



FORMULATION OF GARLIC GEL: USED AS A NATURAL HEALER IN TONGUE ULCER

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ABSTRACT

Garlic is the plant of the (Allium) Onion Family. Garlic is commonly conditions which are related to Heart and Blood System. Garlic is also rich in Sulphur which denotes is Antibiotic Properties which helps in improving the digestive system. Fresh Garlic, Garlic Oil and Garlic Powder is commonly used to Flavour foods whereas, Garlic Dietary supplements are sold as tablets or capsules. Garlic Gel is also used to treat tongue ulcers. Garlic is also applied to the skin or to treat skin and fungal infections and when Garlic is administered orally it treats the High Blood Pressure Problems. There Active component of the garlic is Allicin. If more the amount of allicin is present in the garlic, more the potent garlic is. Actual aim of this article was to compile the data of the effect of garlic gel on the tongue ulcer reported earlier by some researchers and also to choose a suitable formulation with various compositions and their preparations.

Keywords: Garlic Gel, Therapeutic formulation, Tongue Ulcer, Herbal Gel, Gel Formulation.

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INTRODUCTION

Majority of the population feel unaffordable for the products of western pharmaceutical industries and thus exert reliance over the traditional medicines belonging to the botanical origins. Although the developing countries have been estimated to spend 40-50 % of total budget on drugs and health care, 75% of the 3rd world population utilize plant drugs as the modern life saving entities are inaccessible to them. Consequently, strategic developments have been focusing on to reduction in financial burden on developing countries by encouraging the use of herbal remedies which would be creating novel future therapeutic arena.^[1]

Ayurvedic system of medicines utilize plants possessing biologically potential molecules giving rise to lead structures from which modified effective molecules can be derived to exert significant therapeutic roles with reduce toxic parameters.

Vinblastine, vincristine, taxol, podophyllotoxin, camptothecin, digitoxigenin, gitoxigenin, digoxigenin, tubocurarine, morphine, codeine, aspirin, atropine, pilocarpine, capscicine, allicin, curcumin, artemesinin and ephedrine are potentially known compounds obtained from herbal origins.

Isolation and identification of active constituents, elucidation of their molecular characteristics and establishing the mechanisms of actions, have become relevant in inviting the attention of personnel involved in herbal formulations and researches.

When the active molecules are difficult to get synthesized economically, the plant resources become more important to be cultivated from where such effective molecules can be isolated and used therapeutically.

GARLIC AND ITS MEDICINAL BACKGROUND

Garlic (*Allium sativum* L.) is regarded as a plant which was exhaustively investigated for its medicinal values over several decades and being used against infectious diseases. It has been used as food ingredient in cooking due to its own characteristic aroma, enhancing flavor, condiment, protective and digestive properties. Besides, it has been used as folk medicine also. The medicinal potency of garlic was established and is well known to the people since 1500 BC.

Greek physicians, Hippocrates and Galen had mentioned its use in the treatment of GIT disorders while ancient Japanese and Chinese had been utilizing it for headache, flu, sore throat and fever treatments.⁷

Nigerian peoples have been using garlic for the treatment of diarrhea abdominal disorders and infections of respiratory tract. In Indian subcontinent, people have been using garlic in various conditions i.e. common cold, hay fever, asthma, as antimicrobial agent and to relieve from traumatic inflammation as well as for wound healing.^[1]

PLANT PROFILE

GARLIC

Garlic occurs as fresh or dried bulbs of *Allium Sativum* possessing composite nature. It belongs to the family Lilliaceae.^[2]

