Research Article **ISSN: 2349 – 4492**

Asian Journal of Research in Biological and Pharmaceutical Sciences

Journal home page: www.ajrbps.com

https://doi.org/10.36673/AJRBPS.2023.v11.i02.A05

FORMULATION AND EVALUATION OF HERBAL FACE CREAM

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ABSTRACT

Aloe vera, Indian gooseberry (amla) and cucumber peel have been the mainstay traditional medicinal plants in various herbal medicine systems like Ayurveda, Siddha and homeopathy. The gel obtained from the central leaf of aloe vera is essentially added into medicinal and cosmetic products due to its mucilaginous tissue. In Tamil, it is called "alum katti." A form of this gel, which is without anthraquinone, is favored because it does not have strong laxative properties as the whole leaf extract that may contain anthraquinone does. Aloe vera contains around 75 active constituents, in all, of vitamins, enzymes, minerals, sugars, amino acids and proteins. It is also rich in some amino acids like glutamic acid, proline and aspartic acid, which constitute amla. Cucumber peels are rich in fiber and their content includes high levels of some vital minerals like magnesium, silica and potassium, which are essential for proper muscle, bone and tendon strength. In fact, these are the constituents that would keep the skin healthy with good moisturizing effects, for clearing of complexion and improving vision.

KEYWORDS

Aloe vera, Amla, Cucumber peels, Face cream and Laxative effect.

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INTRODUCTION

Cosmetics

The term "cosmetic" refers to any substance designed to be applied, whether by rubbing, pouring, sprinkling, or spraying, onto the human body or any of its parts for the purposes of cleaning, enhancing beauty, increasing attractiveness, or changing the look. This definition also encompasses any item meant to be used as a component of a cosmetic product.

Herbal Cosmetics

These cosmetics are formulated with botanical products known for their cosmetic benefits.

The incorporation of botanical ingredients in beauty products has grown significantly, primarily because they are gentle and non-toxic.

The ingredients in these cosmetics include both natural and phyto-based components.

Natural ingredients encompass oils, extracts and secretions, among others, while phyto-ingredients consist of pure substances extracted through various methods.

Advantages

Aids in diminishing scars caused by injuries to the skin.

Assists people in lessening various skin marks.

Effective in lightening dark circles beneath the eyes.

Disadvantages

Skin irritation.

Increase in acne formation.

Incorrect application might result in eczema.

SKIN ANATOMY

Human Skin

Epidermis

The epidermis, the most superficial skin layer, varies in the body. It is thinnest on the palmar and plantar surfaces. A blood vessel or a nerve fiber is absent in the epidermis; however, the basal layers of this layer are bathed with interstitial fluid furnished from the underlying dermis. The interstitial fluid furnishes the required oxygen and nutrients; it also contains lymph.

Dermis

The strength combined with elasticity of dermis owed to is the presence of connective tissue whose matrix contains collagen fibers interwoven with elastic fibre. These elastic fibres break when the skin is overstretched and result in permanent lines called stretch marks that appear due to destruction of these fibers and generally occur during pregnancy or obesity.

Subcutaneous gland

These consist of secretory epithelial cells that come from the hair follicle's source tissue. They create the greasy material known as sebum, which they release into the hair follicles. They are present throughout the skin, with the exception of the palms and soles. They are most dense within the skin of the face, axillae, groins, and scalp.

TOPICAL DRUG DELIVERY

In recent decades, the administration of drugs to treat various illnesses has been achieved through multiple routes, including oral, sublingual, rectal, parenteral, topical, and inhalation methods. Specifically, topical delivery involves applying a drug-infused formulation directly onto the skin to address skin-related disorders or the skin symptoms of a broader illness, such as psoriasis. The goal is to localize the drug's pharmacological effects to either the surface or deeper layers of the skin. Topical therapies primarily use semisolid formulations, but they also use foams, sprays, medicated powders, solutions and even medicated adhesive systems.

Advantages

Avoidance of first pass metabolism.

Convenient and easy to apply.

Avoid of risk

Inconveniences of intravenous therapy and of the varied conditions of absorption like pH changes

Presence of enzymes gastric emptying time etc.

Achievement of efficacy with lower total daily dosage of drug by continuous drug input.

Disadvantages

Possibility of local irritation at site of application

Skin Irritation or contact dermatitis due to drug or excipient

Skin’s low permeability limits the number of drug that can be delivered in this manner.

