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"Formulation And Evaluation Of Herbal Antioxidant Cream Using Aloe Vera Barbadensis Miller".

1Ovesh S Mafat, 2Shaifali R Patel, 3Sunil Ojha

1B. Pharmacy , 2M. Pharmacy , 3M pharmacy

1Gujarat Technological University ,

2Gujarat Technological University ,

3B pharmacy college rampura

Abstract

Aloe vera has been known and used for centuries for its health, beauty, medicinal, and skin care properties. It's a natural product used in the field of cosmetology. The name Aloe vera derives from the Arabic word "Alloeh" meaning 'shining bitter substance' while "vera" means 'true' 2000 years ago, the Greek scientists regarded Aloe vera as the panacea, The Egyptians called Aloe " The plant of immortality." It contains anti-oxidants so this substance is used to formulate 'a herbal anti-oxidant cream that helps protect the skin surface from damage caused by free radicals. This may increase the shelf life of the product helping in anti-ageing properties. The cosmetic product was formulated by preparation of an alcoholic extract of crude drug (2.5gm) using methanol as an organic solvent. Stearic acid (6gm), Potassium hydroxide (0.3gm), Glycerin (2-3 drops), and Methyl Paraben (0.3gm) water, (10ml) were melted at 70ºC. The research was carried out using evaluation parameters like organoleptic properties, pH, viscosity, homogeneity, spread-ability, irritancy , emollience, and antiseptic activity. Herbal cosmetics are all natural so they are safer to use.

Keywords: Herbal extract; anti-oxidant, health and beauty; skin, clinical effectiveness.

INTRODUCTION

The current article investigates the anti-oxidant properties of Aloe barbadensis and the traditional aspect of its use in Indian medicine for the treatment of inflammation. Medicinal plants have amazing health benefits as they are natural healers and are used for healthcare worldwide. Our body easily absorbs herbs as they are natural and protect the human body from damage of free radicals obtained by oxidative stress factors. For thousands of years, people have been passing on their knowledge of herbs from one person to another. Green medicine is often believed to be healthier than synthetic products which is the fundamental reason for the recent decade-long surge in interest in natural pharmaceuticals. About 80% of people rely on traditional medicine to manage a variety of illnesses. The most important and largest organ that protects the human body is the skin. Since it acts as a defender of the body, it is important to keep the skin healthy. The water content of the stratum corneum and the lipid layer on the skin work together to maintain the skin's function. The use of synthetic ingredients compromises the skin's protective barrier. leading to dryness, scaling, roughness, itching, and other conditions. The research aims to formulate a brand-new herbal cream with anti-oxidant properties that moisturizes the skin, reduces oxidative stress, nourishes skin, and prevents drying which is the main reason for skin diseases.

- **Ideal Properties**

1. Neutralize free radicals and prevent skin aging.
2. Hydrating, must offer moisture to the skin as antioxidants.
3. Reduce the damage cost by oxidation.
4. Has the ability to reduce highly reactive molecules
5. Prevents cell damage cost by free radical
6. Noncomedogenic should not clog pores, especially for those with oily or acne-prone skin.
7. Absorbs quickly the cream should be lightweight and fast absorbing without leaving a greasy residue
8. Protects against UV Damage some antioxidant creams also contain SPF or work synergistically with sunscreen to protect the skin from sun damage.
9. Soothing ideal creams should have calming ingredients like aloe vera or chamomile reducing skin irritation.
10. Safe for sensitive skin hypoallergenic and free from harsh chemicals fragrances or parabens which can irritate sensitive skin.

- **Need for anti-oxidant cream**

1. Helps to reduce the risk of skin diseases.
2. Prevents the damage caused by oxidation.
3. They are vital for skin health: protect and nourish the skin.
4. Skin brightening.
5. Reduces the redness or puffiness, especially for acne-prone skin.

6. Calms the irritated or inflamed skin.
7. Skin repair : aid in the repair of damaged skin cells, improving overall skin texture and elasticity.

➢ HERBAL INGREDIENT PROFILES

1. Aloe Vera Extract

Scientific Name: *Aloe Vera barbadensis miller*

Common Name: Aloe Vera

Family: Asphodelaceae

Synonym: Aloe, Burn plant, Medicinal Aloe, Barbados, Gwar Patha, Ghrit Kumari

Kingdom: Plantae**.**

Order: Aspargales

Genus: Aloe

Species: Aloe Vera

Morphological character: It is a shrubby, perennial, xerophytic, pea-green color plant that grows in Asia, Africa, and America. It has fleshy, triangular leaves with an inner clear gel that contains 99% water and the rest is made of amino acids, glucomannans, lipids sterols, and vitamins.

