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Formulation & development of gel using herbal extract of clove

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Abstract
Mouth ulcer it's a common inflammatory condition of oral mucosa that can cause signification discomfort and pain, affecting daily activity such as eating and speaking. Conventional treating often involve corticosteroids and antiseptics, which may leads to adverse effect with prolonged use[(1)].this study aims to develop and evaluate herbal gel formulation incorporating Aloe and Clove for effective management of mouth ulcer.
Aloe is well known soothing, anti-inflammatory and wound healing properties due to its rich content of polysaccharides, glycoproteins and antioxidant and Clove is rich of eugenol, exhibit potent antimicrobial, analgesic, and anti-inflammatory.
Herbal gel to treat mouth ulcer should be stable, effective, providing synergic effect of both aloe and clove extract. This project focused on the preparation of a mouth ulcer healing gel because better culture, acceptability, better compatibility, with human body and less side effect.

Keywords: Herbal gel, mouth ulcer treatment, clove, aloe, anti-inflammatory, analgesic, soothing properties

Introduction
The herbal formulation hold significance promise in treatment of ulcers topical application for oral ulcer is more established area due to direct accessibility to affected area. The herbal antiulcer gel consist of properties and work in following mechanisms; anti-inflammatory action, anti-microbial action and antioxidant, cyprotective action and wound healing property analgesic mechanism.

Advantage of herbal anti-ulcer gel
1. Localized and targeted action of gel allow direct application if active herbal ingredient of ulcerated area,
2. Maximizing their concentration at site of action and minimizing systematic exposure and exposing side effect.
3. Enhance patient compliance: Gel are generally non greesy, non-staining and easy to apply.
4. More cosmetically and leading to better adherence to the treatment regiment compound to some other dosage forms.
5. Soothing and cooling effect of aloe helps to subdue pain.

Cause of mouth ulcer [1]
1. Injury caused by accidental bitting of tongue or cheeks.
2. Acidic fruits, spicy food makes more prone to mouth ulcer.
3. Vitamin B12, folate and iron deficiency linked to mouth ulcer.
4. Stress and acid reflux can also cause mouth ulcer. Underlying medical condition and weakened immune system is can become cause.
5. Infection caused by bacteria, fungi and virus can also cause mouth lesions.

2. Information about ingredient [2]
2.1 clove: synonym: clove bud
Biological source: Clove consist of dried flower bud of *Eugenia carryophyllus* belonging to family *myrtaceae*.

Chemical constituent: 14-21% of volatile oil, presence of eugenol, acetyl eugenol, gallotannic acid alpha and beta caryophyllene, 60-90% eugenol which is cause of anaesthesic and antiseptic properties.

Use: clove have antiseptic, stimulant, carminative and flavouring action.it also used as anodyne, antiemetic. Dentist use clove oil as anaesthetic agent to disinfect the root canals. Clove exhibit broad spectrum antimicrobial properties against fungi and bacteria.

2.2. Aloe: Synonym: kumari

- **Biological source:** Aloe is fresh juice collected by incision from the bases of leaves *aloe barbadensis, aloe vera* belonging to family *liliaceae.*
- **Chemical constituent:** Most important constituent of aloe are aloin, barbaloin, beta barbaloin and isobarbaloin, aloe emodine.
- **Uses**: aloe is one of the safest and stimulant purgative in higher dose may act as abortifacient. extract of aloe have antibacterial activity the clear gel of leaf make an excellent treatment for wounds, burn, placing protective coat on over affected area, speeding the rate of healing and reducing risk of infection. The gel produce soothing effect on all sort of burns and lesions.

3. Material and Methods

Sr. No	Instrument
1.	Soxhlet apparatus
2.	Weighing Balance
3.	Brookfield viscometer
4.	Franz diffusion apparatus

4. Experimentral

4.1. Extraction of clove by Soxhlet apparatus [3, 4]

The extraction technique used to extract clove buds. This method involve placing ground clove into thimble and then placing thimble in soxhlet apparatus. The solvent used in process is ethanol to extract desired compound from clove bud. The process involve

1. **Preparation:** Take 20 mg of clove grind them into fine powder. Wrap the clove into filter paper placed into thimble.
2. **Soxhlet apparatus:** The thimble placed on soxhlet apparatus, which has a solvent reservoir at the bottom and extraction chamber above.
3. **Solvent extraction:** A solventethanol 100ml added to reservoir. The solvent is heated and vaporized. The vapour rises and condense into extraction chamber, dripping into clove placed in thimble. The solvent dissolve desired compound from clove.
4. **Solvent evaporation:** The solvent along with dissolved compound and drain back into reservoir the process repeated several times FOR 5 HOURS, extracting more and more compound. The obtained solvent is evaporated afterward but here it used as preservative for herbal gel.

