



Formulation of Herbal Facewash

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ABSTRACT

Face skin is delicate, and using regular soaps causes it to become dry and lose texture. Facewash is a gentle cleanser that works without irritating the skin. Facewash claims to be cleansing, anti-aging, anti-acne, moisturising, and to improve the fairness of skin, making it look healthy and youthful. The current facewashes on the market are in gel and cream form, which must be packaged in bulky plastic containers or tubes that are difficult for customers to carry while travelling. Additionally, because these facewashes are aqueous in nature, they require a preservative to maintain their stability. The goals of the current work are to prepare a herbal facewash tablet and overcome the drawbacks of synthetic facewashes. Facewash tablets are designed to reduce cost, packaging size, and the use of harmful preservatives. They are also conveniently portable. The pH, irritability, hardness, friability, thickness, foaming capacity, and accelerated stability of a facewash tablet made with various ingredient concentrations were all evaluated. The results of the current study showed that the formulated batch (F6) produces superb foams and a fine facewash.

Keywords: Azadirachta indica (Neem), Curcuma longa (Turmeric), Coriandrum sativum L. (Coriander), Mentha viridis (Mint),

INTRODUCTION

The skin is the largest organ of the body, accounting for about 15% of the total adult body weight. It performs many vital functions, including protection against external physical, chemical, and biologic assailants, as well as prevention of excess water loss from the body and a role in thermoregulation. The skin is continuous, with the mucous membranes lining the body's surface. To keep skin healthy, clear and glossy, a balanced nutrition is required. Apart from the balanced nutrition, hormonal changes especially during the puberty in both sexes cause many changes in the body. Among various changes, Acne vulgaris is the most common. Acne vulgaris is a common skin condition with substantial cutaneous and psychologic disease burden.

The pathogenesis of acne is a result of multifaceted processes within the pilosebaceous unit resulting in bacterial overgrowth and inflammation. This condition typically develops at the time of the pubertal transition when changes in the body's hormonal milieu alter pilosebaceous gland function. Initially, follicular epithelial cells differentiate abnormally and form tighter intracellular adhesions and, therefore, are shed less readily. This process leads to the development of hyperkeratotic plugs, or microcomedones, which enlarge progressively to form non-inflammatory, closed or open comedones. To overcome the problem of acne vulgaris and to get rid off use of synthetic drugs such as clindamycin, a synergistic anti acne face wash gel has been formulated.

The herbal healing has been mentioned from the ancient era, from Vedas, and even from ancient religious work. Probably it is the oldest medical care system in the world. The herbal healing deals with use of herbs, herbs extracts or natural products for the betterment of health condition. Nowadays in westerns countries medical practitioners and mostly prescribing medicines containing plant extract. Developed countries also appreciating this traditional and ancients form of medicine. As a result, Indian herbal drugs are in demand and witnessing rapid growth in global market.

Wide growth and demand for herbal cures, herbal skin care products and even herbal cosmetics were observed in recent years¹. Although, herbal products are more acceptable with belief that they are safe possess many therapeutic properties and having no or less side effects as comparing to modern chemical entities. Skin being the most exposed and major part of our body to the pathogens. Hence require protection and prevention from skin diseases by utilization of formulations having antibacterial, antioxidant and anti inflammatory and such other properties.

During the puberty imbalance of internal constituents and hormonal balance may cause many skin problems. Acne is found as most common skin problem which is generally characterized by presence of inflammatory lesions, comedon, seborrhea etc. acne may cause long lasting, physical and detrimental psychosocial effect associated with depression and anxiety without disease severity. Although these effects usually improved by treatment. Acne develop in presence of commensally bacteria Propionibacterium acne, Staphylococcus epidermidis and Malassezia furfur in the follicles. Long term uses of antibiotics for the treatment develop resistance to the drugs. To overcome this problem, herbal alternative solution for the treatment has been studied.

