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Formulation and Evaluation of Herbal Cosmetics

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Abstract:
The purpose of the present research work was to formulate and evaluate vanishing herbal cream. Herbal creams offer several advantages over other creams. The majority of existing creams which has prepared from drugs of synthetic origin and give extra fairness to face, but it has several side effects such as itching or serveral allergic reactions. Herbal creams do not have any of these side effects, without side effects it gives the fairness look to skin. Method carried out to prepare herbal cream was very simple. Firstly, oil phase was prepared, mixtureof stearic acid (17%), potassium hydroxide (0.5%), sodium carbonate (0.5%) were melted at700C. Secondly aqueous phase was prepared, mixture of alcoholic extract of crude drugs, including C.officinalis and A. indica, Turmeric, Nutmeg, Cinnamon, are commercially available as extracts and in different formulation to be used either for cosmetic purposes or for medical use.Glycerin (6%), perfume (0.5%), water (71%) heated at 70^0C. Then aqeuous phase was added into the oil phase at 70^0c with continuous stirring. Now, once the transfer was completed it was allowed to come at room temperature all the while being stirred. Perfume was added at last just before the finished product was transferred to suitable container. The above prepared herbal cream was evaluated. The physical parameters such as pH, homogeneity by visual and by touch, appearance, washability, consistency, Patch test, irritancy test accelerated stability studies, type of smear were determined. Further studies are needed to investigate this formulation for its performance.

KEYWORDS: Herbal extract, Vanishing cream, Evaluation, Crude drug, C. Officinalis

INTRODUCTION

Now-a-days herbal extracts are used in the cosmetic preparations for augmenting beauty and attractiveness. Herbal cosmetics are classified on the basis of dosage form like- cream, powder, soaps, solutions, etc. and according to part or organ of the body to be applied for like; cosmetics for skin, hair, nail, teeth and mouth etc.[1] Creams are semisolid emulsions intended for application to the skin or mucous membrane. A low fat moisturizer that disappears into the skin is called as a vanishing cream. It softens skin, leaving nothing behind.[2]

Herbal cream are o/w emulsion based preparations containing aqueous phase and oil phase.[3] Depending on the proportion of water to grease, cream can be water miscible and washed away easily or be thick and sticky. It is perhaps the commonest prescribed topical medicament. As it is less oily, messy and sticky, most patients find it more user-friendly.[4] The traditional systems of medicine, evolved over centuries had been responsible for safe guarding healthcare of the world until the advent of allopathic system of medicine. As the latter system used knowledge of modern biology and chemistry, for both discovery and treatment, it found fast acceptability among the users and now it occupies predominant space in the area of health care. In spite of this, the contribution of the traditional preparations, which are normally polyherbal, is increasing because of the general impression that these products are safe; while the single-molecule based modern drugs used in allopathic system can have severe adverse effects.[5] The skin is the body's first line of defense for external exposure. The signs of ageing are most visible in the skin. Although, ageing skin is not a threat to a person, it can have a detrimental effect on the psychology of a person.[6] Much of the premature ageing occurs as a direct or indirect result of skin's interaction with the environment. Exposure to sunlight is a recognized as a major factor in the etiology of the progressive unwanted changes in the skin appearance.[7]

Photochemoprotective agents are capable of preventing the adverse effects of ultraviolet radiation on the skin, which are caused by excessive generation of reactive oxygen species.[8] This herbal vanishing herbal cream consists of various crude drugs including C. officinalis (calendula officinalis family-compositae) and A.indica (Azadirechta indica family-meliaceae), Turmeric (Curcuma longa, family Zingeberaceae), Nutmeg (Myristica fragrans, family Myristicaceae), Cinnamon (Cinnamomum zeylanicum ,family Lauraceae) .[9]

The Demand of herbal cosmetics due to the availability of new ingredients the financial rewards for developing successful products and maintained of quality standard. Cosmetics are the products applying on the body. Face cream are used as cosmetic for softening and cleansing action. The Ayurvedic system of medicine was one of the most important systems that uses herbal plant and extract of the treatment of management of various Diseases state Aloevera Synonyms-Aloe Barbadensis Belong To Family- Liliaceae, which having 300 specie, Aloevera is cactus like plant that grow readily in hot, dry climates, and Aloevera cultivated in very large Quantities. The Herbal Cosmetics and some medicinal products are made up from the mucilaginous tissue in the centre of aloevera leaf and called Aloevera gel. Aloevera gel contains no Antraquinone. Which are Responsible for the strong laxative affects of aloes.[10]

