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FORMULATION AND QUALITY CONTROL OF HERBAL MOUTHWASH CONTAINING NATURAL EXTRACTS OF TULSI, NEEM, TURMERIC, CLOVE, LIQUORICE, AND PEPPERMINT

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ABSTRACT:

Many different types of bacteria may be found in the mouth. Although some types of oral bacteria are innocuous, others may lead to plaque buildup, poor breath, and even health problems in the mouth. As a result, it's crucial to your oral and OVERALL, health to practice regular, thorough dental hygiene. Herbal remedies are seen as more beneficial than pharmaceutical ones. The antibacterial and antifungal action of medicinal plants against human pathogen has been recognized for decades as an integral part of the healing process. Plaque on teeth can be reduced, bacterial development can be slowed, bad breath may be eliminated, and teeth can be cleaned with herbal remedies. To complement regular dental care routines like brushing and flossing, herbal mouthwashes may be utilized. They may be utilized in a supportive periodontal treatment because of their potent anti-inflammatory and anti-plaque capabilities. Neem, turmeric, clove, and peppermint are just a few examples of the many herbal products and extracts that have shown to be superior than their chemical counterparts. Medicinal herbs have been used for decades as a therapy option due to their antibacterial, antiviral, and antifungal effects against human infections. There may be considerable benefits to using a natural mouthwash instead of a chemical one. If such a formulation could be developed, it would allow individuals to safely produce and utilize natural products in the comfort of their own homes. The population's oral health may improve as a result. Herbal mouthwashes are popular due to their ability to eliminate oral pathogens, provide instantaneous pain relief, and have few to no adverse effects. Dental caries and periodontal disease are among the most widespread infectious illnesses, affecting a large number of the population at some point in their lives. This analysis is an effort to describe the kinds of natural compounds that may serve as useful mouthwashes. The purpose of research is to create a multi-herbs mouthwash that is effective against germs.

KEY WORDS – Herbal mouthwash, Natural extracts, Neem leaves extract, Turmeric rhizome extract, Clove buds extract, Liquorice stolon extract, Peppermint leaves extract.

INTRODUCTON:

Because hands are the main method of transmission for bacteria and infections, maintaining good hand hygiene is the most important precaution to take in order to prevent the spread of harmful germs and diseases.

In general, the act of washing one's hands with water, soap, or another liquid is referred to as "practising good hand hygiene. The advantage of washing hands is that it gets rid of germs and potentially harmful substances like viruses and bacteria. People who make and serve food to the general public, work in the restaurant business, or work in the medical field should maintain proper hand hygiene. The transmission of cold viruses and other pathogens can be slowed down by practising proper hand hygiene, as is widely recognised. Washing one's hands frequently is the best way to maintain personal hygiene and protect oneself from diseases.

Hand washing is the act of cleaning your hands to get rid of dirt, filth, and hazardous germs while preventing the transmission of transient bacteria. Hand cleaning, which also eliminates visible dirt from hands, reduces the quantity of dangerous bacteria like E. coli and salmonella that can be carried by people, animals, or equipment and passed on to food. In order to protect the skin from hazardous bacteria and to halt the transmission of many contagious diseases, it is essential to wash your hands frequently.

The concept of washing hands with an antiseptic chemical is thought to have originated in the early 19th century. A French chemist demonstrated in

1822 that solutions containing lime or soda chlorides might be employed as disinfectants and may be able to get rid of the disagreeable smells associated with human bodies. In an article that was published in 1825, this chemist advised that medical personnel and other individuals caring for patients with contagious diseases bathe their hands in a liquid chloride solution.

