Preparation, Evaluation and Comparative Study of Herbal Lozenges from Plectranthus Amboinicus Leaf Extract and Essential Oil

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ABSTRACT

Plectranthus amboinicus is an herb species ordinarily well-known as Panikoorka of the family of Lamiaceae. These plant species are recognized in every part of India and it is a medicinal plant which is utilised in folkloric medicines for diseases like Flu, bronchitis and epilepsy. This study aims to formulate and evaluate herbal lozenges from *Plectranthus amboinicus* leaf extract & essential oil and to compare the antibacterial activity of it. Fresh leaves of *Plectranthus amboinicus* were collected, authenticated and subjected to cold maceration to obtain hydroalcoholic extract.

The preliminary phytochemical screening indicated the presence of a diverse range of bioactive compounds, including flavonoids, alkaloids, tannins, terpenoids, glycosides, phenolic compounds, and phytosterols. In this study lozenges are prepared with *Plectranthus amboinicus* leaf extract and its essential oil.

The prepared lozenges underwent organoleptic evaluation, assessing shape, texture, odor, color, taste, and type, as well as physicochemical characterization, including disintegration test, dissolution test, hardness, diameter, and weight variation. An in vitro study was conducted to evaluate the antimicrobial activity of the prepared herbal lozenges against Escherichia coli (E. coli), a Gram-negative bacterium.

The antimicrobial activity of *Plectranthus amboinicus* lozenges was evaluated, and the results showed that the lozenges exhibited a higher inhibition zone compared to the extract. This enhanced antimicrobial activity is attributed to the synergistic effects of the various ingredients present in the lozenges, including peppermint oil, glycerin, jaggery, and sugar, which possess inherent antibacterial properties that complement the bioactive compounds present in *Plectranthus amboinicus*.

Keywords: Plectranthus amboinicus**,** Antibacterial activity**,** Lozenges

INTRODUCTION

The Lamiaceae family incorporates the well-known plant Plectranthus amboinicus, also referred to as panikoorka. It is a large, juicy, aromatic perennial herb that raises to a height of 30 to 90 cm.

Its leaves and stem are thick and fleshy. The primary chemical components of P. ambonicus are carvacrol, flavonoids, thymol, terpinene, and terpineol.

It is a juicy and succulent herb with many branches and aromatic leaves. These medicinal plants, which are used in traditional medicines, are found practically everywhere in India and used to treat other illnesses like epilepsy, bronchitis, and the flu[1].

Lozenges are solid preparations that are destined to dissolve or disintegrate gradually in the mouth. They typically contain one or more medications in a sweetened, flavored base.

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They can be made by constricting or molding tablets made of sugar. Since the 20th century, lozenges have been advanced and are still produced commercially; the majority of the preparations are accessible as over-the-counter medications.[2]

They can also be swallowed for oral absorption or used for systemic drug absorption via the buccal and sublingual routes.

In the mouth, the lozenges are meant to gradually crumble or dissolve. They are flavored and sweetened for flavor and contain one or more active ingredients. Lozenges' solid sugar and gum mixture gives them solidity and cohesiveness while also allowing the drug to release gradually.

The use of herbal ingredients in lozenges has increased as a result of consumers' growing desire for safe, all-natural remedies for a variety of ailments.

Numerous natural materials, including essential oils, plant extracts, and other natural substances, can be used to produce herbal lozenges. Because they are thought to be safe and effective, herbal lozenges are becoming more and more well-liked as a natural substitute for pharmaceuticals.

Because they are less likely to have side effects or interfere with other treatments, they are frequently chosen over pharmaceuticals. It is common to choose them over medications because they are less likely to create negative effects or conflict with other therapies.