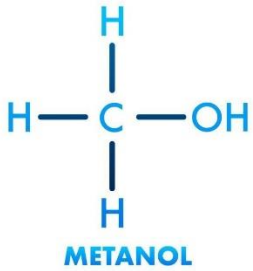
Benefits: antioxidant properties, moisturize skin, heal wounds, anticancer activity, reduce acne and inflammation, enhance nutrient absorption, and fight against sunburn.

Chemical constituents: chromone and anthraquinone, glycoside derivatives.

Properties: Antioxidant, anti-inflammatory, anti-cancer, anti-viral.

Mechanism: Stimulates fibroblast which produces collagen and elastin fibres making the skin more elastic and less wrinkled; softens and gives a cooling effect to the skin

2. METHANOL



Formula: CH_3OH

IUPAC Name: Methyl Alcohol (CH_3OH)

Structure: CH_3OH

Density: 792kg/m^3

Melting point: 97.6ºC

Boiling point: 64.7ºC

Classification: belongs to Class 3, Methanol is a flammable liquid, and Class 6: Methanol is a toxic substance.

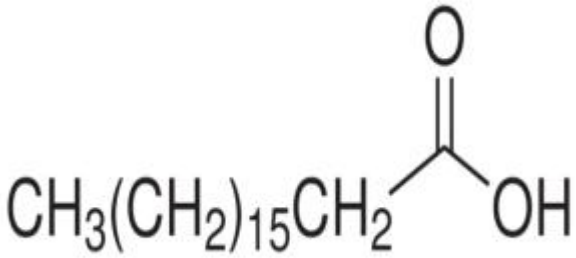
Properties: Methanol is a colorless, flammable, and volatile liquid. It has a sweet and pungent odor. It is more toxic than ethanol (potable alcohol). It is a simple aliphatic alcohol.

Uses: Methanol is used as a precursor to other chemicals, such as formaldehyde, acetic acid, and methyl tert-butyl alcohol. It is also used as a food preservative and "an organic solvent for the maceration process".

3. STEARIC ACID

Formula: C18H36O2

IUPAC Name: octadecanoic acid



Structure:

Density: 941 kg/m^3

Melting point: 69.3 ^oC

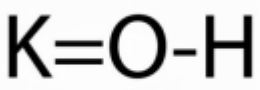
Boiling point: 361^oC

Classification: Long-Chain Fatty Acid

Properties: Emollient**,** Hardening agent**,** lubricating agent, food additive**,** supports body's natural protective mechanism.

Uses: Thickener emulsifier and lubricant **.**

4. POTASSIUM HYDROXIDE



Formula: KOH

IUPAC Name: Potassium hydroxide

Density: 2.044 g/cm^3

Melting point: 360^oC (680^oF)

Boiling point: 1327^oC(2421^oF)

Classification: Potassium hydroxide is a

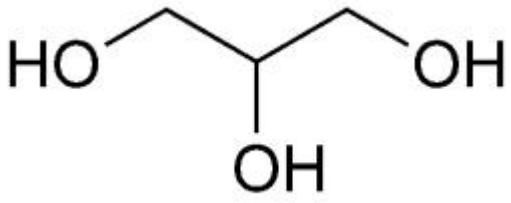
1. Strong base: a highly alkaline substance that completely dissociates in water.
2. Inorganic compound a compound that is not derived from living organisms.
3. Alkali is a type of base that is highly soluble in water.

Properties: KOH is highly corrosive and can cause severe burns. It is highly soluble in water and Polar solvents. It reacts exothermically with water, releasing heat. It has a pH value of around 14, making it a strong base.

Uses:

1. Soap and detergent manufacturing KOH is used to produce soap, detergent, and other cleaning products.
2. Paper production: KOH is used to process wood pulp and produce paper.
3. Textile industry: To treat textiles, remove impurities, and improve fabric quality.
4. Pharmaceuticals: KOH is used as an intermediate in the production of various pharmaceuticals.
5. Battery production: KOH is used as an electrolyte in alkaline batteries.
6. Cleaning and disinfecting: KOH is used as a cleaning agent and disinfecting in various industries.

5. Glycerine



Formula: $C_3H_80_3$

IUPAC Name: propane-1,2,3-trio

Structure:C3H803

Density:1.26g/cm3

Melting point: around 18ºC

Boiling point: 290ºC

Classification: Osmotic laxative; glycerin draws water into the intestines which usually results in a bowel movement within 15 to 60 minutes. Caloric macronutrient glycerin is used as a sweetener and preservative in food items. It can act as a lubricant.