Psidium guajava Linn, a well known traditional medicinal plant used in various indigenous system of medicine, also known as Guava belonging to family Myrtaceae. It is represented by approximately 130-150 species² and widely distributed throughout the world³. All parts of the plants being used as medicine, the parts like fruits, leaves, bark and root have been used to treat diarrhea and used as stomachache, respiratory and gastrointestinal disorders

as antispasmodic, anti-inflammatory, as cough sedative, in obesity, to control diabetes mellitus. Seeds possess antimicrobial⁴, anti-inflammatory⁵, anti-allergic⁶, and anti-carcinogenic activity⁷. Guava is yellow in color and owing to its abundance and reasonable price it is eaten by all sectors of the society. The main guava fruit products are beverages, juices, and canned slices. The important constituents of guava are vitamins⁸, tannins, phenolic compounds, essential oils, sesquiterpene alcohol, and triterpenoids.

1. INTRODUCTION TO COSMETIC:-

Greek word cosmetic means "to adorn" in English (addition of something decorative to a person or a thing). Cosmetics are made up of a variety of chemical compounds that are either derived from natural sources or created synthetically. Cosmetics created specifically for skin care can be used to cleanse, exfoliate, protect, and replenish the skin with the help of cleansers, toners, serums, moisturisers, and balms; cosmetics created for more general personal care, like shampoo and body wash, can be used to cleanse the body; cosmetics created specifically to improve one's appearance (makeup) can be used to hide blemishes, enhance one's natural features (like the eyebrow), add colour to the face.

In the case of more extreme performance-related makeup. It is possible to completely alter the appearance of the face to resemble a different person, creature, or object by using fashion shows and people in costumes. Cosmetics may be created to enhance body fragrance.

1.1 Different Type Of Cosmetics :-

Despite the fact that there are many different types of cosmetics used for a wide range of different purposes, all cosmetics are typically applied externally. These items can be used on the body's skin, particularly the hands and nails, as well as the hair, as well as the face's skin, lips, brows, and eyes. These items might be used for skincare, personal care, or to change one's appearance. There are various types of cosmetics, which are as follows:-

- I. Skin Cosmetics
- II. Hair Cosmetics
- III. Nail Cosmetics

1.1 FACE WASH :-

The products that are used to wash your face without drying it out are called face washes. Face wash is also frequently referred to as "cleanser." All skin types have been found to benefit equally from face wash products. Face wash is very beneficial in getting rid of oil and dirt and giving dry skin moisture. Face washes and cleansers are both used to remove dirt, oil, pollution, etc. from your face. A cleanser removes dirt, makeup, and extra oil from your face. These impurities are oil soluble. A face wash can also be used to get rid of them, but its effectiveness might not be 100%. Ordinary soaps can cause facial skin to dry out because it is so delicate.



Fig. 1 Different Type Of Face Wash

The essential task of keeping skin clean, germ-free, smooth, and fresh is accomplished by a face wash, which also moisturises the horny layer without irritating the skin. so that skin appears young and vibrant. Face washes may be used to impart cleansing, anti-wrinkle, anti-acne, moisturising, and skin fairness properties. Skin lightening substances are thought to work by preventing the production of melanin in melanocytes, thus reducing the amount of melanin, on the metabolism and production of melanin in the skin. Due to their low toxicity to melanocytes, ingredients that inhibit the production of melanin, such as propanediol, arbutin, kojic acid, vitamin C, and its derivatives, Evodia rutaecarpa fruit extract, and others, are used in whitening cosmetics.

1.2 Forms of Face Wash :-

1. Gel based face wash
2. Cream based face wash
3. Liquid based face wash

Face wash in powder form Types of face wash Generally a face wash suits all skin types however now a day different products are available in market that are formulated to suits different skin types for example: an oily skin face wash is made for people have oily skin conditions and does not contains oils and leaves a thin oily film on the skin. These different types of face washes available in the market include.

1. Oily skin face wash
2. Dry skin face wash
3. Normal skin face wash Feature of face wash

1.3 Function Of Face Wash :-

1. Face wash is a facial care of cosmetic used to clean the skin
2. Rejuvenating the skin cells elevate stress
3. Removes oil, dirt and impurities.