The objective of this research work was to formulate the herbal vanishing cream which does not cause any side effects or adverse reactions. The cream also acts as a fairness expert in dayto day life by removing aging signs. It also possesses nutritional value which provided required nutrients to the skin.[11]

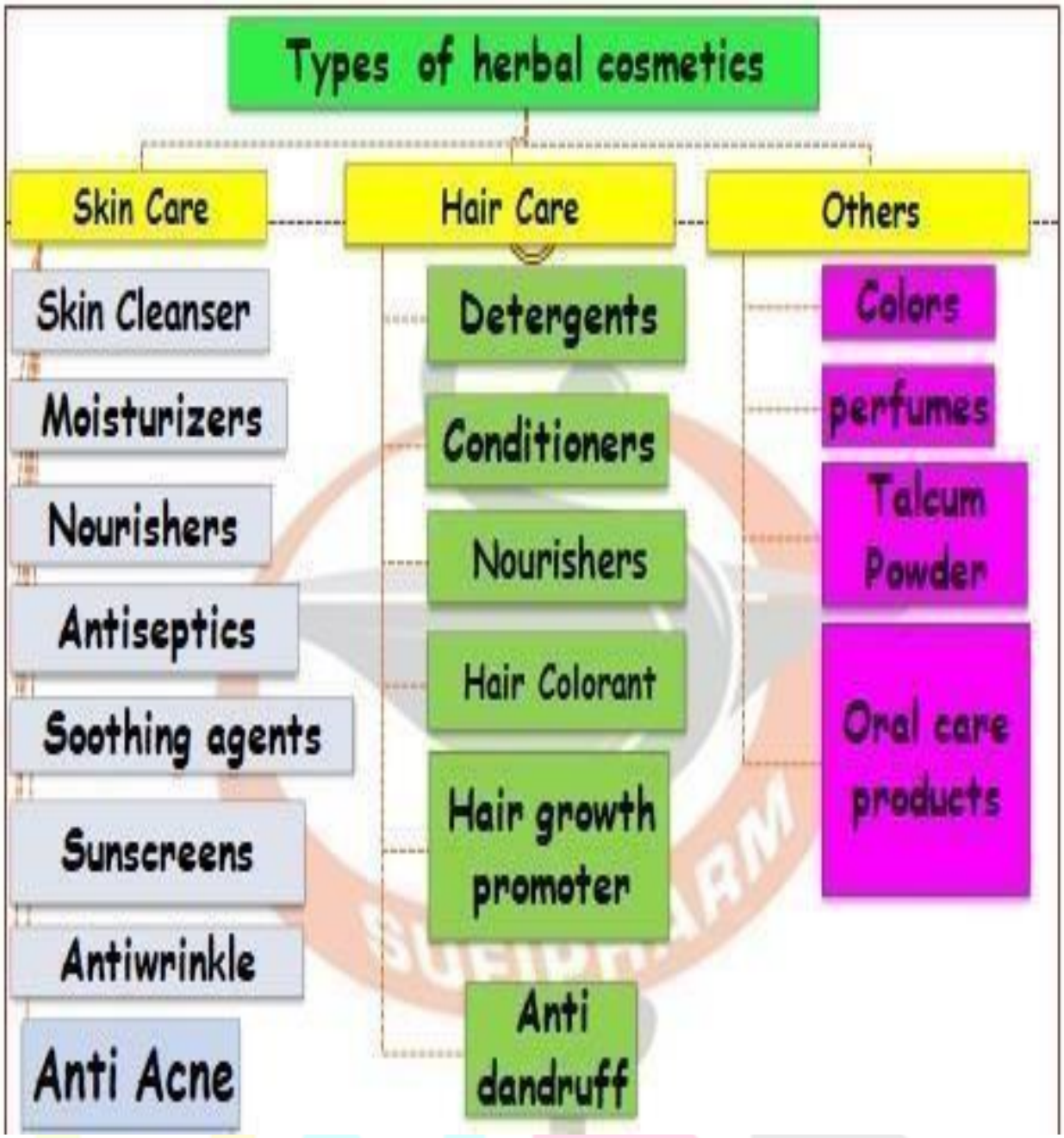

Fig. Types of Herbal Cosmetics

Herbal Cold Creams

They are Herbal cosmetic preparations, which are intended to be applied topically to the face or on the body surface, for the purpose of cooling and hydrating effects. The principle of their formulation is based upon the emulsification of emulsifying agent to water and oils using certain techniques.[12]

