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(REVIEW ARTICLE)

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A Review on Formulation and Evaluation of travel-friendly Facewash Tablet using polyherbal ingredients

Sheri P.S, Anjali S *, Anjudas P and Lekshmi Shaji

Department of Pharmaceutics, Faculty of Pharmacy, Mar Dioscorus College of Pharmacy, Alathara, Thiruvananthapuram.

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Abstract

Herbal cosmetics have gained importance because of their safety, biodegradability, and fewer side effects compared to synthetic cosmetics. Facewash tablets are a new, travel-friendly, and eco-friendly solid dosage form that aims to minimize water content, plastic packaging, and microbial contamination. This review aims to provide information on the formulation and evaluation of polyherbal face wash tablets as an effective alternative to the conventional liquid facewash.

The article emphasizes the choice of herbal ingredients such as neem, aloe vera, lemon peel, Reetha, liquorice, rose petals, Multani-mitti, and orange peel, depending on their traditional and cosmetic values. The article also emphasizes the commonly used excipients such as surfactants, binders, disintegrating agents, moisturizers, preservatives, and pH adjusters. The formulation methods, especially direct compression, and the necessary pre-formulation studies such as flow properties and compressibility indices, are also reviewed to ensure the quality of the tablets.

The article also provides information on the standard evaluation parameters for face wash tablets, including physical properties, hardness, friability, pH, foaming capacity, cleaning efficiency, spreadability, and skin irritation tests. Polyherbal face wash tablets are a promising advancement in cosmetic dosage forms due to their improved stability, portability, and consumer compliance.

Keywords: Herbal cosmetics; Facewash tablet; Travel-friendly; excipients; Polyherbal ingredients

1. Introduction

The skin serves as a protective mechanism against dust, pollution, and bacteria. Keeping the skin clean is vital for healthy and glowing skin. Dirty skin causes dullness and skin breakouts. The face collects dirt, oil, and makeup on a daily basis. If not cleaned thoroughly, pores may clog, causing acne. Thus, the need for frequent face cleaning.

Facewash removes dirt, oil, and dead skin cells without removing the skin's natural oils. Unlike soap, facewash keeps the skin fresh and soft. In some facewash products, chemicals are used that may cause skin irritation. Using gentle facewash with natural components is a healthier alternative for the skin. Healthy skin needs proper facial care and gentle facewash.[1]

Facewash tablets are facial cleansing products used for the removal of makeup, dead skin cells, excess oil, dirt, and environmental pollutants from the skin. Facewash tablets help in the cleansing of pores and preventing skin conditions like acne. Facewash is generally used in a skincare routine as a toner and moisturizer.

* Corresponding author: Anjali S

Facewash tablets are facial cleansers that are used for the purpose of removing makeup, dead skin cells, excess oil, dirt, and environmental pollutants from the skin. Facewash tablets are used for the purpose of cleaning the pores of the skin and preventing conditions such as acne. Face wash is usually used in a skin care regimen as a toner and moisturizer.

Facewash tablets have a number of advantages over the traditional liquid face wash formulation. Facewash tablets are eco-friendly as they are packed in minimal or no plastic packaging at all, thus reducing their impact on the environment to a great extent. Facewash tablets are also very portable as they are very light and can be easily carried around. Facewash tablets are also less likely to be contaminated with microbes as they contain little to no water, thus increasing their shelf life. Facewash tablets are also very economical as they can be accurately measured, thus preventing wastage of the product. Facewash tablets are also very easy to use as they are not messy like liquid facewash products. [2]

2. Structure and function of the skin

The skin is the largest organ in the human body and is very important for protection, sensation, thermoregulation, and homeostasis. The skin is a part of the integumentary system, which also consists of hair, nails, sebaceous glands, and sweat glands. The skin has three main layers: epidermis, dermis, and hypodermis or subcutaneous tissue.

2.1. Epidermis

The epidermis is the thinnest and outermost layer of the skin and serves as the main protective barrier. On the outside, the skin consists of an elastic epidermal layer that continuously regenerates. The primary cells of the epidermis, known as keratinocytes, are produced by cell division at the basal layer and gradually migrate toward the surface, where they flatten and eventually die. These flattened, dead keratinocytes form the outermost layer of the epidermis called corneocytes or the stratum corneum, which acts as a protective barrier and is constantly shed and renewed. Melanocytes, another important epidermal cell type, are responsible for producing melanin, the pigment that gives skin its colour and provides protection against ultraviolet radiation.

2.2. Dermis

The dermis is the skin layer that is positioned just below the epidermis. It is thicker in structure. It is made up of connective tissue with collagen and elastin fibers. These fibers make the skin strong and elastic. The dermis contains vital structures such as blood vessels, nerve endings, hair follicles, sweat glands, and sebaceous glands. It is through these structures that the dermis is able to perform its sensory functions such as touch, pain, and temperature, as well as regulate body temperature and provide nutrients to the epidermis.