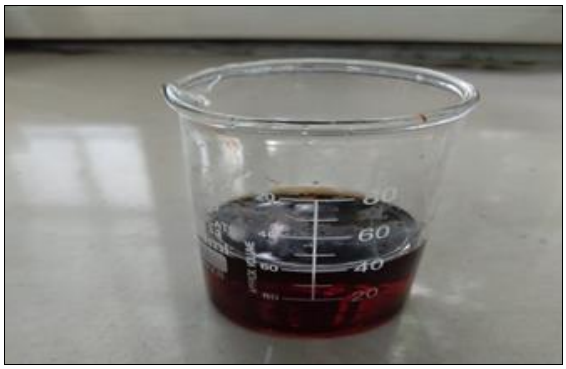

Fig 1: clove extract

4.2. Formula of herbal gel

Ingredient	Quantity	Uses
Aloe vare extract	20 ml	placing a protective coat over the affected area, speeding up the rate of healing and reducing the risk of infection
Clove extract with solvent ethanol	5 ml	Clove is used as an antiseptic, stimulant, carminative, aromatic, and as a flavouring agent.
Carbapol 934	1 gm	Gelling agent

4.3 Preparation of aloe gel solution

1. Take fresh aloe leaves. Wash aloe leaves
2. Remove extract by cutting leaves and remove outer skin.
3. Take aloe extract and blend it either by mixer or by trituration. Aloe gel is prepared.

Fig 2: fresh aloe gel

4.4 Preparation of herbal mouth ulcer gel

Gel preparation

Dispersion method

Gelling agent dispersed in water with stirring at 1200 rpm for 30 min. Drug was dissolved in non-aqueous solvent with preservative. This solution was added gel with continuous stirring.

Procedure

1. Take 6mg of carbopol add aloe gel solution until the volume reaches to
2. 5ml.saparate in two beaker quantity of 5 ml add extract slowely and stir it well
3. Keep in cool temperature to prevent thermal degradation of gel.
4. Taken viscosity readings by Brookfield viscometer.

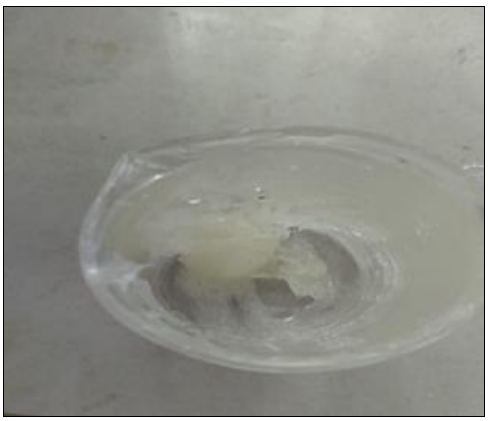

Fig 3: Aloe and carbopol gel

Fig 4: Addition of 5 ml clove extract

Fig 5: Herbal gel of aloe and clove

5. Result

5.1 Clove extract

wt of empty beaker+ clove extract-wt of empty beaker

Where;

wt of empty beaker+ clove extract=81.40 gm,

wt of empty beaker=49.43 gm, =81.40 gm-49.43 gm =31.97 gm; obtained clove extract =31.97 gm

5.2. Chemical test for clove [2]

Test	Observation	Result
Mayer's Test	White precipitate	alkaloid present
Dragendorff's Test	orange-white precipitate	alkaloid present

5.3. Chemical Tests for aloe [2]

Test	Observation	Result
Borax Test:	green coloured fluorescence turned yellow	Presence of aloe-emodin anthranol.
Bromine Test:	bulky yellow precipitate	presence of tetrabromaloin

5.4. A spreadability test [5]

$S = M \times L / T,$

Where, S = Spreadability, M = Weight in the pan (tied to the upper slide),

L = Length moved by the glass slide

T = Time in sec, required to separate slide completely from each other

CALCULATION; S = M × L / T = 50* 5.5 / 15 sec = 18.33 g cm/ cm

5.5 pH Measurement

pH paper determine gel pH lies in between 5-6.8,ideal for oral application.

5.6. Visual Appearance

Color	Orangish white colour
clarity	Homogenous and clear
texture	Viscous gelly

Fig 6: Herbal gel of aloe and clove

5.7 Gel viscosity: spindle 64

Speed of Spindle 64 (rpm)	Viscosity (Pas)
100 rpm	4083
60rpm	5249
50rpm	5580
30rpm	7860
20rpm	11970

5.8 *In-vitro* drug diffusion study [9]

Diffusion study are performed by franz apparatus and absorbance measured under UV-Visible spectroscopy it observed that as concentraction increases the absorbance also increased.

Concentration(ug/ml)	Absorbance
0	0
2	0.2451
4	0.3231
6	0.5697
10	0.7562
11	0.8034
12	0.9254

6. Conclusion

Herbal gels offer a promising, natural approach for managing mouth ulcers, with some formulations showing potential for effective relief and faster healing. The use of synergistic herbal ingredients can target the underlying causes and symptoms of ulcers, making them a viable alternative to conventional medications.

Clove have good antimicrobial activity, anti-inflammatory activity and aloe is good combination which used to provide neutral pH to mouth its colling property plays essential effect foe healing. Herbal formulation of clove and aloe vera with gelling agent carbapol is prepared and evaluated.

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