Plant Profile

SYNONYMS [(3)]

Plectranthus amboinicus Lour, Coleus amboinicus Lour

COMMON NAME [(3)]

Kannada: Dodda pathre. dodda pathre soppu

Hindi: Patta ajavayin, Patharchur, Amroda, pathercheer

English: Country borage, Indian borage, Indian mint

Bengali: Amalkuchi

Malayalam: Panikoorka

Gujarati: Ovapan

Marathi: Pan ova

Sanskrit: Karpuravalli, Sugandhavalakam, Parnayavani

Marathi: Pathurchur

Chemical Composition

The main chemical compounds found in the essential oil of *P. amboinicus* are carvacrol, thymol, humulene, undecanal, terpinene, p-cymene, caryophyllene oxide, terpineol, and β-selinene[4].

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Figure 1: Leaves of *P. amboinicus*

MATERIALS AND METHODS

Collection and Authentication of Plant Material

Fresh leaves of plant were collected from Kannur district during the month of November 2024.The leaves were washed 2-3 times with distilled water to remove soil and other foreign particles and shade dried. The dried leaves were crushed by mechanical grinder to obtain the powder and then stored in desiccator. The plant was recognized by the botanist available at MVR Ayurveda Medical College Parassinikkadavu, Kannur.

Preparation of Plant Extract

The extraction is done by maceration method (cold maceration) by using Hydro alcohol (Alcohol 70: Water 30) as solvent. Maceration method is carried out by weighing 25 g of crushed powder, dissolved with alcohol and water for preparing hydro alcoholic extract which is allowed to stay overnight for 24 hours. After overnight soaking the sample was filtered by muslin cloth, the filtrate was dried on hot plate[3].

Phytochemical Screening

The chemical test for identification of chemical constituent were done on hydro alcoholic extract of *Plectranthus amboinicus*. As for the alkaloid, Wagner's test and Mayer's test is performed. Keller-killani test, bromine test, Salkowski test ,10 %NaOH test, Gelatin test these are performed for detecting presence of glycosides, tannins, phytosterols and terpenoids.

Fehling's test, millions test, Braymer's test, iodine test, ferric chloride test, lead acetate test are performed for detecting presence of carbohydrates, proteins and amino acids, flavonoids, tannins and phenolic compounds[4].

Distillation for Essential Oil

The leaves were cut into small pieces (30gm) and the distillation was carried out in Clevenger apparatus using distilled water as a solvent (500ml) for 3-5 hrs. The oil gained in the collection bottle was stored in refrigerator at 2-8^{o}c.

Formulation of Lozenges

The hard lozenges holding extract and essential oil were prepared individually by making use of heating, melting and congealing method.

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Preparation of Lozenges: In a beaker, melt 10g of jaggery, 6g of sugar, and enough water to make formulations F1 and F3. Only 16g of jaggery must be melted in an adequate amount of water in F2 and F4. Stir the mixture continuously while heating it over medium heat until the sugar dissolves. Increase the heat to medium-high and boil the mixture for 10 to 15 minutes, or until it reaches 300ºF (150ºC), after the sugar has dissolved. Mix the extract solution or essential oil with the sugar solution. For 5 to 10 minutes, heat the mixture until it reaches a consistency. Glycerin, a few drops of peppermint oil, and 1 milliliter of liquid paraffin should be added. After taking the mixture off of the stove, let it to cool for a few minutes. Pour the mixture into the molds. If molds are not being used, transfer the mixture onto a piece of butter paper and allow it to cool until it becomes manageable. The powdered sugar should be sifted in a small beaker. Coat the lozenges on all sides by rolling them in the powdered sugar. The prepared lozenges can be kept at room temperature for up to two weeks in an airtight container after being wrapped in butter paper.[5,6,7]

The composition of both herbal lozenges formulation is mentioned in below table.

