



FORMULATION DEVELOPMENT AND EVALUATION OF POLYHERBAL MOUTHWASH

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Abstract : The primary goal of the current study is to create and assess a polyherbal mouthwash that contains neem, tulsi, mint, and curcumin, which are antibacterial and antiseptic substances. In the current study, plant material was harvested, and extraction procedures were carried out following harvesting from the plants. Additionally, a formulation was created from the entirety of the extracted material, and a subsequent evaluation process was carried out based on the characteristics of a physical examination, pH, microbiological test, and stability study. According to the evaluation study, the formulation had high antibacterial activity, prevented foul breath, and was able to stop microbial development.

Keywords : Polyherbal Mouthwash, Antibacterial, Antimicrobial, Neem, Curcumin.

Introduction

Mouthwashes are antiseptic liquids used to lessen the amount of bacteria in the mouth, while some mouthwashes may also be used for analgesic, anti-inflammatory, or anti-fungal effects.^[1] Mouthwashes are liquids with analgesic, antibacterial, and anti-inflammatory properties. Mouthwash is a common remedy for its deodorising, cooling, and antibacterial qualities as well as for plaque control. Alcohol, glycerin, artificial sweeteners, surface-active ingredients, flavourings, colorings, etc. should all be present.^[2, 3, 4]

Mouthwashes made from natural plant extracts are known as herbal mouthwashes. Natural extracts from diverse plant leaves, fruits, seeds, and different tree oils are used to make the herbal mouthwashes. Although some mouthwashes may be used for additional purposes, such as their analgesic, anti-inflammatory, or anti-fungal effect, most mouthwashes are antiseptic solutions used to lower the microbial burden in the mouth. Mouthwash is a medicinal liquid that is kept in the mouth and swished by the perioral muscle to get rid of oral infections. It is an aqueous solution that is most frequently used to reduce plaque. Herbal medicine takes a proactive stance. The main benefit of using these natural herbs is that no negative effects have been associated with them to date. Aside from this, all herbal mouthwashes are free of sugar and/or alcohol.^[5] They are also used to clean, freshen, get rid of bad breath, and treat infections.

A person's dental hygiene is greatly influenced by their mouthwash, which also aids in the relief of gingivitis-related symptoms of swollen gums. The majority of dental patients use mouthwashes to treat sensitive teeth, ulcerated throats, and xerostomia. Before performing oral surgery on patients, dentists always use mouthwash as an antibacterial agent since it helps to sanitise the surface of the inflamed gums and teeth, preventing the contamination of any other pathogens. Due to its long-lasting antibacterial and antifungal activity against human pathogens, medicinal plants are essential in the treatment of disorders. Due to their immediate pain relief, ability to combat oral infections, and reduced side effects, herbal mouthwashes are in high demand. Hydrogen peroxide and chlorhexidine, which are found in chemical mouthwash, instantly whiten, sterilise, and reduce tooth discomfort. However, they have the tendency to discolour teeth and may cause adverse effects, despite being reasonably priced.^[6]

1.1 Types of Mouthwash

1.1.1 Fluoride mouthwash

Mouthwashes with fluoride include sodium fluoride, which helps guard teeth against decay and cavities. Being cautious when using this sort of mouthwash is advised because fluoride may be present in toothpaste and tap water, and too much fluoride intake can be harmful to your general health.

1.1.2 Antiseptic mouthwash

The most popular mouthwash is this one. People with mouth infections typically use this mouthwash, which typically contains alcohol, to prevent bacterial development. Those who suffer halitosis or poor breath can also benefit from this. This aids in warding off bacteria that cause oral infections and bad breath by working in tandem with good tooth brushing and flossing. Avoid using antiseptic mouthwash excessively because it can stain teeth.

1.1.3 Cosmetic mouthwash

a mouthwash that merely serves to conceal foul breath or freshen your breath without actually improving your oral health.