The skin is a very effective barrier, so only drugs with small molecules that can easily penetrate the skin can be delivered by this method.

potential for localized irritant and allergic cutaneous reactions

CREAMS

Creams are homogeneous, semi-solid or thick subtle elements with a by and large fluid consistency that are associated remotely to the skin or particular mucous layers for helpful, preventive or protective purposes when an occlusive affect is not required. These semisolids are as regularly as conceivable composed of one or more drugs that have been broken down or broken down in the true blue bases.

Advantages

Avoid change of sedate levels inter-and intra-patent variations.

Convenient and simple to apply.

Avoidance of to begin with pass digestion system.

Avoid of risk.

Disadvantages

Skin bothering of contact dermatitis may happen due to the medicate and/ excipients.

Poor porousness of a few drugs through the skin.

Possibility of unfavorably susceptible reactions.

Can be utilized as it were for drugs which require exceptionally little plasma concentration for action.

Ideal Properties

Easy to apply.

Spread effortlessly on the skin

Pleasant in appearance.

Melt or melt when connected on to the skin.

Types

Oil-in-water (o/w) type

Water-in-oil (w/o) type

Cosmeticcreams

Medicatedcreams

Oil-in-water (o/w)

They may be cleaned off with water more promptly and are less oily. For occurrence, fluocinolone acetonide cream.

Water-in-oil (w/o)

More challenging to work with. hydrophobic and will come out of a W/O cream less demanding than an O/W cream. As in cold cream and moisturizing cream.

Corrective creams

These creams are broadly utilized for dermatoses, a run of skin diseases.For occurrence, hydrating, cold, all-purpose, night, skin-protective and hand creams; vanishing; and establishment and moisturizing

Medicine creams

A cream is an emulsion that is semisolid and contains either broken up or suspended medication.For case, zinc oxide moisturizer, anti-microbial cream and antifungal cream.

Classification

Cleansing and Cold Creams.

Foundation and Vanishing Creams.

Night and Message Creams Hand and Body Creams.

All-purpose Creams is Cleansing and Cold Creams

Method of preparation

Trituration

Levigation

Fusion method

Trituration

Geometric weakening is utilized when including finely isolated insoluble solids or fluids. The center is turned into a well for including fluids. When littler sums were required, we utilized glass chunks to avoid discuss pockets. A mortar and pestle were utilized to crush up huge sums of powder.

Route

Including insoluble coarse particles; this handle is too known as "damp crushing". Coarse powder is rubbed with a liquid base that is fluid, semisolid, or liquid. To expect grittiness, the shearing oblige must be taken into account.

Fusion strategy

This approach incorporates dissolving drugs and other materials in a cream base a few time as of late combining them. The dissolvable components break up when the settling is broken up into the base. Smoothing happens after trituration or figure of the thicken mix. To expect warm corruption from harming the base and other components, combination utilizes specific approaches.

PLANTS PROFILE

Drug and Excipients profile

Aloe Vera (L.) Burm.f.

Botanical Description

Scientific name: *Aloe barbadensis*

Common Name: Korphad

Synonym: Aloe, Ghritkumari

Kingdom: Planta

Biological source: Aloes is obtained from the dried juice of the leaves of ***Aloe barbadensis Miller*** (Curacao aloes),

Aloe Ferax Miller (Cape Aloe), ***Aloe perryi Baker*** (Socotrinealoes).

Family: Liliaceae

Genus: Aloe

Species: A. vera

Part of Used: Leaves

Description

Aloe Vera is a short-stemmed shrubby aloe, frequently suckering and forming dense clumps. The leaves are succulent, erect, forming a dense rosette. The leaves are greyish green, growing to about 50cm long, with margins thatare pinkish with many small spines.

Chemical Constituents

Amino acid, Lignin, Saponins, Anthraquinones, Mono and Polysaccharides, Vitamins, Minerals, enzymes.etc.

Uses

Wound Healing, Skin Health and Aging, Tooth and Gum Disease, Acid Reflux and Heartburn, Constipation, Diabetes and High Cholesterol.

Pharmacological activity

Antibacterial, anti-inflammatory, antioxidant, Antimicrobial, Antiviral, Wound healing, Antidiabetic, Skin-protective etc[1].

***Amla (Phyllanthus emblica L.*)**

Botanical Description

Scientific name: *Emblica officinalis Gaertn.*

Common Name: Aawla

Synonym: Emblica, Indian goos berry

Kingdom: Plantae

Biological source: This is consists of dried, as well as fresh fruits of the plant ***Emblica officinalis***.

Gaerth ***Phyllanthus emblica*** Linn.