Ingredients	F1	F2
P.amboinicus leaf extract	1 gm	1 gm
Pepper mint oil	2 drops	2 drops
Glycerin	1 ml	1 ml
Liquid paraffin	1 ml	1 ml
Sugar	6 gm	-
Jaggery	10 g	16 gm
Water	q.s	q.s

Table no :1 Formula-1 (F1 & F2) Extract

Ingredients	F3	F4
P.amboinicus essential oil	1 ml	1 ml
Pepper mint oil	2 drops	2 drops
Glycerin	1 ml	1 ml
Liquid paraffin	1 ml	1 ml
Sugar	6 gm	-
Jaggery	10 g	16 gm
Water	q.s	q.s

Table no:2 Formula-2 (F3 & F4) Essential oil

Evaluation of Lozenges

The prepared lozenges will be evaluated for its organoleptic parameters like color, odor, taste and touch, hardness, weight variation, friability, dissolution and disintegration time.

Weight variation test

10 lozenges from each batch were individually weighed in grams on an analytical balance. The average weight and standard deviations are measured.

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Friability

Determining how much the lozenges are prone to chipping or breaking.

Disintegration Test

Measuring how quickly the lozenges dissolve in a liquid.

Dissolution testing measures the extent and rate of solution formation from a dosage form, such as tablet, capsule, ointment.

Hardness test

The hardness of lozenges was measured using a Monsanto Hardness Tester.

In -Vitro Anti Bacterial Evaluation

The antibacterial properties of formulated lozenges were tested against Gram-negative E.coli bacteria. The agar well diffusion assay was used for testing antimicrobial activity. 2 sterilized petri-plate was pre-seeded with 30ml of respective growth agar medium and 0.2ml of inoculums by spread plate method and dry for 30 minutes. Make 2 wells in both petri plate with the help of sterile cork borer. 5mm diameter wells were made in the plates containing bacterial culture under aseptic condition.in first petri-plate place Lozenges prepared by essential oil of *P.amboinicus* in well A and place Lozenges prepared by extract of *P.amboinicus* in well B. in second petri-plate place standard Gentamicin in well A and place extract of *P.amboinicus* in well B. The inoculated plates were kept at room temperature for 10-15 minutes so as to allow the diffusion of the substances and then incubated at 37±2 °c for 24 hours. The inhibition zones were measured.

RESULTS

2g of dried extract is obtained and it used for phytochemical screening. The shade dried powdered plant material was extracted to get hydro-alcoholic extract by using maceration method. The essential oil is extracted by hydro distillation method.

Figure 2: Hydroalcoholic extract

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Phytochemical Screening of the Extract

The confirmatory qualitative phytochemical screening of plant extracts was performed to identify the main classes of compounds present in the extracts. Phytochemical screening revealed the presence of flavonoid, alkaloid, Tannins, terpenoids, glycosides, phenolic compounds and phytosterols.

Table no:3 Qualitative phytochemical screening

CONSTITUENT	RESULT
Alkaloid	+ve
Flavonoid	+ve
Terpenoid	+ve
Tannins	+ve
Glycoside	+ve
Phytosterol	+ve

Preparation of Lozenges

Step-1

In a beaker, Melt 10g of jaggery, 5g of sugar and suffient amount of water. Heat the mixture over medium heat stirring constantly until the sugar has dissolved. Once the sugar has dissolved, increase the heat to medium-high and let the mixture boil for 10-15 minutes or until it reaches a temperature of 300ºF (150ºC).

Step-2

Combine sugar solution to panikoorka extract solution and heat mixture for 5-10 minutes until consistency obtained. Add 1ml of liquid paraffin, glycerin and few drops of peppermint oil.

Step-3

Remove the mixture from the heat and let the mixture cool for a few minutes. If using molds, pour the mixture into the molds or pour into butter paper and let it cool and solidify for 30-45 minutes.

Step-4

If not using molds, pour the mixture onto a sheet of butter paper and let it cool until it is firm enough to handle. In a small beaker, sift the powdered sugar. Roll the lozenges in the powdered sugar until they are coated on all sides.

Step-5

Wrap the prepared lozenges in a butter paper and Store the lozenges in an airtight container at room temperature for up to 2 weeks.

