Original Article

FUTURE JOURNAL OF PHARMACY AND MEDICAL SCIENCES

Published by Pharma Springs Publication Journal Home Page: https://pharmasprings.com/fjpms

Synthesis and Assessment of Herbal Lozenges Manufactured from Piper Longum and Eucalyptus Leaves that Contain Volatile Oil

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Article History:

Received on: 25 Aug 2024
Revised on: 19 Sep 2024
Accepted on: 21 Sep 2024

Keywords:

Synthesis,
Assessment,
Herbal,
Lozenges,
Volatile oil

Abstract

The study aims to synthesize and assess Herbal Lozenges Manufactured from Piper Longum and Eucalyptus Leaves that Contain Volatile Oil. A lozenge made from eucalyptus and piper longum extract has been effectively developed to disguise the flavor, release a small amount of medication, and cause microbiological resistance. The product's inhibiting effectiveness against *C.albicans* infections that are not resistant made it a great release chart for such a combination extract of eucalyptus and piper longum. Further research is necessary to thoroughly standardize the mixture for optimal antimicrobial action without endangering another beneficial characteristic of Eucalyptus and Piper longum and to screen different fungi and bacteria from the local environment. Regarding qualities such as weight variation, disintegration time, friability, and Hardness, lozenges are of good quality. Consequently, it can be concluded that these lozenges are an appropriate dosage form for administration and can be used for various conditions. They can be used like tablets with only one extract, as lozenges combine them.

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eISSN: Applied
DOI: https://doi.org/

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INTRODUCTION

Throat infections are the most common disease in today's world. However, it is not taken too seriously by people. Long-term throat infections can lead to severe throat problems like pharyngitis and cancer. Acute sore throat is a symptom often caused by an inflammatory process in the pharynx, tonsils, or nasopharynx. Most of these cases are of viral origin and occur as a part of the common cold [1]. A sore throat is pain, scratchiness, or irritation of the throat that often worsens when you swallow. The most common cause of a sore throat (pharyngitis) is a viral infection, such as a cold or the flu. A sore throat

caused by a virus resolves on its own. Strep throat (streptococcal infection), a less common type of sore throat caused by bacteria, requires antibiotic treatment to prevent complications. Sore throats may be caused by viral infections, Bacterial infections, Irritants, and injuries [2]. Signs and symptoms might include pain or a scratchy sensation in the throat, pain that worsens with swallowing or talking, difficulty swallowing, sore, swollen glands in your neck or jaw, swollen, red tonsils, white patches or pus on your tonsils, hoarse or muffled voice [3].

Common infections causing a sore throat might result in other signs and symptoms, including fever, Cough, Runny nose, Sneezing, Body aches, Headache, Nausea, or vomiting. Conventional treatment of sore throat Anti-inflammatory drugs, Corticosteroids, Antibiotics, and Others [4]. Lozenges are solid preparations containing one or more medicaments, usually in a flavored, sweetened base, intended to dissolve or disintegrate slowly in the mouth. They can be prepared by molding or by compression of sugar-based tablets. Lozenges' development dates back to the 20th century and is still in commercial production. Most lozenge preparations are available as over-the-counter medications. Lozenge provides a palatable means of dosage form administration and enjoys its position in the pharmaceutical market owing to its several advantages [5].

METHODOLOGY

Eucalyptus Volatile Oil Extraction: Eucalyptus leaves were gathered and dried in the shade for a week. The foliage was divided into small pieces (50gm), and distilled water (500ml) was used as the solvent throughout the distillation process, which took three to five hours. Oil recovered from the reservoir was kept in a refrigerator at 2-8^0 C. The extraction process was repeated twice [6].

Volatile oil from *Piper longum* is extracted using 500ml of distilled water as the solvent during the distillation process in a Clevenger apparatus, and fresh *Piper longum* leaves are cut into small pieces. The oil collected from the reservoir was refrigerated to 2-8^{0}C [7].

Lozenge preparation: Volatile oils were accurately weighed and transferred to a beaker, combined with lactose. The medication mixture was added, carefully mixed, and then put through sieve number 60 after Sucrose and mannitol had been measured but also completely pulverized [8]. The gelatin was added to the mixture, and the mixture was triturated to create the necessary mass consistency. On a lozenge board, the bulk was rolled before being trimmed to size. The tablets were dried in a hot air oven [9].

TEST OF EVALUATION

Physical and chemical attributes: Physical stability, color, odor, taste, and other physicochemical characteristics are assessed [10].