Reduces microbial flora of skin Leave skin fresh and breathing. Gel based face wash gel A gel is a solid jelly like material that can have properties ranging from soft and weak to hard and tough. Gels are defined as a substantially dilute cross-linked system, which exhibits no flow when in the steady-state. By weight, gels are mostly liquid, yet they behave like solids due to a three-dimensional cross-linked network within the liquid. It is the cross linking within the fluid that gives a gel its structure (hardness) and contributes to the adhesive stick (tack).

In this sense, gels are a dispersion of liquid molecule within solid, where solid is continuous phase and liquid is discontinuous phase. Thomas Graham, a Scottish chemist, coined the word "gel" by borrowing it from gelatin in the nineteenth century. Herbs for skin whitening Using substances, mixtures, or physical treatments to lighten skin tone is known as skin whitening. Treatments for skin whitening function by lowering the skin's melanin content. Many substances have been demonstrated to be effective at lightening the skin; some have positive effects (such as antioxidants and nutrients), while others pose a serious risk to health (for example, those containing mercury).

The development of new skin-care cosmetics, such as natural bleaching agents like melanin biosynthesis or tyrosinase inhibition, which are able to modulate the metabolism of pigmentation for human colour, is made possible by the search for naturally active compounds from organic herbal medicines or Traditional Chinese Medicines (TCMs). Antioxidants that are active in the oxidative stress of ageing skin cells may support skin health, whereas skin and it play a crucial protective role in skin whiteness. Melanin can be overproduced as a result of chronic sun exposure, melasma, or other hyper pigmentation diseases. Melanin is biosynthesized by melanocyte cells in the basal layer of the epidermis.

Thus, melanin overproduction such as hyperpigmentation of darkened age spots is reduced by bleaching agents, whereas melanin and other pigmenting agents are intended to increase pigmentation for sun protection. The prevention of ultraviolet (UV) exposure, the suppression of melanocyte metabolism and proliferation, the inhibition of tyrosinase activity, or the removal of melanin through corneal ablation have all been described as ways to inhibit melanin biosynthesis. The first two steps of this pathway—the hydroxylation of tyrosine (one of the monophenolic compounds) to L-dopa (L-3,4-dihydroxyphenylalanine; one of the o-diphenols) and the oxidation of L-dopa to odopaquinone—are catalysed by the enzyme known as tyrosinase (one of o-quinones).

Then, through a series of nonenzymatic reactions, these o-quinones are converted into melanin. Tyrosinase thus becomes the primary target enzyme for screening and the discovery of new inhibitory compounds, and tyrosinase inhibitors are significant components of cosmetics and skin-whitening agents. To stop the occurrence of these melanin overproduction or hyper pigmentation disorders, a continuous search for tyrosinase inhibitors derived from natural plants or TCMs is under way.

Reactive oxygen species (ROS) and other free radicals produced by oxidative stress in skin cells or by exposure to UV radiation have been shown to be improperly processed in order to increase melanin biosynthesis, damage DNA, and possibly promote the proliferation of melanocytes. Antioxidants and other free radical or ROS scavengers are known to lessen hyperpigmentation. Although free radicals are scavenged by plant-derived antioxidants, it is thought that the nature and concentration of these compounds vary among various plant species. However, 1, 1- diphenyl-2 picryl hydrazyl (DPPH) is a stable radical, and the DPPH free radical-scavenging assay is a straightforward and well-liked method for evaluating a compound's capacity to scavenge free radicals or its antioxidant activity.

Ingredients' uses Numerous cosmetic and pharmaceutical companies are concentrating on research that will change skin pigmentation as attention is being paid to skin appearance. Today, a wide variety of substances are known to be capable of reducing skin pigmentation. Numerous of these active ingredients

have tyrosinase-inhibiting properties that result in decreased total melanin production. Today, tyrosinase inhibitors include substances like kojic acid, arbutin, Evodia rutaecarpa, and various plant or herbal extracts.

