

Preparation Evaluation and Comparative Studies of Herbal Face Cream

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Abstract: *The aim of this article is to propose, create, and evaluate a new herbal (green tea) face cream formulation using the oil-in-water emulsion method using a mixture of raw medicinal alcohol extracts and green herbal tea extract using aloe vera gel, and compare to commercial tea face cream. It is prepared using the general method for the preparation of herbs, vanilla sugar, and soft drinks. The formulation is well-developed and tested. Both the physicochemical properties of the drug and the auxiliary substances added to the formulation contribute to the treatment. All of our creams have a pH of 5.5 - 7, which is good for the pH of the skin. Finally, we conclude from several studies that the preparation of green herbal tea has shown to be good and effective and may be suitable for commercialization in the future after successful completion.*

Keywords: Herbal face cream, Green tea, Formulation, Oil-in-water emulsion, Aloe vera gel, Commercialization

1. Introduction [1,2,3,4,5,6,7,8]

Cosmetics are cosmetic products containing medicinal ingredients designed to improve the health and beauty of the skin. Skin Cosmeceutical is a product used in the treatment or prevention of skin abnormalities (disease). Cosmetic products have the following features:

- The product is chemically active and intended for use on normal or near-normal skin.
- Products with good antibacterial properties (cosmetics).
- Since skin diseases are mild, the risk of this product should be very low.

1.1 Skin Care Cosmeceuticals Products:

Cosmetics and skincare products are widely used in daily beauty. The skin, the largest organ of the human body, protects the internal environment against skin damage that can be caused by external radiation, air pollution, chemicals, and industrial processes. Using cosmetics or other beauty products does not make the skin or the environment look beautiful. Cosmetic products contain chemicals or chemical-like substances that can affect the biological activity of the skin, depending on the type of activity they have. Skincare cosmetics improve the appearance, texture, or function of the skin.

1.2. Physiology of skin

Epidermis: The epidermis is the outer layer of the skin composed of stratified keratinized squamous epithelium that varies in thickness in different parts of the body. The palms and soles of the feet are the thickest. The epidermis has no blood vessels or blood vessels, but its deeper layers are bathed in fluid between the dermis, which provides oxygen and nutrients and flows out in the blood glands.

Dermis: Dermis is tough and durable. It consists of

connective tissue with a matrix containing collagen fibers intertwined with elastic fibers. When the skin is overstretched, the elastic fibers can break, causing permanent stretch marks or stretch marks that can occur during pregnancy and obesity. Collagen fibers bind water and give the skin its tensile strength, but as this ability decreases with age, wrinkles appear. Fibroblasts, macrophages and mast cells are the main cells in the dermis. Beneath it is the deepest part of the areola tissue and is different from adipose tissue.

Subcutaneous Gland: Contains epithelial secretory cells derived from the same tissue as the hair follicle. They secrete an oily substance called sebum in the hair follicles on the skin of all parts of the body except the palms and feet. They are usually found on the scalp, face, armpits and groin skin. In areas of transition from one epithelium to another, such as the lips, eyelids, nipples, labia minora, and glans, sebaceous glands are found independently of secreted hair follicles.

1.2.1 Functions of skin

- 1) Protection
- 2) Regulation of body temperature
- 3) Formation of vitamin D
- 4) Cutaneous sensation
- 5) Absorption
- 6) Excretion

1.3 Creams

Creams are cosmetic products that can be applied to the skin. Cream is defined as an "oil-in-water or water-in-oil liquid or semi-solid emulsion" formulation, the consistency of oil and water differs from oil and water^[11]

Creams are used for cosmetic purposes such as cleansing, beautification, appearance improvement, protection or treatment. These topical drugs are used to deliver the drug to

the skin or submucosa for local effects. This product is intended for topical application to the skin for the treatment of skin conditions^[12]. Creams are considered drugs as they are prepared according to procedures set by the pharmaceutical industry; non-pharmacological and topical drugs are widely used in the treatment of various skin diseases.

Creams can be Ayurvedic, herbal or allopathic and people use it according to their skin condition. They have one or more substances dissolved or dispersed in a suitable matrix. Depending on the level, the cream can be divided into O/W or W/O type emulsions. The term "cream" is often used for semi-liquid products that are formed as water-in-oil (for example, water-in-oil) or oil in water (eg: cream)^[13].