2.3. Hypodermis

The hypodermis, or subcutaneous layer, is the innermost skin layer and is made up mostly of fat and connective tissue.

The hypodermis serves several functions:

It is an energy storage tissue because it contains fat, it is an insulator that helps to regulate body temperature, and it protects internal organs from injury.[2,3]

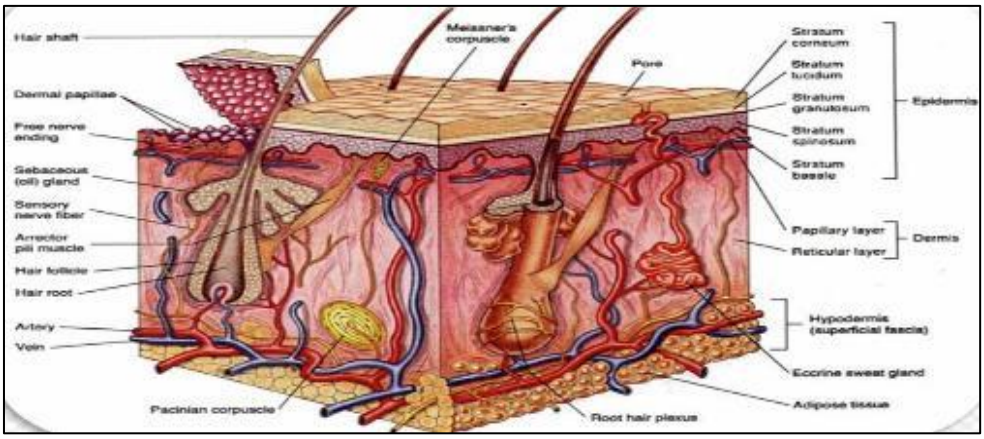

Figure 1 Structure of Skin

3. Facewash Tablet

A face wash tablet is a small, solid dosage form designed to dissolve in water to produce a facial cleanser. It shall be prepared with a blend of natural and/or mild ingredients to make it gentle on the skin and for all skin types and skin concerns. These tablets are compact, lightweight, highly portable, and offer convenience sans the mess associated with liquid cleansers or bulky packaging. Harsh chemicals, artificial fragrances, and synthetic colours are also usually avoided in these tablets to ensure a skin-friendly and eco-conscious cleansing option.

During recent years, more and more attention has been focused on herbal cosmetics, with many consumers showing concern about chemical and synthetic additives in personal care products. For this reason, herbal formulations could be developed based on plant ingredients, including herbs, flowers, roots, stems, and essential oils, representing effective skin care with minimal adverse effects. Herbal active ingredients are considered to be more biologically active compared to artificial components, thus safer for long-term usage. Thus, various herbal face wash formulations will become an integral component in daily skin care routines to maintain healthy, clean, and radiant skin.

3.1. Characters of facewash tablet

Face wash tablets are small solid tablets that dissolve in water to form a facial cleanser.

- They are made using mild and natural ingredients.
- Gentle on the skin and suitable for all skin types.
- Easy to use and convenient for daily cleansing.
- Compact, lightweight, and easy to carry.
- Free from harsh chemicals, artificial fragrances, and colours.
- Herbal face wash tablets use plant-based ingredients such as herbs and essential oils.
- Herbal formulations are preferred due to fewer side effects compared to synthetic products.
- Commonly used in regular skin care routines to maintain clean and healthy skin.[3]

3.2. How To Use Face Wash Tablet

A face wash tablet can be applied by first putting one tablet on the wet hand and rubbing it to create a mild foam. The foam is then applied to the wet but cleansed face, massaging it circularly for about 30-60 seconds to remove dirt, oil, and impurities. Finally, the face is rinsed with lukewarm water and patted dry with a clean towel. When not planning to use it soon, the tablets are kept in a dry place to avoid dissolving. When done with cleansing, moisturizing can be applied to the face.

Figure 2 How to use Facewash Tablet

4. Selection of herbal ingredients used in facewash tablet

Herbal ingredients are selected based on their traditional use, pharmacological activity, and cosmetic benefits. Commonly used herbs in facewash tablet formulations include:

4.1. Neem leaves

The herb Neem was used for its antibacterial and anti-inflammatory properties to clean the skin and prevent acne. Aloe vera was included because of its moisturizing effect and soothing action on the skin.

Figure 3 Neem

4.2. Aloe vera

Aloe vera was included because of its moisturizing effect and soothing action on the skin

Figure 4 Aloe vera

4.3. Lemon peel

Lemon peel was selected based on its antioxidant and cleansing properties, which refresh the skin tone and promote a fine complexion.

