

Formulation and Evaluation of Herbal Mouthwash of Acacia Nilotica Gum

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ABSTRACT

Background: *A. nilotica* is known to have a medicinal effect and is beneficial in treating oral disorders. It offers a good remedy for curing tooth decay and acts as a pain reliever and contains antimicrobial properties that promote oral hygiene.

Aim: To prepare a mouthwash formulation containing *A. nilotica* and to evaluate the physicochemical parameters

Materials and Methods: In the present study, the preparation of herbal mouthwash formulation was carried out initially and Physical evaluation, pH viscosity, and stability studies were conducted

Results: Five formulations of mouthwash were prepared by using *A. nilotica*, mint oil, PEG 40, glycerol, Saccharin etc. and evaluated for different parameters like colour, odour, pH, viscosity, and stability studies.

Conclusion: The current study set out to create and assess a mouthwash made of herbs. Mouthwashes containing herbs like *A. nilotica* can be used in addition to regular dental hygiene procedures like flossing and brushing. Herbal mouthwashes are quite popular because of their potency against oral infections, quick pain relief, and few adverse effects.

Keywords: *A. nilotica* Mouthwash

I. INTRODUCTION

Since the dawn of civilization until the twenty-first century, people have understood the significance of keeping their mouths and teeth clean. Many mouthwash products with various active and inactive ingredients are available to patients and oral health professionals.¹

Acacia species, often referred to as babool (or babul), Egyptian mimosa, Egyptian thorn, kikar, Indian gum, and red thorn, have been utilized for therapeutic purposes and other utilitarian purposes for a very long time.²The ancient Egyptians made furniture and statues from the wood of *A. nilotica*. Since the early Egyptian dynasties, reports of its use have existed. In his *De Materia Medica*, the

Greek physician Dioscorides often referred to as the founder of botany described the usage of *A. nilotica* (as a remedy made from the leaves and fruit pods).³He gave it the name "akakia," and the contemporary term "acacia" is derived from this word. The name "acacia" derives from the adjective "spiny," which describes the species well. The species is prevalent.⁴

The species is extensively distributed in Asia, with a range that extends eastward to Pakistan and India, as well as in Africa, where it ranges from Egypt to Mauritania southward to South Africa.⁵ It has been imported to China, Australia, the United States, Central America, South America, the Caribbean and Indian Ocean islands, and Australia, where it is regarded as a pest plant of national concern. In many places of the world, it has been introduced as a medicinal, fodder, and fuel wood plant.⁶Sore throats (aerial portion), toothaches (bark), colds, bronchitis, diarrhea, bleeding hemorrhoids, and leucoderma have all been successfully treated with *A. nilotica*.⁶ Twigs from *A. nilotica* have been used as toothbrushes.⁷

Due to their immediate pain relief, ability to combat oral pathogens, and reduced side effects, herbal mouthwashes are in high demand.⁸ Chemical mouthwashes contain hydrogen peroxide, chlorine dioxide, and cetylpyridinium chloride, which act as an instant tooth whitener, sanitizer, and pain reliever.⁹ However, they have the tendency to discolor teeth and may cause adverse effects, despite being reasonably priced.¹⁰

Mouth rinses act as delivery systems for antimicrobial compounds as well as adjuncts to mechanical plaque reduction.¹¹ Chlorhexidine has long been regarded as the best antibacterial mouthwash among all those that are commercially available.¹² Chlorhexidine has certain unavoidable adverse effects, including discoloration of teeth and composite restorations, changed taste perception, a metallic taste, and a burning feeling, even while it is successful in lowering the number of

Staphylococcus.¹³ Plant components can serve as medicinal alternatives to antibacterial substances produced synthetically.¹⁴ serve as therapeutic alternatives to artificially produced antibacterial drugs.¹⁵

Method of preparation

Take the weighted quantity of gum in the mortar and pestle and mixed thoroughly with a

small quantity of distilled water. Add all other remaining ingredients with good mixing. Add drop by drop of mint oil and mix properly (taking care to avoid lump formation). Then add PEG 40 and Glycerol drop by drop and mix well. Finally, add preservatives and make volume with distilled water. The product will be packed in an attractive, well-closed container.