Marketed Cold Creams

Fig. Herbal Cold Cream

Herbal Vanishing Creams

They are oil-in-water emulsions, the principle of their formulation is based upon emulsification of both stearic acid and water using alkaline substance such as sodium hydroxide, potassium hydroxide, and borax, tri-ethanolamine, etc. glycerin is also added. Stearic acid is the most important constituent of vanishing creams hence a good quality triple pressed stearic acid should be selected.

Fig. Herbal Vanishing CreamFormulation of Herbal Cream

Steps carried out in the preparation of vanishing herbal cream were as follows.[13]

Preparation of alcoholic extract of crude drugs:

All above mentioned powdered crude drugs of 5gms were taken into the conical flask and then 100 ml. of ethanol was added to it, then the conical flask was capped with aluminum foil. Then this mixture was placed for maceration for 5 days.

Preparation of oil phase:

Stearic acid (17%), potassium hydroxide (0.5%), sodium carbonate (0.5%) was taken into one porcelain dish and this mixture was melted at 70^0C.

Preparation of aqueous phase:

Alcoholic extract of crude drugs mentioned in step-1 (4.5%), Glycerin (6%), Water (71%) were taken into another porcelain dish and heated this mixture at 70^0C.

Addition of aqueous phase to oil phase:
The aqueous phase was added to the oil phase with continuous stirring at 70^0c. Now, once the transfer was completed it was allowed to come at room temperature, all the while being stirred. Perfume (0.5%) was added at last just before the finished product was transferred to suitable container. Then cream was evaluated for various physical parameters.[14]

Composition of cream:

Sr. no.	Ingredients (for 100gm)	Quantity (gm)
1	Ethanol extract of Azadirachta indica	2
2	Stearic acid	12
3	Cetyl alcohol	3
4	Almond oil	4
5	Methyl paraben	0.028
6	Propyl paraben	0.029
7	Propylene glycol	4
8	Triethanilamine	Q.S

Herbal Vanishing Cream:

The herbal vanishing cream was prepared by using o/w emulsion method usingmixture of alcoholic extract of crude drugs, including C. officinal is and A. indica, Turmeric, Nutmeg, and Cinnamon and the extract were used and formulated 3 different formulations.[15]

Table 2: Composition of Herbal Cream

Sr. No.	Ingredients	Quantity (%)
1	Steric acid	17%
2	Potassium hydroxide	0.5%
3	Sodium carbonate	0.5%
4	Alcoholic extract	4.5%
5	Glycerin	6%
6	Perfume	0.5%
7	Water	71%

Evaluation of Herbal Cream

Determination of organoleptic properties: The appearance of the cream was judged by its color, pearl scence and roughness and graded.

pH : The pH meter was calibrated and measured the pH by placing in the beaker containing 20mg of the cream.

Determination of homogeneity: The formulations were tested for the homogeneity by visual appearance and by touch.

Spreadability test: 500mg of the cream was sandwiched between 2 slides. A weight of 100gm was placed on upper slide. The weight was removed and extra formulation was scrapped off. The lower slide was fixed on board of apparatus and upper slide was fixed with non-flexible string on which 20g load was applied. Time taken by upper slide to slip off was noted down.[16]

Dye test: The test was done by mixing the cream with red dye then place the drop of cream was placed on a slide and covered with cover slip, observed under microscope. If the dispersion phase appears in red colored globules the cream was O/W type. If the continuous phase appears red color the cream was w/o type.[17]

Homogeneity: The test was done by physical touch with hands.

Appearance: The appearance of the cream was found by observing its color, opacity, etc.

Smear type : The test was conducted after the application of cream on the skin the smear formed was oily or aqueous in nature.

Determination of emolliency : Emolliency, slipperiness and amount of residue left after the application of fixed amounts of cream was checked.

Determination of viscosity: The viscosity determinations were carried out using a Brookfield Viscometer using spindle number S-64 at a 20 rpm at a temperature of 25^0C. The determinations were carried out in triplicate and the average of three readings was recorded.