1.3.1 Classification of creams

All the skin creams can be classified on a different basis:

- 1) According to function, e.g., cleansing, foundation, massage, etc.
- 2) According to characteristics properties, e.g., cold creams, vanishing creams, etc.
- 3) According to the nature or type of emulsion.

1.3.2. Types of creams according to function, characteristic properties, and type of emulsion:

- 1) Make-up cream (o/w emulsion): a) Vanishing creams. b) Foundation creams.
- 2) Cleansing cream, cleansing milk, cleansing lotion (w/o emulsion) 3. Winter cream (w/o emulsion): a) Cold cream or moisturizing creams.
- 3) All-purpose cream and general creams.
- 4) Night cream and massage creams.
- 5) Skin protective cream.
- 6) Hand and body creams.

1.4 Herbal Creams

Today, herbal extracts are used in cosmetics to increase beauty and attractiveness. Cosmetic herbs are classified according to their dosage forms (sugar, powder, soap, medicine, etc.) and according to the body or body used; skin, hair, nails, teeth mouth etc. For cosmetics Creams are semi-solid emulsions that are applied to the skin or mucous membranes. Low-fat moisturizers that disappear on the skin are called disappearing creams.

It softens the skin without leaving any marks. Vanishing cream is an oil-in-water emulsion formulation consisting of an aqueous phase and an oil phase. Depending on the ratio of water to oil, creams can be mixed with water and washed easily, or they can be liquid. It is probably the most prescribed drug. Most patients find it easier to use as it is less greasy, messy, and sticky.

The evolution of traditional medicine has been responsible for securing world health for centuries until the advent of allopathic medicine. The latter technique is rapidly gaining acceptance and now dominating the medical field, as it uses modern knowledge of biology and chemistry for discovery and treatment. However, the involvement of traditional preparations (mostly many herbal remedies) is increasing because these products are generally considered safe;

Conventional single-molecule-based drugs used in allopathic medicine can have serious side effects. The skin is the first open border of the body. Signs of aging appear on the skin.

Although skin aging does not pose any threat to humans, it can have negative effects on the human brain. Many premature aging occurs as a direct or indirect result of the skin's interaction with the environment. Sun exposure is believed to be a significant, undesirable change in the skin. The photochemical reaction prevents the harmful effects of UV radiation on the skin caused by excessive oxygen production^[15,16,17].

1.4.1 Advantages of herbal creams

Herbs are important for their disease prevention and health promotion properties having the following advantages which are described below:

- 1) Natural cosmetics are natural and generally do not contain synthetic ingredients that can harm the skin.
- 2) It is safe to use safe and effective natural cosmetics. They are hypoallergenic, dermatologist tested and proven to be safe to use anytime, anywhere. Because they are made from natural ingredients, people do not need to worry about acne or skin irritation.
- 3) Suitable for all skin types Whether you are brunette or fair skinned; You will find natural cosmetic products suitable for your face, such as foundation, eye shadow and lipstick. Women with oily or sensitive skin can use it and not worry about their skin getting worse.
- 4) Many options. These products are more valuable than synthetic products. They are available at affordable prices and are inexpensive on sale. According to the estimates of the World Health Organization, about 80% of the world's population rely on natural products for treatment due to the side effects and rising prices of modern medicine.
- 5) No side effects. Synthetic beauty products can cause skin irritation and acne. They can clog pores and leave skin dry or oily. With natural cosmetics, you don't have to worry about these. Use natural ingredients to avoid side effects; People can use them anytime and anywhere.
- 6) Cosmeceuticals Cosmetics make up the largest segment of the beauty industry. Cosmeceuticals are cosmetic products designed to improve the health and beauty of the skin by providing specific effects, from acne control to sunscreen to anti-wrinkle.^[18]

1.4.2 Disadvantages of herbal creams

- 1) Chemicals and/or additives may irritate the skin causing contact dermatitis
- 2) Some chemicals have poor permeability to the skin
- 3) Allergic reactions may occur
- 4) Use of drugs that require less plasma is too much to benefit
- 5) Epidermis Enzyme causes massive epidermal denaturation
- 6) Using drugs that require Drugs with very small plasma size are not easily absorbed by the skin.