Table 1: Plant Profile of Garlic [3]

| | |
|------------------------------|--|
| Synonyms | Rasona, Yavanesta, Garlic, Lasan, Lassun, Lahasun, Lahsan, Seer, Ajo |
| Chemical constituents | Allin, allicin, 2 mercapto-Lcysteins, anthocyanins, glycosides of kaempferol and quercetin, polysaccharides, 6Sllinase, sterols, hydrocarbons, sativin I & II, scordinines A & B; Essential oil etc. Allicin is reported as the most important biologically active compound, responsible for the characteristic odor and flavor of fresh garlic. |
| Uses | Garlic has been reported to possess antioxidant, antihyperlipidemic, antiatherosclerotic, fibrinolytic, platelet inhibiting, anticancer, hypoglycemic, antimicrobial, antirheumatic and antispasmodic potentials |

NUTRITIONAL VALUES AND PROPERTIES OF GARLIC**Table 2: Nutritive Value of Garlic** [4]

| Properties | Values |
|---------------------|---------------|
| Energy | 119 kcal |
| Moisture | 70% |
| Protein | 4.3 g |
| Carbohydrate | 24.3 g |
| Fiber | 1.2 g |
| Fat | 0.23 g |
| PH | 6.05 g |
| Acidity | 0.172 g |

Oral Drug Delivery Systems:

Oral drug delivery is the most ancient and utmost utilized practice since the time unmemorable to the public of present arena. It surpasses all other routes of drug administration. The wide acceptability and higher popularity is pertaining to the ease of administration and patient compliance.

Anatomical and Physiological Features of Oral Mucosa

The buccal surface constitutes one third of total area of the oral cavity (100 cm²). It is lined with layer of epithelial cells (0.5 mm thickness). Oral epithelium has two distinct regions i.e. keratinized and non-keratinized which differ from each other with reference to cellular lipid composition. [5]

Oral Permeability:

The permeability of buccal mucosa is around 4000 times higher than the skin itself. Sublingual permeability is the highest while the palatal permeability lies at the lowest magnitude intermediating the buccal type.

Characteristics of Topical Oral Formulations: [6]

The formulations, intended for local action at any specific area of the oral cavity, must be designed to overcome the following limitations:

1. Salivary secretion and mechanical stress bringing about rapid loss of the applied drug (dosage form) from the site of absorption.
2. Non-uniform distribution of drug released by the delivery system in the saliva resulting in some of the areas of the oral cavity receiving least or no concentration of drug.
3. Non-agreeable taste and consequent oral sensation, associated with the incorporated drug leading to reduced patient compliance.
4. Comparative permeability of mucosal tissue (oral) and obstacle offered by certain regions of the mucosa retarding the drug absorption rate.

Mucoadhesive Dosage Forms:

Mucoadhesion is commonly defined as the adhesion between two materials, at least one of which is a mucosal surface. Mucoadhesive dosage forms also prolong the residence time of the dosage form at the site of application.

Advantages of Oral Mucoadhesive Drug Delivery System: [7]

1. Enhances the residence time
2. Enhances absorption determining drug efficacy
3. Excellent accessibility
4. Faster absorption attributed to rich blood supply and circulation rates
5. Increased drug bioavailability
6. Surpassing GIT degradation
7. Easy drug administration
8. Rapid onset of action
9. Apparent patient compliances.

Adhesive Semisolid Systems (Gels, Ointments): [8]

According to U.S.P., gels have been defined as a semisolid dispersion system containing inorganic particles (smaller size) or organic molecules (large size) which may either enclosed the liquid molecules or may get interpenetrated by the molecules of continuous phase liquid. Semisolid dosage forms i.e. gels or ointments can be easily dispersed throughout the oral mucosal surface and attach intimately to the mucosal membrane inducing faster release of the medicament despite the fact that the drug dosing is not accurate as compared to the other oral dosage forms i.e. tablets, films, patches etc.

Bioadhesive formulations have overcome the lower retention time of the applied gels. However the residence time of gels is lesser as the body fluids i.e. saliva wipes them from the functional site. Consequently the drugs with narrow therapeutic window have got limited utility.