1.1.4 Natural mouthwash

The only difference between natural mouthwash and conventional mouthwash is that natural mouthwash uses only natural ingredients. It is also a well-liked substitute for alcohol-free mouthwash. When compared to other kinds of mouthwash, their chemicals are less dangerous to consume.^[7, 2]

1.2 Advantage of mouthwash

1. Fresh air.
2. Organic
3. Moderate
4. Simple to prepare
5. Affordable
6. Effective
7. Lacking of harmful artificial chemicals (dyes) and other additives
8. Safe for diabetics, expectant mothers, persons with dry mouth, and kids
9. Children may utilise it without an adult's supervision.
10. Using sodium fluoride to reduce tooth decay.
11. Killing germs to reduce gum irritation.
12. Using a bleaching product to whiten teeth
13. Using an antiseptic or anti-plaque substance to prevent gum disease.
14. By eliminating the bacteria that might otherwise infect the gums and dental sockets, mouthwash helps to prevent gingivitis and gum disease.
15. It can demineralize your teeth, reinforce the enamel, and reduce plaque buildup, all of which help you avoid tooth decay.

1.3 Uses

- Mouthwashes are used to treat a variety of oral health disorders, from breath freshening to the treatment of potentially fatal secondary infections such as oral mucositis in patients receiving bone marrow transplant treatments.
- In order to use mouthwashes effectively, a proper diagnosis of the oral condition and product knowledge are required.
- Using herbal mouthwash helps maintain good oral health.
- It aids in reducing tooth plaque.
- Gum diseases can benefit from its use.
- Used to eliminate bacteria in the mouth cavity.
- It masks bad breath and freshens it.
- To prevent gum disease, mouthwash is essential.
- Septic sockets are cleaned with it.
- It reduces inflammation and pain.
- For the treatment of halitosis and mucositis.

2. Aim and objective

2.1 Aim

The goal is to prepare an antibacterial herbal mouthwash using aqueous extracts from many different leaves, including *Mentha longifolia* (Mint), *Azadirachta indica* (Neem), and *Ocimum basilicum* (Tulsi).

2.2 Objectives

1. To prepare and evaluate the polyherbal mouthwash from various polyherbs.
2. To determine the antimicrobial activity.
3. To assess the consistency of mouthwash.
4. To develop a formulation of polyherbal mouthwash.

2.3 Need of Study

- Polyherbal formulations are now preferred over synthetic ones since they have fewer adverse effects, most often local ones like itching, contact dermatitis, and skin redness. Compared to synthetic agents, natural formulations are more effective.
- Using a multi-herbal mouthwash can help reduce oral bacteria, which in turn lowers the quantity of dental plaque that accumulates.
- Mouthwash works against oral pathogens and has less adverse effects than synthetic herbal products.
- People prefer polyherbal mouthwashes because they quickly ease pain.
- Mouthwash containing a variety of herbs can aid in preventing infectious illnesses and gingivitis.
- Polyherbal mouthwash can help you get rid of oral bacteria naturally and safely without using any dangerous chemicals.

3. Materials and methods

3.1 MATERIALS

- **List of materials:** -

Sr. No	Materials
1	Neem
2	Tulsi
3	Mint
4	Curcumin
5	Salt Solution
6	Alcohol
7	Distilled water

table - list of materials

- List of equipment's: -

Sr. No	Equipment's
1	Measuring cylinder
2	Beaker
3	Mortar pestle
4	Conical flask
5	Funnel
6	Water bath
7	Burner
8	Petri dish
9	pH meter
10	Incubator