The herbal remedy is also referred to as phytomedicine or botanical treatment. The use of any plant's seeds, roots, leaves, bark, flowers, or aerial parts for medical purposes is referred to as "herbal medicine. Numerous diseases have been treated and managed with herbal therapy. Because it is the most exposed, our skin needs to be protected from skin pathogens. To protect the skin from dangerous microbes in order to prevent the spread of disease. An incredibly important precaution is cleaning your hands. The single most crucial, easiest, and least expensive method of preventing nosocomial infection is hand cleanliness. The major goal of hand washing is to remove dirt, grime, and harmful bacteria from the hands and to prevent the spread of transitory microbes. In its simplest form, hygiene is understood to be the branch of science concerned with knowledge and application connected to the promotion of health. The idea emphasises the need to maintain hygiene for illness prevention. Hygiene practises help stop the viral or bacterial spread of infection. An herbal medicine cure promotes a healthy existence. It was typically employed to supply first-line and widespread healthcare providers. Herbal therapy has been the foundation for treating and curing a variety of disorders in India since ancient times. Herbal medicine is used to treat a variety of medical conditions, including wound healing, infection-related inflammation, skin lesions, leprosy, diarrhoea, scabies, and venereal diseases, including snakebites and ulcers. Plants have been a reliable source of antimicrobial activity, and plant extracts have the potential to act as antimicrobial agents against a variety of pathogenic microorganisms that cause infections, diseases, and medication resistance.

HANDWASHING:

Using either conventional or antibacterial soap or water, it involves cleaning your hands. The truth is that it can vary widely, from a simple hand rinse to a full scrub. Hand washing is done in a medical setting to get rid of germs and stop the transmission of dangerous bacteria. The majority of hospital settings still practise subpar hand hygiene, with many doctors and nurses routinely forgetting to wash their hands before interacting with patients, according to surveys. One study found that simple practises like routine hand washing can reduce the occurrence of catheter-related bloodstream infections by 66%.

The skin has to be shielded from viruses because it is one of the body's most vulnerable areas. Hand washing is without a doubt an essential preventative measure to perform in order to safeguard the skin from harmful bacteria and halt the onset of many communicable diseases.

Hand cleaning helps reduce the amount of harmful bacteria on hands and gets rid of obvious dirt. Two dangerous bacteria and viruses, Salmonella and E. coli, can be carried by people, animals, or equipment and spread to food. The hands perform the majority of biological functions and are frequently exposed to a variety of materials, including soil when farming, food while preparing, touching raw or contaminated food, and personal hygiene items. Because clean hands restrict the transfer of germs, hand washing is typically emphasised as the single most important step in any infection control strategy for preventing the cross-transmission of microorganisms between patients.

Fig. 1: Handwashing activity to get rid of germs

BENEFITS OF USING HERBAL HAND WASH:

1.Since herbs are widely available in both urban and rural areas, everyone can use them.
2.Affordably priced: Herbal plants cost less than the chemical ingredients in synthetic hand wipes.
3.Greater efficacy: Herbal hand soaps are more effective at promoting proper hand hygiene.
4.Less adverse effect: Herbal hand washes offer fewer side effects than regular hand washes, according to factor number 1

Fig. 2: Power of Herbal products

ADVANTAGES OF HERBAL COSMETICS:

Since ancient times, herbal cosmetics have been used for beauty. Because they have no negative side effects, they are regarded as the best for skin and hair care. It is becoming more and more popular on a global scale.
Here are a few benefits of utilising natural cosmetics:

1) Safe to use:
When compared to cosmetics The use of natural cosmetics is secure. They have been dermatologically tested and found to be hypoallergenic and safe for use at any time.

2) No side effects:
The synthetic cosmetics can irritate skin, cause acne, and block pores, as well as make skin dry or greasy. The use of natural components guarantees the absence of negative effects.

3) Animal testing not required:
To make sure they are safe and effective for human usage, several cosmetics are initially tested on animals. However, it is not necessary to test natural cosmetics on animals. Experts examine these natural products in labs using technology without using any animals.

4) Natural products:
Herbal cosmetics are implied by their name to be natural and free of synthetic ingredients, which could otherwise be detrimental to the skin. Different plant extracts are employed in these goods instead of conventional synthetic ones.
For e.g. - Aloe-vera gel and coconut oil.