Additionally, molecules like nicotinamide and soybean have been shown to affect the transfer of melanin from melanocytes to keratinocytes, resulting in a lighter overall tone for the skin. To remove too much melanin from the skin, people frequently use substances like retinoic acid that increase the desquamation of the skin..

MATERIALS AND METHODS

Collection of Herbs and Chemicals Herbs

All the herbs were collected from plant nurseries from the region of New Delhi and dried in sunlight.

Chemicals

Ultrez 20 Carbomer (Lubrizol Advanced Materials, USA)- Gelling Agent, Glycerine- Humectant, Sodium Lauryl Ether Sulphate- Surfactant (Jangra Chemicals, Punjab), Sodium Methyl Paraben, Sodium Propyl Paraben- Preservatives and Sodium Hydroxide- Neutralizer (Thermo Fischer Scientific India Pvt. Ltd., Mumbai) and EDTA- Chelating agent (S.D. Fine-Chem Limited, Mumbai) of laboratory grade were used in the study.

Authentication and Evaluation of Herbs

Dried herbs were authenticated by Dr. H.B. Singh (Chief Scientist & Head (Retd), Raw materials Herbarium & Museum, NISCAIR, New Delhi), Herbs Authentication Officer, AIMIL Pharmaceuticals (I) Limited, New Delhi. Moreover, all the herbs were evaluated as per Ayurvedic Pharmacopeia of India.

Preparation of Herbal Synergistic Extract[5,7-9]

Ethanollic Extract of aerial parts of *Azadirachta indica* (Neem), rhizomes of *Curcuma longa* (Haldi), leaves of *Coriandrum sativum* (Dhaniya), whole plant of *Aloe barbadandis* (Aloe Vera) and fruit of *Citrus limon* (Lemon) was prepared by Hot Extraction Method using water condensor.

Formulation of Polyherbal Face wash Gel

Carbomer Ultrez 20 was swelled in ethanolic extract, water and *Mentha* (Pudina) distillate along with the preservatives. After swelling of carbomer, glycerine was added. To the above mixture, Sodium lauryl ether sulphate (SLES) was introduced and gently mixed. Finally chelating agent i.e. EDTA and NaOH Solution was added to get complete gel with consistency.

Characterization and Evaluation of Gel[6]

The prepared face wash gel was evaluated for various parameters.

a) Colour

The colour of the face wash gel was visually analyzed.

b) Odour

The formulation was evaluated for its odour by smelling it.

c) Consistency

It was determined manually.

d) Viscosity

Viscosity of the gel was determined using Brookfield viscometer. The values obtained for the sample and for water were noted down.

e) Spreadability

The spread ability of the gel was found manually by applying the gel on the skin with gentle rub.

f) Washability

The product was applied on hand and was observed under running water.

g) Foamability

Small amount of gel was taken in a beaker containing water. Initial volume was noted, beaker was shaken for 10 times and the final volume was noted. Foamability was also analysed by applying onto skin with contact with water.

h) Grittiness

The product was checked for the presence of any gritty particles by applying it on the skin.

Accelerated Stability Studies [6]

The Face wash gel formulation was subjected to stability testing for 2 months as per ICH Guidelines at a temperature of $40\text{oC} \pm 2\text{oC}$ and RH 75%. The Gel formulation was analysed for the change in appearance, pH and phytochemicals.

Consumer Acceptance test

The Product was evaluated for consumer acceptance by 30 targeted consumers who were between 15-30 years old. The Evaluation was done on the basis of four parameters: (1) Appearance; (2) Foaming; (3) Fragrance; (4) After Rinse-off feel. This test was carried out with consent of all the participants.

RESULTS AND DISCUSSION

❖ Evaluation of Herbs

- *Azadirachta indica* (Neem)



Azadirachta indica, commonly known as neem, nintree or Indian lilac,[3] is a tree in the mahogany family Meliaceae. It is one of two species in the genus *Azadirachta*, and is native to the Indian subcontinent and most of the countries in Africa. It is typically grown in tropical and semi-tropical regions. Neem trees also grow on islands in southern Iran. Its fruits and seeds are the source of neem oil. Nimba (leaf) consist of dried leaf of *Azadirachta indica* ; (Family: Meliaceae); a moderate sized to fairly large evergreen tree, attaining a height of 12-15m with stout trunk and spreading branches, occurring throughout the country upto an elevation of 900m.