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Figure 3: Preparation of Lozenges

Physical Evaluation Parameters of Lozenges

The prepared lozenges were evaluated for its organoleptic parameters like color, odor, taste and touch, hardness, weight variation, friability, dissolution and disintegration time. Depending upon the evaluation parameters F1 and F3 were found out as the best formulations and these formulations were used for the antibacterial study.

Table no:4 Physical evaluation parameters of lozenges

Formula	**F1**	**F2**	**F3**	**F4**
Shape	Round	Round	Round	Round
Colour	Brown	Light Brown	Brown	Light Brown
Odor	Aromatic	Aromatic	Aromatic	Aromatic
Taste	Sweet	Sweet	Sweet	Sweet
Type	Hard	Hard	Hard	Hard
Weight variation(gm)	3.1	3.6	3	3.8
Hardness(kg/cm^2)	8	5	7	4
Friability (%)	1.02	1.2	1	1.3
Diameter	1	1	1	1

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Disintegration time(min)	8	10	7	11
Dissolution time(min)	15	8	13	7

Depending upon the evaluation parameters F1 and F3 were found out as the best formulations and these formulations were used for the antibacterial study.

In Vitro Anti Bacterial Evaluation

The antibacterial properties of formulated lozenges were tested against Gram-negative E.coli bacteria. Agar well diffusion method was used to screen the antibacterial activity of both the formulations (F1 and F3)

- Microorganism – E.coli (Gram negative bacteria have been used for the study).
- Standard – Gentamycin is used as standard
- Test – Lozenges, Extract and Essential oil are used for testing purpose.
- Method – Agar well diffusion method is used

Both the formulations F1 and F3 showed zone of inhibition. It was observed that well containing lozenges prepared by extract of *Plectranthus amboinicus* showed more zone of inhibition when compared to the lozenges prepared by essential oil of *Plectranthus amboinicus.*

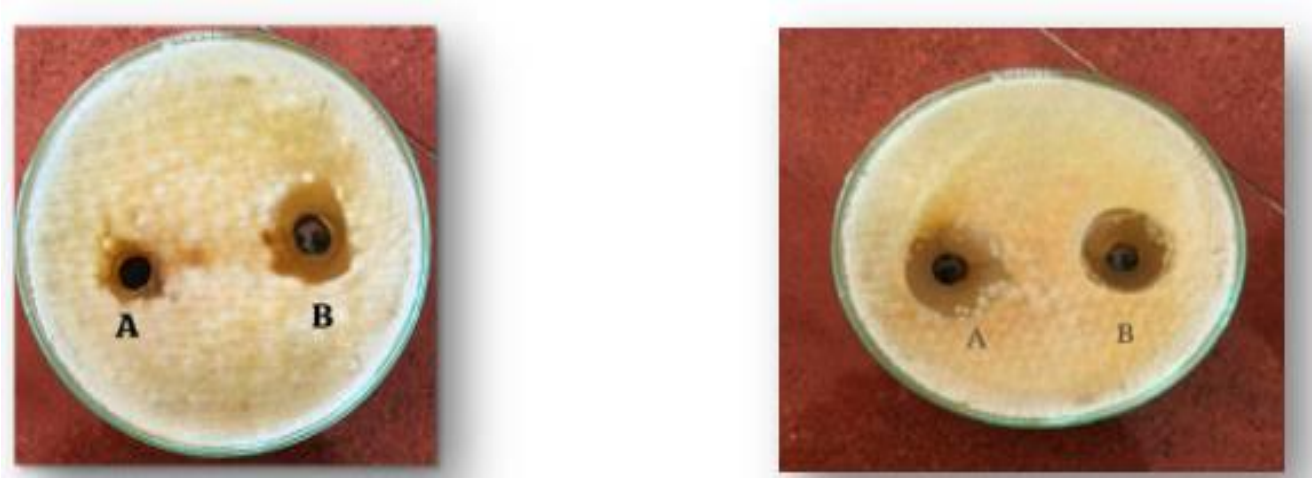

Figure 4: A – *P.amboinicus* lozenges from essential oil , B – *P.amboinicus* Lozenges from extract Fig-5 : A- Gentamicin, B-*P.amboinicus* extract

DISCUSSION

Plectranthus amboinicus was collected and authenticated. The shade dried leaves of plant then subjected to maceration and using this preliminary phytochemical screening was done. The essential oil was separated from the herbal material using the distillation method with a Clevenger apparatus.

