been introduced to parts of Africa, the Caribbean, and numerous counties in South and Central America

2.2. Chemical Constituent :

Good number of chemical isolated from the plant belong to the classes diterpenes (sugiol) , nimbiol (bark) , triterpenes: beta – sitosterol, stigasterol (leaf) , Limonoids; Neem leaves contain not less than 1.0 %w/w of Rutin.

2.3. Mechanism Of Action :

Neem (*Azadirachta indica*) plants parts shows antimicrobial role through inhibitory effect on microbial growth/potentiality of cell membrane breakdown. Azadirachtin, a posh tetranortriterpenoid limonoid present in seeds, is that the key constituent answerable for both antifeedant and toxic effects in insects

2.4. Cultivation and collection :

Neem seedlings are often raised on nursery beds and transplanted to main field or they even is sown directly within the field. Planting or transplanting neem trees before or during season is that the best for his or her establishment. For seed collection and planting, use fruits at the Paris green colour stage .

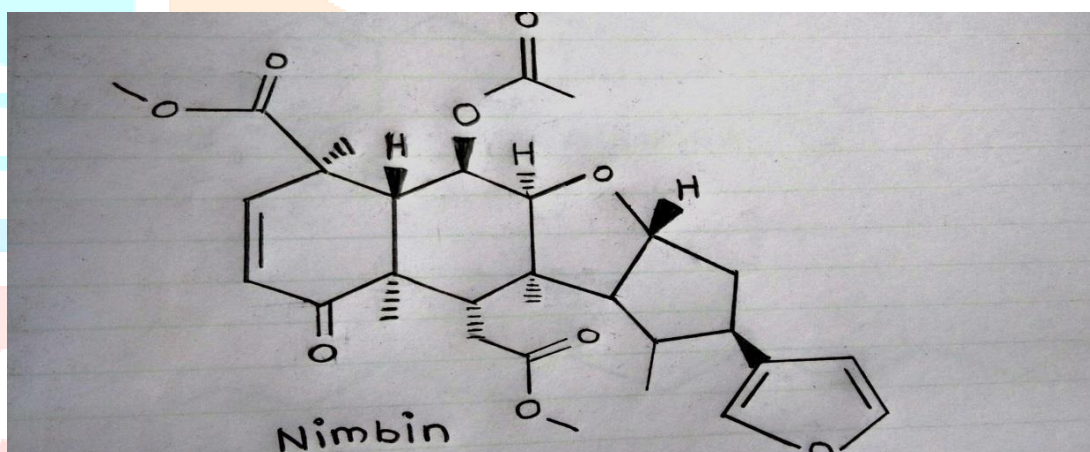


Fig No.6. Nimbin

2.5. Uses :

- Neem bark is employed as an energetic ingredient during a number of toothpastes and toothpowders.
- Neem bark has anti-bacterial properties, it's quite useful in dentistry for curing gingival problems and maintaining oral health in a very natural way.
- Neem twigs are used as oral deodorant, toothache reliever and for cleaning of teeth.

3.Aloe :



Fig No.7. Aloe

Kingdom :

Plantae **Order :**

Asparagales

Family:

Asphodeaceae

Genus : *Aloe*

Species : *Aloe Prefoliata* [3]

3.1. Habitat :

Aloe vera grows in Human Altered environments (yards, fields, and in and around abandoned houses). Distribution in Bahamas/Globally: burn plant is native to the Mediterranean region (north Africa) but is naturalized throughout the subtropical regions of the planet.

3.2. Chemical Constituent :

Cosmetic and a few medicinal products are made of the mucilaginous tissue within the centre of the A. vera leaf and called A. vera gel. The peripheral bundle sheath cells of A. vera produce an intensely bitter, yellow latex which is because of the presence of aloin, aloe-emodin and related compounds.