5) Inexpensive:
Natural cosmetics are reasonably priced. In fact, some of these goods are less expensive than those made of synthetic materials. According to estimations, 80% of the world's population relies on natural goods for their healthcare.

6) Compatible with skin type:
Natural cosmetics work well on all skin tones, whether they are fair or dark. Regardless of skin tone, natural cosmetics like foundation, eye shadow, and lipstick can be used without risk.

ADVANTAGES OF HERBAL HAND WASH:

1) No negative consequences. /side-effects.
2) We can reduce the number of bacteria on our hands.
3) It also aids with the skin's antibacterial and fungal issues.
4) It also facilitates the efficient removal of oil and impurities from the skin.
5) Easier accessibility than washing with soap and water.
6)The simplest method for eliminating microorganisms.
7) Washing your hands helps keep germs from getting into your body.

MATERIALS AND METHODS:

1) Tulsi:

Fig. 3: Tulsi

Scientific classification of Tulsi:
Kingdom -plantae
Division- magnoliophyta
Class- Magnoliopsida
Order -Lameness
Genus- Ocimum
Species -O.tonuiflorum
Bionomical name: Ocimum tenuifloram/Ocimum sanctum
Nepali name: Tulsi
Ocimum sanctum commonly known as holy basil or Tulsi. Tulsi consists of fresh and dried Ocimum sanctum is a member of the Lamiaceae family. A fragrant perennial herb, tulsi. The cleansing, purifying, and antibacterial qualities of tulsi are well documented. Tulsi assists in hand protection by eradicating 99.99% of germs. Today, tulsi is grown for its volatile oil in commercial agriculture. It is a tall, 30- to 75-cm-tall, heavily branched, tiny herb. In particular, the fresh and dried leaves of tulsi are used in medicine. The leaves are ablong-acute, completely pubescent on both sides, and minutely gland-dotted along their sterolate margins. The leaves have a fragrant flavour, are green in hue, and are slightly compressed. Subglobose, reddish-black seeds. The dorsiventral stomach and leaves are of the dicyclic kind. Especially plentiful on the lower surface.

Chemical constituents:

Eugene makes up around 70% of it, along with carvacrol and Eugene methyl ether (20). Caryophyllin is another component, and seeds have a fixed oil with effective drying qualities. The plant also contains traces of maleic and tartaric acids, as well as alkaloids, glycosides, sap, tannins, and sapping. The juice, volatile oil, and fresh leaves are used for a variety of things.

Uses of Tulsi:

The leaves have stimulant, aromatic, spasmolytic, and diaphoretic properties. The juice is employed as an antiperiodic, a component of numerous skin disease treatments, and a remedy for earaches. It functions as a natural immune booster as well as an antiviral, antifungal, and antifungal agent.

2)Aloe-Vera:

Fig. 4: Aloe Vera

Scientific classification of aloe-vera:
Kingdom -plantae
Order -Aspargels
Family- Xanthorrhoeaceae
Genus -Aloe
Species- A.Vera
Bionomical name: Aloe vera
The succulent plant species known as Aloevera likely originated in northern Africa. Despite similarly related aloes not being in northern Africa, the species has no naturally occurring population. It is generally stated that the species has been used in herbal therapy since the first century. Aloe vera extract is touted as having various regenerating, healing, or smoothing characteristics and is widely used in the alternative medical and cosmetic industries.
Aloe vera is the dried juice that is extracted by cutting into the underside of the leaves of several aloe species. Aloe perry Baker, also known as Aloevera linn or Aloe barbandesis, is a member of the Liliaceae family and is only found in the Socotra and Zanzibar Islands as well as their surrounding regions. As a result, the product made from this species is referred to as soothing and zanzibar. Aloevera linn is also referred to as Aloe barbendesis or Aloe vulgaris. Aloe is a perennial that grows slowly to a size of 0.8 by 1 mm. The plant prefers medium and light (sandy) soil but may grow in nutrient-deficient soil. The plant favours neutral, basic, and acidic soil. It prefers dry or damp soil and can withstand drought but cannot thrive in shade. These plants have xenophobia. Seeds can be used to spread it. Springtime brings out the seeds.

