

DYNAMIC FORMULATION OF MOUTH ULCER GEL BY USING SAPODILLA LEAF EXTRACT : REVIEW

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Abstract

Ulcers are an open sore of the skin or mucus membrane characterized by sloughing of inflamed dead tissue. Ulcers are lesions on the surface of the skin or a mucosa characterized by a superficial loss of tissue. Ulcers are commonest on the skin of the lower extremities and within the canal, although they'll be encountered at almost any site. There are many sorts of ulcer like mouth ulcer, esophagus ulcer, ulceration, and genital ulcer. of those ulcer is seen among many folks. The peptic ulcers are erosion of lining of stomach or the duodenum. the 2 commonest kinds of ulceration are called "gastric ulcer". The name refers to the positioning of ulceration. someone may have both gastric and duodenal ulcers at the identical time. Gastric ulcers are located within the stomach, characterized by pain; ulcers are common in older cohort. Eating may increase pain instead of relieve pain. Other symptoms may include nausea, vomiting, and weight loss. Although patients with gastric ulcers have normal or diminished acid production, yet ulcers may occur even in complete absence of acid. Duodenal ulcers are found at the start of gut and are characterized by severe pain with burning sensation in upper abdomen that awakens patients from sleep.

Keyword: Anti-Ulcer, β - carotene, Manikara zopata leaf.

1.INTRODUCTION

The pathophysiology of peptic ulceration disease involves an imbalance between offensive (acid, pepsin, and Helicobacter pylori) and defensive factors (mucin, prostaglandin, bicarbonate, gas, and growth factors). Peptic ulcers are once believed to be caused by spicy food and stress; these are found merely to be

aggravating factors and therefore the real causes are found by research to incorporate bacterial infection (Helicobacter pylori) or reaction to numerous medications, particularly NSAIDS (nonsteroidal anti-inflammatory drugs). Helicobacter pylori, NSAIDS drugs, emotional stress, drug abuse, and smoking are the principal etiological factors related to ulcer. The Gram-negative bacterium Helicobacter pylori remains present between the mucous layer and also the gastric epithelium and is strategically designed to measure within the aggressive environment of the stomach. Initially, Helicobacter pylori resides within the antrum but over time migrates toward the more proximal segments of the stomach. Peptic ulcer is one in all the planet's major gastrointestinal disorders and affecting 10% of the world population. About 19 out of 20 peptic ulcers are duodenal. An estimated 15000 deaths occur annually as a consequence of ulcer. Annual incidence estimates of ulceration hemorrhage and perforation were 19.4–57 and 3.8–14 per 100,000 individuals, respectively. the typical 7-day recurrence of hemorrhage was 13.9% and therefore the average long-term recurrence of perforation was 12.2%. within the Indian pharmaceutical industry, antacids and antiulcer drugs share 6.2 billion rupees and occupy 4.3% of the market share. In this era also 75–80% of the planet populations still use herbal medicine mainly in developing countries, for primary health care due to better cultural acceptability, better compatibility with the anatomy, and lesser side effects. Histological studies revealed that these medicinal plants failed to show any acute toxicity. Present study was conducted to review medicinal plants considered as gastroprotective and healing agents on ulcers in ayurvedic resources and beside that to assemble evidence for his or her effectiveness and biological mechanisms in modern investigation. Many varieties of adverse reactions induced by drug medications within the mouth are now well recognized

Among these, the foremost frequent are waterlessness (hyposalivation), dysgeusia, and stomatitis. Stomatitis could be a general term for disturbance of oral epithelial cells and covers several sorts of oral mucosal symptoms. Oral mucosal symptoms caused by drugs is further divided as follows:

- (1) lichenoid reaction/lichen planus;
- (2) ulcers;
- (3) erythema multiforme;
- (4) pigmentation;
- (5) autoimmune vesiculo-bullous disease;
- (6) infections;
- (7) tumors (fibrovascular hyperplasia);
- (8) swellings (angioedema);
- (9) keratosis

This paper focuses on ulcers and/or erosions within the oral fissure induced by pharmacotherapy, with a stress on new drugs for the treatment of chronic diseases like diabetes, heart disease, rheumatoid arthritis and osteoporosis.

1.1 Oral ulcers

Oral ulcers are common symptoms observed within the rima and include traumatic, infective, aphthous, ulceration associated with dermatoses, drug-induced, ulceration as a manifestation of systemic disease, and ulceration thanks to malignancy. When ulcers show typical clinical findings, medical diagnosis could also be easy; however, the exact diagnosis is difficult in most cases, and histopathological diagnosis could also be needed.