Family: Euphorbiaceae

Genus: Phyllanthus

Species: P. emblica

Part of Used: Fruits

Description

It is a wild deciduous tree that can grow up to 10-16 feet tall. The Indian gooseberry tree has smooth, gray-brown bark. The leaves are like a tamarind tree or a fern-like, oblong but narrow, up to 2-4cm and the flowers are inconspicuous as they are green in color. The flowers are bisexual and appear in clusters. Fruits are smaller, with a diameter of up to 3-5cm, in a greenish-yellow color that changes into orange-brown after maturity. The flesh is tart, juicy and crisp and contains 1 or 2 tiny seeds[2,3].

Chemical Constituents

Amino acid like glutamic acid, proline, And Aspartic acids etc.

Uses

Hair Care, Reduces Stress, Eye Care, Respiratory Health, Treats Anemia, Blood Purifier, and Diuretic.

Pharmacological activity

Antibacterial, antifungal, antiviral, antidiabetic, hypolipidemic, antiulcerogenic, free radical scavenging, antioxidant, antimutagenic, antiinflammatory, immunomodulatory, antipyretic, analgesic, antitussive, antiatherogenic, adaptogenic, snake venom neutralizing, etc[4].

Cucumber (Cucumis sativus L.)

Botanical Description

Scientific name: *Cucumus sativus L.*

Common Name: Cucumber

Synonym: *melon, melon vine.*

Kingdom: Plantae

Biological source: Cucumber is obtained from the fruits of ***Cucumis sativus.***

Family: Cucurbitaceae

Genus: Cucumis

Species: C. sativus

Part of Used: Peels

Description

The cucumber plant is a sprawling vine with large leaves and curling tendrils. The plant may have 4 or 5 main stems from which the tendrils branch. The leaves of the plant are arranged alternately on the vines, have 3-7 pointed lobes and are hairy. The cucumber plant produces yellow flowers that are 4cm (1.6 in) in diameter. The cucumber fruit varies in shape but is generally a curved cylinder rounded at both ends that can reach up to 60cm (24 in) in length 10cm (3.9 in) in diameter. Cucumber plants are annual plants, surviving only one growing season and the vines can reach up to 5m (16.4 ft) in length[5].

Chemical Constituents

Ascorbic acid, Enzyme, cucur-bitacins etc.

Uses

Hydration, Rich in Nutrients, Weight Management, Antioxidant Properties, Anti-Inflammatory Effects, Skin Benefits, Heart Health, Detoxification, Blood Sugar Regulation, etc.

Pharmacological activity

Antioxidant, anticancer, anti-inflammatory, analgesic, ant hepatotoxic, antidiabetic, antifungal,

antibacterial, antidiarrheal and thrombolytic effects, etc[6].

Bees Wax:
IUPAC Name: Beeswax / Cera Flava
Molecular Formula: $C_{15}H_{31}COOC_{30}H_{61}$
Melting Point: 62 to 64°C
Solubility: Soluable in chloroform, ether, sparingly soluble in ethanol, insoluble in water.
Density: 0.95-0.960 Gram per milliliter (g/mL)
Odor: sweet honey balsam waxy hay tobacco spice
Functional Category: Emulsifier
Structural Formula:

White soft paraffin
IUPAC Name: White soft paraffin
Molecular Formula: C15H11ClO7
Molecular Weight: 338.69664g·mol^{-1}
Melting Point: Between 38 to 56°C
Density: 0.835 Gram per milliliter (g/mL)
Functional Category: Emollient or skin protectant[7].
Structural Formula:

Methyl Paraben
IUPAC Name: Methyl 4-hydroxybenzoate
Molecular Formula: $CH_3(C_6H_4(OH)COO)$
Molecular Weight: 152.15g·mol^{-1}
Melting Point: Between 96° to 99°C
Boiling Point: 298.6°C
Density: 1.46 Gram per milliliter (g/mL)
Functional Category: Antimicrobial preservative[8].
Structural Formula:

Menthol
IUPAC Name: 5-Methyl-2-(propan-2-yl)cyclohexan-1-ol
Molecular Formula: $C_{10}H_{20}O$
Molecular Weight: 156.269g·mol^{-1}
Melting Point: Between 36° to 38°C
Boiling Point: 214.6°C
Density: 0.890 Gram per milliliter (g/mL)
Functional Category: Analgesic or cooling agent[9].
Structural Formula:

Glycerine
IUPAC Name: Propane-1,2,3-trio
Molecular Formula: $C_3H_8O_3$
Molecular Weight: 92.09382 g·mol^{-1}
Melting Point: 17.8°C
Boiling Point: 290°C
Density: 1.26 Gram per milliliter (g/mL)
Functional Category: Humectant/ Moisturizing agent[10]
Structural Formula:

Propylene glycol
IUPAC Name: Propane-1,2-diol
Molecular Formula: $C_3H_8O_2$
Molecular Weight: 76.095g·mol^{-1}
Melting Point: −59°C
Boiling Point: 188.2°C
Density: 1.036 Gram per milliliter (g/mL)
Viscosity: 0.042 Pa·s(pascal second)
Functional Category: Humectant and Solvents[11].
Structural Formula

Zinc oxide
IUPAC Name: Propane- oxazinc
Molecular Formula: ZnO
Molecular Weight: 81.406 g·mol^{-1}
Melting Point: 1,974 °C
Boiling Point: 2,360 °C
Density: 5.61 Gram per milliliter (g/mL)
Functional Category: Bulking agent[12]
Structural Formula

Sodium benzoate
IUPAC Name: Sodium benzoate
Molecular Formula: $C_7H_5NaO_2$
Molecular Weight: 144.105 g·mol^{-1}
Melting Point: 410 °C
Solubility: soluble in liquid ammonia, pyridine
Density: 1.497 Gram per milliliter (g/mL)
Odor: Odorless.
Functional Category: Preservative[13]
Structural Formula

EXPERIMENTAL WORK

Selection and authentication of plant

The plant was selected Aloe Vera (L.) Burm.f. [Liliaceae], Phyllanthus emblica [Euphorbiaceae], Cucumber (*Cucumis sativus L.*) [Cucurbitaceae]. The plant was collected from and authentified by Botanical Survey of India, P.S.G.V.P. Mandal's Arts, Science and Commerce College, Shahada, Dist. Nandurbar (MS), 425409[14,15].

Selection of the part of the plant

The leaves, fruit, peel part of Aloe Vera (L.) Burm.f, Amla/ Phyllanthus emblica, Cucumber (*Cucumis sativus L.*) had been selected for the Research. Contain more amount of active constituents which are responsible for the main

pharmacological activities like Antibacterial, anti-inflammatory, antioxidant, Antiviral, Wound healing, Antidiabetic, Skin-protective, antifungal, hypolipidemic, antiulcer genic, anticancer, anti-inflammatory, analgesic, ant hepatotoxic, antidiarrheal, etc[16].

Collection and Cultivation of Aloe Vera (L.) *Burm.f, Phyllanthus emblica, (Cucumis sativus L.)* and Excipients

Materials and Methods

Leaves, fruit, peel was collected from the botanical garden, Leaves, fruit, and peel were shade dried for 15-20 days under room temperature. After dried leaves is crushed in Commercial electrical stainless steel blender was used and material was converted into powdered form and saved for further analysis[17].

Extraction

Plant material (30g) was extracted with ethanol by using Soxhlet extraction method. Set temperature on heating mantle. After completion of extraction. Extract aside for evaporation on water bath, until it's nature get sticky. Then they were preserve in refrigerator[18,19].

Method of preparation

Beeswax, propylene glycol was taken in first beaker. Then heat on a water bath for uniform mixing. After few minutes oil phase was formed.

Aloe Vera, Amla and cucumber peel extract, Distilled water, white soft paraffin and glycerin, zinc oxide, Sodium benzoate was taken in second beaker.

Mixing all the ingredients by heating on a water bath, the aqueous phase was formed.

Oil phase was added into aqueous phase and continuous stirring was done until semisolid mass was formed.

EVALUATION

Evaluation of Cream

Physical Appearance

Colour: The colour of the cream was watched by visual examination. The result was shows in Table No.3

Odour: The odour of cream was found to be characteristics in Table No.3

State: The state was cream was examined visually. The cream was solid in state result was shows in Table No.3

Consistency

The formulation was examined by rubbing cream on hand manually. The cream having smooth consistency in Table No.3

Washability

Formulation was applied on the skin and then ease extends of washing with water was checked. Results were shown in Table No.3

pH

The pH of all the cream was determined using digital pH meter. The solution of 1.0gm cream was prepared by using 100 ml of Distilled water and set aside 2hr. pH was decided in three times for arrangement and the normal esteem was calculated.