Chemical constituents:

The three isomers of aloins, barbaloins, and isobarbaloins that make up so-called crystalline aloevera are the plant's most significant ingredients. Amorphous aloin, resin, eroding, and aloe emodin are other ingredients that are 10–30% contained in the medication.

Barbaloins can be found in all types. Bitter, water-soluble isobarbaloin, which has a somewhat yellow hue and is crystalline in nature, is present in minimal amounts in cape aloe and is completely missing from socotrine and zanzibar aloe. Barbaloin is the main component of zanzibar aloe and socotrine aloe. Aloe vera has received numerous recommendations for skin care:

a) Relieves skin burns brought on by skin.

b) Aloe vera gel can be used to get smooth, radiant skin.

c) It is an excellent moisturiser for the skin.

d) aids in restoring the natural beauty of the skin. It gives the cells oxygen, which helps to fortify the skin tissues and keep the skin healthy.

e) When using a plant's oil extract to achieve normal, smooth, and shiny skin, it is advantageous for dry skin.

f) Aloe vera extracts, which have antibacterial and antifungal properties, may aid in the treatment of mild skin infections.

g) Blisters, insect bites, allergic reactions, eczema, burns, inflammation, wounds, and psoriasis can all be treated with it.

There are numerous aloevera-based cosmetic products on the market that make the claim to provide natural skin care based on the healing and soothing properties of aloevera. These products are also useful for treating eczema, psoriasis, dermal imperfections, acne, and pigmentation. Aloe vera is a fantastic source of vitamins and antioxidants that promote skin protection.

3) CITRUS LEMON:

Fig. 5: Lemon and lemon juice

Scientific classification of Citrus lemon:

Kingdom: plantae

Family: Rutaceae

Order: sapindales

Genus: citrus

Species: c.limon

The citrus Limon in South Asia is the natural home of the Limon, a kind of tiny evergreen tree in the Rutaceae family of flowers. Mostly in eastern India.

The ellipsoidal yellow fruit of the tree is mostly used for its juice, which has both culinary and non-culinary uses around the world. Additionally, the hind and pulp are used in baking and cooking. Lemon juice contains 5% to 6% of its weight. With a pH of about 2.2, citric acid gives food a sour taste. Lemon juice is a vital component of many beverages and dishes, including lemon meringue pie, due to its distinctively sour flavour.

It is made from the ripe or almost ripe fruit of the rutaceae family's citrus Limon. The fruit, in particular the essential oil and juice that are extracted from it, is the primary raw material for citrus limon. Juice from the citrus fruit limon has long been used as a treatment. For investigation prior to the discovery of vitamin C.

Characteristics:

The citrus limon tree grows to a height of 2.5 to 3 metres. Its leaves are lance-shaped and evergreen. The axils of bisexual flowers are purple and white. The fruit is an elongated, pointy, green berry that ripens to a yellow colour. The berry's interior is loaded with a segmented, delicious pulp.

Chemical constituents:

Citrus fruits' chemical makeup is widely recognised. In addition to being calculated for the entire fruit, it has also been determined for the pericarp, juice, and essential oils separately.

Uses of citrus Limon:

The antioxidant properties of citrus flavonoids Limon-heseperidin and hesepertin were not just restricted to their capacity to scavenge free radicals but also supported the antioxidants' role in cellular defence. The gramme-positive bacteria Enterococcus feacalis and Bacillus substitute, as

well as the gramme-negative shigella sonnei, have been demonstrated to be inhibited by limon fruit. Due to its proven antibacterial and fungistatic properties, the oil is employed as a flavour or scent as well as a natural preservative in medicine and cosmetic formulations.