3.3. Mechanism Of Action :

3.3.1. Anti- Fungal action of Aloe :

The antibacterial action of aloe gel enhances the wound healing process by its anti-inflammatory action. Streptococcus pyogenes and Streptococcus faecalis are the 2 microorganisms inhibited by

Aloe gel, Aloe gel acts against both gram positive and gram negative bacteria. It possesses bactericidal action against *Pseudomonas aeruginosa*. Leaf pulp and liquid fraction of aloe acts against plant pathogenic fungi. Aloe gel preparation is additionally inhibitory to *Monilia albicans*. Lectin containing fraction of Aloe gel directly inhibits the expansion of Cytomegalovirus, by interfering the protein synthesis. The anthraquinone derivatives of Aloe leaf have shown virucidal effects on enveloped viruses. Aloe emodin inactivates most of the viruses, including Varicella zoster, influenza and pseudorabies virus and herpes simplex viruses.[14]

3.4. Cultivation and collection :

Aloe Vera is found to grow in hot humid and high rainfall conditions. it's grown all told quite soils but well drained soil with the high organic matter is most fitted. Therefore, well- drained high land should be selected for its cultivation. A rainfall starting from 1000 – 1200 mm is good for aloe cultivation.

3.5. Uses :

- Aloe vera gel is effective in controlling bacteria that causes cavities
- Aloe vera gel ability to kill and take away harmful microorganism is thanks to compound called anthraquinones.
- It is healthier alternative for people with sensitive teeth.
- It is additionally employed in herbal medicine.

4. Clove :



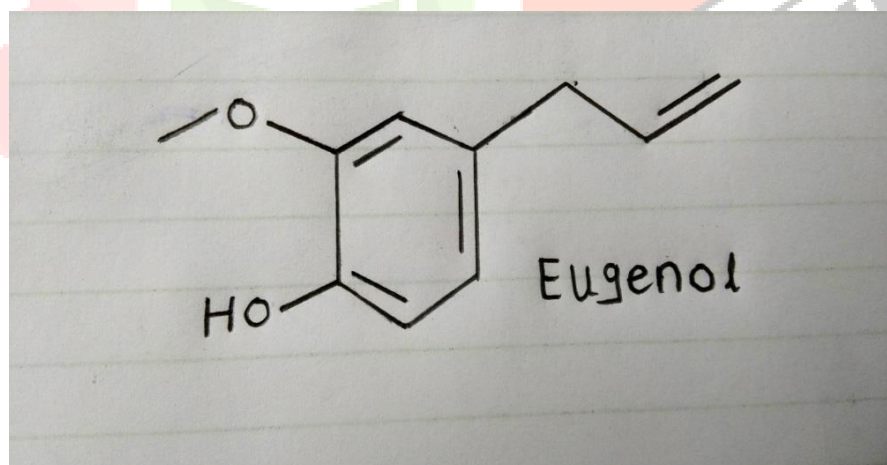
Fig No.8. Clove

Kingdom:*plantae* **Order :***Myrtales* **Family**: *Myrtaceae***Genus :***Syzygium***Species :***S.Aromaticum***Binomial Name :** *Syzygium aromaticum***4.1. Habitat :**

Syzygium aromaticum commonly referred to as clove. The clove is native to the north , moluccas, the SpiceIslands of Indonesia. it's cultivated in India , Sri Lanka , Brazil , Zanzibar , archipelago .

4.2. Chemical constituent :

Clove oil comprises in total 23 identified constituents, among them eugenol (76.8%), followed by beta-caryophyllene (17.4%), alpha-humulene (2.1%), and eugenyl acetate (1.2%) because the main components.

**FigNo.9.Eugenol**

4.3. Uses :

- It may reduce pain and sensitivity caused by toothache
- Irritation and supply temporary pain relief
- Clean your mouth: trapped food particles between teeth may cause pain
- Protect liver against infections [4]

4.4. Dental analgesic action of clove :

The chief constituent present in oil of cloves is that the phenol "eugenol" which is present in amounts up to 85%. essential oil acts as a germicide 9 to Escherichia coli, Staphylococcus aureus and Pseudomonas aeruginosa .Clove oil is believed to inhibit prostaglandin synthesis, thereby reducing painful symptoms. Eugenol, the most constituent of volatile oil is presupposed to have anticancer action. In one study, eugenol