Test for weight variation: Individual weights of the ten tablets were recorded, and the average weight of the tablets was calculated by dividing the overall weight by the number of tablets. It was then contrasted with typical monographs [11].

Test of friability: Use a Roche friability at a 25 rpm speed [12].

Time for dissolution: Using the USP dissolving device, the dissolve time was estimated [13].

Lozenge in vitro antimicrobial evaluation: 3 beakers received 25ml of sterile saline solution. Each beaker of beads received three tablets containing a combination of *Piper longum* and Eucalyptus oil [14]. The beakers were then set on a magnetic stirrer. Five minutes, 10 minutes, and 15 minutes later, 1ml of solution were taken out. In sterile test tubes, the samples were kept. Gentamicin standard solution (40 mg/ml) was reduced to 0.6 µg/ml.C. albicans were pipetted into agar plates in 0.1 ml increments and hardened. A 4mm well was created, and a lozenge solution was added at varied intervals. A regular gentamicin solution was employed as a control. The zone of inhibition is then evaluated after it has been incubated for 24 hours at 37°C [15].

RESULTS AND DISCUSSION

***Piper longum* and eucalyptus volatile oil extraction:** Eucalyptus oil and *Piper longum* oil were extracted using the proper solvent and quantity of oil following the formula's instructions.

Formulation creation: 50-lozenge trial batches took place, and the formulas were listed below in Table 1. There were four formulations with eucalyptus oil alone (E1-E4), four formulations with *Piper longum* alone (P1-P4), and four

Table 1 Formulations containing Eucalyptus Volatile oil alone

Ingredients	E1	E2	E3	E4
Extracts of Eucalyptus Volatile oil	1%	2%	3%	4%
Lactose	30 mg	30 mg	30 mg	30 mg
Gelatin	100 mg	75 mg	50 mg	60 mg
Mannitol	200 mg	200 mg	200 mg	200 mg
Sucrose	663 mg	688 mg	713 mg	703 mg
Magnesium stearate	7 mg	7 mg	7 mg	7 mg
Purified water	q.s	q.s	q.s	q.s

Table 2 Formulations containing Piper longum Volatile oil alone

Ingredients	P1	P2	P3	P4
Extracts of *Piper longum* Volatile oil	1%	2%	3%	4%
Lactose	30 mg	30 mg	30 mg	30 mg
Gelatin	100 mg	75 mg	50 mg	60 mg
Mannitol	200 mg	200 mg	200 mg	200 mg
Sucrose	663 mg	688 mg	713 mg	703 mg
Magnesium stearate	7 mg	7 mg	7 mg	7 mg
Purified water	q.s	q.s	q.s	q.s

Table 3 Formulations containing both Eucalyptus and Piper longum Volatile oils

Ingredients	G1	G2	G3	G4
Extracts of Eucalyptus Volatile oil	1%	2%	3%	4%
Extracts of Piper longum Volatile oil	1%	2%	3%	4%
Lactose	30 mg	30 mg	30 mg	30 mg
Gelatin	100 mg	75 mg	50 mg	60 mg
Mannitol	200 mg	200 mg	200 mg	200 mg
Sucrose	663 mg	688 mg	713 mg	703 mg
Magnesium stearate	7 mg	7 mg	7 mg	7 mg
Purified water	q.s	q.s	q.s	q.s

Table 4 Physical Stability Evaluation Test of Formulations containing Eucalyptus Volatile oil alone

Physical Stability	E1	E2	E3	E4
Color	NCC	NCC	NCC	NCC
Odor	NCC	NCC	NCC	NCC
Taste	NCC	NCC	NCC	NCC
Hardness	NCC	NCC	NCC	NCC

NCC – No Characteristic Change

Table 5 Physical Stability Evaluation Test of Formulations containing Piper longum Volatile oil alone

Physical Stability	P1	P2	P3	P4
Color	NCC	NCC	NCC	NCC
Odor	NCC	NCC	NCC	NCC
Taste	NCC	NCC	NCC	NCC
Hardness	NCC	NCC	NCC	NCC

NCC – No Characteristic Change

Table 6 Physical Stability Formulation evaluation tests that include both Eucalyptus and Piper longum Volatile oils

Physical Stability	G1	G2	G3	G4
Color	NCC	NCC	NCC	NCC
Odor	NCC	NCC	NCC	NCC
Taste	NCC	NCC	NCC	NCC
Hardness	NCC	NCC	NCC	NCC