4) Eucalyptus Oil:

Fig. 6: Eucalyptus oil

The essential oil known as eucalyptus oil is produced by distilling fresh leaves of Eucalyptus globular and other species like Eucalyptus sp. That are members of the Myrtaceae family. Since a very long time, eucalyptus globulus has been used to treat intermittent fever. The leaves and their preparation have been used successfully as tonics, stimulants, stomach treatments for dyspepsia and typhoid, fever treatments for asthma, whooping cough, and other conditions. It has lately been suggested for use as a diuretic in the management of diarrhoea.

Characteristics:

The trunk of the eucalyptus tree, which can reach a height of 300 feet or more, is coated in papery, peeling bark. The plant's young leaves. Children under five are blue in colour, opposing, sensible, soft, oblong, and pointed. The blooms are solitary and white without petals, while the adult leaves are alternate, petioled, leathery, and scimitar-shaped. Eucalyptus oil is a colourless to straw-coloured fluid that is soluble in its own weight in alcohol and has a distinct aroma and flavour.

The British Pharmacopoeia Claims Eucalyptus oil should have a specific gravity of 0.910 to 0.930 and contain at least 55% by volume of eucalyptus. An isobilateral eucalyptus leaf has anomocytic-type stomach cells that have shrunk on both surfaces. Below each epidermis, epidermal cells are composed of three to four layers of elongated palisade cells. Between these palisade regions, two to three layers of spongy parnchyma occur, and some of its cells have clusters of prismatic calcium oxalate crystals.

Chemical constituents:

1–8 cineole, commonly known as eukalyptol, makes up 78–85% of the volatile oil in eucalyptus oil. P-cymene, alpha-pinene, and a minor amount of sesquiterpenes like lemon, aromadendrene, aldehyde, ketone, and alcohols are also found. Additionally, it contains flavonoids including eucalyptus, hyperopia, and rutine, as well as polypenolic acids like ferulic, caffeic, and gallic acids.

Uses:

The oil is used as an antispasmodic, flavouring agent, antibacterial, stimulant, and scented deodorant. As a vapour bath for asthma and other respiratory conditions, it is also used to treat bronchitis, sore throats, colds, and lung illnesses. Eight phloroglucinol sesquiterpene pair components, including three novel compounds called macrocarpas, were obtained from a 50% ethanolic extract of eucalyptus globular leaves.

It has been determined to kill lower forms of life by disinfecting activity. Air fresheners also employ eucalyptus oil. The majority of eucalyptus oil is used in scent lamps. Electric mist generator and room diffuser. Mix 50–100 drops of essential oils with 4 fluid ounces (120 ml) of purified water to create a simple mist spray that will refresh and purify the air. The active ingredient, eugobal, a phloroglucinol monoterpene derivative, was extracted from the leaves of Eucalyptus grandis. It reduced the promotion stages of two stages of carcinogenesis induced by both TPA-type and non-TPA promoters and prevented the pulmonary tumorigenesis induced by 4NQO and glycerol. Eucalyptus globules were therefore shown to be effective against cute quinquefascatus and culxetrianiorhynchus, suggesting that they might be useful as chemoprotective agents in chemical carcinogenesis. Terpinol, a low-toxicity volatile terpene alcohol, is frequently used in the perfume business. It is a significant component of many plants' essential oils, which find great use in aromatherapy and traditional medicine.

METHODS:

Plant collection and Authentication:

The leaves of **Tulsi** were collected from Campus of Fabtech College of pharmacy Sangola Dist. Solapur Maharashtra and was authenticated from department of Botany, Science College Sangola.

Preparation of extract:

The Tulsi leaves were professionally cleansed with distilled water and shade-dried in a spotless environment.

Using a grinder, dried leaves were ground into a fine powder. Soxhlet extraction was used to obtain the leaf powder (25g), which was combined with 250 ml of methanol solution (9 parts methanol and 1-part distilled water).

This mixture was heated continuously for 10–12 hours at 60°C in a Soxhlet apparatus.