Spreadability

Spreadability was decided by device, which is appropriately adjusted in the research facility and utilized for the ponder. It comprises of a wooden square, which is given by a pulley at one conclusion. By this strategy, spreadability is measured on the premise of 'Slip' and 'Drag' characteristics of cream. A ground glass slide is settled on this square. An abundance of cream (approximately 2gm) beneath consider is put on this ground slide. The cream is at that point sandwiched between this slide and another glass slide having the measurement of settled ground slide and given with the snare. The best plate is at that point subjected to drag with the offer assistance of string connected to the snare and the time (in seconds) required by the best slide to cover a remove be famous and weight in gram was recorded. Spreadability was calculated using following formula

i.e. $S = m * L/T$. ----------[1]

Where m = weight tide to upper slide,

L = length proceeded onward glass slide,

T = time taken.

Results are mentioned in Table No.3

Non- Irritancy Test

Herbal cream formulation was evaluated for the non-irritancy test. Preparation shown no redness and irritancy. Observation of the state was done for 24 h 28[17]. Results was shown in Table No.3.

Viscosity

Viscosity had been measured using Brookfield Viscometer at the temp of 25°C. As the system is

non-Newtonian spindle no. S-63 were used. Results are mentioned in Table No.3.

Phase separation

The prepared cream was transferred in a suitable wide mouth container. After 24 hours, the oil phase and aqueous phase separation were visible and were put aside for storage. Result were shown in Table No.3.

RESULTS AND DISCUSSION

Results and Discussions

Selection and authentication of plant

The authetification of *Aloe vera, Phyllanthus Emblica, Cucumis sativus* is done by P.S.G.V.P. Mandal's Arts, Science and Commerce College, Shahada, Dist. Nandurbar (MS), 425409.
[Table No.2].

The present study was the formulation and evaluation of herbal cream. The evaluation parameters were coming under results, like the physical evaluation of herbal cream, PH of the cream, Spreadability, Washability, non-irritancy test, viscosity and phase separation of the herbal pain reliving cream was shown in Table No.5. The present work was the formulation and evaluation of herbal cream. The present study was the formulation and evaluation of herbal cream. The evaluation parameters were coming under results, like the physical evaluation of herbal cream, PH of the cream, Spreadability, Washability, non-irritancy test, viscosity and phase separation of the herbal pain reliving cream was shown in Table No.3. The present work was the formulation and evaluation of herbal cream.

Table No.1: Formulation

S.No	Ingredients	Quantity
1	Aloe Vera	2.25gm
2	Amla	1.5gm
3	cucumber peels	1.2gm
4	Bees wax	4.8gm
5	White soft paraffin	13.5gm
6	Methyl paraben	0.45gm
7	Menthol	0.3gm
8	Glycerin	1.5ml
9	Propylene glycol	1.5ml
10	Zinc oxide	1.05gm
11	Sodium benzoate	0.15gm
12	Distilled water	q.s

Table No.2: Selection and authentication of plant

Specimen No	Plant Name	Family
1	*Aloe vera*	Liliaceae
2	*Phyllanthus Emblica*	Euphorbiaceae
3	*Cucumis sativus*	Cucurbitaceae

Table No.3: Observation results of herbal cream

S.No	Parameter	Results
1	Colour	White Green
2	Odour	Characteristics
3	State	Semi- Solid
4	Consistency	Soomth
5	Wash ability	Easy washable
6	pH	6.46
7	Spreadability	7.4g.cm/s
8	Non- irritancy test	Non- Irritant
9	Viscosity	39015 Pa.s
10	Phase separation	No Phase sepration

