

Formulation and Evaluation of Pharmaceutical Aqueous Gel of Powdered Guava Leaves for Mouth Ulcer Treatment

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Abstract: *The objectives of present investigation were to formulate and evaluate herbal gel for mouth ulcer treatment of dried powdered guava leaves. Herbal gel was prepared by using different concentration of powdered guava leaves and Carbopol 934, Propylene glycol as a gel base. Formulations were evaluated for various parameters Infrared spectroscopy revealed that there was no interaction between powdered Guava leaves and Polymer. The formulated gel was transparent, homogeneous and pH ranges from 7 to 7.5. Formulation showed acceptable rheological behaviour with applicable Spreadability and Extrudability properties. Anti-fungal studies of formulations showed excellent efficacy against *Aspargiliousaureus*, *Candida albicans*. From the experimental evidence of invitro studies it was observed that powdered guava leaves contain flavonoids so it showed significant antioxidant effect. Developed herbal formulation was stable, safe and effective over to synthetic formulations for the treatment of mouth ulcer..*

Keywords: Psidium guajava Linn; Leaf powder, Herbal gel , Mouth ulcer

I. INTRODUCTION

Gels are typically semi-solid formulations having a liquid phase that has been thickened with other components. Uses of topical gel preparations are for skin application or percutaneous penetration of medicament or local action to certain mucosal surfaces (Singh, 2014). A mouth ulcer is a break or breach in the mucous membrane, which is lines the inside of the mouth. It usually has yellow or white colour and usually looks like a depression in mouth that is the mucous membrane (Dosani, 2011).

The Commercially available gels containing synthetic and semi synthetic active agents which have several disadvantages like staining on the teeth, irritation, and burning sensation only because presence of high degree of alcohol content and some organic compounds. The present investigation deals with use of herbal powdered Guava Leaves in the treatment of mouth ulcer in pharmaceutical gel.

Commonly known as guava, Peru, Ambrud. A biological source is *Psidiumguajava* belongings to family Myrtaceae. Chemical composition contains Flavonoids, Triterpinoids, Steroids, Carbohydrates, Oils, Lipids, Glycosides, Alkaloids, Tannins and Saponins. Used as Antioxidant, Antibacterial activity, Anti-inflammatory activity, Anticancer activity (Wang, 2014). Importance of herbal medicine has both medicinal and economical. Although herbal medicines has benefits to increased, their safety, efficiency, Quality and importance of industrialized and developing countries. Herbal medicines are getting increasing patient compliance as they are avoiding typical side effects of allopathic medicines. It is no wonder that the world's one-fourth population i.e. 1.42 billion people, are dependent on traditional medicines for the treatment of various diseases. Medicinal plants have been a major source of cure for human diseases since time immemorial. Recently considerable attention has been paid to utilize bio-friendly and eco-friendly plant based products for the cure and prevention of different diseases, so it is documented that most of the World's population has taken in traditional medicine. The India offers a variety of plants having medicinal properties. Medicinal plants can be use to find out effective alternative to synthetic drugs (Jadhav, 2015). The use of the medicinal plant based medication is gradually becoming popular throughout the world. Near about half of the world's, twenty five bestselling pharmaceutical innovator agents are derived from natural products (Das, 2011). The use of medicinal plants as raw materials in the preparation of new drugs is ever increasing because of their potentials and the problem of drug

resistance in micro-organisms. Demand for medicinal plants is increasing in both developed and developing countries. Research on herbal medicinal plants is one of the leading areas of research globally (Dwivedi, 2012). Herbal formulations have now a day’s undergone more thorough investigation for their potential in preventing and cure oral disease (Silva, 2012). Herbs have long been used traditionally for routine cleaning of teeth and dental disease and to treat various oral diseases (Deepa, 2011). Oral diseases like oral cancer, dental caries and periodontal diseases among the most important oral health problems. There is a well-established link between the activities of microbial species that form part of the micro biota of the oral cavity and oral diseases. The big need for alternative treatment, products and prevention options for oral diseases that are safe, economical and effective comes from the rise in disease incidence particularly in developing countries, increased resistance by pathogenic bacteria to currently used chemotherapeutics and antibiotics opportunistic infections in immunocompromized individuals and financial that is economical considerations in developing countries. Moreover, allopathic medicine is too expensive and capital intensive for a developing country like India and has only limited success in the prevention and treatment of oral diseases and periodontal disease. Hence, the plant extracts used in traditional medicine and alternative products continues are considered as good alternatives to synthetic and organic medicine (Nagi, 2015)&(Jose, 2011). The present investigation deals with use of herbal Guava Leaves in treatment of mouth ulcer in pharmaceutical gel.

