

## Formulation and Evaluation of Herbal Facewash Tablet

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**ABSTRACT:** The formulation of a herbal facewash tablet incorporating liquorice (*Glycyrrhizaglabra*) and neem (*Azadirachta indica*) aims to provide a natural, effective, and convenient skin care solution. Both liquorice and neem are renowned for their therapeutic properties, with anti-inflammatory and antioxidant benefits, while neem is known for its antimicrobial, anti-inflammatory, and purifying effects. In this study, herbal extracts of liquorice and neem we combined to create a tablet-based facewash, which promises gentle yet effective cleansing, while nourishing and protecting the skin. The tablets were developed using herbal extracts, binders and excipients, ensuring ease of use and minimal environmental impact. Key quality parameters, including tablet hardness, pH, and cleansing efficiency, were evaluated. The product's dermatological safety and effectiveness in cleansing and removing impurities were also tested. The results suggest that the liquorice and neem-based herbal facewash tablet is a promising, eco-friendly alternative to liquid facewash products, offering a natural approach to skincare with potential benefits for acne-prone and sensitive skin types.

**KEYWORDS:** Herbal facewash tablet, liquorice, neem, facewash tablet formulation.

### I. INTRODUCTION

Cosmeceuticals means combination of cosmetics and pharmaceuticals. Cosmeceuticals are cosmetic products with biologically active ingredients purporting to have medical or drug-like benefits.

Cosmeceuticals are used to improve and nourish the skin appearance and known to treat different dermatologic conditions. Like cosmetics, cosmeceuticals are also applied topically having ingredients that influence the skin biological function. Cosmeceuticals are meant to improve appearance by delivering nutrients necessary for healthy skin. Cosmeceuticals usually claim to reduce wrinkles and to improve tone, texture and radiance of the skin.

Facewash tablets are the formulation prepared by incorporating the ingredients of herbal facewashes in a tablet form. Facewash tablets are formulated to minimize the cost, packaging size and the utilization of harmful preservatives and easily portable. The herbal face wash tablet is a single use tablet and its quantity is a sufficient product to avoid overuse.

### Advantages of Herbal tablet facewash over Synthetic facewash (Gel and Cream):

The most of herbal formulation available enhance the beauty with safety and improves the consumer satisfaction since they are free from synthetic chemicals and have relatively low side-effects compared to the synthetic cosmetics. Following is some of the advantages of using herbal tablet facewash which make them a better choice over the synthetic ones.

The present form of facewashes available in market are gel and cream state, etc. which should be packed in large collapsible tube or plastic containers in turn difficult for the consumer to carry during their travel. The main drawback on face wash are that they are aqueous in nature, it needs preservative to maintain the stability and nature. To minimize the cost, packaging size and the utilization of preservative, tableting technique can be used to prepare the face wash.

### II. DRUG AND EXCIPIENTPROFILE

**LIQUORICE:** Liquorice is scientifically known as *Glycyrrhiza glabra* Linn and belongs to the *Leguminosae* family. Liquorice root has a good reputation as being helpful for sensitive skin. Liquorice root also aids in diminishing the appearance of dark under-eye circle, discoloration, diminishing age spots and acne scar.

**NEEM:** Neem (*Azadirachta indica*) is a member of the *Meliaceae* family and its role as health-promoting effect is attributed because it is rich source of antioxidant. It is considered that *Azadirachta indica* shows therapeutic role due

to the rich source of antioxidant and other valuable active compounds such as azadirachtin, nimbolin, nimbin, nimbidin, nimbidol, salannin, and quercetin. Neem (Azadirachta indica) plants parts show antimicrobial role through inhibitory effect on microbial growth/potentiality of cell wall breakdown. Neem also plays role as anti-inflammatory via regulation of proinflammatory enzyme activities including cyclooxygenase (COX), and lipoxygenase (LOX) enzyme.

**SODIUM LAURYL SULFATE:** SLS is a synthetic organic compound widely used as an anionic surfactant in personal care products, detergent, emulsifying agent, skin penetrant, tablet and capsule lubricant and wetting agent.

**CARBOPOL:** Carbomers are used as bio-adhesives, controlled-release agents; emulsifying agents; emulsion stabilizers; rheology modifiers; stabilizing agents; texturing agent; thickening agent; suspending agents or occasionally, as tablet binders

**MAIZE STARCH:** Maize starch, also known as cornstarch, it is widely used in various industries, in Food Industry widely used as a thickener, stabilizer, and emulsifier in a wide range of food products. In Pharmaceutical Industry used as an excipient, binder and filler in medications.