table - list of equipment's



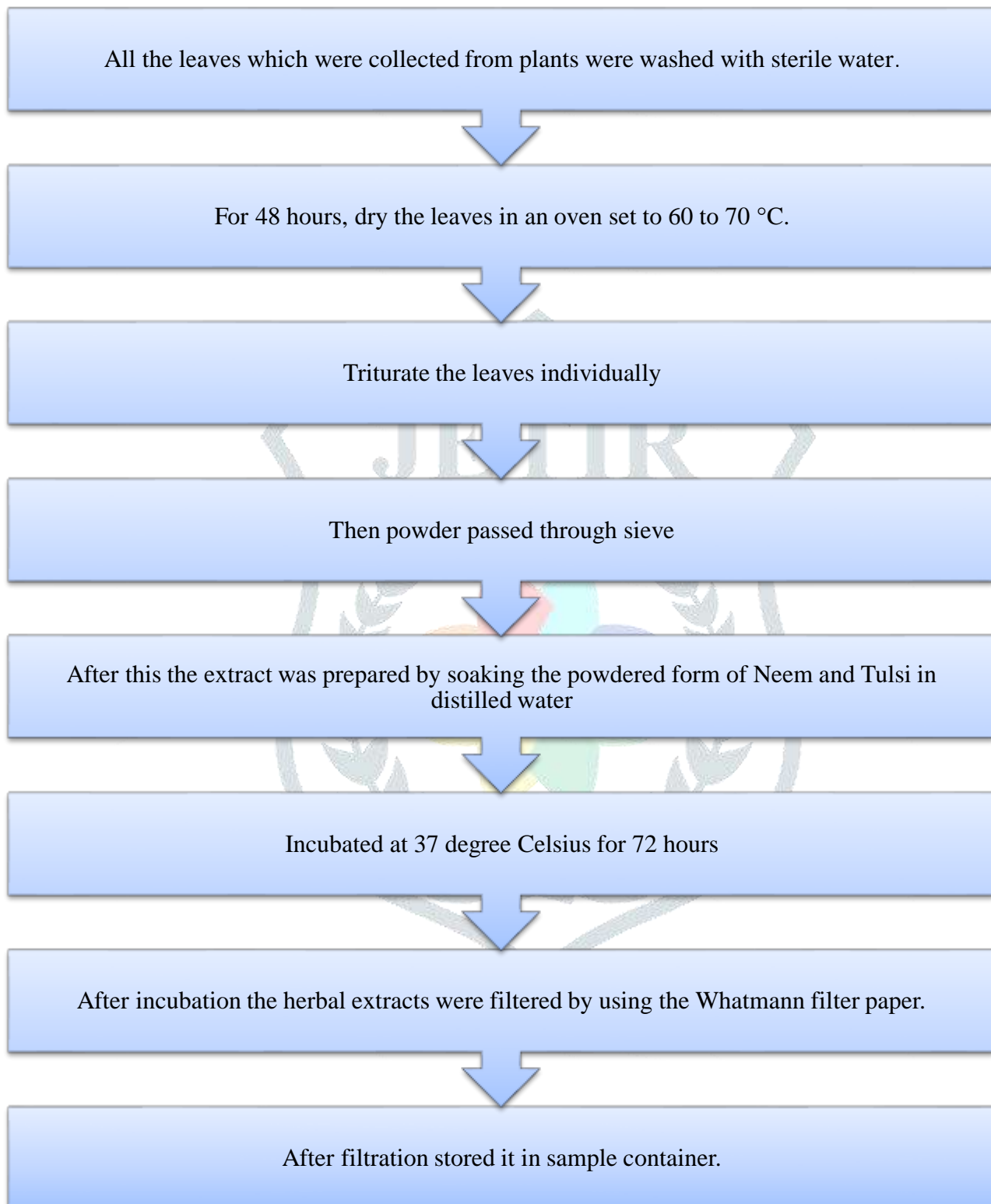
3.1.1 Collection of Plants

Leaves of Neem (*Azadirachta indica*), Tulsi (*Ocimumtenuiflorum*), and Mint (*Mentha*) were collected from mature plant. and Powder of Turmeric (*Curcuma longa*) and salts and alcohol taken from Swami Institute of Pharmacy college laboratory.

