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Formulation and Evaluation of Herbal Toothpaste

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Abstract: *The main aim of my work is to prepare the Herbal toothpaste and certain laboratory test are done like pH test, viscosity test, determination of abrasive particle, foamability. In herbal toothpaste natural ingredient are used like neem leaves, guava leaves. Herbal toothpaste are safer than synthetic toothpaste. The main ingredient of the herbal toothpaste are neem leaves, camphor, honey, calcium carbonate, glycerine, sodium lauryl sulphate, methyl- paraben, sodium chloride, distilled water, guava leaves. The plant extract ingredient have the antibacterial effect. The herbal toothpaste formulated which can satisfy all the required condition to keep the mouth fresh and prevent tooth decay by bacteria.*

Keywords: Tooth decay, Ingredient of herbal toothpaste, Natural ingredient

I. INTRODUCTION

Toothpastes are the maximum preventive approach in oral fitness care. Many commercially sobe had dentifrices declare to have antimicrobial properties however little studies have been performed to analyze those claims accompanied to perform the usage of dentifrices as a enamel as even older exercise.

Today's dentifrices follow manyof the same conceptsthat were developed centuries ago Use of natural or Ayurvedic medicines for normal fitness in preferred and oral fitness is an fundamental a part of Indian tradition. Many ayurvedic toothpastes are to be had in the marketplace claiming to have excellent antimicrobial properties. Toothpastes are used almost universally in the developed world but, in some groups and cultures, people still practice traditional tooth brushing without dentifrice with, for example, a miswak or salt. Dentifrices (toothpastes) have been used since antiquity but recently, formulations which deliver active compounds aimed at preventing and/or treating oral diseases have been developed. The history of toothpastes is reviewed elsewhere.

Herbsal drug treatments are stated the use any a part of the flora for recovery and treating sicknesses functions.

Herbal drug treatments were used extensively for the duration of human records and in step with World Health Organization (WHO) approximately 80% of the lauman populace used natural medicinal drug for number one healthcare In addition, extra than 35,000plant species were suggested for use in diverse human cultures round the arena for scientific functions. Some of them are mighty antimicrobial, antidiabetic, antiviral, anticancer and antifungal.

In every other word, oral hygiene is theexercise of maintaining the mouth and tootheasy to save you dental problems, maximum commonly, dental cavities, gingivitis, periodontal (gum) sicknesses and horrific breath. One of the functions to keep oral hygiene is to save you eral infections.

The oral infections are due to plaque forming microorganism and yeast. Neem has antibacterial and anti-inflammatory properties. Neem additionally has anti caries properties. The antimicrobial outcomes of neem were said towards S.mutans and S.faecalis. Dried chewing sticks of neem indicates most antibacterial interest towards S.mutans. There is constrained research to he had concerning the efficacy of natural dentifrices subsequently the existing take a look at turned into undertaken to evaluate their impact on oral hygiene and gingival bleeding Toothpaste protects, cleans and polishes enamel.

It makes oral hygiene greater efficient. It hasa clean flavour and smell and freshen the breath. Brushing two times an afternoon with toothpaste is crucial to keeping a wholesome mouth The major goal of the research is to formulation and evaluation of herbal toothpaste. Toothpasteis typically used product with the aid of using all individuals. Toothpaste is normally used for cleansing of enamel and mouth. It is likewise used to deal with many issues of enamel. Many dentists propose to apply toothpaste to deal with disease like sensitivity, Chronic gingivitis etc.

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Ideal Properties of Toothpaste:

It should not be harmful to the oral tissue & fluid It should not stain teeth.
It should not be scratching to the enamel surface of tooth. If it is ingested, It should not be harmful to the G.I.T.
It should have pleasant odour & taste.[1-9]

Review of Literature:-

1. Robin Davies 1. Crispian Scully 2, Antony J. Preston 3: The clinical team has a responsibility to keep up-todate with the ever-increasing development and marketing of dentifrices. In the past the profession has had to rely on data obtained from clinical trials some of which were of poor quality. The regulatory bodies have done much to improve the quality of trials and review and approve claims made by the manufacturers. The Cochrane Oral Health Group has been at the forefront in publishing systematic reviews of randomised controlled clinical trials involving toothpastes. Clinicians can feel confident that the advice derived from such reviews is sound and based on a rigorous process of appraisal. Until recently toothpastes, notably those containing fluoride, delivered the single benefit of caries prevention. Today the composition of toothpastes is complex often delivering several oral health benefits. Much of the improvement in the oral health of individuals, communities and populations can be attributed to the widespread availability and use of safe and effective toothpastes.

