

“Formulation And Evaluation Of Herbal Toothpaste: Remedy For Oral Cancer “

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ABSTRACT:

Toothpaste is a paste or gel dentifrice used with a toothbrush as an accessory to clean and maintain the aesthetics and health of our teeth promoting oral hygiene. Now a day we use commercial toothpaste which contains many chemical compounds like sodium lauryl sulfate, which is harmful to our gum. We have developed some common food materials and waste materials which can replace these harmful or costly chemicals like citric acid, coloring agents and preservatives making our toothpaste economically more viable than commercial toothpastes. The developed toothpaste contains natural ingredients and waste materials like baking soda (teeth whitener), egg shell powder (ca +2 source), clove oil (sensitivity), glycerin (preservative), lemon peel (substitute for citric acid), orange peel, banana peel (substitute for iron) etc. Microbial and sensory tests have been done with our developed product. Recent researches shows Vitamin C can kill cancer cells acting as a per-oxidant, if dosed in proper amount which is found in fruit peels and some herbs which are abundant. We aimed to develop the toothpaste that can destroy cancer cells inside our mouth. Apart from making the toothpaste that cures all problems of teeth and mouth, our other objective of this project to find the proper dosage of vitamin C which when taken orally along with the toothpaste, can identify and destroy the cancer cells. Here no chemical preservatives are added; instead glycerin and common salt are added as natural preservatives. This toothpaste can cure various diseases of teeth like Gingivitis, tooth decay, cavity, gum bleeding, bad breath and dental-caries as well as it has anti-smoking and anti-cancer properties.

I. INTRODUCTION:

The chemical agent that could supplant patient dependent mechanical plaque control and it reduce and prevent oral disease. Self performed mechanical plaque removal is one of most accepted

method of controlling plaque and gingivitis. The mechanical plaque control is time consuming and some are may lack motivation for these procedures¹. The therapeutic effect showing plants has been beneficial to the oral health from the thousands of year throughout the world. The traditional medicine has advantage more than the side effect like allergies. Neem is one of the most widely researched tropical trees for the development therapeutic action. 20 year ago the component of neem extract was analyzed².

The chewing sticks have been widely used in the Indian subcontinent, the Middle East and Africa since ancient time period. Dental caries is steadily increasing in the underdeveloped and developing country. Hence, there is an urgent need to promote traditional preventive measure that are acceptable, easily available and cost effective³. The neem has been antibacterial activity is has evaluated from the ancient times. It has been use for the various activities like as astringent, antiseptic, insecticidal, anti-ulcer and for cleaning the teeth in pyorrhea and other dental disease. The leaf extract of neem showed superior antiviral and antihyperglycemic activity in vitro and in vivo on animals. It showed good in vitro broad range antibacterial activity⁴. Nanotechnology may defined as the creation of material, drug and devices that are used to manipulate matter that in specific size and increase the drug targeting. While the using various herbal be use to be developed the nano-materials to enhances the action⁵. It is an two group comparative study. Food debris are white small particles on teeth, can be easily rinsed off. The dental plaque is thin film of bacteria that sticks to teeth and yellow colour can't be rinsed off. There has been closer relationship between tartar, calculus and periodontal disease. The extract are use in various category like Neem Antibacterial, Guava-Anti-inflammatory, Babul Astringent, Kalmi-Flavoring agent and other ingredient are Camphor-Antiseptic, Honey Sweetening agent, Glycerine-Humectant, Cal Carbonate-Abrasive, SLS-Detergent and also use the sodium chloride

and distilled water. This led to paing increased attention on using natural ingredients in herbal

dentrifrices6 .

II. MATERIAL AND METHODS:

INGREDIENTS	USES
Eggs Shell Powder	Antimicrobial
Glycerin	Preservative
Backing Soda	Improve certail cancer treatment
Common Salt	Preservative
Saccharine	Sweeting agent
Green Tea	Antimicrobial
Pudina Leaf	Antioxidant
Turmeric	Anti Inflammatory
Nyantara	Anticancer
Echinacea	Anti fungal
Choti Elaichi	Antibacterial
Neem	Antimicrobial
Aloe Vera	Antiinflammatory
Bay Leaf	Anti-Oxidant
Brahmi	Anti Inflammatory
Clove oil	Dental Analgesic
Peppermint oil	Flovouring Agent
Lemon Peel	Antimicrobial
Orange Peel	Antioxidant
Pumpkin peel	Anti-Inflammatory
Mango peel	Anti Cancer
Banana Peel	Antioxidant
Papaya Peel	Antioxidant
Jackfriut seed	Anti Cancer
Indian Ginseng	Treat boost nutrition,Pain &Inflammation
Gotu Kola	Antioxidant
Fennel	Anti Pasmodic
Licorice Root	Anti viral
Cayenne	Anti Oxidant
Ajwain	Antifungal
Valerian	Antioxidant
Hyssop	Asthama
Ginseng	Antioxidant
Amla	Antimicrobial
Distilled Water	-

METHOD OF PREPARATION:

Dry Gum Method:

Preparation of base:

The solid ingredients (all herbs) listed in table (5.1) were weighed accurately as mentioned in the formula and sieved with sieve no.80 so as to maintain the particle size.