Washability: The removal of the cream applied on skin was done by washing under tap water with minimal force to remove the cream.[18]

Irritancy test: The cream was applied on left hand dorsal side surface of 1sq.cm and observed in equal intervals up to 24hrs for irritancy, redness and edema.

Accelerated stability studies: Accelerated stability studies were performed on all the formulations by maintaining at room temperature for 20 days with constant time interval. During the stability studies the parameters like homogeneity, viscosity, physical changes, pH and type of smear were studied.[19]

Herbal Sunscreens Lotions

Sunscreens are used to protect the skin from the harmful effects of the sun, including the appearance of erythema in the short term and actinic photo-ageing and skin cancers in the long term. The decrease in the intensity of UV radiation reaching the skin through sunscreensmay reduce the risk of sun-induced skin cancer.

Fig. Herbal Sunscreen Lotions

Formulation of herbal sunscreen lotions

Accurate quantities of cetyl alcohol, zinc oxide, stearic acid, glycerin, and hydroxy propyl methyl cellulose (HPMC) were weighed. Accurate quantity of water was measured and taken in a 400 ml beaker. 1.0 g of triethanolamine was added to water and stirred. The water solution was heated up to a temperature of 80°C to 85°C.

After the water solution has reached the required temperature, melted cetyl alcohol, zinc oxide, stearic acid, glycerin, hydroxy propyl methyl cellulose mixture and propyl paraben were slowly poured into the water solution a little at a time, stirring constantly. Stirring was continued until a smooth and uniform paste was obtained. The prepared sunscreen lotion was set aside to cool.[20]

Table : Composition of Sunscreen Lotions

Sr. No.	Ingredients	Quantity (%)
1	Aloe gel	5%
2	Olive oil	2%
3	Rose oil	1%
4	Rose water	3%
5	Zinc oxide	12%
6	Cetyl alcohol	2%
7	Glycerin	2%
8	Vitamin E	1%
9	HPMC	10%
10	Distilled water	50.50%

Evaluation of formulated sunscreen lotions

i. Physicochemical studies

The physicochemical parameters considered for the study include color, pH, volatile and nonvolatile content, ash value, layer thickness and rheological studies such as viscosity Spreadability and stability. The parameters were evaluated according to the guidelines of Bureau of Indian Standard (BIS), World Health Organization [WHO], European Cosmetic, Toiletry and Perfumery Association [COLIPA] and Scientific Committee of Cosmetics and Non-Food Products [SCCNFP].[21]

ii. Safety evaluation by Mutagenicity assay

The standard plate incorporation test for Mutagenicity was carried out as per Maron and Ames. The strain used for the study was Salmonella typhimurium strain TA 100 without the S9 mix. The assay was performed in triplicate for each sample and the mutagenic responses of the sunscreen agents were evaluated.[22]

iii. Irritation test

The skin irritation test was performed on albino rats of both sexes weighing about 150–200 g. The animals were maintained on standard animal feed and free access to water. Hair was shaved from the back of rats and an area of 2 cm^2 on both sides.[23]

iv. Efficacy analysis

Efficacy of herbal sunscreens was determined by In-vitro method using UV Visible spectrophotometer. 0.10 % solution (w/v) each of the three formulated sunscreen lotions in n-propyl alcohol was prepared by dissolving 0.050 g of the sunscreen lotion in 50.0 ml of n-propyl alcohol. 0.10 % solution of the two selected commercial sunscreen lotions (SPF 20 and 55) in n-propyl alcohol was also prepared.

Herbal Aloevera Gel

Aloe is also common in both traditional Chinese and ayurvedic medicine. The aloevera is derived from Arabic word "Alloeh" meaning "shining bitter substance" while "vera" in latine means "true". The plant aloevera has a history dating back to biblical time. There are over 250 species of aloe grown around the world.[24]

Marketed preparation

Fig : Aloevera gel

Fig : Aloevera plant

Fig : Aloevera juice

Objective :

1. To prepare good quality product.
2. To formulate lotion that is safe for all types of skin.
3. To formulate lotion that locks natural moisture and provides essential hydration to skin that gives healthy and soft skin.
4. To evaluate herbal lotion.[25]

Plan of work

- Selection of plant.
- Literature survey.
- Collection of plant leaves.
- Extract mucilage part of the leaves.
- Formulation of herbal lotion of aloevera.
- Evaluation of herbal lotion of aloevera.[26]

Formulation of Aloevera Gel

Formulation method of Gel :

Collect raw material (aloe leaves) Washing leaf and removed base and tip of the leaf, leaf are is cut into section (Filleting) Extract mucilage part of the leaves into mixing jar and Heat it and add agar into the mixing jar. Grinding/Homogenization of Unpasteurized Juice Add Vitamin E and Pasteurize the mixer cool the mixer of aloe leaf Packaged the produced gel and Stored it.