- treated HL-60 cells showed features of apoptosis including DNA fragmentation and formation of DNA ladders in agarose gel electrophoresis. it absolutely was observed that eugenol transduced the apoptotic signal via reactive oxygen species (ROS) generation, inducing mitochondrial permeability transition (MPT), decreasing anti- apoptotic protein bcl-2 level, inducing cytochrome release to the cytosol, and subsequent apoptotic necrobiosis. When taken together, the study showed that ROS plays a critical role in eugenol- induced apoptosis in HL-60, and this is often the primary report on the mechanism of the anticancer effect of eugenol

5. Evaluation Parameters Of Herbal Toothpaste :

5.1. Physical Examination :

- Color – The colour of the toothpaste was checked visually .
- Taste – The taste of the toothpaste was checked orally.
- Odour – The formulation evaluated for its odour by smelling it.
- Smoothness – The smoothness of the paste was tested by rubbing the formulation between the fingers
- Relative Density [9]

5.2. Performance Evaluation:

- **Moisture Content** : The weight loss was used to calculate the moisture content using the formula

$$\% \text{ Moisture} = \frac{\text{Original sample weight} - \text{Dry sample weight}}{\text{Original sample weight}} \times 100\%$$

- **Cleaning Ability** :

Eggshells contain high amount of most approximate tooth enamel for testing cleaning ability to toothpaste. One eggshell used for each toothpaste tested.

- **Foaming Ability** :

Take a product which was weighed into a glass beaker ,Add it into distilled water and allowed it to stand for 30 mins .The contents of the beaker were stirred and then it should be transferred to a graduated measuring cylinder. Then stirred again to form to uniform suspension then cylinder was subjected to 12 complete shakes and then allowed to stand for 5 mins.

The volume foam was calculated as ; Foaming

$$\text{Ability} = L1 - L2$$

L1 = Volume in ml of foam with water
L2 = Volume in ml of water only [11]

- **Spread Ability** :

- To check the spread ability of product following procedure is used ;
- Take a product and place it into the glass plate at a center.
- Then place second plate over it add 1 kg weight on the top of set up carefully.
- Then allowed it for sometime then remove the and measure the diameter in cm.[16]

- **Stability** :

Some quantity of the toothpaste were transferred into each of 3 glass test tubes and stoppered. The test tubes were heated at 45°C for 72 hours allowed to cool and content examine visually for homogeneity signs of fermentation and other deterioration results were reported as pass or fail .[22]

- **Composition :**

All ingredients should be complied with the Indian Standards. Toothpaste is not composed of mon or disaccharides such as sucrose or fermentable carbohydrates.

- **PH :**

The herbal product was dissolved in deionized water , stirred well to make a suspension. Then measured the pH with Jen way 3510 PH meter.[4]