1.4.3 Application of Herbal Creams

- 1) Herbal Skin Care: Lavender Bath Powder and Soap, Silk Soap and Conditioner.
- 2) Herbal lip cosmetics: herbal lip plumper, herbal lip balm, herbal lip balm, and herbal lip gloss.

- 3) Eye cosmetics: eye shadow, eye color, eye make-up, liquid eyeliner
- 4) Herbal Creams, Lotions, Gels: Face cream: rich face cream and hand cream, Aloe Vera Moisturizing Hand Cream
- 5) Herbal Oils: Herbal oils are effective in the treatment of hair loss, hair loss, thinning hair, itchy scalp and itching
- 6) Herbal Fragrances and Fragrances: Citrus Fragrances: Light, fresh citrus notes (bergamot, orange, lemon, petitgrain, mandarin, etc. fruit, and chypre).^[19]

2. Green Tea

Green tea has been consumed throughout the ages in India, China, Japan, and Thailand. In traditional Chinese and Indian medicine, practitioners used green tea as a stimulant, diuretic (to promote the excretion of urine), astringent (to control bleeding and help heal wounds), and to improve heart health.^[19,20]

2.1 Plant Description

2.1.1 Plant name – Green tea

2.1.2 Biological source: - Camellia sinensis Family: - Theaceae

2.1.3 Synonym: -Tea plant or tea shrub.

2.1.4 Adulterants: The common adulterants of soapstone, gypsum, graphite, indigo dye, and Prussian blue dye substances.^[21]

2.1.5 Chemical Constituents: - The healthful properties of green tea are largely attributed to polyphenols, chemicals with potent antioxidant properties. In fact, the antioxidant effects of polyphenols appear to be greater than vitamin C. The polyphenols in green tea also give it a somewhat bitter flavor. Polyphenols contained in teas are classified as catechins. Green tea contains six primary catechin compounds: catechin, gallic acid, epicatechin, epigallocatechin, epicatechin gallate, and epigallocatechin gallate (also known as EGCG). EGCG is the most studied polyphenol component in green tea and the most active. Green tea also contains alkaloids including caffeine, theobromine, and theophylline. These alkaloids provide green tea's stimulant effects. Tea leaves contain many compounds, such as polysaccharides, volatile oils, vitamins, minerals, purines, alkaloids e.g., caffeine, and polyphenols e.g., catechins, and flavonoids. Although all three tea types have antibacterial and free radical capturing (antioxidizing) activities, the efficacy decreases substantially the darker the variety of tea. This is due to lower contents of anti-oxidising polyphenols remaining in the leaves. The polyphenols found in tea are more commonly known as flavanols or catechins and comprise 30-40 percent of the extractable solids of dried green tea leaves. The main catechins in green tea are epicatechin, epicatechin-3-gallate, epigallocatechin, and epigallocatechin-3-gallate (EGCG), with the latter being the highest in concentration. Green tea polyphenols have demonstrated significant antioxidant, anticarcinogenic, anti-inflammatory, thermogenic, probiotic, and antimicrobial properties in numerous human, animal, and in vitro studies.^[22,23]

3. Material and Methods

3.1 Collection of plant material-

The plant materials required for the present study were obtained from local market of Nagpur.

3.2 Procurement of herbs, & other excipients

Table 1: Procurement of herbs and other excipients

Materials	Property
Green tea leaves	Active ingredient
Steric acid	Emulsifying
Cetyl alcohol	Emollient
Potassium hydroxide	Lye
Aloe Vera gel	Moisturizing agent
Glycerine	Humectant
Methyl paraben	Preservative
Triethanolamine	Solvent
Water	Vehicle
S.M twenty	Perfume

Table 2: Formulation table

Sr. No.	Ingredients	Quantity taken
1.	Stearic acid	13gm
2.	Cetyl alcohol	0.1gm
3.	Potassium Hydroxide	0.1 gm
4.	Sodium Carbonate	0.1 gm
5.	Green tea Extract	1.0gm
6.	Aloe vera gel	2.0ml
7.	Glycerine	6.0ml
8.	Triethanolamine	0.2ml
9.	Water	q.s. (ml)
10.	SM Twenty	q.s.