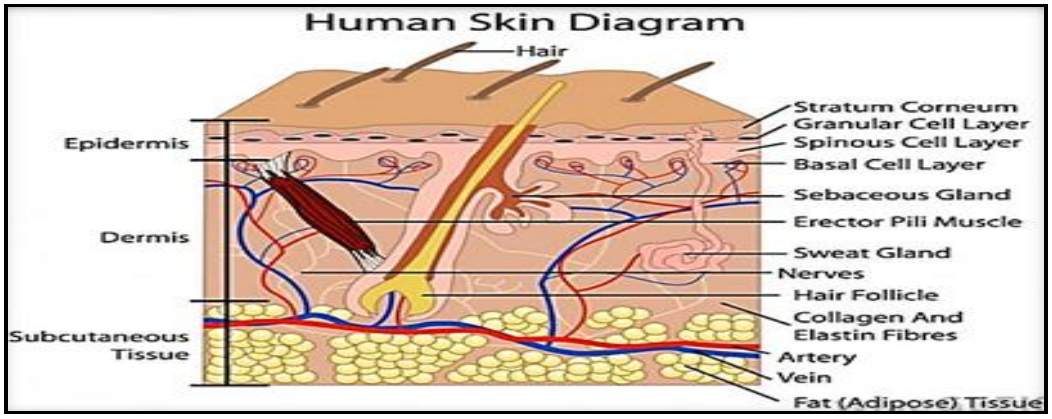


Figure No.1: Skin anatomy

Figure No.2: Aloe vera

Figure No.3: Amla

Figure No.4: Cucumber peel

Figure No.5: Aloe Vera Powder

Figure No.6: Amla Powder

Figure No.7: Cucumber Peel Powder

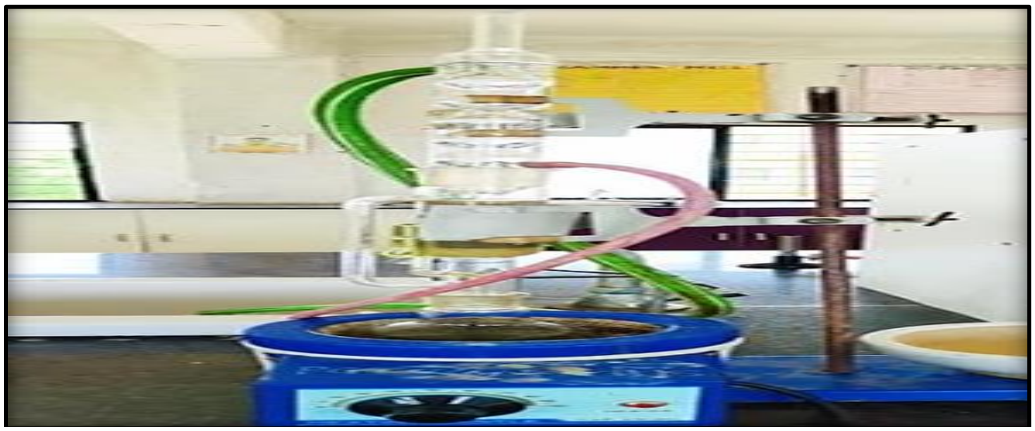


Figure No.8: Extraction (Soxhlet extraction)

Figure No.9: Filtration (Extract)