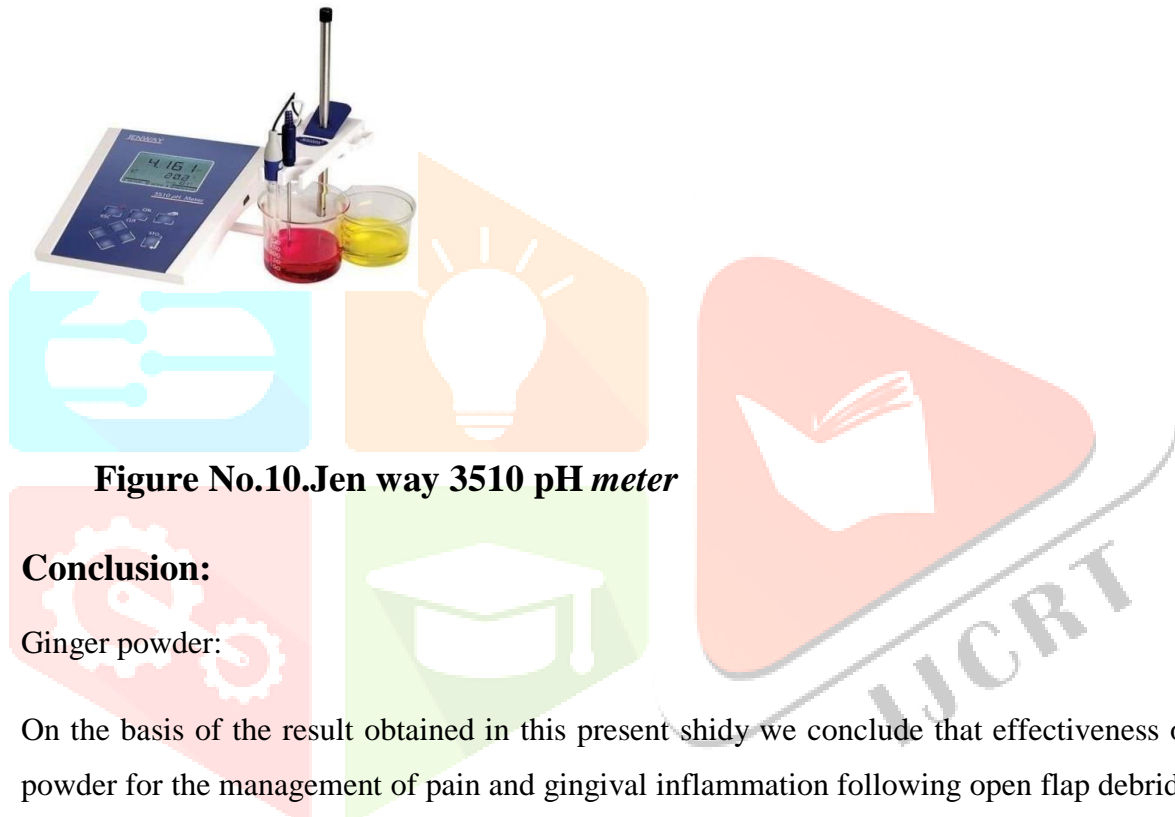


Figure No.10.Jen way 3510 pH meter

Conclusion:

Ginger powder:

On the basis of the result obtained in this present shidy we conclude that effectiveness of ginet powder for the management of pain and gingival inflammation following open flap debridement is comparable to than of ibuprofen. and also ginger is useful for cleans the teeth throughly smoothes and strengthness the gums . It ensure a healthy oral Flora and fresh breath. It is also suitable for children.

Clove oil tooth paste: -

On the basis of the result obtained in this present shidy we conclude that the paste formulation. of clove oil shows good physicochemical properties as well as good drug content compared to other formulation and also the clove extract .Of clove oil this toothpaste ensure strong teeth. and healthy gum besides this regular brushing with this tooth paste can even give you fresh breath for few hours.

Reference :

1. Andres R. Sanchez, DDS, Roys. Rogers III , MD , and Phillip. J .Sheridan, DDS. Tetracycline- derivative staining of the teeth and oral cavity. International Journal Of Dermatology
2. D.Mamatha , G.Naveen Kumar . Preparation evaluation and comparison of herbel toothpaste with Available Toothpaste . IOSR Journal of pharmacy and Biological Science 2017 ; vol 12 , issue 6 :1-6
3. Dr.C.K. Kokate , A.P. Purohit , S.B. Gokhale . Terpenoids . Pharmacognosy . Pune . Dr.C.K. Kokate ; 14.131-14.133 .
4. Durgesh Gautam , Preetam Palkar, Kiran Maule , Shilpa Singh ,Gopika Sawant , Chinmay Kuvalekar , Tushar Rukari , Dr.Vijaya Jagyap .Preparation evaluation and comparison of herbal toothpaste with marketed herbal toothpaste. Asian Journal of Pharmacy and technology 2020;vol.10 issue 03:165-169.
5. Harry's Cosmetics , Volume 1 of 2,8th edition, Published by chemical publishing Co.Inc. New York .
6. Haward I. Maibach's Handbook of Cosmetic Science and Technology , third edition , Published by Informa Healthcare USA Inc. New York - 10017
7. Ilze maldupa , Anda Brinknane , Inga Rendeniece , Anna Mihailova . Evidence based toothpaste classification, According to certain characteristics of their chemical composition. Stomatologija , Baltic Dental and Maxillofacial Journal 2012;14:12-22.
8. Kankanam Gamage Chithramala Dissanayake , Waliwita Angoda Liyanage Chandrasiri , Ruwan Priyantha Liyanage. A review on medicinal uses of zingiber officinal (Ginger). International Journal of Health Sciences and Research 2020;Vol.10:Issue: 6:142-148.
9. Kavita Varma Shukla, Deepika Kumari . Formulation development and evaluation of herbal toothpaste for treatment of oral disease. Journal of drug delivery and therapeutic 2019;9(4-5):98-104.
10. Kuldeep singh , Pooja singh , Gurpeet oberoi. Comparative studies between herbal toothpaste (dantkanti) and non herbal toothpaste . International Journal of dental research 2016 ;4(2):53-56.
11. Mahendram sekar , Noor Jasmin , Shamsul Ariffin . Formulation, evaluation and antibacterial properties of novel polyherbal toothpaste for oral care. International Journal of pharmaceutical and clinical Research 2016;8(8);1155- 1158.
12. MD.Nazrul islam Bhuiyan, Jaripa Begum, Nemai Chandra Nandi and Farhana