TONGUE ULCERS

Oral ulcers are sores or open lesions in the mouth or tongue which are caused by various disorders. Lesions are less common on the heavily keratinized palate or gingiva. In mild recurrent aphthous ulcers (tongue ulcers), the lesions reach a size of 0.3 to 1 cm and begin healing within a week.

Types of Oral Ulcers:^[9]

1. Minor aphthous ulcers
2. Major aphthous ulcers
3. Herpetiform ulcers

Causes of Tongue Ulcers:^[11]

The reasons for development of oral ulcers have not been established and may be attributed to one or more causative factors such as:^[10]

1. Disturbed immune system Injury
2. Hormonal changes
3. A lack of iron
4. Certain vitamins deficiency
5. Food hypersensitivity
6. Allergy
7. Genetic factors
8. Stress/anxiety
9. Tobacco consumption
10. Medications

Table 3: Management and Treatment of Tongue Ulcer^[12]

| S. No | Category | Drugs and Formulation |
|-------|---|---|
| 1 | Antiseptic, antiinflammatory and analgesic drugs | Chlorhexidine mouth rinse or gel 3x1, triclosan gel 3x1; topical diclofenac %3 3x1; Amlexanox %5 2-4 x1 |
| 2 | Antibiotics | Tetracycline, Cephalexin, Azithromycin susp |
| 3 | Hyaluronic acid | 0.2% gel 2 x1 |
| 4 | Topical anesthetics | Topical lidocaine % 2-5, mepivacaine % 1.5, Tetracaine % 0.5-1 spray or gel, mouth wash solution containing Benzocaine and Cetylpyridinium chloride |
| 6 | Corticosteroids | Prednisolone or Prednison equivalents 10-30 mg / day 1-2 months |
| 7 | Essential Elements | Zinc sulphate (150 mg / day), vitamin B12, iron, folic acid replacement |
| 8 | Immunomodulators: | Thalidomide 50-100 mg / day, Levamisole 150 mg 3 times a week, 6 months |

Actual aim of this article was to compile the data of the effect of garlic gel on the tongue ulcer reported earlier by some researchers and also to choose a suitable formulation with various compositions and their preparations.

MATERIALS & METHODS:**Composition of formulated garlic gel:****Table 4: Formulation design of garlic gel**^[13]

| INGREDIENTS | QUANTITY |
|---|----------|
| Garlic freezeed powder (extracted) | 1.5 gm |
| Carbapol | 2 gm |
| Polyethylene Glycol | 1.5 gm |
| Glycerol | 1 gm |
| Sodium Benzoate | 1% w/w |
| Clove Oil | 5 drops |
| Purified Water | 100 ml |

Method for Preparation of Garlic Gel:

About 2 g of gelling agent (carbopol) was taken and it was dispersed in 100 ml of purified water with heating and with the help of continuously stirring at magnetic stirrer followed by mechanical stirrer. Required quantity of polyethylene glycol and menthol crystals were dissolved in this gelling solution. The solution was cooled and mixed with glycerol. Later on, required quantity of freeze dried extract and sodium benzoate were mixed. Characteristic odour of garlic masked with clove oil. Finally, the gel mass was homogenized with the help of homogenizer. The pH adjustment was performed using sodium hydroxide solution and it was measured.^[14]

RESULTS AND DISCUSSION:

Garlic Gel exerts beneficial effects on prevention the tongue ulcer. Garlic taken orally (by mouth) has been used in in treating high blood pressure, coronary artery disease (hardened arteries), stomach cancer, colon cancer or rectal cancer, and in preventing tick bites. Garlic applied to the skin may also be possibly effective in treating fungal skin infections such as ringworm, jock itch, or athlete's foot.

CONCLUSION:

A Garlic Gel is used as a natural healer for treating the tongue ulcer. By the formulation a herbal gel is prepared which can be used in our daily life for preventing the tongue ulcers. Also Garlic is used in treating various diseases such as fungal infections, hypertension and in cancer.

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