Formulation of Hand Wash using extracts of Tulsi, Aloe Vera juice, lemon juice:

Tulsi leaf methanolic extracts, 4 millilitres of lemon juice, 20 millilitres of distilled water, aloe vera juice, and sodium lauryl sulphate are added. Add suitable amounts of preservative after adding the glycerine, essence oil, and scents or flavourings to the mortar paste to create a hand wash formulation. The solution was blended and rendered homogeneous at room temperature before being used to screen the activity.

Procedure:

1) Methanolic extract of Tulsi leaves is mixed with 4ml citrus Limon juice in 20ml.of water.
2) Then add aloe vera twice and add extract of SLS to produce sufficient foaming capacity.
3) Then add desired quantity of glycerine and eucalyptus oil with moderate stirring.
4) At the end add preservative in sufficient quantity.
5) The solution is mixed, made homogeneous under room and further utilized for screening of the activity

FORMULATION:

Fig. 7: Formulation of Herbal Hand Wash

FORMULATION TABLE:

Ingredients	Quantity taken	Action
Tulsi extract	8ml	Antimicrobial agent
Citrus lemon juice	4ml	Antiseptic
Aloe vera	6ml	Healing agent
Eucalyptus oil	4ml	Cooling /Foaming agent
Sodium lauryl sulphate	3ml	Foaming agent
Glycerine	12ml	Moisturizing agent
Methyl paraben	0.3 ml	Preservative
Water	Q. S.	Vehicle
Perfume	2 drops	Aromatic agent

Table 1: Formulation Table

EVALUATION PARAMETERS:

Physical Evaluation:

1) Colour: It was determined visually.
2) Odour: It was determined manually.
3) Appearance: It was determined visually
4) Homogeneity: It was determined visually
5) Fragrance test: - It was based on individual observation for its acceptability. 5 people were asked for acceptability of fragrance and their opinion was taken. And fragrance was evaluated based on the below-described criteria

A). Fragrance was good, as good as the fragrance of reference hand wash.

B). Fragrance was not so good but comparable to the reference hand wash.

C) Fragrance is not acceptable.

Chemical Parameter:

1) **PH Determination:** The pH was determined using digital pH meter and the pH of herbal wash was found 5.2
2) **Viscosity:** The viscosity of Herbal handwash was determined by using digital Brookfield viscometer.

3) Foam Height:

1ml of sample of herbal hand wash taken and dispersed in 50ml distilled water, then transferred it into 500ml stoppers measuring cylinder, volume make up to 100ml with water. 25 stroke was given and stand till aqueous volume measured upto 100ml and measured the foam height.

4) Foam Retention:

50ml of herbal hand wash was taken into a 250ml graduated cylinder and shaken ten times. The volume of foam at 1minute interval for minute was recorded foam Retention should be stable at least 5 min

5) **Washability test: -** It is determined Visually.

Fig. 8: Washability Test

RESULTS:

Evaluations	Results obtained
PH	5.2
Colour	Orange – Brownish
Odour	Aromatic
Consistency	Smooth
Homogeneity	Homogeneous
Appearance	Good
Stability	Stable
Washability	Easily Washable
Foam Retention	Stable
Foam height	3.4 cm

CONCLUSION:

The main cause of diseases affecting the skin, respiratory system, digestive tract, etc. is the hand. The bar soap becomes contaminated because of various illnesses and germs, which may cause germs to spread. The added benefit is that the soap in the liquid hand wash is unspoiled and uncontaminated. In today's sophisticated society, liquid hand washes are used considerably more frequently than bar soap. With every fresh pump, wash your hands. There are several different hand washes on the market that all claim to eradicate dangerous bacteria quickly and effectively. The effectiveness of handwashing must be established in order to make this determination. The organisms identified for hand washing and conducting viable counts experienced an average percentage reduction and log reduction.

In comparison to normal handwash, the handwash that has been specially designed exhibits superior results in terms of physical and chemical parameters as well as outstanding activity against all tested bacteria. Additionally, healthy toddlers and adults can consistently use formulations to improve their cleanliness. Future research challenges include more pharmacological assessments, toxicological investigations, and the potential isolation of the therapeutic antibiotic from this plant.

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