Four formulations of lozenges were prepared using the herbal extract and essential oil. The evaluation of prepared lozenges was done by organoleptic method as well as physicochemical characterization, including disintegration test, dissolution test, hardness, diameter, and weight variation.

The antimicrobial activity of *Plectranthus amboinicus lozenges* was evaluated by in vitro agar diffusion method, and the results showed that the lozenges prepared by herbal extract exhibited a higher inhibition zone compared to the lozenges prepared by essential oil.

It has been reported that large number of different chemical compounds such as Alkaloids, Phenolics, Tannins, Glycosides etc are presented in hydroalcoholic extracts of leaves, and thus these chemical components can affect multiple target sites against the bacterial cells.

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CONCLUSION

Two type of lozenges were prepared using herbal extract and essential oil and then standardized by using different evaluation variables. The herbal lozenges formulated with *Plectranthus amboinicus* leaf extract demonstrated superior antibacterial activity compared to those prepared with essential oil, likely attributed to the presence of alkaloids and phenolic compounds, which are known to exhibit antibacterial properties according to existing literature. Phytochemical analysis of the extract revealed presence of various phytochemicals such as flavonoid, phenolic, glycosides, alkaloids and tannins.

Lozenges are of good quality with regards to characteristics like hardness, friability, weight variation and disintegration time. Thus it can be concluded that these lozenges can be used for respiratory tract infections like sore throat, throat pain and other respiratory disorders.

REFERENCES

1. Punet Kumar et.al, Pharmacognostical, Pharmacological Studies and Traditional uses of Plectranthus Ambonicus: A Review, Research Journal of Pharmacognosy and Phytochemistry. 11(4): October-December, 2019 ;245
2. R. Muthukumarana, R.M. Dharmadasa, Pharmacognostical investigation of Plectranthus hadiensis (Forssk.) Schweinf. ex Sprenger. and Plectranthus amboinicus (Lour.) Spreng, World Journal of Agricultural Research, 2014, Vol. 2, No. 5, 240-246
3. Greetha Arumugam et.al, Review Plectranthus amboinicus (Lour.) Spreng: Botanical, Phytochemical, Pharmacological and Nutritional Significance, Molecules 2016, 21, 369, 30 January 2016; Accepted: 8 March 2016; Published: 30 March 2016.
4. Kamlendra Kumar Mishra et al, Formulation and evaluation of herbal lozenges, Journal of Drug Delivery and Therapeutics.2017;7(7)87
5. Punet Kumar et.al, Pharmacognostical, Pharmacological Studies and Traditional uses of Plectranthus Ambonicus: A Review, Research Journal of Pharmacognosy and Phytochemistry. 11(4): October-December, 2019 ;245
6. V.P Kamboj, HERBAL MEDICINE, General Article, Current science.10 january 2000;78(3)
7. Poojitha .M, Saravana Kumar, S.V. Satyanarayana, Pharmacognostic study data of Indian medicinal plants, International Journal of Pharmaceutical Research. 2020; 12 (3)
8. Kamlendra Kumar Mishra et al, Formulation and evaluation of herbal lozenges, Journal of Drug Delivery and Therapeutics.2017;7(7)87
9. Kshirsagar Sanjeevani et.al, Formulation & Evaluation Of Herbal Lozenges For Flu And Cold, 2023 IJNRD | Volume 8, Issue 5 May 2023 | ISSN: 2456-4184 | IJNRD.ORG,page no.205.