Figure 01: Mouth ulcer

1.2 Treatment of drug-induced oral ulceration

Topical steroids are ineffective against these ulcers. If ulcers don't show improvement despite topical steroid treatment for 1-2 weeks, and no signs of malignancy are evident, drug exposures must be carefully checked. If a

medicine is suspected as a reason behind oral ulceration, contact must be made with the prescribing medical doctor to debate the likelihood of different medications or dose reduction. After cessation, change, or dose reduction of the drug, ulcerations may improve in 1-2 weeks. It's further necessary to verify that the drug is absolutely a responsible drug, so restarting the drug is also important, but is incredibly difficult.

2. CASE PRESENTATION

2.1 Case 1

The patient was a 76-year-old woman who presented with ulceration of the left tongue margin. Her medical record revealed articular rheumatism, diabetes, hypertension, and anemia. She had been treated with indomethacin (75 mg/day) to regulate pain from articular rheumatism. Ulceration (20 mm x 14 mm) on the left tongue margin with no induration was observed (Fig. 1). The surface was flat and clean, with no bleeding. The ulcer margin was slightly raised. Clinically, ulcer was suspected, but no improvement was observed after application of a topical steroid. We considered the denture wasn't a cause and instructed the patient to prevent taking indomethacin after consulting together with her physician. The oral ulceration showed re-epithelialization after 2 weeks.



Figure 02: Indomethacin-induced oral ulceration

2.2 Case 2

The patient was a 71-year-old man with oral mucosal ulceration of the bottom of the mouth and a 6-year history of autoimmune disease (RA). Case history included RA, hypertension, prostatic hyperplasia, and cardiac disease. He had been treated with methotrexate

(MTX) at 8 mg/week. Ulceration (22 mm 18 mm) on the left floor of the mouth was seen, showing no induration (Fig. 2). The surface of the ulceration was flat and clean, with no bleeding. Ulceration didn't improve with corticosteroid treatment. We considered the denture wasn't a cause and contacted his physician. After the dose of MTX was reduced from 8 mg/week to 2 mg/week, oral ulceration greatly improved and re-epithelialization was achieved.

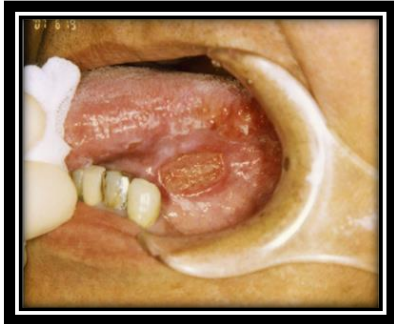


Figure 03: Oral ulceration due to low-dose MTX. Ulceration on the left floor of the mouth with no induration.

The patient was a 77-year-old woman referred with oral ulceration. account included type 2 DM and treatment with DPP-4 inhibitors for 1.5 years. Ulceration (10 mm7 mm) was apparent on the left labial mucosa (Fig. 3). The surface of the ulcer was flat and clean, with no bleeding or induration. Ulcer margins were slightly raised. because the ulcer remained unimproved despite topical steroid 7.3. Case 3 The patient was a 77-year-old woman referred with oral ulceration. account included type 2 DM and treatment with DPP- 4 inhibitors for 1.5 years. Ulceration (10 mm 7 mm) was apparent on the left labial mucosa (Fig. 3). The surface of the ulcer was flat and clean, with no bleeding or induration. Ulcer margins were slightly raised. because the ulcer remained unimproved despite topical steroid

2.3 Case 3

The patient was an 82-year-old woman who complained of oral ulcerations. She had been treated for osteoporosis with alendronate for five years. Several ulcerations on the lower lip,soft palate, and upper and lower gingiva were observed (Fig. 4). These ulcers showed irregular shape and were covered with pseudomembrane. Autoimmune bullous disease was

clinically suspected, but blood examination showed negative results. We contacted her physician and alendronate was stopped. Ulcerations showed complete epithelialization within 7 days. On questioning, she was found to possess been sucking the tablets instead of swallowing them.



Figure 04: Oral ulcerations induced by incorrect use of alendronate. Several ulcerations on the lower lip, soft palate, and upper and lower gingiva.

2.4 Case 4

The patient was a 77-year-old man who complained of multiple oral ulcers. His anamnesis included heart condition and fibrillation, and he had been treated with several drugs. After changing medication to nicorandil, he noticed multiple oral ulcerations. Multiple ulcers were seen on the bilateral buccal mucosa and bilateral tongue margin (Fig. 5). These ulcers were irregularly shaped and thus the sur- face was covered with pseudomembrane without indura- tion. After contacting his physician, nicorandil was changed to a unique drug. Ulcerations subsequently improved within 2 weeks.