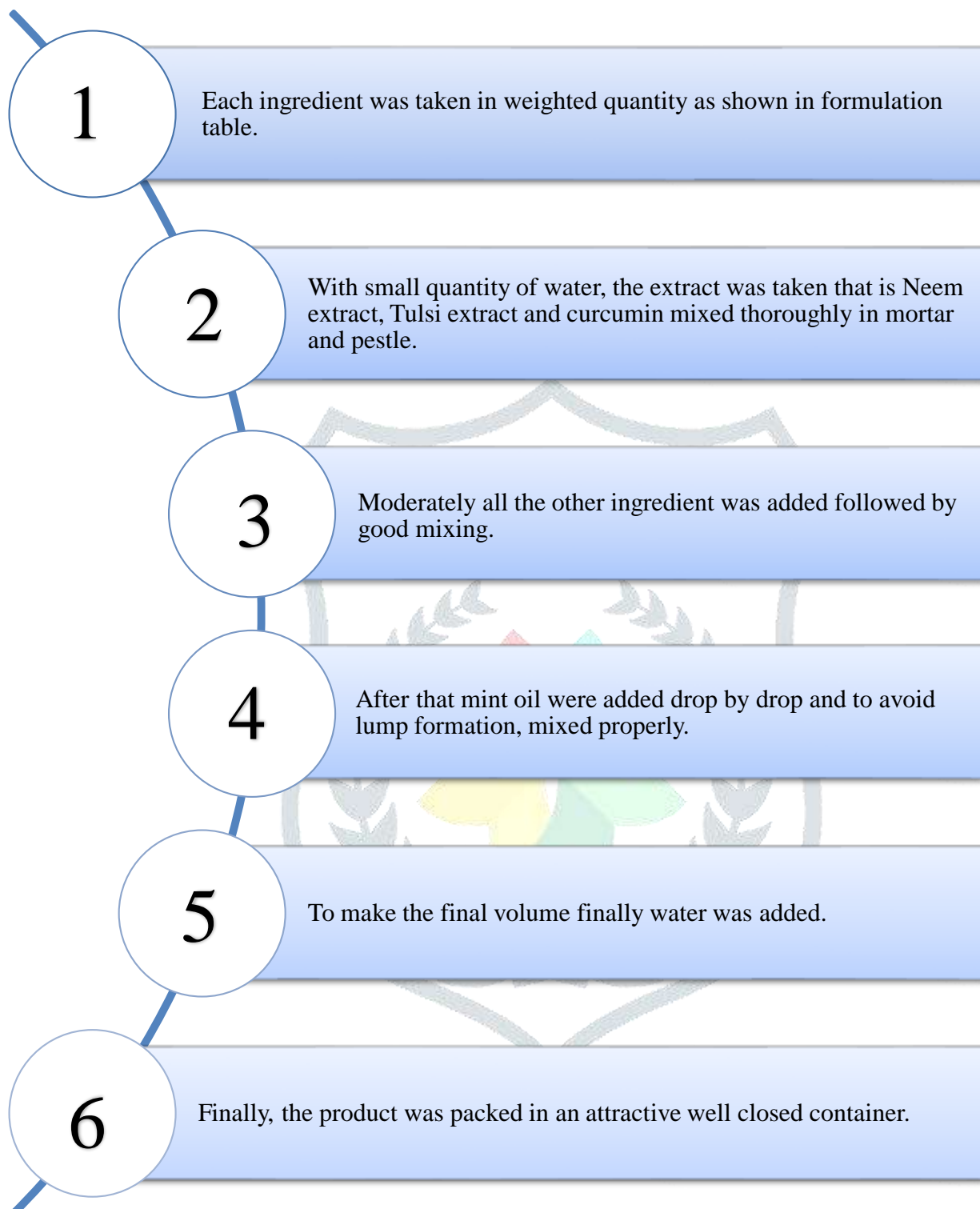
Sr No	Ingredients	Botanical Name	Part used	Uses	Picture
1	Neem	<i>Azadirachta indica</i>	Leaves	Antimicrobial agent	
2	Tulsi	<i>Ocimumtenuiflorum</i>	Leaves	Dental care	
3	Mint	<i>Mentha</i>	Leaves	Flavouring agent	
4	Curcumin	<i>Curcuma longa</i>	Rhizomes	Antibacterial agent	

3.2 Methods

3.2.1 Extraction of Crude Drug :- ^[15,16,17]



3.2.2 Formulation of Herbal Mouthwash: - [15, 16, 17]



3.2.3 Formulation Table: -

Sr. No	Ingredients	Botanical Name	Roles	Formulation
1	Neem	Azadirachta Indica	Antimicrobial agent	5ml
2	Tulsi	Ocimumtenuiflorum	Dental care	10ml
3	Mint	Mentha	Flavouring agent	5ml
4	Curcumin	Curcuma longa	Antibacterial agent	0.2g
5	Salt Solution	-	Preservative	5ml
6	Alcohol	-	Preservative	10ml
7.	Distilled water	-	Q.S	Q.s

table – formulation table

3.2.4 Evaluation of Herbal mouthwash**Colour and Odour**

Physical parameters like odour and colour were examined by visual examination. ^[15,19]



fig - colour and odour

pH Determination

With the help of a digital pH metre, the pH of prepared herbal mouthwash was determined. A standard buffer solution was used to calibrate the pH metre. One millilitre of mouthwash was weighed, dissolved in fifty millilitres of purified water, and its pH was measured.^[15,20]