Steps Used In Formulation of Gel :

Reception of raw materials- The Aloevera leaves after harvesting were preferably transported to the processing place. The leaves should be sound, undamaged, mold/rot free and matured (3-4 years) in order to keep all the active ingredients in full concentration.

Grinding- The major steps in this process include crushing or grinding. The aloe gel fillets should be crushed and homogenized using a commercial high speed tissue crusher at room temperature (25°C).And add agar into the mixture Addition of vitamin E- The unpasteurized aloe gel juice was fortified with vitamin E to improve the flavor of Aloevera gel juice and to stabilize the juice. It is used for its antioxidant activity.

Measure the quantity of above formulated gel. Weigh all other ingredient used in formulation. Take a large glass or plastic mixing bowl. Add measured out gel of the aloevera into the mixing bowl. Then add other ingredients of the formulation one by one like coconut oil, rosewater, vitamin E, glycerin, essential oil & arrowroot powder with measured quantity. Mix all the ingredient of the bowl in vigorously manner. Herbal lotion was prepared.[27]

Fig : Crushing of Aloevera Pulp

Fig : Aloevera herbal lotion

Composition : [28]

Table : Composition of Aloevera Gel

Chemicals	Quantity	Role
Aloevera gel	3 ml	Moisturizing the skin
Coconut oil	2.4 ml	Antibacterial activity
Rose water	5 ml	Hydrate the skin
Vitamin E	2 capsule	Antioxidant
Glycerin	3 ml	Moisturizing agent

Evaluation of Aloevera Gel :

- **Determination of pH :** pH of 1% aqueous solution of the formulation was measured by using calibrated digital pH meter at constant temperature. pH value of the formulation is 5
- **Homogeneity :** All developed gels were tested for homogeneity by visual inspection after the gels have been set in the container. They were tested for their appearance andpresence of any aggregates.
- **Smoothness :** The smoothness of the lotion formulation was tested by rubbing between the fingers and observes whether the gel is smooth, clumped, homogenous orrough.
- **Appearance :** All the formulations of aloevera lotion were light green.[29]

Herbal Shampoos

- Shampoos it is a preparations used to remove both hydrophilic and hydrophobic grease, dirt and debris from the hair and scalp without harm and adverse reactions.
- Generally they are prepared water soluble ingredients into water phase, then continuous mixed and stirring with hydrophobic substance melted phase with additionof suitable type surfactant/surfactants.
- Addition of substances to improve the functions appearance acceptability such as coloring, perfumes, glow etc. should be at the end.[30]

Marketed shampoos

- Lotus
- Vatilka
- Shikakai
- Patanjali
- Himalaya
- Ayur

Formulation of herbal shampoo:

Decoction Method:

Weghied all the ingredients according to the formula.

Decoction of Hibiscus, Henna, Neem, Amla, Banyan root powders, Alovera gel, Soya milk was prepared in one part of water.

Filter it, by using muslin cloth. Collect filtrate.

Decoction of Shikakai and Ritha was prepared in another part of water. Filter it by using muslin cloth. Collect filtrate.

Mixed to each other of above filtrate with constant stirring.

Mixed gaur gum as a thickening agent for maintenance of consistency of herbal shampoo as like semisolid nature. Preservatives and perfume was added lastly.[31]

Figure : Formulation of Herbal Shampoo

Formulation Table :

Sr. No.	Ingredients	Quantity
1	Moringaoliefera	2ml
2	Aloe vera	2ml
3	Hibiscus	1ml
4	Guar gum	0.05gm
5	SLS	0.25gm
6	Rose water	3ml

Composition [32]:

Table : Composition of Herbal Shampoo

Sr. No.	Constituents	Part of plant used	Quantity
1	Hibiscus powder	Leaves	5 gm
2	Neem powder	Leaves	5 gm
3	Henna powder	Leaves	5 gm
4	Amla powder	Fruits	10 gm
5	Shikakai powder	Fruits	15 gm

