



Development, Standardization of Herbal Dental Drops Prepared from *Achyranthes Aspera* Linn. (Apamarga) Leaves

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ABSTRACT

Dental drops is a liquid accessory to relief pain and maintain the health of our teeth. The drops are enriched with natural herbs and herbal tincture. We have developed a dental drop with some common properties like anti-inflammatory, analgesic and antimicrobial. Herbal dental drop preparation is developed using hydroalcoholic extract of Apamarga leaf and aqueous extract of Tulsi leaf, Clove powder, Neem oil, Coconut oil. The formulation is indicated to be used for the treatment of toothache and associated pain and sensitivity. The developed formulation was standardized by analysing necessary evaluation parameters such as organoleptic, pH, stability and phytochemical characteristics.

Keywords: Herbal dental drops, *Achyranthes aspera*, Coconut oil, Neem oil, Tulsi.

INTRODUCTION

With the prevalence of oral cancer and other conditions rising in emerging nations, oral illnesses continue to be a major global health issue. The state of the body is also reflected in the mouth. When it comes to the prevention and treatment of oral disorders, modern medicine has had only sporadic success. Alternative prevention and treatment methods need to be secure and efficient on a global scale. The basic goal of Ayurveda is the preservation and development of good health; treating ailments is just a secondary goal. An excellent alternative, Ayurveda has the potential to inspire the creation of brand-new preventive and therapeutic methods for dental health. This 5000 year old medical method not only advises using particular herbs and minerals to treat various dental disorders but also suggests certain regular treatment practises for the preservation of oral health. ^[1]

Dental caries occurs when plaque builds up on the tooth's surface and reacts with the free sugars (all sugars that have been added to foods by the manufacturer, cook or consumer, as well as sugars that are naturally present in honey, syrups and fruit juices) to produce acids that gradually erode the tooth. A persistently high consumption of free sugars, insufficient fluoride exposure and a failure to remove plaque from the teeth with tooth brushing can result in caries, pain and occasionally tooth loss and infection. The gums and bone supporting the teeth are both impacted by periodontal disease. Pain, bleeding or swollen gums (gingivitis) and occasionally poor breath are the disease's hallmarks. There are more than one billion cases of severe periodontal diseases worldwide, which is believed to affect 14% of adult population. Tobacco smoking and poor dental hygiene are the main causes of periodontal disease. ^[2]

Dental drop is the Ayurvedic formulation available in the form of drop. The drops are enriched with natural herbs and natural tinctures. The formulation is indicated to be used for the treatment of toothache and associated pain and sensitivity.

The Apamarga plant leaves have been used as a herbal dental agent for toothache. The fresh leaf is squeezed and its juice is applied to the pain area to get relief. The apamarga plant is found during monsoon season but rarely seen in other seasons. So the leaves when available are dried, powdered and stored in a suitable container and is applied directly onto the tooth to get relief from toothache. Additionally possessing laxatives, anthelmintics, diuretics, antifungals, antibacterials, anti-allergics, hypoglycemics, expectorants, stomach tonics, and hypoglycemics. ^[5]

Clove is utilized in a number of dental creams, tooth pastes, mouth washes and throat sprays since it is recognised to have antimicrobial characteristics. Additionally, it eases gum discomfort and enhances general oral health. In dentistry, eugenol and zinc oxide are used to temporarily fill cavities. For dental emergency, clove is an anodyne (a substance that dulls or relieves pain). The aphrodisiac cloves (an agent for arousing or increasing sexual desire or potency). Due to the large amount of flavonoids in clove, it is utilized as an anti-inflammatory. ^[6]

Tulsi has been used as expectorant, analgesic, anticancer, antiasthmatic, antiemetic, diaphoretic, antidiabetic, antifertility, hepatoprotective, hypotensive, hypolipidemic and antistress agent. Tulsi is also a promising herb in the treatment of oral diseases and dentistry as it is very effective in treating various medical ailments. Tulsi leaves are very effective in treating common dental infections. The Tulsi leaves contains strong antibacterial such as caracrol and tetrape & sesquiterpene b caryophylline. Chewing of Tulsi leaves help in maintenance of oral hygiene. ^[3]

Neem have antimicrobial, anti-fungal, anti-inflammatory property. Neem bark and leaf are used to treat and prevent the onset of many dental disorder since ancient time. ^[4]

Coconut oil is an edible oil obtained from the pulp of ripe coconuts harvested from the coconut palm, a plant of the Arecaceae family. It is helpful in the prevention of dental caries. It has anti-inflammatory, anti-microbial and anti-fungal properties. It may be helpful in the treatment of skin conditions, it may protect hair from damage.^[7]

Material and methods

Collection and Identification of herbal ingredients

The ingredients used in the tooth drops are Apamarga leaf powder, Tulsi leaf powder, Clove powder, Coconut oil, Neem oil were purchased from local market. Samples were identified by microscopy and compared with standard samples.

Formulation of dental drop

Table 1 : Composition of dental drops

Sl.no	Ingredients	Botanical name	Functions	Quantity
1	Hydroalcoholic extract of Apamarga leaf powder	<i>Achyranthes aspera</i>	Dental carries, Anti-inflammatory, Antimicrobial	40ml
2	Aqueous extract of Tulsi leaf powder	<i>Ocimum tenuiflorum</i>	Antibacterial, Analgesic, Anti-inflammatory, Tooth ache	20ml
3	Clove powder	<i>Eugenia caryophyllus</i>	Analgesic, Anti-inflammatory	3g
4	Coconut oil	<i>Cocos nucifera</i>	Antimicrobial, Tooth decay, Gum disease	30ml
5	Neem oil	<i>Azadiracta indica</i>	Antimicrobial	10ml

Extraction process

Preparation of hydroalcoholic extract of Apamarga leaves

75g of Apamarga leaf powder extracted with 250ml mixture of water and ethanol by maceration for 4days and filtered. Then the filtrate was concentrated.