Table 1: Evaluation and Phytochemical Screening of *Azadirachta indica* (Neem).

RESULT OF ANALYSIS			
Description	:	Yellowish-green pieces, taste, bitter	
Macroscopic	:	Compound, alternate, rachis 15-20cm long, 0.1cm thick, leaflets with oblique base, opposite, acute, serrate, 7-8cm long.	
Parameter	RESULTS	SPECIFICATIONS	
Foreign Matter	:	0.8% w/w	Not more than 2% w/w
Total Ash	:	7.25% w/w	Not more than 10% w/w
Acid Insoluble Ash	:	0.4% w/w	Not more than 1% w/w
Alcohol Soluble Extractive	:	15.7% w/w	Not less than 13% w/w
Water Soluble Extractive	:	21% w/w	Not less than 19% w/w
Phytochemical Screening	:	Complies	Triterpenoids and Sterols

➤ *Curcuma longa* (Turmeric)



Fig 2: Rhizomes of Turmeric

Turmeric is a [flowering plant](#), *Curcuma longa*, of the [ginger](#) family, [Zingiberaceae](#), the [rhizomes](#) of which are used in cooking. The plant is a [perennial, rhizomatous, herbaceous plant](#) native to the [Indian subcontinent](#) and [Southeast Asia](#) that requires temperatures between 20 and 30 °C (68 and 86 °F) and a considerable amount of [annual rainfall](#) to thrive. Plants are gathered each year for their [rhizomes](#), some for propagation in the following season and some for consumption. The rhizomes are used fresh or boiled in water and dried, after which they are ground into a deep orange-yellow powder commonly used as a [coloring](#) and flavoring agent in many [Asian cuisines](#), especially for [curries](#), as well as for [dyeing](#), characteristics imparted by the principal turmeric constituent, [curcumin](#).

Haridra consists of the dried and cured rhizomes of *Curcuma longa* Linn (Family: Zingiberaceae); a perennial herb extensively cultivated in all parts of the country; crop is harvested after 9-10 months when lower leaves turn yellow rhizomes carefully dug up with hand picks between October-april and cured by boiling and dried.

Table 2: Evaluation and Phytochemical Screening of *Curcuma longa* (Turmeric)

RESULT OF ANALYSIS			
DESCRIPTION	:		Ovate, oblong, yellowish to yellowish-brown
MACROSCOPIC	:		Rhizome ovate, oblong or cylindrical, about half as broad as long, latter 2-5cm long and about 1-1.8cm thick, externally yellowish to yellowish brown with root scars.
PARAMETER	RESULTS		SPECIFICATIONS
FOREIGN MATTER	:	0.85% w/w	Not more than 2% w/w
TOTAL ASH	:	6.2% w/w	Not more than 9% w/w
ACID INSOLUBLE ASH	:	0.6% w/w	Not more than 1% w/w
ALCOHOL SOLUBLE EXTRACTIVE	:	9.7% w/w	Not less than 8% w/w
WATER SOLUBLE EXTRACTIVE	:	14% w/w	Not less than 12% w/w
PHYTOCHEMICAL SCREENING	:	Complies	Polyphenolic curcuminoids, Volatile oil

➤ *Coriandrum sativum* L. (Coriander)



Fig 3: Leaves of Coriander

Coriander is a plant. Both the leaves and fruit (seeds) of coriander are used as food and medicine. However, the term "coriander" is typically used to refer to the fruit. Coriander leaves are usually referred to as cilantro. In the following sections, the term "coriander" will be used to describe the fruit.