**SPAN:** Span (sorbitan ester) used in skincare products are generally Sorbitanoleate. Sorbitan Oleate is a common emollient, emulsion stabilizer, and conditioning agent for skin care.

**CITRIC ACID:** Citric acid is a weak acid, serves as a pH adjuster and exfoliant.

**TALC:** Talc is a naturally occurring mineral, chemically classified as a hydrated magnesium silicate, serves as lubricant and glidant in tablet and capsule formulations and as filler in solid dosage forms.

### III. MATERIALS AND METHOD

SL NO	INGREDIENTS	FORMULATION
1	LIQUORICE	32%
2	NEEM	8%
3	STARCH MAIZE	16%
4	SODIUM LAURYL SULFATE	12%
5	CARBOPOL	6%
6	SPAN 80	2%
7	CITRIC ACID	8%

8	TALC	4%
9	LACTOSE	8%

### METHOD OF FORMULATION

#### Preparation of liquorice powder:

Dried roots of the liquorice are taken and the outer layer of liquorice roots are peeled. Then the peeled roots are cut into small pieces. liquorice roots were dried in Hot air oven at 50°C for 30 mins. Weigh 10grams of cut pieces of dried liquorice root into grinder mixture then collect the liquorice powder and pass it through the sieve no 80. Dry and collect the fine powder of liquorice powder.

#### Preparation of neem leaf powder:

Neem leaves are taken & dry in sunlight. Dried neem leaves were grinded into powder then collects the neem leaves powder and pass it through sieve. Dry and collect the fine powder of neem leaves.

### PRE-FORMULATION STUDIES

A pre- formulation study for a herbal facewash tablet involves conducting various tests and assessments to gather essential information before the formulation process.

### BULK CHARACTERIZATION

#### Bulk Density:

Bulk density is the apparent density of powder under defined condition. It is the untapped powder volume and expressed as (g/cm<sup>3</sup>). Bulk density of powder is determined using

Bulk density = weight of sample in gram/volume occupied by the sample

#### Tapped density:

Tapped density is the apparent density of powder obtained by standard conditions. It is the volume of powder obtained after mechanical tapping. Tapped density of powder is determined using

Tapped density = weight of sample in gram/ Tapped Volume

#### Hausner's ratio and Compressibility index:

Hausner's ratio and compressibility index is used to predict the flow property of particles in a simple manner. Both were determined using Bulk density and Tapped density.

#### Hausner's ratio:

Hausner's ratio is indicated by number useful in industries for correlating the flowability of powder. The value greater than 1.25 the powder has the poor flowability. It is determined using Hausner's ratio= Tapped density(g/cm<sup>2</sup>)/bulk density(g/cm<sup>3</sup>)

### Compressibility index:

Compressibility index is a measure of tendency of the powder to be compressed as its ability to get settled and involve in interparticle interaction. It is indicated by Carr's index (%). It is determined using

$$\text{Carr's index}(\%) = \frac{\text{Bulk density} - \text{Tapped density}}{\text{Tapped density}} * 100$$

### Angle of Repose:

It is the angle that differentiates transitions between phases of the granular material and commonly used for evaluating interparticle interaction. It is calculated using

$$\tan \theta = \frac{h}{r}$$

Where, h = Height of pile, r = Radius of the base of pile,  $\theta$  = Angle of repose

### PREPERATION OF FACEWASH TABLET:

Weigh 32% of Liquorice powder, Neem leaf powder, SLS (Sodium lauryl sulphate), Carbopol and Span 80, Citric acid, Talc, Lactose in the concentrations mentioned for 250mg total weight of tablet. Triturate the ingredients using mortar and pestle. Then prepare a starch paste by dissolving starch maize in water, heating it to a smooth paste. Slowly add the paste to the dry powder blend and mix thoroughly to form a cohesive mass. Pass the mass through a sieve to create granules for better compression. Dry the granules at a controlled temperature until the moisture content is minimal. 250mg of triturated mixture is weighed and taken for compressing of tablet. Tablets are compressed using wet granulation method by using tablet punching machine.



### Steps

#### 1. Pre-Mixing:

- Sift liquorice powder, neem powder, maize starch, Carbopol, Sodium Lauryl Sulfate,

and Talc to remove clumps and ensure uniformity.

- Span 80 should be added to the dry ingredients and mixed to ensure even distribution.

#### 2. Granulation:

- Prepare a starch paste by dissolving maize starch in water, heating it to form a smooth paste.
- Slowly add the paste to the dry powder blend and mix thoroughly to form a cohesive mass.
- Pass the mass through a sieve to create granules for better compression.

#### 3. Drying:

- Dry the granules at a controlled temperature of 50–60°C (air drying or using a drying oven) until the moisture content is minimal.