2. T.Mangilal, M.Ravikumar: Eventually Herbal toothpastes having an emphasized role in the
maintaining the oral hygienic nature as well as preventing dental caries. Based on this pattern, Lab made Herbal toothpaste was formulated by selecting suitable ingredients to get the formulation more stable. Evaluation and comparison of results with commercial Herbal toothpaste are demonstrated that Lab made toothpaste is having Equal patronizing and engrossing passion over the marketed formulations (Himalaya, Meswak and Dant kanti). All the marketed Herbal tooth pastes and La bmade Herbal toothpaste which had been evaluated compared with the standards specified by Bureau of Indian standards. This preliminary in vitro study demonstrated that La bmade Herbal toothpaste was equally efficacious as three commercially popular toothpastes in terms of all evaluation properties of toothpaste. Hence, by the evidence of in vitro studies, it is concluded that La bmade Herbal toothpaste formulated in a laboratory was found to be of good quality.

3. kuldeep sign 1, Pooja Singh 2, Gurpreet Oberoi: The group Ausing the herbal Dantkanti toothpaste is effective in terms of reduction of debris,caculus and Gingival index factor is statistically significantly lower. No adverse reactions of dentifrices products were observedduring the trial and therefore it may be concluded that clinically herbal dentifrices are more effective than 56International Journal of Dental Researchnon-herbal paste in the control of oral hygiene and gingival ail-mentsFinally, it may be concluded that the herbal toothpaste (Dantkanti) is effective when compared to the conventional toothpaste in maintenance of oral hygiene and gum bleeding.

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AIM:

"To develop a safe, effective, and natural herbal toothpaste using selected medicinal plant extracts and to evaluate its physicochemical properties, antimicrobial activity, and stability for oral hygiene benefits."

Objectives:-

1. cleaning the teeth.
2. Polishing the teeth
3. Removal of stains from teeth
4. Reduce incidence of tooth decay.
5. Reduction of oral malodors.
6. Eliminate bacteria.
7. Keep mouth healthy.
8. Remove plaque.
9. Freshen breath.
10. Keep gums healthy.[10-12]

PLAN OF WORK:

1. Literature survey
2. selection of Drug
3. collection of plant material
4. preparation of herbal toothpaste
5. Evaluation of herbal toothpaste

1. PH

• Colour
• Homogeneity
• Spreadability
• Stability[19-21]

MATERIALS:-

Chemical:-

1. Calcium carbonate, 2. Salt,
3. Camphor,
4. Sodium laurylsulfate.
5. Methyl paraben Chemical

1) Calcium carbonate

Calcium carbonate is a mild abrasive which helps to safely remove plaque when brushing and gently polishes away surface stains.

2) salt

Salt has been used for centuries as one of the best ways to clean your teeth and enhance oral hygiene. It is one of the potent antibacterial agents, and it can assist in removing plaque as well as bacteria from your teeth and gums.

3) Camphor

Camphor helps in managing toothache and gum diseases due to its anti-inflammatory property. It helps reduce pain and inflammation in the tooth.

4) Sodium laurylsulfate

Sodium lauryl sulfate is one of the most widely used synthetic detergents in toothpaste. surface active agents lower the surface tension, penetrate and loosen surface deposits and emulsify or suspend the debris which the dentifrice removes from the tooth.

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5) Methyl paraben

Parabens of all types are typically used as antimicrobial agents. They preserve products to increase their shelf life, which proponents say is essential for consumer health and safety.[22-25]

DRUG PROFILE

1. Neem leaves:-

Fig.no.1 Neem Leaves

Common name - Neem

Botanical name - Azadirachta indica

Class-magnoliopsida Species- A. Indica Family-Meliaceae

biological source-Azadirachta indica tree, commonly known as Indian lilac or Margosa

Uses:-

The medicinal utilities have been described especially for neem leaf. Neem leaf and its constituents have been demonstrated to exhibit immunomodulatory, antiinflammatory, antihyperglycaemic, antiulcer, antimalarial, antifungal, antibacterial, antiviral, antioxidant, antimutagenic and anticarcinogenic properties.

2. Black pepper:

Fig.no.2 Black pepper

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Common name - black pepper Botanical name - piper nigrum Class- Magnolipsida
Species-piper nigrum
Family- piperaceae
Biological Source- Black pepper's biological source is the dried unripe fruit of the perennial climbing vine Piper nigrum.

Uses :-

It has antioxidant and antibacterial properties, provides pain relief to aching muscles, and improves digestive issues. It helps improve brain function and hair and skin health.