Figure 5 Lemon peel

4.4. Reetha powder

Reetha was used as a natural foaming agent to enhance the cleansing action without using any synthetic chemicals. [4]

Figure 6 Reetha powder

4.5. Liquorice

Liquorice is commonly known for its anti-inflammatory and antioxidant activities, hence providing soothing and antioxidant activities to the skin. [5]

Figure 7 Liquorice

4.6. Rosa gallica (rose petals)

Rosa gallica is a medicinal plant used for making herbal cosmetics. In the petals of a rose, flavonoids, tannins, phenolic compounds, and essential oils are present.

In herbal face wash tablets, Rosa gallica facilitates effective cleaning by soothing the face, calming irritation, shrinking pores, maintaining moisture on the face, and improving the appearance of the face. The fragrance of rose petals makes the formulation more acceptable.

Figure 8 Rose gallica

4.7. Multani mitti

Multani mitti is a clay compound composed mainly of aluminum silicates; however, it is also a mineral compound. It is generally used for skincare purposes.

In face wash tablets, Multani Mitti removes extra oil, dirt, and impurities, prevents pimple formation, and smoothes out the skin, providing gentle scrubbing and refreshing the complexion.[6]

Figure 9 Multani Mitti

4.8. Orange peel

Orange peel (*Citrus sinensis*) is used in polyherbal facewash tablets because of its beneficial effects on the skin. It is rich in vitamin C and antioxidants, which help in cleansing the skin, improving skin brightness, and protecting against oxidative damage. Orange peel powder has mild exfoliating and antibacterial properties, which aid in removing dead skin cells, excess oil, and impurities. Its astringent nature helps in tightening pores and controlling oil secretion, making it suitable for acne-prone and oily skin. Therefore, orange peel acts as a natural cleansing, exfoliating, and skin-refreshing agent in herbal facewash tablet formulations.[7]

Figure 10 Orange peel

5. Excipients used in facewash tablet

5.1. Surfactants

These surfactants lower surface tension, trapping air to form stable lather that lifts dirt and oil. Common examples include Sodium Lauryl Sulphate for deep cleanse or Reetha powder in herbals. Surfactants are important ingredients in soaps and cleaning materials. One common surfactant found in everyday life is sodium lauryl sulphate (SLS). We all know that water and oil don't go well together naturally, but they do when we add a surfactant to the mixture. This is probably why it's easy to wash away dirt along with oil.

Sodium lauryl sulphate has wide acceptability because it is simple to make, inexpensive, and efficient as a cleaning agent. It appears in most products that people use in their daily lives, such as body wash, hand soap, toothpaste, shampoo, bubble bath, and facial cleansers[9].

5.2. Preservatives

Preservatives are chemical agents used in a product such as food products, cosmetics, and medicine to prevent growth of organisms and increase product shelf life. Despite their common use in products, many organisms have the capacity to produce dangerous natural products called toxins, which may pose health hazards or even death in extreme cases. Some of the common preservatives used are associated with possible health risk factors, where methyl paraben may be used.[8]

5.3. Moisturizer

Glycerine is an excellent and trusted moisturizing ingredient commonly used in various skin care products for its ability to attract and retain moisture, thus hydrating, fresh, dewy, plump, and smooth skin.

In cleansers and moisturizers, glycerine plays a crucial role by ensuring the skin's oil is not lost, thus preventing the dry skin and the tightness associated with such cases. In addition, the use of glycerine increases the ability of other substances to be absorbed, such as lipids, thus enabling their effectiveness.[9]

5.4. PH adjuster

Citric acid has numerous benefits for the skin, and it is also utilized as a pH adjuster for skincare formulations. It helps control acne, exfoliate, reduce pigmentation, and also lighten the skin.

Citric acid, as such, is well appreciated for its skin whitening properties, making it effective in lightening areas of discoloration on the skin. It does this by inhibiting melanin, thereby promoting an even tighter and brighter complexion.[9]

5.5. Disintegrating agent

In face wash tablet formulations, disintegrating agents play an essential role in ensuring that the tablet breaks down quickly when it comes into contact with water. Unlike conventional liquid face washes, face wash tablets must rapidly disintegrate to form a smooth cleansing solution or foam before application on the skin. Proper disintegration improves ease of use, uniform dispersion of active ingredients, and overall cleansing efficiency[10].SSG is widely used in direct-compression tablets to facilitate fast disintegration, which in the context of a face wash tablet means the tablet will quickly disperse into a wash solution upon contact with water an essential functionality for a portable cleansing tablet.[4]

5.6. Binder

A binder is a pharmaceutical excipient used to hold together powdered ingredients in a formulation, helping them form a cohesive and mechanically strong tablet or granule during compression.