#### 4. Tablet Compression:

- Blend the dried granules with Talc for improved tablet flow and compress into tablets using a tablet press.
- Ensure each tablet weighs approximately 250 mg and is uniformly compressed.



## IV. EVALUATION

**Physical evaluation:** The formulated face wash tablets can be evaluated physically for the parameters such as colour and appearance.

**Colour:** The colour of the herbal facewash tablet was analysed visually.

**Appearance:** The appearance of the herbal facewash tablet was checked visually.

**Consistency:** It was determined manually.

**Washability:** The washability of the face wash tablet can be determined by applying the formulation on the skin and washed with water and checked manually.

**Spreadability:** The spreadability of the herbal face wash tablet was checked manually by applying the tablet on the skin with a gentle rub.

**Foaming ability by cylinder shake method:** Take 50ml of water in a 250ml cylinder and drop the

tablet in the cylinder and cover the cylinder with hand and shake it vigorously for few minutes. Measure the volume of the foam produced.

IP/BP	Limit	USP
80mg or less	+/-10%	130mg or less
80-250mg	+/-7.5%	130-324mg
>250mg	+/-5%	>324mg

**pH:**The pH of the facewash tablet was made to match with the skin so that the skin irritation is avoided. The pH of 5% aqueous solution of the formulation was measured by using a calibrated digital pH meter at room temperature.it can be done by making 1% aqueous solution of formulation and measure by using calibrated digital pH meter at constant temperature.

**Hardness test:**The ability of a tablet to withstand for mechanical shocks is known as hardness. Pfizer hardness tester is the instrument which is used to determine the hardness of tablet. It is expressed in kg/cm<sup>2</sup>. Take three tablets from each batch and hardness should be determined and the selection of tabled should be done randomly. Then the mean and standard deviation values should be determined.

**Friability test:**Roche friabilator is the equipment which is used for the determination of friability. It is expressed in percentage. Note down the initial weight of the tablets individually (W initial). Tablets are placed in a plastic chamber which revolves at 25 rpm and they are subjected to fall from a height of 6 inches in the friabilator for about 100 revolutions. Then measure the weight of the tablet (W final) and observe any weight difference before tablet and after the friabilator processing. Limits: loss in weight less than 0.5 to 1% of the initial weight of the tablet should be considered as acceptable limits. Percentage of friability is calculated

Formula:

$$\frac{\text{Initial weight} - \text{Final weight}}{\text{Initial weight}} \times 100$$

**Weight variation test:**20 tablets of each formulation were taken for the weight variation test. Each of the tablet are weighed individually using the electronic balance and average weight was calculated and the deviation was recorded by comparing with the average value. According to US Pharmacopeia small variations in the weight is negligible and can be accepted the weight variation limit should not exceed +/-7.50.

$$\text{Formula: } \% \text{ of weight variation} = \frac{\text{individual weight} - \text{average weight}}{\text{average weight}} \times 100$$

**Irritancy test:**Skin irritation test is an essential for formulating pharmaceuticals and cosmeceuticals. The formulation is applied on left hand dorsal skin surface of 1sq. cm and observe in time interval 5-10 minutes for irritancy, redness and edema.

**Thickness:**The Thickness of the tablets should be measured with the help of Vernier calliper. Thickness of the tablet should be in limit of ±5. It is expressed as Kg/cm<sup>2</sup>.

## V. RESULT AND DISCUSSION

### RESULT

#### 1 Physical Evaluation

SL NO:	PARAMETERS	OBSERVATIONS
1	Bulk density	0.491g/ml
2	Tapped density	0.545g/mi
3	Hausner's ratio	1.109
4	Carr's index	9.09
5	Angle of response	37

Herbal facewash tablet was evaluated based on physical evaluation as showed in Table

#### 2. Physiochemical evaluation

SL NO:	PARAMETERS	OBSERVATIONS
1	Colour	Brown
2	Washability	Excellent
3	Foaming ability	Good foam
4	pH	5.20
5	Hardness	1.2kgf
6	Friability	0.33%
7	Weight variation	No irritation
8	Thickness	3mm



Foaming ability Ph test Hardness test



Friability test Irritancy test

## VI. CONCLUSION

In this study we can understand how cosmeceuticals play a major role in the health industry. Herbal facewash tablet is considered to be an efficient product for the cleansing of skin. In this article, we tried to focus on how herbal based facewash tablet is beneficial for skin cleansing. Liquorice is rich in isoflavones glabridin and hispaglabridins A and B have considerable antioxidant property that protect skin from environmental stress. Neem has anti-bacterial property which prevent skin causing acne and pimples.

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