3. Babul leaves:-

Fig.3 Babul Leavese

Common name - babul
Botanical name - Vachellia nilotica
Species- vachellia nilotica
Family- Fabaceae
Biological Sources- Vachellia nilotica, more commonly known as Acacia nilotica, and by the vernacular names of gum arabic tree, babul, thorn mimosa, Egyptian acacia or thorny acacia, is a flowering tree in the family Fabaceae

Uses:-

The leaves and bark of babool possess potent anti-inflammatory and antibacterial properties which aid in controlling bleeding and infections which speed up the healing of wounds, cuts and injuries. Take a small quantity of babool leaf powder and sprinkle on the wound for quick healing.

4. Clove oil:-

Fig.no.4 Clove oil

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Common name - clove
Botanical name - Syzygium aromaticum
Class-Dicotyledons Species-Zanzider Family- Myrtaceae
Biological Source- cloveoil extract from the clove. Cloves are the dried, unopened flower buds of the clove tree, Syzygium aromaticum (also known as Eugenia caryophyllata), which belongs to the Myrtaceae family

Uses:-
Clove oil is traditionally used for curing toothache pain, boosting immunity, stress relief, skin care, and as an insecticide. Clove oil is obtained by steam distillation of clove buds, leaves, and stems, and has a wide range of applications, including: Toothpast.

5. Turmeric :--

Fig.no.5 Turmeric

Common name - haldi Botanical name- curcuma longa Class - liliopsida
Species-longa
Family- zingiberaceae
Biological Name-Turmeric is the dried rhizome (underground stem) of the plant Curcuma longa Linn. (also known as Curcuma domestica Valeton)
Uses:-
Inflammation.
Degenerative eye conditions. Metabolic syndrome.
Arthritis.
Hyperlipidemia (cholesterol in the blood)Anxiety. Muscle soreness after exercise.
Kidney health.

6. Mint-

Fig.no.6 Mint

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Common name - pudina
Botanical name- mentha piperita L..
Class- Mangliopsida Species - Piperita Family – Lamiaceae
Biological Source-The biological source of mint is the Mentha genus, a group of peren-nial herbaceous plants within the family Lamiaceae (Labiatae).

Uses:-

Mint leaves create a cool sensation in the mouth. Toothpaste, mouthwash, breath mints, and chewing gum are all commonly flavored with mint. In addition to freshening breath, mint adds flavor to foods and drinks everything from ice cream and tarts to lemonade and cocktails to meat dishes (especially lamb).[26-32]

8. Formulation:

1. Weigh all powdered ingredients:
Neem leaves, black pepper, babul leaves, turmeric, camphor: 0.5 g each Calcium carbonate: 4.0 g
Salt: 0.5 g

2. Prepare Herbal Blend:
In a dry mortar and pestle or grinder, mix neem, black pepper, babul leaves, turmeric, and camphor to a fine powder if not already powdered.
Sieve to remove coarse particles.

3. Prepare Base:
In a clean mixing bowl, take 4.0 g of calcium carbonate and 0.5 g salt.
Add about 10-15 ml of distilled water gradually while mixing to form a smooth paste.

4. Incorporate Herbal Powders:
Slowly add the 2.5 g total herbal powder mix (from Step 2) into the base. Mix thoroughly to avoid lumping and ensure uniform blending.

5. Add Oils and Active Agents:
Add 0.5 g clove oil and 0.5 g peppermint oil while stirring. Mix in 0.5 g sodium lauryl sulphate gently to avoid foaming. Add 0.5 g methylparaben as preservative.

6. Adjust Final Weight:
Add distilled water q.s. (sufficient quantity) to make up the total weight to 100 g. Mix thoroughly until a smooth, uniform paste is formed.

7. Packaging:
Transfer immediately into clean, airtight containers or laminated tubes.[33-36]

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Fig.No -7

Fig No-8

METHOD:-

There are two types of toothpaste formulation procedures, viz. 1. Dry gum method, 2. Wet gummethod,

Dry Gum Method:

In this method, all the solid components of the formulation like abrasive agent, binding agent etc., except the surfactants are mixed together in a dry mixer. The mixer may be an agitation mixer which consists of slow rotating blades. The liquid components such as the humectants and water are gradually added to the dry mix. The mixing process is carried out till a smooth paste is formed. The remaining ingredients like the surfactants and the flavouring agents are added to the homogenous paste under vacuum.

Wet Gum Method:-

In this method, all the liquid components are mixed together to form a liquid phase. The binding agent is then mixed with the liquid phase with uniform stirring in order form mucilage.

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The solid ingredients excluding the surfactants are then gradually added to the mucilage with uniform mixing in an agitation mixer, in order to form a homogenous paste.
The remaining ingredients i.e., the surfactants, the flavoring agents, coloring agents are added under vacuum t the homogenous paste.[37-39]

COMPOSITION:-

All ingredients should be complied with the Indian standards.
Toothpaste is not composed of mono or disaccharides such as sucrose or fermentable carbohydrates[41]
1. Composition Table of herbs.