II. MATERIALS AND METHODS

The fresh plant materials of Psidiumguajava were collected from local area from Agricultural farmhouse (Belhe. Pune, district). Fresh plant leaves were washed under running distilled water as well as tap water and shade drying was carried out. All other ingredients was provided by Samarth Institute of Pharmacy , Belhe.

2.1 Preparation of herbal Gel:



Specified amount of Carbopol 934 was dispersed in required amount of distilled water with continuous stirring. 5 ml of distilled water was taken and required quantity of methyl paraben and propyl paraben were dissolved by heating on water bath after cooling propylene glycol was added. Further varying concentration of Psidiumguajava powder was mixed to the above mixture and volume was made up to 20 ml with distilled water. Finally full mixed ingredients were mixed properly to the Carbopol 934 gel with continuous stirring and triethanolamine was added drop wise to the formulation for adjustment of required pH (6.8-7) (Das, 2010).

The composition of herbal gel prepared from the powdered guava leaves is tabulated in Table1.

Table 1

Ingredients	Quantity
Guava leaves powder	2%
Carbopol 934	2%
Methyl paraben	0.0015%
Propyl paraben	0.01%
Triethanolamine	QS
Propylene glycol	QS
Distilled water	Upto 20 ml

2.1 Evaluation of Herbal Gel

- **Physical Appearance:** Physical parameters such as appearance and colour were checked.
- **Measurement of pH:** The pH of herbal gel formulations were determined by using digital pH meter. 1 gm of gel was taken and dispersed in 10 ml of distilled water and keep aside for two hours. The measurement of pH of formulation was carried out in three times and the average values are reported (Sanghavi, 1989). pH of gel formulation was reported in table no 2.
- **Homogeneity:** All developed gel formulations were tested for homogeneity by visual inspection after the gels have been set in to the container. They were tested for their presence and appearance of any aggregates (Gupta, 2010). Homogeneity of gel formulation was reported in table no 2.
- **Spreadability:** Spreadability was determined by glass slide and wooden block apparatus. Weights about 20 gm were added to the pan and the time were noted for upper slide to move to separate completely from the fixed slide (Shivhare, 2009). An excess amount of gel 2 gm under study was placed on this ground slide. The gel was then sandwiched between this slide and another glass slide having the fixed ground slide and there is provided with the hook. A 1 kg weighted was placed on the top of the slides for 5 minutes to provide a uniform film of the gel and remove air between the slides. Excess of the gel was removed off from the edges. The top plate was then subjected to pull with the help of string attached to the hook and the time in seconds required by the top slide to cover a distance of 7.5 cm be noted. A shorter or less interval indicates better Spreadability. Spreadability of gel was calculated using the following formula (Pawar, 2013). Spreadability of gel was reported in table no 2.

$$S = M \times L / T$$

Where, S = Spreadability,

M = Weight in the pan which is tied to the upper slide,

L = Length moved by the glass slide

T = Time in second taken to separate the slide completely each other.

- **Viscosity:** Viscosity was determined by using Brookfield viscometer. Formulated gels were tested for their rheological behaviors at 250C. The measurement was made over range of speed from 10rpm to 100rpm with 30seconds between 2 successive speeds and then in a reverse orders (Bhramaramba, 2015).
- **Extrudability:** The gel formulations were filled in standard capped collapsible aluminium tubes and sealed to the end. The extrudability was determined by pressing of the thumb. The result is reported into table no.2.

Table 2

Formulation quantity	Physical appearance	PH	Homogeneity	Spreadability (gm.cm/sec)	Viscosity	Extrudability
2%	Greenish	6.8±0.9	Good	5.30 ± 0.1	3.111 ± 0.004	Good

- **Clarity:** The clarity of all the three batches was determined by visual inspection (Pandey, 2011).
- **Gel strength:** Gel strength was determined by the time in seconds required by the weight to penetrate in the gel. A Sample amount of 5 gm of each of the optimize batches was taken and 3.5 gm weight was placed on the surface of gel. The time in seconds required by the weight to penetrate 0.5 cm in the gel. The gel strength was then reported in table no 3.

Table 3

Bioadhesive strength (dyne/cm ²)	Gelling Strength (Sec)	Stability study for 1 Month
4322.22 ± 18.82	42±0.75	Open container -Not stable Closed container- Stable

Antifungal Activity: The antifungal activity of all developed batches of formulation and without drug containing gel formulation i.e. blank formulation were carried out by Cup-plate method in comparison with marketed antifungal formulation (Zolef cream). There are two different bacteria cultures used were *Aspargillousaureus* & *Candida Albicans*.

III. CONCLUSION

The data presented in this study, it was demonstrated that the developed herbal gel formulation possess significant, therapeutically efficacious, suitable vehicle for drug delivery in low cost but definitely with high potential. Developed new herbal gel formulation is suitable for mouth ulcer treatment.

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