For example Microcrystalline cellulose is added as a binder to hold all the powdered ingredients together. It helps the herbal powders and other excipients stick to each other so that a strong, uniform tablet can be formed during compression. The binder improves tablet strength, prevents crumbling, and ensures the face wash tablet remains intact during handling and storage, while still allowing it to break down easily when used with water.[4]

6. Formulation of face wash tablet

In this process, all the apparatus were thoroughly dried before using them. The required amounts of the powdered materials were cleanly weighed using an electronic balance and then repeatedly moistened with a little water using a mortar and pestle before sieving using sieve No. 44 to achieve a fine powder. The required excipients were then incorporated, and all the ingredients were uniformly mixed for proper blending. Finally, the powder mixture thus obtained in the powder blending stage was then compressed using a tablet punching machine to achieve tablets for direct compression. Direct compression tablets are defined as the process of compressing materials that are in powder form without any modification in their physical characteristics. This process is a cost-effective method widely applied for tablet production in the pharmaceutical INDUSTRY, especially for manufacturing generics.[8]

7. Evaluation parameters

7.1. Preliminary analysis of herbal ingredients

Preliminary analysis ensures the quality, purity, and identity of herbal raw materials

Organoleptic evaluation

Herbal powders are evaluated for:

- Color
- Odor
- Taste (if applicable)
- Texture
- Foreign matter

Visual inspection is carried out to detect the presence of extraneous matter such as dust, stones, or other plant parts.

7.2. Physicochemical properties of herbal ingredients

Standard parameters include:

- Loss on drying: Indicates moisture content
- Ash values: Total ash, acid-insoluble ash, and water-soluble ash
- Extractive values: Alcohol-soluble and water-soluble extractives
- Foaming Index: Indicates foamability.

These parameters help establish quality standards for herbal ingredients.

7.3. Pre-formulation studies of formulated powder

Pre formulation studies are essential to assess the suitability of the powder blend for tablet compression.

7.3.1. Angle of repose

A Pile of Powder's angle of repose is the greatest angle that Can exist between its surface and the horizontal plane. It determines the interparticle force or friction force in a powdered bulk

$$\text{Tan } \theta = h/r$$

Where h = Height, r =radius, θ=Angle of repose

7.3.2. Bulk density and tapped density

Bulk density is the ratio of the mass of the powder to the bulk volume. The Bulk Density of a sample is equal to its weight in grams divided by its volume.

Tapped density is the amount of vacant space in a powder after the bulk quantity has been tapped.

Tapped Density is calculated by the weight of the powder divided by the calculated density.

7.3.3. Carr's index

The powder's cohesiveness, particle size distribution, and flow rate are all correlated with Carr's index.Formula for determine Carr's Index,

Bulk Density- tapped density/ Tapped density x 100

7.3.4. Hausner's ratio

Hausner's Ratio is the ratio of tapped density to bulk density. It is calculated using Hausner's ratio, which is equal to tapped density divided by Bulk density.[9]

7.4. Evaluation of herbal facewash tablets

7.5. Physical evaluation

- Appearance: Color, shape, and surface texture •
- Thickness: The thickness of tablet is measured using Vernier calliper. Tablet thickness should be expressed in as Kg/cm^2
- Hardness: The hardness of tablet is measured using Monsanto hardner tester. Average tablet hardness should be 3-8. It expressed in as Kg/cm^2
- Friability: The friability of tablet is measured using friabilator. Formula for determine the friability
- Friability = (initial weight-Final weight) / Initial weight x 100
- Weight variation: 20 tablet from each batch selected randomly Weight of each individual tablet T are taken Variation in the weight of individual tablet are recorded by comparing with the average value. The maximum weight variation should not be more than ±7 .5[11]

7.6. Evaluation of facewash tablet

- PH
- Measured using a digital pH meter to ensure skin compatibility (ideal pH 5.5- 7).
- Foaming ability and foam stability
- Assessed by shake flask method or cylinder method

7.7. Spreadability

- Determines ease of application on skin.
- Cleansing ability
- Evaluated by removal of artificial sebum or dirt from skin or substrate.
- Skin irritation test

- Performed on a small area to ensure absence of irritation or redness.[11]

8. Advantages of herbal facewash tablets

- Eco-friendly and water-free formulation
- Better stability and longer shelf life
- Reduced use of synthetic surfactants
- Easy transportation and storage
- Enhanced patient and consumer compliance

9. Conclusion

Herbal facewash tablets represent a promising advancement in cosmetic dosage forms, combining the benefits of herbal ingredients with pharmaceutical tablet technology. Systematic evaluation of raw materials, pre-formulation parameters, tablet characteristics, and cosmetic performance ensures product quality, safety, and efficacy. This review provides a structured approach that can be effectively utilized for academic projects and formulation research.

Compliance with ethical standards

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