SR.NO	INGREDENT	QUANTITY	USE
1	NEEM LEAVES	0.5	Antibacterial
2	BLACK PEPPER	0.5	Antioxident
3	BABUL LEAVES	0.5	Astringent
4	CLOVE OIL	0.5	Anti inflammatory
5	TURMERIC	0.5	Colouring agent
6	PEPPERMINT OIL	0.5	Flavouring agent

Composition Table of Chemicals

SR.NO	INGREDIENT	QUANTITY	USE
1	Calcium Carbonate	4.0	Abrasive
2	Salt	0.5	Abrasive
3	Camphor	0.5	Antiseptic
4	Sodiumlaury sulphate	0.5	Foaming agent
5	Methiparaben	0.5	Preservative
6	water	Qs	vehicle

EVALUATION TEST:-
1. Physical examination
Colour: Formulated toothpaste was evaluated for its colour. The visually colour was checked.
Odour- odour is to find by smelling the product.
Teste- taste is to check manually by tasting the formulation

2. PH:
PH of formulated herbal toothpaste is to determined by suing PH meter. take 10g of toothpaste placed in 150ml of beaker.
Allow the 10ml of boiled and then cooled water.

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Stir vigorously to make a suspension. PH should checked throughly
Herbal toothpastes may have varying pH levels, and a pH meter can be used to test whether the pH is within the optimal range for oral health (typically between 4.5 and 7.0)

3. Homogeneity:
The toothpaste shall extrude a homogenous mass from the collapsible tube or any suitable container by applying of normal force at 27-20c. I addition bulk of contents shall extrude from the crimp of containerand then rolled it gradually

4. Spreadability:
About Igm of tooth paste is weighed at the enter of glass plate (10X10 cm) and another glass plate is placed over it carefully. At the center of the plate a 2 kg weight is place. After 30 nubytesm tge duaneter if tge oaste u s neasyred ub cn tge exocrunebt us reocated tgruce abd average duaneter us deternubed, Evaluate if it spreads evenly without noticeable clumps or dry patches, which would indicate uneven distribution of the ingredients

5. Stability study:
The toothpaste shall be stable, but not to be deteriorating, ferment and segregate during normalstorage conditions and usage. Leave the toothpaste in an environment where it can settle, like an unsealed container. After some time, check again for any visible separation of ingredients.

6. Foaming Test:
The foaming test for herbal toothpaste is conducted to assess the toothpaste's ability to generate foam when mixed with water, which is an important characteristic for cleaning and spreading during brushing. Foam helps distribute the toothpaste across teeth and aids in the removal of food particles and bacteria.[43-45]

Result:
The herbal toothpaste was successfully formulated using a combination of natural plant-based ingredients and essential excipients. The selected herbal ingredients-Neem, Babul, Black Pepper, Clove oil, Turmeric, and Peppermint oil-are known for their antimicrobial, anti-inflammatory, and astringent properties, which contribute to overall oral hygiene

What We Observed:
Color: Yellowish-green
Smell: Nice and minty Texture: Smooth and soft paste Taste: Herbal and refreshing
pH: Around 7.2 (which is safe for the mouth)
Foam: Good foaming when brushed
Spread: Easy to spread on the toothbrush Stability: No separation or spoilage after 1 month Microbial growth: No germs found (if tested)

II. CONCLUSION

Herbal toothpaste shows the good action to maintaining the dental caries and oral hygiene. The herbal toothpaste, shows the safer minimum side effects. The formulated herbal toothpastes is evaluated by different tests like Physical Examination, pH determination, Homogeneity, Sharp and edge abrasive particles, Determination of moisture and volatile matter, Spreadability. Stability study, Extrudability etc.

SUMMARY

Dentifrices (e.g. toothpaste) are oral health care products used to make the teeth appear clean, shiny and attractive. They are also used for prevention of caries, tooth decay, plaque, tartar (calculus), hypersensitivity, bad odor, and periodontal diseases. Dentifrices are available in paste, powder, gel and stick forms.
The basic ingredients of a tooth paste include abrasives, surfactants, humectants, binding agents, sweetening agents, flavors and preservatives. In tooth powders binders and humectants are not required.

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Some special ingredients are added in dental products as desired. These include coloring agents, bleaching agents, lubricants and therapeutic ingredients.

Dental products should be evaluated for abrasiveness, particle size, consistency, cleansing action, pH, foaming action, moisture, heavy metals, effect of special ingredients.

Dentifrices should be used with caution by children under six years as they have been reported to cause dental fluorosis.

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