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- Accurately weighed herbal extract in form of powders were sieved and added to the base along with Aloe Vera gel and clove oil, peppermint oil was added as a flavoring agent .



Evaluation and comparison of Herbal Toothpaste

Physical Examination (Colour, odour, taste, smoothness, relative density) Formulated toothpaste was evaluated for its colour, visually colour was checked. Odour was found by smelling the product. Taste was checked manually by tasting the formulation. The Smoothness was tested by rubbing the paste formulation between the fingers.

Spread ability

In this method slip and drag characteristic of paste involve. Formulated paste (2g) placed on the ground slide under study. The formulated paste placed like sandwich between this slide and another glass slides for 5min to expel air and to provide a uniform film of the paste between slides. Excess of the paste was scrapped off from the edges. The top plate was then subjected to pull of 80g with the help of string attached to the hook and time (sec) required by the top slide to cover a distance of 7.5cm was noted. A short inter vak indicated better spreadability.

Formula was used to calculate spreadability:

$$S = M \times L / T$$

Where,

S= Spreadability

M= Weight in the pan (tied to the upper slide)

L= Length moved by the glass slide

T=Time (sec) taken to separate the upper slide from the ground slide.



Foam ability

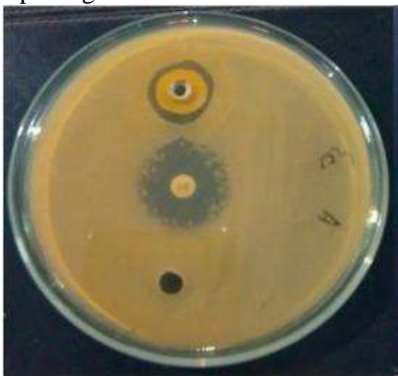
The foamability of formulated toothpaste evaluated by taking small amount of formulation with water in measuring cylinder initial volume was noted and then shaken for 10 times. Final volume of foam was noted.



Anti-bacterial activity

In-vitro anti-bacterial study of formulated paste was performed by disc diffusion method in triplicate manner by using Muller Hinton Agar medium against a pathogenic bacterial strain Staphylococcus aureus (S. aureus, MTCC 3160). S. aureus was initially cultured cells were tend to multiple in the Muller Hinton agar plates. Then the formulated paste containing discs were placed over the bacterial plates and incubated at 37°C for the 24 hour, comparing ciprofloxacin as the positive control. The diameter of zone of inhibition (ZOI) was measured in millimeters (mm). The minimum inhibitory concentration (MIC) are the smallest concentration in which the compound displays no visible microbial growth. It had been determined by agar streak dilution method in triplicate manner. The protocol involves

formulation of microbial suspension (~10⁵ CFU/mL), application to the petridish with serial dilution and incubation of petridish at 37±1°C. The MIC value was determined and average was taken 9. Reading of plate and interpretation After 15 to 16 hours of incubation, each plate was examined. If the plate satisfactory streaked, the inoculums were correct the result of ZOI should be uniformly circular and a confluent lawn of growth. After measure the diameter of ZOI the data was noted and interpreting the result.



PH Determination

Dispense 10 gm of the toothpaste from the container in a 50 mL beaker and add 10 mL of freshly boiled and cooled water (at 27°C) to make 50 percent aqueous suspension. Stir well to

make a thorough suspension. Determine the PH of the suspension within 5 min, using a PH meter.



Determination of moisture and volatile matter

5 g of formulation placed in a porcelain dish containing 6-8 cm in diameter and 2-4 cm depth in it. Dry the sample in an oven at 105°C.

Calculation :

% by mass = $100 \frac{MI}{M}$

MI-Loss of mass(g) on drying

M-Mass (g) of the material taken for the test.

AFTER



BEFORE

III. RESULT AND DISCUSSION:

SR.NO	EVALUATION TEST	RESULT OBTAINED
1	Physical Appearance	Colour-Yellowish Brown Odour-Aromatic Taste-Sweet
2	PH Determination	6.8
3	Antimicrobial activity	There is no microbial growth in zone of incubation
4	Fomability	15mm
5	Determine of moisture content	105°C at 25min
6	Spredability	7.5cm

The herbal toothpaste was formulated by mixing proper proportions of aqueous extract of all the ingredients. The following table give the result of evaluation test of formulation for herbal Toothpaste.

1) Formulated herbal toothpaste was evaluated visually for its colour i.e. Yellowish brown. Odour was found by smelling the product i.e Aromatic and Characteristic. Taste was checked manually by testing the formulation.

2) We found that all the toothpastes were having good consistency and smooth texture and also shown no symptoms for deterioration such as phase separation, gassing, fermentation when all samples were place at temperature of 34 +/-30C for period of 30 days. It confirmed that the toothpaste is stable.