3.3 Procedure^[26]



3.4 Evaluation of herbal cream ^[27,28,29,30,31]

- 1) Physical properties: The cream was watched for colour, scent and appearance. Colour was watched by visual perception, scent was watched by scent faculties and appearance was watched utilizing feel observation.
- 2) pH: Weighed 300 mg of cream, broken down in 30 ml of refined water and its pH was measured with the assistance of advanced pH meter. 3 pH readings were taken and after that their normal was calculated.
- 3) Viscosity: Thickness of the cream was decided by Helipath DV-E Brookfield Viscometer. 3 values of consistency were watched and its normal was at that point considered.
- 4) Spreadability test: The spread capacity of the cream details was decided by measuring the spreading distance across of 1 g of cream between two even plates (20 cm x 20 cm) after one diminutive. The standard weight connected on the upper plate was 100g.
- 5) Homogeneity: Homogeneity was tried by means of visual appearance. Whether the cream looks homogeneous or not was watched.
- 6) Dye test: The amaranth arrangement was blended with the cream. Set a drop of the cream on a minuscule slide, secured it with a cover slip, and inspected it beneath a magnifying instrument. In case the ceaseless stage shows up in ruddy colour the cream is o/w sort. On the off chance that the scattered stage shows up ruddy globules the cream is w/o sort.
- 7) Irritancy test: Stamped an region (1 sq. cm) on the left-hand dorsal surface. The cream was connected to the required zone and time was famous. Irritancy, erythema, edema, were checked in the event that any for standard interims up to 24 hrs. and detailed.
- 8) Washability: The cream was connected on the hand and watched beneath the running water. Perceptions were made on the premise of whether the cream is effortlessly washed off or not.
- 9) Determination of emolliency: Emollience, elusiveness and sum of buildup cleared out after the application of settled sums of cream was checked. The cream was connected on the skin and emolliency was observed.
- 10) Hard & sharp-edged rough molecule: Take almost 15 gm glue test on a plain paper. Test the glue by spreading on paper by a finger for positive of difficult & sharp edge grating particles. The test might be free from difficult & sharp edge rough molecule with can be feel by finger.



Figure 1: Formulated and marketed herbal face cream

4. Result and Discussion

4.1 Organoleptic Properties

Formulated face cream had cream colour and marketed Globus cream had light tea colour whereas good vibes face cream had an emerald colour. All three formulations have a Pleasant Odour.

4.2 pH

The formulated face cream has a pH of 6.49, marketed good vibes cream have a pH of 6.36 & globus cream with a pH of 6.39. The pH of all three creams was found to be in the range of 5.5 – 7 which is suitable for skin pH.

Figure 2: pH determination

4.3 Viscosity

Brookfield viscometer was used for the study of viscosity of the herbal creams. Resultant dial reading is been noted at each speed. Viscosity was obtained by dial reading X factor set in the brook field viscometer catalogues. The standard value through certain references of the viscosity for herbal face cream is 5×10^{-4} to 50 P.sec.

Table 3: Observation of Viscosity

Sr. no.	Cream	Spindle No.	RPM	Viscosity (cp)	Viscosity (Pascal. sec)
1.	Formulated	S-94	10	*18560	*18.56
2.	Globus	S-95	3	*123800	*384.4
3.	Good Vibes	S-95	3	*142300	*143.3

*n=3, average of three readings

4.4 Spreadability

The spread ability of the cream formulations was determined by measuring the spreading diameter of 1 g of cream between two horizontal plates (20 cm x 20 cm) after one minute. The standard weight applied on the upper plate was 100g.

Formulated cream = Final diameter - Initial diameter
= 4.2cm – 1cm = 3.2cm

Globus cream = Final diameter - Initial diameter
= 2.7cm – 1cm = 1.7cm

Good Vibes cream = Final diameter - Initial diameter
= 4.2cm – 1cm = 3.2cm

As we can observe the marketed goodvibes green tea face cream and formulated green tea face cream has excellent spreadability and globus green tea containing face cream has good spreadability.