Different parts of herbs used in shampoo:

Sr. No.	Constituents	Biologiocal source	Family	Uses
1	Hibiscus leaf	Dried leaves of hibiscus rosea	Malvaceae	Prevents hair loss and hair growth promoter
2	Henna leaf	Dried leaves of lawsonianermis	Lythraceae	Growth of hair, conditioner
3	Neem leaf	Dried leaves of azadirachtaindica	Miliaceae	Prevent the dryness of hairs and flaking ofhairs
4	Amla fruit	Dried ripew fruits of embelicaofficinalis	Euphorbiaceae	Darkening of hairs and hair growth promoter
5	Shikakai fruit	Dried pods of cacia concinna	Mimosaceae	Foam base and anti dandruff

Evaluation of Herbal Shampoo:

To evaluate the prepared formulations quality control tests including visual assessment and physicochemical controls such as pH and viscosity were performed. Also to assure the quality of products, specific tests for shampoo formulations including the determination of dry residue

and moisture content tests were carried out. The results were compared with marketed formulations.[33]

Physical appearance /visual assessment

The formulations prepared were evaluated in terms of their clarity, foam producing ability and fluidity.

Determination of pH

The pH of shampoo solution in distilled water was determined at room temperature by using pH paper.

Determine percent of solids contents

A clean, dry evaporating dish was weighed and added 4 gram's of herbal shampoo to the evaporating dish. The exact weight of the shampoo was calculated only and put the evaporating dish with shampoo was placed on the hot plate until the liquid portion was evaporated. The weight of the shampoo only (solids) after drying was calculated.[34]

Rheological evaluation

The viscosity of the shampoo was calculated by using viscometer. The viscosity of the shampoos was measured with the temperature and sample containers size was kept constants during the study.[35]

Result and Discussion:

A majority of the world's population in developing countries still relies on herbal medicine to meet its health needs and because of this extensive research is now being carried out in this area. The pH of the prepared cream with the extract was found to be around 6 which is suitable for topical application because the pH of the skin is between 4.5– 6.

The spreadability studies showed that formulation have better spreadability when compared with the marketed cream. This is perfectly challenged to Marketed Creams. The stability studies of the various parameters like visual appearance, nature, pH of the formulations showed that there was no significant variation after two months of the study period. The formulation shows no redness, edema, inflammation and irritation during Patch Test studies. These formulations are safe to use for skin. There is more scope for pathogenic microorganisms study culturing it with agar medium.

Conclusion:

The herbal cream of crude drugs with the best properties and having nutritional value was to be prepared by simple methods and less equipment are required. The prepared herbal cream also has antioxidant and antibacterial activity due to this it retards aging signs and pimple formation on the face. Further studies are required for this vanishing herbal cream. It was found that this type of formulation of the vanishing herbal cream was not prepared earlier. Oil in water emulsion-based cream was formulated using natural ingredients and was evaluated. By combining all these ingredients it can be concluded that this cream can be used as a multipurpose cream and the ingredients mixed can produce synergistic effect of the other. Further studies can be carried out on stability and skin irritancy test of the cream.

Future Perspectives:

In India, traditional medicine literature like the Ayurveda has proved the concept of using herbs for beautification in the past. The herbal cosmetic preparations were used for worship and sensual enjoyment. Moreover, herbal extracts have been used for various skin and hair ailments and for enhancing the overall appearance over centuries. Over the last couple of decades, the Indian cosmetics industry has witnessed rapid and strong growth. Today, it is recognized as one of the emerging industries with immense growth potential. Next to China, India is the largest producer of medicinal plants, and India owns more than 40% of global diversity.

According to the research report, India is one of the 12 mega biodiverse countries around the world. In India, nearly 45,000 plants are used in the Indian system of medicine, while 9,500 plant species are used by tribals in their daily requirements. Out of these 9500 species, 7,500 plants have direct medicinal use, while 950 are giving new leads and claims that require scientific scrutiny. Furthermore, in India, more than 70% of the population uses herbal cosmetics for health care. However, as indicated in the "International cosmetic ingredient dictionary and handbook" issued in 2016, India has not been included as the country that recognizes the need for uniformity in cosmetic ingredient nomenclature and has not formally identified dictionary (potential cosmetic ingredients) in its regulations.

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