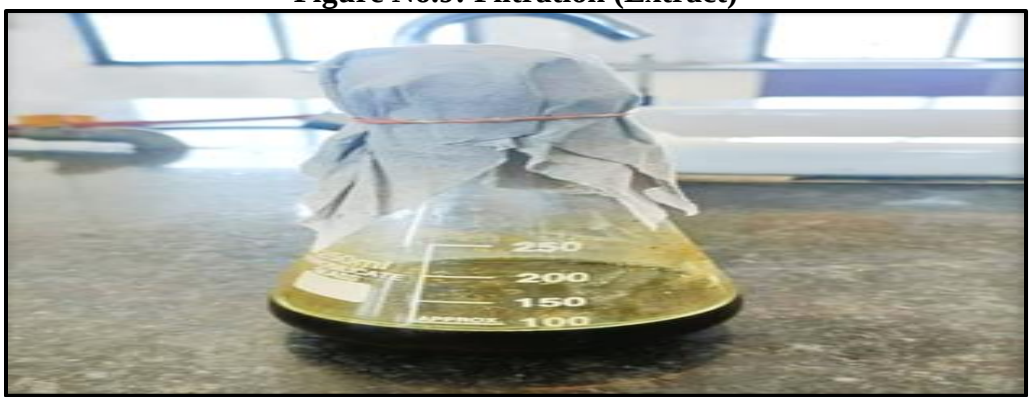


Figure No.10: Filtrate Extract

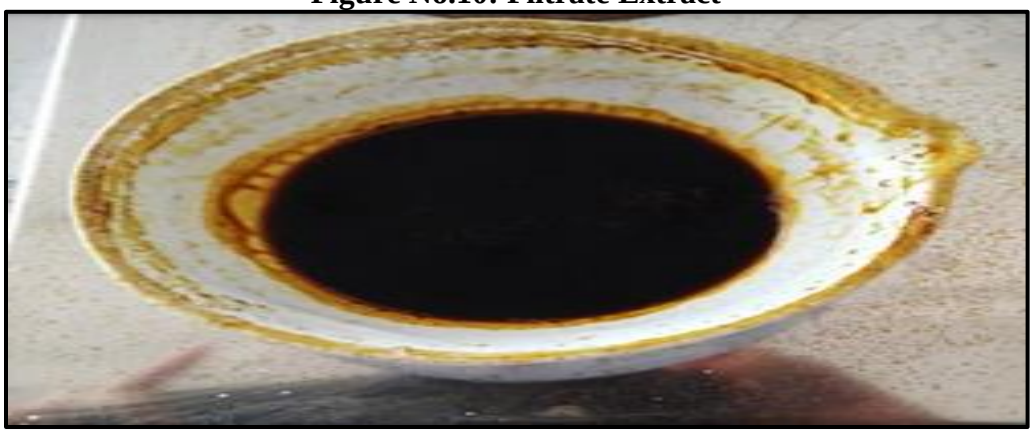
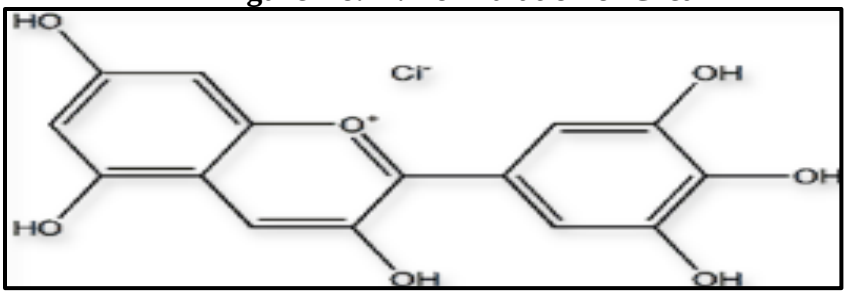


Figure No.11: Evaporate (Extract)