Preparation of aqueous extract of Tulsi leaves

25g of Tulsi leaf powder was mixed with 150ml of distilled water and boiled for 20minutes. The mixture was filtered and concentrated.^[8]

Formulation of Herbal Dental Drops

All the measured ingredients were mixed with hydroalcoholic extract of Apamarga and aqueous extract of Tulsi. The mixture was boiled and stirred continuously for 15minutes. Then filtered and stored in well closed container in cool and dry place.

Evaluation of Herbal Dental Drops

Organoleptic Evaluation

Organoleptic properties such as colour, odour, taste were studied.

pH of formulated Herbal Dental Drops

0.5% of formulated herbal dental drops was prepared and pH was determined using digital pH meter.

Stability study

The product was maintained in different temperature conditions to check its stability.^[10]

Preliminary phytochemical screening

Test for Carbohydrates

Molisch's test: To 2-3ml of sample solution, added few drops of Molisch's reagent shake and added Con.H₂SO₄ from sides of the test tube. A violet ring was formed at the junction of two liquids.

Fehling's test: Mixed 1ml of Fehling's A and 1ml of Fehling's B solutions, boiled for one minute. Added equal volume of test solution. Heated for 10-15 minutes in a simmering hot water bath. First a yellow, then brick red precipitate was observed.

Test for Proteins and Amino acids

Biuret test: To 3ml of sample solution 1ml of 4% NaOH and few drops of 1% CuSO₄ solution added. Violet or pink color appears.

Xantho-protein test: 3ml of sample solution mixed with 1ml Con.H₂SO₄. White precipitate turns yellow on boiling.

Test for Lipid

Spot test or Filter paper test: Press the sample solution between filter paper. Formation of permanent oily stain.

Test for Alkaloids

Mayer's test: 2-3 ml of sample solution treated with few drops Mayer's reagent, gives creamy white precipitate.

Hager's test: 2-3 ml of sample solution treated with few drops Hager's reagent gives yellow precipitate.

Test for Tannins

Ferric chloride test: About 0.5g of the sample solution were boiled in 20ml of water in a test tube and then filtered. A few drops of 0.1% ferric chloride was added and observed for brownish green or a blue-black coloration.

Lead acetate test: To the 1ml of sample solution, 1ml of lead acetate solution added. It gives a creamy gelatinous precipitate.

Test for Resins

Acetone water test: Treat sample solution with acetone and added to water. Turbidity appears it indicates that presence of resins.

Test for Glycosides

Baljet test (Steroidal glycosides): The sample solution showed yellow to orange color with sodium picrate.

Borntrager's test (Anthraquinone): To 3ml sample solution added dil.H₂SO₄. Boil and filter to the cold filtrate added equal volume benzene or chloroform, shake well separate the organic solvent. Adding ammonia turns the ammonia layer pink or red.

Test for Cyanogenic glycosides

Grignard test: Soak the filter paper strip first in 10% picric acid then in 10% sodium carbonate, dried. In conical flask place sample solution the above filter paper strip is placed the slit in cork. The filter paper turns brick red or maroon.

Test for Coumarin

Alkali test: Sample solution when made alkaline, shows blue or green fluorescence.

Test for Saponin

Foam test: Shake drug sample solution or dry powder vigorously with water. Persistent foam observed.

Test for Flavonoids

Shinoda test: Sample solution were treated with magnesium turnings and conc. HCl. Formation of magenta color.

Lead acetate test: Mix sample solution with lead acetate solution. Formation of yellow precipitate.^[9]

Results and Discussions



Formulated Herbal Dental Drops

The present study was formulate and evaluate the Herbal Dental Drops. The organoleptic properties showed a yellowish green colour with agreeable odour with a spicy and bitter taste.

The pH of the formulation was found to be 5.53. The prepared formulation shows no changes when kept under different temperature conditions.

The Preliminary phytochemical studies were conducted based on qualitative analysis to identify the presence of bioactive chemical constituents. The results are shown in table 1.

Table 1: Preliminary phytochemical Screening

Sl. no	Phytoconstituents test	Test	Result
1	Carbohydrates	Molisch's test Fehling's test	+
2	Proteins and Amino acid	Biuret test Xanthoprotein test	-
3	Lipid	Spot test	+
4	Tannins	Ferric chloride test Lead acetate test	-
5	Resins	Acetone water test	-
6	Glycosides	Baljet test Borntrager's test	-
7	Cynogenetic glycoside	Grignard test	-
8	Coumarin	Alkali test	-
9	Saponin	Foam test	-
10	Flavonoids	Shinoda test Lead acetate test	+
11	Alkaloids	Hager's test Mayer's test	+

Conclusion

The formulated Herbal Dental Drops can work in long way to help people to relief from tooth pain and many oral disorders. Besides we can be rest assured and take comfort in the fact that there aren't any unhealthy ingredients present in this preparation. The organoleptic evaluation results confirms that the color and odour of formulations is acceptable with pleasant odour.

Present study has an important impact in order to create an inexpensive herbal oral health intervention for low social economic communities. The natural herbs used in present formulation have been medicinally proven to prevent the problem of oral hygiene and pain relief. Since years and decades, these herbs have been known for working wonders as reflected in many research findings. Person can easily insert this drops in his dental cavities by using this Dental drops and stay clear of wide variety of oral health issue.

Conflict of interest

Authors have declares that no conflict of interest.

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