Dhanyaka consists of dried leaves of *Coriandrum sativum* Linn (Family: Umbelliferae) ; a slender, glabrous, branched, annual herb, cultivated all over India, 30-90 cm high; giving characteristic aroma when rubbed; crop matures in 2-3 months after sowing. Coriander is used for a long-term disorder of the large intestines that causes stomach pain (irritable bowel syndrome or IBS), constipation, diarrhea, gas (flatulence), nausea, athlete's foot (*Tinea pedis*), and many other conditions, but there is no good scientific evidence to support these uses. In foods, coriander is used as a culinary spice and to prevent food poisoning. In manufacturing, coriander is used as a flavoring agent in medicines and tobacco and as a fragrance in cosmetics and soaps.

Table 3: Evaluation and Phytochemical Screening of *Coriandrum sativum* L. (Coriander)

RESULT OF ANALYSIS		
DESCRIPTION	:	Small chopped leaves and twigs
MACROSCOPIC	:	Dried leaves,30-90 cm high; giving characteristic aroma

PARAMETER	RESULTS	SPECIFICATIONS	
FOREIGN MATTER	:	0.42% w/w	Not more than 1% w/w
TOTAL ASH	:	1.36% w/w	Not more than 3% w/w
ACID INSOLUBLE ASH	:	0.3% w/w	Not more than 0.5% w/w
ALCOHOL SOLUBLE EXTRACTIVE	:	6.80% w/w	Not less than 4% w/w
WATER SOLUBLE EXTRACTIVE	:	6.96% w/w	Not less than 5% w/w
PHYTOCHEMICAL SCREENING	:	Complies	Volatile oil

➤ *Aloe barbadensis* Linn (*Aloe Vera*)



Fig 4: Leaves of Aloe Vera

Aloe vera is a stemless or very short-stemmed succulent plant growing to 60–100 cm (24–39 in) tall, spreading by offsets. The leaves are thick and fleshy, green to grey-green, with some varieties showing white flecks on their upper and lower stem surfaces. The margin of the leaf is serrated and has small white teeth. The flowers are produced in summer on a spike

RESULT OF ANALYSIS			
DESCRIPTION	:	Leaves are large with a wide base and an apex.	
MACROSCOPIC	:	Leaves are thick and fleshy, green to grey-green, spike up to 90 cm (35 in) tall, each flower being pendulous, with a yellow tubular corolla 2–3 cm (0.8–1.2 in) long.	
PARAMETER	RESULTS	SPECIFICATIONS	
FOREIGN MATTER	:	2.75% w/w	Not more than 4% w/w
TOTAL ASH	:	3.4% w/w	Not more than 5% w/w
ACID INSOLUBLE ASH	:	0.4% w/w	Not more than 1% w/w
ALCOHOL SOLUBLE EXTRACTIVE	:	7% w/w	Not less than 5% w/w
WATER SOLUBLE EXTRACTIVE	:	13% w/w	Not less than 10% w/w

➤ *Mentha viridis (Mint)*



Fig 5: Leaves of Mint

Pudinah consists of the aerial part of *Mentha viridis* Linn (Family: Lamiaceae) a perennial, creeping aromatic herb of 30 to 90cm high, widely cultivated throughout the plains of India for culinary and medicinal purposes.

Table 5: Evaluation and Phytochemical Screening of *Mentha viridis (Mint)*

RESULT OF ANALYSIS			
DESCRIPTION	:	Small chopped leaves and twigs	
MACROSCOPIC	:	Small chopped twigs; leaves opposite, decussate, shortly petiolate, petioles 2mm long; mature leaves 2.5 to 3.5 cm long and 1.5 to 2.0cm broad.	
PARAMETER	RESULTS	SPECIFICATIONS	
FOREIGN MATTER	:	0.7% w/w	Not more than 2% w/w
TOTAL ASH	:	8% w/w	Not more than 14% w/w
ACID INSOLUBLE ASH	:	2.5% w/w	Not more than 4% w/w
ALCOHOL SOLUBLE EXTRACTIVE	:	4% w/w	Not less than 2% w/w
WATER SOLUBLE EXTRACTIVE	:	9.2% w/w	Not less than 7% w/w
PHYTOCHEMICAL SCREENING	:	Complies	Essential oils

❖ Formulation of Face wash Gel

Anti-acne face wash gel was fabricated using extract of herbs. The composition of gel developed in the laboratory is given in Table 6.