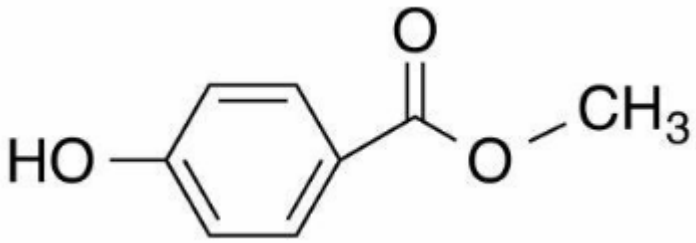
Properties: Miscible with water and alcohol insoluble in chloroform ether and in volatile oils. It's colorless and viscous. It is nontoxic odorless and serves as a humectant, solvent, and pharmaceutical agent. It is a polyol compound that contains three hydroxyl groups and three carbon atoms.

Uses: It is used in the food industry as a sweetener, moisturizer, and preservative. It is a vital component of skincare products. It is used as a pharmaceutical agent.

6. **Methyl Paraben**

Formula: $C_8H_8O_3$

IUPAC Name: Methyl 4- hydroxybenzoate



Structure:

Density: 1.46 grams

Melting point: 125-128ºC

Boiling point: 275ºC

Classification: Category 3 carcinogen and a weak sensitizer

Properties: Antimicrobial and antifungal properties

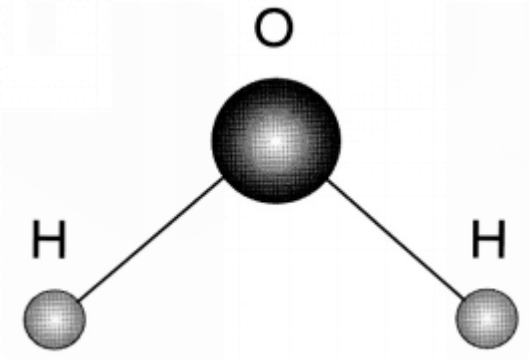
Uses: 1. To increase shelf life and avoid bacterial and fungal growth.

2. To prevent contamination of amide anesthetic solution.

7. **Water**

Formula: H_2O

IUPAC Name: Oxidane



Structure:

Density: 0.997g/cm^3(liquid at 25^{o}C/77^{o}F)

0.917g/cm^3(solid at 0^{o}C/32^{o}F)

Melting point: 0^{o}C(32^{o}F)at standard atmospheric pressure

Boiling point: 100^{o}C(212^{o}F)at standard atmospheric pressure

Classification: Water is a:

1. Compound: a substance formed by the chemical bonding of two or more different elements.
2. Inorganic compound: a compound that is not derived from living organism.
3. Polar solvents: a solvent that has a slightly positive charge on the hydrogen atoms and a slightly negative charge on the oxygen atom.

Properties:

1. High surface tension: water has a high surface tension, which allows it to resist external forces.
2. Universal solvent: water is a polar solvent that can dissolve a wide variety of substances.
3. Essential for life: water is necessary for many biological processes and is essential for human survival.

Uses:

1. Drinking water: water is essential for human consumption and is necessary for many body functions.
2. Agriculture: water is used for irrigation and other agricultural purposes.
3. Industry: water is used in many industrial processes, such as manufacturing, mining and energy production.
4. Recreation: water is used for swimming, bathing, and other recreational activities.
5. Scientific research: water is used as a solvent and reactant in many scientific experiments.

❖ Table of herbal profiles with their properties.

Serial Number	Ingredients	Properties
1	Aloe Vera Barbadensis miller	Used as an Extract, anti-oxidant, cooling effect, healing wounds.
2	Methanol	Extraction Solvent
3	Stearic Acid	Emollient
4	Potassium Hydroxide	Thickening Agent
5	Glycerine	Humectant
6	Methyl Paraben	Preservative
7	Water	Excellent solvent

➢ **Aim and Objectives**

Aim: Formulation and evaluation of herbal antioxidant cream using Aloe Vera barbadensis miller.

Objectives :

1. To formulate an eco-friendly herbal cream that would not provide any allergic reactions to the skin or body.
2. To evaluate formulated products by different tests like pH tests, viscosity, washability, color, odor, consistency, etc.

3. To prepare a product that will reduce the microbial count and site of infections.
4. To prevent nosocomial infections.