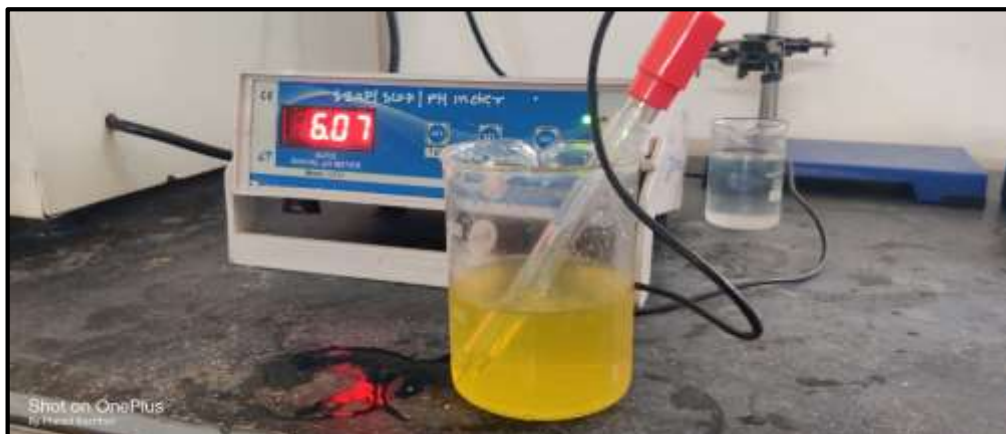


fig – pH determination

Test for microbial growth in formulated mouthwash

By using the streak plate approach, the created mouthwash was infected in the agar media plates while a control was made. The plates were placed in the incubator and are incubated at 37°C for 24 hours. After the incubation period plates were taken out and checked for microbial growth by comparing it with the control.^[15,20]



fig - test for microbial growth in formulated mouthwash

Stability Studies –

Any pharmaceutical product's formulation and preparation are lacking without adequate stability assessments of the finished product. This is carried out to assess the prepared product's physical and chemical stability and, consequently, its safety. The stability of Prepared mouthwash was determined by storing the sample at different temperature condition , and checks its physical properties like pH, colour, odour, and homogeneity.^[15,21]

3.2.5 Evaluation Table

Sr.No	Parameters	Results
1	Colour	Yellowish
2	Odor	Pungent
3	pH	6.07
4	Stability Test	Stable
5	Antimicrobial Test	No microbial Growth

table – evaluation table

4. Result and Discussion

The pH of the formulation was found to be 6.07. Since the skin has an acidic pH of roughly 5.5, this formulation's pH range is suited for conditions of the mouth. Heavy metals were discovered to be absent from the formulation. The formulation was free from microbes as they have not produced any microbial growth when they got inoculated in the agar medium. This mouthwash is made entirely from herbs and does not contain any alcohol or other additives like other brands on the market. Stability tests for the formulation were conducted for both chemical and physical change. There were no observable significant differences in the formulation's qualities.

5. Conclusion

This research is about the polyherbal mouthwash is a liquid dosages form might be useful as the synthetic mouthwash. In this research formulations of polyherbal mouthwash were prepared and evaluated on the basis of their physiochemical properties like colour, odor, taste, pH, temperature, microbial test, phase separation. The data presented in this study, it was concluded that the developed polyherbal mouthwash possess significant, therapeutically efficacious, suitable vehicle for drug delivery in low cost but definitely with high potential. Polyherbal Mouthwash preparations have potent action and minimal side effects when compared with that of the other marketed mouthwashes, hence there is need for increased usage of polyherbal preparations to avoid the adverse effects.

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