Table 6: Composition of Anti-acne face wash gel of polyherbal extract.

Ingredients	Concentration
Synergistic Herbal Extract	3.0%
De-mineralized Water	q.s. to 100
Mint distillate	10.0%
Carbomer Ultrez 20	1.0%
Glycerine	4.0%
Sodium Lauryl Ether Sulphate (SLES)	15%
NaOH (18% Solution)	2.4%
Sodium Methyl Paraben	0.1%
Sodium Propyl Paraben	0.1%



Fig 6: Anti-acne Face Wash Gel Formulation

❖ Evaluation of Gel

➤ Determination of Gel Viscosity

Table 7: Viscosity of Face wash Gel

Formulation	Viscosity (cp)
Anti-acne Face Wash Gel	1748

➤ Determination of pH, Physical properties

Table 8: Physical properties & pH of Face wash Gel

Physical parameters	Inference
Colour	Slightly yellowish
Odour	Sweet Lemon
Appearance	Translucent
Feel on application	Smooth & slippery
pH	6.15

➤ Spreadability, Consistency, Washability, Foamability and Grittiness of Formulation.

Table 9: Spreadability, Consistency, Washability, Foamability and Grittiness of Developed face wash gel

Formulation	Spreadability (g.cm/sec)	Consistency (60 sec)	Washability	Foamability	Grittiness
Anti-acne Facewash Gel	7.0	8 mm	Easily Washable	Foam volume 92ml at 5 minutes	No gritty particles
Marketed Face wash Gel	7.5	11 mm	Easily Washable	Foam volume 85ml at 5 minutes	No gritty particles

The values of Spreadability indicate that the face wash gel is easily spreadable by small amount of shear. Spreadability of marketed face wash gel was 7.5 g.cm/sec. The consistency reflects the capacity of gel, to get ejected in uniform and desired quantity when tube is squeezed. Consistency in terms of distance travelled by cone was between 7-8 mm of developed formulation as compared to 11 mm of marketed one. Consistency is inversely proportional to the distance travelled by falling cone. Hence, the consistency of face wash formulation was better as compared to that of marketed wash face gel. Developed anti-acne face wash gel showed foam volume of 92ml at 5 minutes and No gritty particles were observed in the formulation.

❖ Accelerated Stability studies

On storage of anti-acne face wash gel sample at 40oC and 75% RH, the appearance of the formulation was found to be clear with no significant variation in pH. The result of accelerated stability studies are presented in Table 10.

Table 10: Accelerated stability study results of developed Anti-acne Face wash Gel

Days	Appearance	pH	Phytochemicals
0	Slightly yellowish	6.15	Present
10	Slightly yellowish	6.15	Present
20	Slightly yellowish	6.17	Present
30	Slightly yellowish	6.17	Present
45	Slightly yellowish	6.19	Present
60	Slightly yellowish	6.20	Present

Based on the results of physicochemical evaluations (Viscosity, Spreadability, consistency, pH and accelerated studies) of the gel formulations, it was observed that the formulation was appropriate and it was further analysed for Consumer Acceptance Test.

❖ Consumer Acceptance Test

Parameter evaluated by 30 consumers were noted and proportional representation is given below.

- 85% of the users were satisfied with the Appearance of the Face Wash Gel.
- 77% of the consumers were satisfied with the light foaming formed by the Face Wash.
- 90% users liked the natural fragrance i.e. Lemon characteristic Odour of Face Wash.
- The After rinse-off feel by using the face wash gel was liked by 80% of the targeted consumers.
- No skin irritation case was found during and after the use of the Face Wash Gel.
- 4% users were not satisfied with the Face Wash Gel.