NCC – No Characteristic Change

Table 7 Assessment of Eucalyptus-containing Formulations Volatile oil alone

Evaluation Test	E1	E2	E3	E4
Hardness	5	6	4	5
Weight variation	Fail	Pass	Pass	Pass
Friability	1.3	1.2	0.4974	0.6478
Dissolution time	11 min	12 min	11 min	14 min
Antimicrobial evaluation	-	12 mm	16 mm	21mm

Table 8 Evaluation Test of Formulations containing Piper Longum Volatile Oil Alone

Evaluation Test	P1	P2	P3	P4
Hardness	4	6	4	5
Weight variation	Fail	Fail	Pass	Pass
Friability	1.5	1.3	0.5964	0.5247
Dissolution time	12 min	13 min	13 min	15 min
Antimicrobial evaluation	-	11 mm	14 mm	16 mm

Table 9 Analytical test of formulations with Eucalyptus as well as Piper longum Volatile oils

Evaluation Test	G1	G2	G3	G4
Hardness	5	5	5	5
Weight variation	Fail	Pass	Pass	Pass
Friability	1.1	1.2	0.5374	0.5465
Dissolution time	14 min	14 min	11 min	15 min
Antimicrobial evaluation	12 mm	12 mm	21 mm	23 mm

E4, P4, and G4 were identified as the best formulations based on the evaluation criteria, and this formulation was utilized for the scale-up batch.

Table 10 Formula for Scale-up Batch

Ingredients	E4	P4	G4
Extracts of Eucalyptus Volatile oil	4%	4%	4%
Extracts of *Piper longum* Volatile oil	4%	4%	4%
Lactose	30 mg	30 mg	30 mg
Gelatin	60 mg	60 mg	60 mg
Mannitol	200 mg	200 mg	200 mg
Sucrose	703 mg	703 mg	703 mg
Magnesium stearate	7 mg	7 mg	7 mg
Purified water	q.s	q.s	q.s

formulations with both eucalyptus oil and *Piper longum* (G1-G4).

A lozenge manufactured from Eucalyptus and *Piper longum* extract masks the flavor, releases a tiny amount of medication, and causes antimicrobial action. The product served as a

Table 11 Physical Stability Studies for Scale-up Batch

Physical Stability	E4	P4	G4
Color	NCC	NCC	NCC
Odor	NCC	NCC	NCC
Taste	NCC	NCC	NCC
Hardness	NCC	NCC	NCC

NCC – No Characteristic Change

Table 12 Evaluation Tests for Scale-up Batch

Evaluation Test	E4	P4	G4
Hardness	5	5	5
Weight variation	Pass	Pass	Pass
Friability	0.6478	0.5247	0.5465
Dissolution time	14 min	15 min	15 min
Antimicrobial evaluation	21mm	16 mm	23 mm

highly efficient release schedule for such combined Eucalyptus and *Piper longum* extract due to its inhibitory efficiency against non-resistant C.albicans infections. It will take more investigation to properly standardize the mixture for the best antimicrobial effect without sacrificing the other good qualities of both eucalyptus and piper longum and to screen various fungi and bacteria from the local environment. The lozenges are excellent in hardness and weight measurement. Still, as a result, it might be said that these lozenges are a suitable dose form for administration and effective for several ailments. They can be used as single-extract lozenges or lozenges that combine both extracts.

CONCLUSION

A lozenge made from Eucalyptus and *Piper longum* extract has been effectively developed to disguise the flavor, release a small amount of medication, and cause microbiological resistance. The product's inhibiting effectiveness against *C.albicans* infections that are not resistant made it a great release chart for such a combination extract of Eucalyptus and. Further *piper longum* research is necessary to thoroughly standardize the mixture for optimal antimicrobial action without endangering other beneficial characteristics of Eucalyptus and *Piper longum* and to screen different fungi and bacteria from the local environment. Regarding qualities such as weight variation, disintegration time, friability, and Hardness, lozenges are of good quality. Consequently, it can be concluded that these lozenges are an appropriate dosage form for administration and can be used for various conditions. They can be used like tablets with only one extract as lozenges combining those extracts.

Acknowledgment

I want to thank the Principal and management of Ratnam Institute of Pharmacy, Pidathapolur (V & P), Muthukur (M), and SPSR Nellore District for their constant support.

Funding Support: The Author declares that there is no funding.

Conflict of Interest: The Author declares that there is no conflict of interest.

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