Figure 05: Oral ulcerations due to nicorandil.



Figure 06: Multiple ulcers on bilateral buccal mucosa and bilateral tongue margins.

3. COSMETIC VALUE OF SAPODILLA

Sapodilla, being rich in nutrients are used as a herbal remedy for skin infections and particularly for beauty enhancement. The Vitamins E, A and C of the fruit fruit tree, makes the skin healthy thanks to its moisturising effect. Presence of antioxidant like water-soluble vitamin, polyphenols and flavonoids help in reducing wrinkles. Warts and fungal growth on the skin is cleared away by the milky sap of the sapodilla plant. The seed oil helps in moisturizing the scalp and softening hair. It yields beneficial results in the management of curly hair. The sapodilla seed oil helps in treating hair-fall due to dermatitis.



Figure 07: Sapodilla fruit and leaf of plant.



Figure 08: Manikara zapata leaf.

4. ACTIVE PROFILE

Nature has blessed us with an exquisite flora and fauna, which has made our life beautiful. one amongst these wonders could also be a sapodilla fruit. The Sapotaceae family includes about 800 species of evergreen trees and shrubs in around 65 genera. Sapodilla, which is scientifically mentioned as sapodilla is one altogether the tropical plants belonging to the present family. it's grown for several purposes like for its fruits, timber and latex. The fruit sapodilla is sometimes stated as chickoo or sapota, which should not be confused with sapote meaning soft and edible fruits. It possesses tremendous nutritional value. Sapodilla is believed to be natural energy booster because it contains fructose and sucrose. it's resemblance to pear thanks to this it absolutely was also called as Manilkara achras, Manilkara zapota or Nispero achras, (a derivative of the Greek word achras for the Pear tree). Now it's cultivated throughout India, though it's native of Mexico and Central America. The plant contains several phytochemical constituents like saponin, myricetin- 3-O- α -L-rhamnoside, vitamin C, β - carotene, which have medicinal benefits. Moreover; various parts of the plant are used as home remedies to cure health problems.

Table 1: Botanical classification of Sapodilla	
Kingdom	Plantae
Subkingdom	Tracheobionta
super division	Spermatophyte
Division	Magnoliophyta
Class	Magnoliopsida

Subclass	Dilleniidae
Order	Ericales
Family	Sapotaceae
Genus	Manilkara
Species	<i>M .zapota</i>

Sr.	Phytoconstituents	Plant part
1.	Triterpenoid: Erythrodiol	Leaf
2.	Fixed oils: Unsaturated oils: like oleic acid, linolenic acid and linoleic acid, lupeol acetate, oleanolic acid. Saturated oils: palmitic acid	Leaf
3.	Hydrocarbons: n-hexane, n-triacontane, n-octacosane.	Leaf
4.	Sterols: β -sterol, stigmasterol.	Leaf
5.	Enzyme: polyphenol oxidase	Fruit
6.	Alkaloids: saptinine, saptin	Whole plant
7.	Phenolic compounds: D-quercitol , methyl chlorogenate, dihydromyricetin, quercitrin, myricitrin, myricetin-3-O- α -L-rhamnoside, methyl 4-O- galloylchlorogenate and 4-O-galloylchlorogenic acid, (+)-catechin, (-)-epicatechin, (+)-galocatechin, and gallic acid, apigenin-7-O- α -L-rhamnoside,	Leaf, Fruit, Seed
8.	Ascorbic acid	Leaf, fruit, bark
9.	Minerals: Iron, copper, zinc, calcium, potassium	Fruit
10.	Carbohydrates: lactose, glucose, galactose , fructose, arabinose, sucrose, and galactouronic acid	Leaf, Fruit

➤ It also aims at Evaluating its stability parameters.

5. AIM:

To Formulate and Evaluate Mouth Ulcer Gel by using Sapodilla Leaf Extract.

6. OBJECTIVE:

➤ The present study aims at formulating a mouth gel to treat mouth ulcer.

7. METHODOLOGY:

A proper method has to be carried out while formulating the Anti-ulcer mouth gel,

- 1) Selection of active
- 2) Collection and Authentication

- 3)Extraction Method
- 4)Selection of base
- 5)Formulation
- 6)Preparation
- 7)Evaluation

7.1 Selection of active

The analysis of Manikara zopata linn plant parts showed the presence of Lupeol acetate, oleanolic acid, Tannic acid, vitamin C, alkaloids, flavonoids, terpenoids. It also contain aminoalkanoic acid -2, proteins, vitamin C, phenols carotenoids and minerals like iron, copper, zinc, calcium, and potassium.