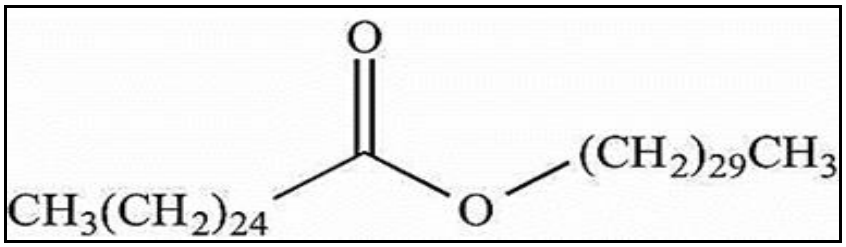
Figure No.12: Aqueous Phas

Figure No.13: Oil Phase

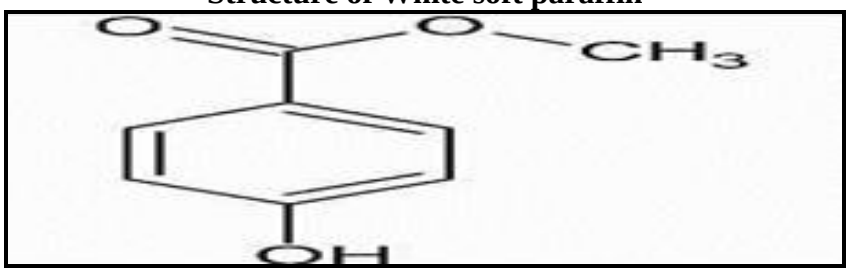
Figure No.14: Formulation of Cream



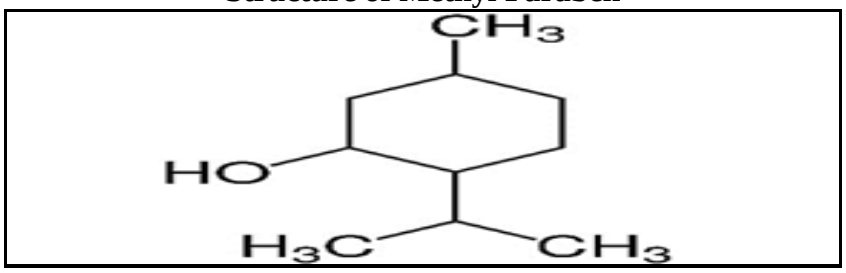
Structure of Bees Wax



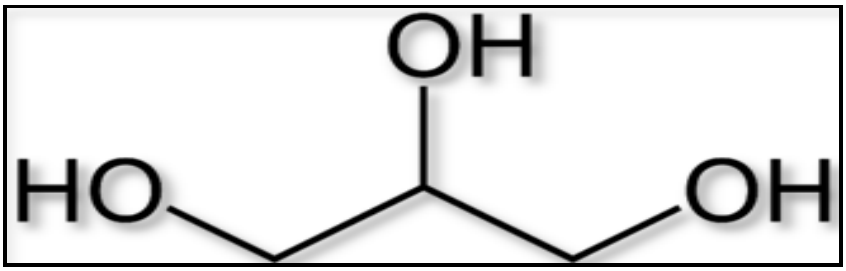
Structure of White soft paraffin



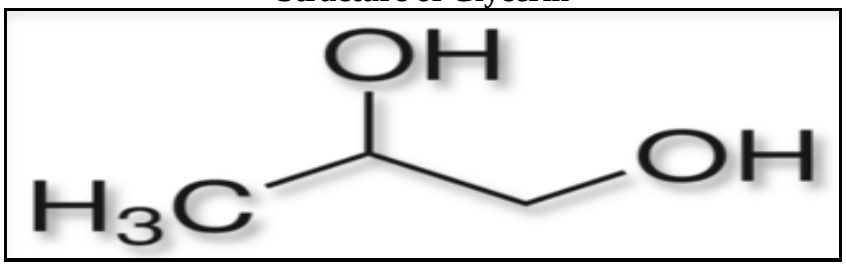
Structure of Methyl Paraben



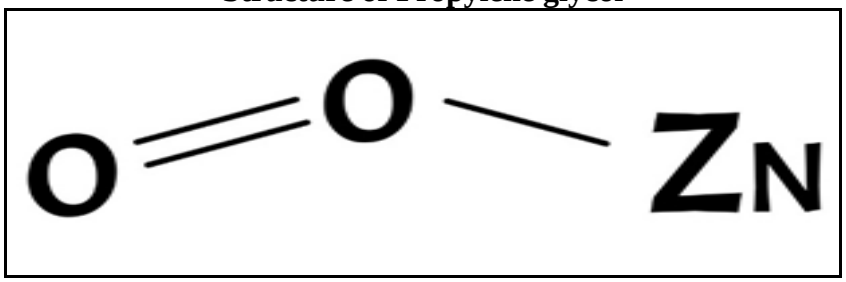
Structure of Menthol



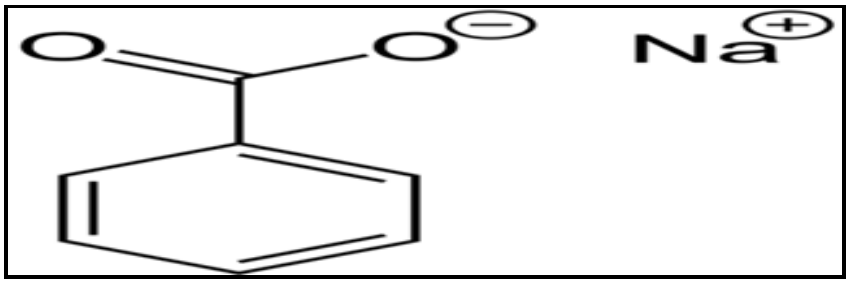
Structure of Glycerin



Structure of Propylene glycol



Structure of Zinc oxide



Structure of Sodium benzoate

CONCLUSION

The present work describes an innovation that *Aloe vera, Phyllanthus Emblica, Cucumis sativus* product containing herbal cream based formulation. *Aloe vera* contains more amounts of active constituents which are responsible for the main pharmacological activities Antibacterial, anti-inflammatory, antioxidant, Antimicrobial, wound healing, Skin-protective, Laxative. *Phyllanthus Emblica* is responsible for the main pharmacological activities like Antibacterial, antifungal, antioxidant, Antimicrobial and Cucumis *sativus* is responsible for the main pharmacological activities like Emollient, anti-itching, wound healing. Formulation which comprises of *Aloe vera, Phyllanthus Emblica, Cucumis sativus* extract, Bees wax, White soft paraffin, Methyl paraben, Menthol, Glycerin, Propylene glycol, Zinc oxide, Sodium benzoate. The current study highlighted an approach in developing *Aloe vera, Phyllanthus Emblica, Cucumis sativus* based herbal cream formulation that will provide the skin with necessary nutrients and required moisture. It is purely made by herbs and shrubs. To treat various skin diseases like acne, skin irritation, skin aging, itching, sunburn, pigmentation, remove dead skin, skin tanning.

ACKNOWLEDGEMENT

The authors wish to express their sincere gratitude to Department of Pharmaceutics, P.G. College of Pharmaceutical Sciences and Research, Chaupale, Nandurbar, Maharashtra, India for providing necessary facilities to carry out this research work.

CONFLICT OF INTEREST

We declare that we have no conflict of interest.

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Please cite this article in press as: Priyanka S. Ahire *et al*. Formulation and evaluation of herbal face cream, *Asian Journal of Research in Biological and Pharmaceutical Sciences,* 11(2), 2023, 40-53.