- Akker
.Constituent of the essential oil from leaves and buds of clove
(*syzigium caryophyllatum* (L.) Alston). African Journal of plant science
2010;vol.4(11):451-454.
13. Pallavi L. Phalke, Tushar G.Rukari and Anuradha S.Jadhav. Formulation and evaluation of toothpaste containing Combination of aloe and sodium chloride. IJPSR 2019;vol10(3):1462-1467.
14. Priyanka Sharma,Amit C Kharkwal, Harsha Kharkwal, M Z Abdin, Ajit Varma. A Review on Pharmacological Properties of Aloe vera. Int. J. Pharm. Science 2014 ;29(2): 31-37.
15. R.J. Reiter, S.A.Rosales : Corral , X.Y. Liu, D. Acuna – Castroviejo , G.Escames , D-X . Tan. Melatonin in the oral cavity physiological and pathological implications. Journal Of Periodontal Research 2015;50 :9-17.
16. Roshan Telrandhe , Pavan Deshmukh , Mahendra Gunde. Formulation and evaluation of herbal toothpaste compared with marketed preparation. International Journal of Pharmaceutics and drug Analysis 2017 ; vol.5 Issue10.
17. Sadeq-A . AL- Maweri , Mohammad zakaria , Nader Alaizari , Butchibabu Kalakonda , Hashem M.Al – Shamiri , Mohammed N. Alhoji , Walid A.Al – Soneidar , Ahmed W. Alahmary . Efficacy of aloe vera mouthwash versus chlorhexidine on plaque and gingivitis: A systematic review. International Journal of dental hygiene 2020;18:44- 51.
18. Salonee Tawde , Chetan Mhaprolkar , Kinjal Gawde , Deepak Mahind , Chetan Mahaprolkar : Development and evaluation of anti- arthritic gel containing ginger (*zingiber officinale*) .International Journal of Innovative Science and Research Technology 2020; vol.5 , issue 7:1147-1153.
19. Satabdi Bhattacharjee , Soumitra Nath, Prisweta Bhattacharje ,Mansi Chouhan Bihas Deb
. Efficacy of toothpaste on bacteria isolated from oral cavity.Into J med. Public health 2018;8(2):89-92.
20. Subodh Kumar , Kiran Saxena , Uday N. Singh , Ravi Saxena. Anti- inflammatory action of ginger: A critical review in anemia of inflammation and it's future aspects . International Journal Of Herbal Medicine 2013 ; 1(4):16-20.
21. Urmila Nishad , Meraj Ali , Anupama Maurya. Formulation and evaluation of a polyherbal toothpaste using medicinal plants. Journal Of Pharmaceutical Science And Research 2020; vol12(1);105-111.
22. Vijaya Kumar Voleti, Sana Banu Shaik, Chandana Konduru , Sathish Peyam , Cahran Kumar Yaramseti , Subramanyam Pasala , Shammuya Pandiyan

Pitchaimuthu . Formulation and development of dental gel containing clove oil for the treatment of human periodontal diseases. Journal of comprehensive pharmacy 2016 ;3(1):1-7.

23. X.Fatima Grace , Darsika C ,etal. Preparation and evaluation of herbalDentifrice. Int . Res .J. Pharm . 2015 ; 6(8) : 509-511