Table 1: Formulation of mouthwash

S. No	Ingredient	Function	Formulation				
			F1	F2	F3	F4	F5
1	Gum	Active ingredient	1gm	2gm	3gm	4gm	5gm
2	Mint Oil	Flavour	0.2ml	0.2ml	0.2ml	0.2ml	0.2ml
3	Saccharin	Sweetener	50mg	50mg	50mg	50mg	50mg
4	PEG 40	Surfactant	5gm	5gm	5gm	5gm	5gm
5	Glycerol	Co surfactant	5ml	5ml	5ml	5ml	5ml
6	Alcohol	Preservative	2ml	2ml	2ml	2ml	2ml
7	Patent V	Colouring agent	1 drop	1 drop	1 drop	1 drop	1 drop
8	Distilled water		Up to 100 ml	Up to 100 ml	Up to 100 ml	Up to 100 ml	Up to 100 ml

Evaluation of mouthwash

1. Physical evaluation -Physical parameter such as colour, odour, taste and consistency are examined by visual examination.
2. pH -Measure the pH of prepared herbal mouthwash by using digital pH meter.
3. Viscosity- Viscosity is measured with the help of digital viscometer.
4. Microbial Assay – The antibacterial activities are evaluated by measuring the zones of inhibition (in mm).
5. Stability studies – A short term accelerated stability study will be carried out for the period of 3 months for the prepared formulation. The samples are stored at under the following conditions of temperature as 3-5^o C, 25^o C RH=60%, 40^o C ±2% RH= 75% and check the Visual Appearance, Phase Separation and Homogeneity.
6. Taste – The taste is strong and remain almost same over the week except for the ambient temperature sample.

7. Flavor – The flavor is almost unchanged and has an excellent fragrance of clove and peppermint. Only a week after, the fragrance is somewhat lost when kept at ambient temperature.

II. RESULTS AND DISCUSSION

The formulation's pH was discovered to be 6.1. Since the skin has an acidic pH of around 5.5, this formulation's pH range is suitable for the conditions of the mouth. Heavy metals were discovered to be absent from the formulation. Since they did not produce any microbial growth when they were inoculated in the agar medium, the formulation was free of microbes. This mouthwash is made entirely from herbs and does not include any alcohol or other chemicals 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. The results of stability investigations are displayed in the table 4.



Fig:1.Different concentrations of *A. nilotica* mouthwash

Table 2: pH of different mouthwash formulation

S NO	Formulation	pH
1	F1	5.5
2	F2	6.5
3	F3	6.8
4	F4	7.2
5	F5	6.8

Table 3: Viscosity of different mouthwash formulation

S NO	Formulation	Viscosity cps
1	F1	8.2
2	F2	7.8
3	F3	6.4
4	F4	6.4
5	F5	6.2

Table 4: Stability studies of different mouthwash formulation

Temperature	Evaluation parameter	Observation (months)				
		F1	F2	F3	F4	F5
3-5 ⁰ C	Visual Appearance	Light brown	Light brown	Light brown	Light brown	Light brown
	Phase Separation	NIL	NIL	NIL	NIL	NIL
	Homogeneity	Good	Good	Good	Good	Good
	PH	6.1	6.2	6.2	6.1	6.1
	Odour	No change	No change	No change	No change	No change
Room Temperature (25°C RH=60%)	Visual Appearance	Light brown	Light brown	Light brown	Light brown	Light brown
	Phase Separation	NIL	NIL	NIL	NIL	NIL
	Homogeneity	Good	Good	Good	Good	Good
	PH	6.1	6.2	6.2	6.1	6.1
	Odour	No change	No change	No change	No change	No change
40°C±2°C RH=75%	Visual Appearance	Light brown	Light brown	Light brown	Light brown	Light brown
	Phase Separation	NIL	NIL	NIL	NIL	NIL
	Homogeneity	Good	Good	Good	Good	Good
	PH	6.1	6.2	6.2	6.1	6.1
	Odour	No change	No change	No change	No change	No change

The greatest formulation of mouthwash was found to be F3, with an optimum concentration of gum. It is fresh, effective against oral germs, and herbal mouthwash that also contains these ingredients. It can be stored for a long period without losing its pH, colour, or smell. Head and neck cancers are known to be increased by alcohol

usage, cigarette use, and other risk factors. The age-old debate has always been about whether using mouthwash with alcohol increases the chance of developing cancer. When paired with regular brushing and flossing, antimicrobial ingredients found in mouthwashes have been shown to

decrease plaque and gingivitis. They result from a number of breakdown sources.

The current liquid herbal mouthwash may be really effective in assisting people to get rid of foul breath and other oral health issues. Additionally, we can rest and find solace in the knowledge that ensures this formulation is free of any harmful components. The findings of the physicochemical examination show that the current gum mouthwash color and odor are acceptable, with a pleasant aroma and improved after effects.

The current study has a significant influence on efforts to develop a herbal oral health intervention for poor socio-economic populations that is both efficient and affordable. However, it is necessary for longer studies with larger sample sizes

However, since this study was brief, longer studies with larger sample sizes are necessary. The *A. nilotica* gum utilized in this composition has been shown to have medical benefits for treating oral hygiene issues and foul breath.

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