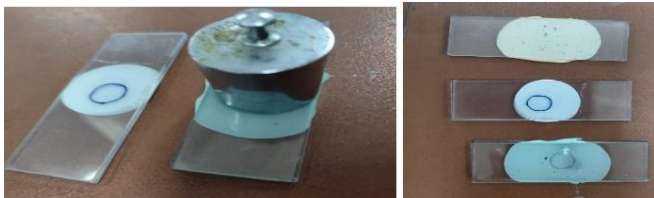


Figure 3: Determination of spreadability

& sharp edge abrasive particles. The sample shall be free from hard & sharp edge abrasive particle with can be feel by finger. In both the marketed face creams the hard and sharp edge particles were found absent hence is non-abrasive whereas in formulated face cream was found little abrasive due to presence of few particles.

4.5 Dye Test

The amaranth solution was mixed with the cream. Placed a drop of the cream on a microscopic slide, covered it with a cover slip, and examined it under a microscope. If the continuous phase appears in red colour the cream is o/w type. If the dispersed phase appears red globules the cream is w/o type. On observing all the three dyed creams under microscope it was found that all the three creams are oil in water emulsion.



Figure 4: Hard- & sharp-edged abrasive particle

4.6 Hard- & sharp-edged abrasive particle

Take about 15 gm paste sample on a plain paper. Test the paste by spreading on paper by a finger for positive of hard

5. Comparative Studies

Table 4: Comparative Studies of Herbal Face cream & Marketed Face cream^[29,30]

Sr. no.	Physicochemical Parameters	Standard Value	Results		
			Formulated cream	Marketed Good vibes cream	Marketed Globus cream
1	Colour	Cream- green	Cream	Emerald	Tea
2	Odour	Pleasant	Pleasant	Pleasant	Pleasant
3	Viscosity	$5 \times 10^{-4} - 50 \text{ P*sec}$	18.56	143.3	384.4
4	pH	5.5-7	6.49 ± 0.08	6.36 ± 0.25	6.39 ± 0.38
5	Homogeneity	Excellent	Good	Excellent	Excellent
6	Fines	Excellent	Good	Excellent	Excellent
7	Hard- and sharp edged particles	Absent	Present	Absent	Absent
8	Spreadability	Excellent	Excellent	Excellent	Good
9	Removability	Should be easily removable	Easily remove	Easily remove	Not easily removable
10	Emolliency	No Residue should be found	Small amount of Residue	No Residue	No Residue
11	Sensitivity test	No Irritation	No Irritation	No Irritation	No Irritation
12	Irritation test	No Irritation	No Irritation	No Irritation	No Irritation
13	Dye Test	o/w	o/w	o/w	o/w

6. Conclusion

The herbal face cream was prepared by using the o/w emulsion method using a mixture of alcoholic extract of crude drugs, including green tea extract, aloe gel is used and formulation is developed, evaluated, and compared with marketed green tea face cream.

Herbal (Green tea) Face cream was prepared using the general method for the preparation of vanishing cream and compared with market creams.

- Colour: Formulated face cream had a cream colour and marketed Globus cream had a light tea colour whereas Good Vibes face cream had an emerald colour.
- Odour: All three formulations have a pleasant Odour.
- Viscosity: Formulated face cream had a viscosity of 18.56Psec, Marketed Globus cream had a viscosity of 384.4Psec, and good vibes cream had a viscosity of 143.3Psec.

- pH: Formulated face cream has a pH of 6.49, Marketed Good Vibes cream has a pH of 6.36 & Globus cream with a pH of 6.39.
- Spreadability: The Spreadability of Formulated and Marketed face cream was observed between 3cm/s to 5cm/s.
- Hard and sharp-edged particles: There was the absence of hard & Sharp-edged particles in both marketed creams but few hard- and sharp-edged particles were observed in the formulated face cream.
- Homogeneity and fines: Both marketed face creams had excellent smoothness, homogeneity, and finess whereas formulated cream had good smoothness, homogeneity, and fines.
- Emolliency: In the case of marketed creams, no residues were found whereas in the case of formulated creams small amount of residue was observed on rubbing.
- Sensitivity: No irritation was experienced after application of all three creams.
- Dye test: It proves that all the creams were o/w emulsion.

Hence formulation, evaluation, and comparative study of Formulated green tea face cream with marketed green tea cream of the brand - Globus and Good Vibes was performed efficiently. Finally, we conclude from various studies that the prepared herbal cream of green tea in comparison with the marketed cream is showing good and effective results and may be suitable for the market in the future after final finishing.

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