CONCLUSION

Herbal anti-acne face wash gel was developed and characterized along with the stability studies. The optimal formula was 65% de-mineralised water, 1% Carbopol Ultrez- 20, 2.4% NaOH (18%), 4% Glycerin, 10% Mint distillate, 15% SLES, 0.1% Sodium propyl

paraben, 0.1% Sodium methyl paraben and 3% herb extract (30.0% Neem, 20.0% Turmeric, 10.0% Coriander, 20.0% Fresh Lemon, 20.0% Aloe Vera juice) , which gave high effectiveness. In consumer test, the product was accepted by 83% of targeted consumers.

RESULTS AND DISCUSSION

The color of the formulations was brownish yellow and the intensity of the color increased with the increase in concentration of the extract in the gel. This might be due to the brownish yellow color of the combined extracts. The viscosity and the pH of the formulations are given in Table. The results showed that pH and viscosity were significantly changed as the concentration of extract increased. The pH value of the products varied from 6.82 to 7.34. Exceptionally Gel-CRB 100 showed a pH of 6.46. This might be due to the acidic nature of Carbopol used in the formulation.

This shows the weak acidic nature of the anti-acne gels. The viscosity values showed a consistent decrease with the increase in the concentration of extract. The viscosity of the Gel-CRB 100 was between Gel-HPMC 50 and 100. This shows that the Carbopol in even lesser quantity give a good consistency to the gel. The results of the spreadability test was given in Table and observed that Gel-HPMC 50 with 3.4 g-cm/s possess a better spreadability than other formulations. Stability studies were performed and the results were tabulated in Table. The results showed that the gels stood stable at all temperatures with a little change. The pH was slightly increased for Gel-HPMC 200 at 40°C. The viscosity of the formulations varied and the Gel-CRB 100 showed a decrease of 1 cps at 4°C, Gel-HPMC 50 showed a variation of 7 cps between 4 and 40°C, Gel-HPMC 100 showed a raise of 2 cps at 40°C and Gel-HPMC 200 showed a decrease of 1 cps at 4°C. No syneresis was exhibited by the gels. Thus, it can be concluded that all formulations are exhibiting similar stability profiles. The skin irritation test performed showed no signs of sensitivity, erythema, and edema. So the prepared formulations were considered to be non-irritant. The efficacy of the anti-acne gels from herbal extracts is shown in Table

The anti-acne gels could inhibit the growth of the microorganisms that inhabit acnes and all the formulations exhibited comparatively less efficacy to standard drug but Gel-HPMC 200 showed almost equal absorbance to Clindamycin gel. Gel-CRB 100 showed high absorbance compared to Gel-HPMC 100 indicating high growth of microorganisms even the extract concentration is same. Hence, HPMC is considered best for preparation of antiacne gels. The comparison of the gels with the standard and control

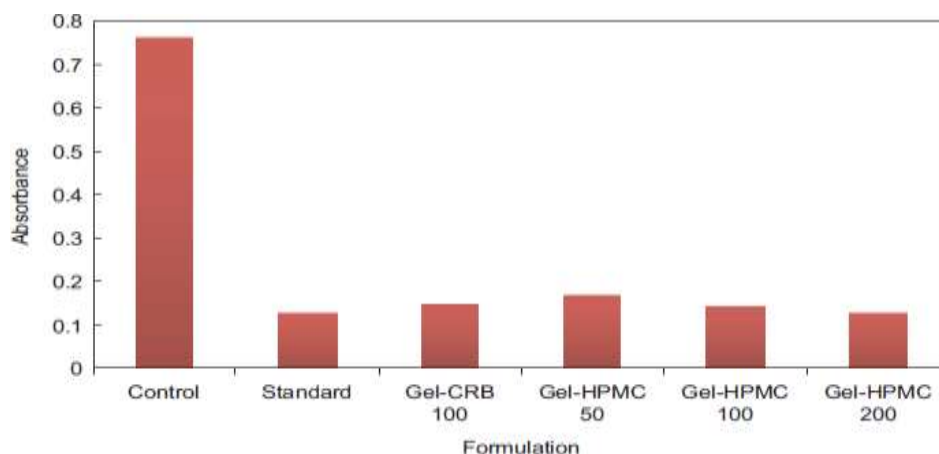


Fig. 1. Anti-acne efficacy of formulations

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