3) The internal part of all collapsible tubes have given no sign of corrosion or damage during normal storage conditions at a temperature of 45±20C for 10 days. So it was confirmed that the containers of formulated herbal toothpaste as well as all marketed herbal toothpaste have shown good tube inertness.

4) The Smoothness was tested by rubbing the paste formulation between the fingers.

5) The pH of formulated herbal toothpaste was compared to other herbal marketed formulations and it was found to be 9.16 and therefore it complied with BIS limit given in figure.

6) The foamability of formulated herbal toothpaste is more than commercial formulation. Loss on drying of formulated herbal toothpaste was found to be minimum than other marketed herbal formulation. While zone of inhibition of formulated herbal toothpaste was found to be 15mm.

7) The activity increases in terms of abrasiveness and spreadability. Comparison of abrasiveness of marketed pastes with formulated herbal toothpaste suggests that formulated herbal toothpaste has more abrasiveness than the marketed pastes.

8) The loss on drying of formulated herbal toothpaste as compare to other marketed toothpaste is less and is observed that formulated herbal toothpaste decreases chances of loss than other figure.

9) Antimicrobial activity of formulated herbal toothpaste were compared with marketed herbal toothpaste. It was observed that, formulated herbal toothpaste has good antimicrobial activity and same efficacious with that of marketed one.

10) Smoking and Tobacco chewing is bad for health. It is one of the prime causes for oral cancer and several other disease of teeth are caused by smoking. We have added certain herbs likes nayanthara, Jackfruit ,Mango peel ,Black Cumin seeds etc.That shows anti-cancer activity .we have also added certain energy boosting herbs that will enhance the oral hygiene.

11) In the formulation selected four herbal ingredient like mango peel, nayantara, jackfruit seed,and Black cumin seeds shows anti-cancer activity.

IV. CONCLUSION :

From the above results of our products activity, it can be concluded that the toothpaste is theoretically as well as experimentally serve the basic properties of general toothpaste with an advantage of having the medicinal properties of 32herbs which makes it unique in its category. From the microbial tests it is seen that the toothpaste can easily inhibit growth of bacteria, pH test shows that our product is within neutral range. Although our product lacks much of foam, it successfully whitens the teeth, kills germs, imparts freshness feel inside mouth.

Neem's findings are taken in very small amounts due to bitterness, this bleeding act as anti-inflammatory component against the gums. Mint is known for its aroma hence it helps to get rid of bad breath. Clove is applied on the gums (used topically) for aching, for pain management

throughout dental work, and for a complication of tooth extraction known as “dry socket.” it's conjointly applied to the skin as a counter pain in the neck for pain and for mouth and throat inflammation. It helps in the destruction of oral microorganisms by preventing oral pathogens such as pyorrhea and cavities. Turmeric is used to replace chloroxidine, an anti-microbial and anti-septic agent that is used in oral hygiene. Leaves of Neem (*Azadirachta indica*), Peppermint (*Mentha piperita*), Turmeric (*Curcuma longa*), Clove (*Syzygium aromaticum*), Betel (*Piper betle*) and Guava (*Psidium guajava*) leaf were extracted by aqueous method. In the qualitative phytochemical testing presence of assorted secondary metabolites were found in binary compound. The developed dentifrice was evaluated for chemistry parameters such as color, odour and hydrogen ion concentration. The development dentifrice was tested for antibacterial drug against *Staphylococcus aureus*, *Escherichia coli* and micro the efficiency was qualitatively and quantitatively assessed by the presence or absence of a zone of inhibition and zone diameter values. The developed dentifrice exhibited extremely vital result towards the entire tested microorganism, whereas the negative management doesn't turn out noticeable repressive result for any of the tested microorganism. Neem (*Azadirachta indica*), Peppermint (*Mentha piperita*), Turmeric (*Curcuma longa*), Clove (*Syzygium aromaticum*), Betel (*Piper betle*) and Guava (*Psidium guajava*) were potential for inhibition bacteria. The antibacterial drug activity of the developed Polyherbal dentifrice conjointly showed vital antibacterial drug activity against all the tested microorganisms. This observation indicates that the activity to the presence of huge kinds of phytoconstituents present within the extract. Hence, the ascertained antibacterial drug activity of the dentifrice was thanks to the presence of active constituents of the extract and therefore activity also well maintained once it absolutely was reborn to dentifrice. This was sensible sign to try to additional studies thereon to create it together of the business flavoring dentifrice for the treatment of oral microorganism infections. The research concluded that Herbal toothpaste an emphasizing and more acceptable in dental research and they are safer with minimum side effect than synthetic preparation. The formulated toothpaste capable to the toothpaste and oral hygiene show the antimicrobial activity against pathogen. The formulation compared with market preparation. Therefore it shows the equal patronizing and engrossing passion over the

marketed formulations. The formulated herbal toothpaste has been good scope in future in nature remedies research and dental health of public.

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