7.2. Collection and Authentication

The fresh plant materials of sapodilla L were collected from local area from Agricultural farmhouse (Shirpur, Dhule district). Fresh plant leaves were washed under running water moreover as water and shade drying was

administered. The collected plant was authenticated at Department of Botany, R.C. Patel of Arts, commerce and science Shirpur tal. shirpur Dist dhule (Maharashtra).

7.3 Experimental Work:

Preparation of herbal mouth ulcer Gel:
 Specified amount of Carbopol 934 was dispersed in required amount of water with continuous stirring. 5 ml of water was taken and required quantity of methyl paraben and propyl paraben were dissolved by heating on water bath after cooling humectant was added. Further varying concentration of Sapodilla leaves Extract was mixed to the above mixture and volume was made up to twenty ml with water. Finally full mixed ingredients were mixed properly to the Carbopol 934 gel with continuous stirring and triethanolamine was added drop informed the formulation for adjustment of required pH (6.8-7). The composition of herbal mouth ulcer gel prepared from the sapodilla leaves coded as S1, S2, and S3 .

Table 03: Composition of mouth ulcer gel formulations containing sapodilla leaves Extract.

Ingredients	S1	S2	S3
Sapodilla leaves extract	2%	1%	0.5%
Carbopol 934	2%	2%	2%
Methyl Paraben	0.0015%	0.0015%	0.0015%
Propyl Paraben	0.01%	0.01%	0.01%
Triethanolamine	q.s + pH 6.5-7	q.s + pH 6.5-7	q.s + pH 6.5-7
Distilled water	Up to 20 ml	Up to 20 ml	Up to 20 ml

7.4 Evaluation Test of Herbal mouth ulcer Gel:

7.4.1 Physical Appearance:

Physical parameters like appearance and colour were checked.

7.4.2 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 H₂O and keep aside for 2 hours. The measurement of pH of formulation was applied in

thrice and also the average values are reported. 6.8 to 7 pH of mouth ulcer gel formulation.

7.4.3 Homogeneity:

All developed gel formulations were tested for homogeneity by visual inspection after the gels are set in to the container. They were tested for his or her presence and appearance of any aggregates

7.4.4 Spreadability:

Spreadability make up my mind by glass slide and wooden block apparatus. Weights about 20gm were

added to the pan and also the time were noted for upper slide to maneuver to separate completely from the fixed slide. 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's supplied with the hook. A 1 kg weighted was placed on the highest of the slides for five minutes to produce the same film of the gel and take away air between the slides. far more than the gel was removed faraway from the perimeters. the highest plate was then subjected to drag with the assistance of string attached to the hook and also the time in seconds required by the highest slide to hide a distance of seven.5 cm be noted. A shorter or less interval indicates better Spreadability.

Where,

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

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.

7.4.5 Viscosity:

Viscosity resolve by using Brookfield viscometer. Formulated gels were tested for their rheological behaviors at 250C. The measurement was remodeled range of speed from 10rpm to 100rpm with 30seconds between 2 successive speeds then during a reverse orders.

7.4.6 Extrudability:

Formulation	Physical Appearance	pH	Homogeneity	Spreadability (gm.cm/ sec)	Viscosity (Pa•S)
S1 (2%)	Greenish	6.8±0.9	Good	5.30 ± 0.1	3.111 ± 0.004
S2 (1%)	Greenish	7±0.09	Good	5.76 ± 0.15	3.029 ± 0.049
S3 (0.5%)	Greenish	6.9±0.5	Good	6.23 ± 0.057	2.292 ± 0.012

9. CONCLUSION:

The data presented during this study, it absolutely was demonstrated that the developed herbal gel

The gel formulations were filled in standard capped collapsible aluminium tubes and sealed to the top. The extrudability resolve by pressing of the thumb.

7.4.7 Clarity:

The clarity of all the three batches made up our minds by visual inspection.

7.4.8 Gel strength:

Gel strength made up our minds by the time in seconds required by the burden to penetrate within the gel. A Sample amount of 5 gm of every of the optimize batches was taken and three.5 gm weight was placed on the surface of gel. The time in seconds required by the burden to penetrate 0.5 cm within the gel. The gel strength 42±0.75 .

7.4.9 Stability study:

Stability studies were finished open and shut container. Here, by subjecting the merchandise to temperature for 1 month.

Table 04: Stability study for 1 Month	
Open Container	Close Container
Not Stable	Stable

8. EVALUATION PARAMETERS

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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