❖ **METHODOLOGY**

a) 5gm of turmeric extract was placed in a conical flask.

b) 100ml of Methanol(Organic solvent) was weighed in a measuring cylinder and put in the conical flask.

c) Aluminium foil was used to cover the conical flask and rubber was tied. If aluminum foil is not there, cotton is used & stopper is placed.

d) After covering the flask with (crude drug extract + organic solvent), it is put for 5 days for maceration.

e) After the maceration, the product is filtered with help of a filter paper & funnel is used.

f) On a rectangular hot water bath weigh & place 6g Stearic acid in a porcelain dish and put it to melt

g) at 70 degrees Centigrade.

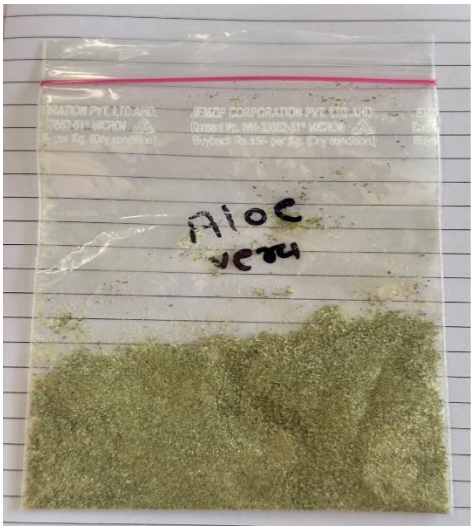
h) In a beaker, add 10 ml of distilled water to that beaker. Weigh & add KOH (potassium hydroxide 0.3g + methylparaben (0.3g) and 2 to 3 drops of glycerin. Then put the beaker in a rectangular hot water bath & melt at 70°C.

i) In another porcelain dish, keep the filtered macerated extract & melt at 70°C.

j) From the beaker that is filled with (KOH, H_2O, Methylparaben, and Glycerin), with the help of a dropper, take drop by drop from if and add to the porcelain dish filled with stearic acid.

k) Then remove the beaker from the water bath after it gets emptied. take drop by drop from the porcelain dish of extract & add to the stearic acid (dish) until consistency arrives.

l) Cream formation occurs; allow it to cool. If debris is formed, allow it to agitate with the help of an agitation mixer. Then fill the formulation in a container & label it.

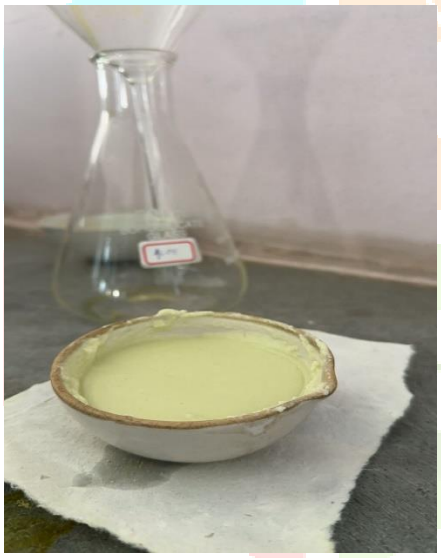


(a)

(b)

(c)

(d)



(e)

(f)

a) Dried powdered extract

b) Maceration process with methanol

c) Base of cream, melting process on hot rectangular air bath

d) Distilled water assembly

e) Herbal Formulated cream

f) Agitation of cream .

- **Evaluation Parameters: Result and Discussion.**

The formulation was further studied for it characterization such as color, appearance, odor, the feel of the application, pH value, viscosity, grittiness, emollience, washability, and anti-bacterial activity.

1) Physical evaluation

In this test, the cream was observed for the following state :

Appearance: Semisolid in nature.

Odor: Pleasant

Color: Light Green

Transparent : non- transparent

Consistency: Smooth

2) pH

The pH of the formulated cream was determined using a digital pH meter by dissolving 1 gm of cream in 100 ml of water. The pH of the cream was also determined by dissolving the pH paper into the above solution of the cream.

3) Consistency

The consistency of formulated creams were determined by hand. Take pinch of cream and rubbed with your fingers.

4) Viscosity

The viscosity of the cream was measured using a Brookfield viscometer, at various speeds:

1	**Spindle no**	64
2	**Speed**	30 rpm
3	**%Torque**	18.4%
4	**Reading in centipoise**	3680 cps

which indicates that the cream is easily spread by the small amount of shear.

5) Homogeneity

All formulations produce a uniform distribution of extracts in cream. This was confirmed by visual appearance and touch.

6) Appearance

When the formulation was kept for a long time, it was found that there was no change in the color of the cream.

7) Washability

The cream applied on the skin was easily removed by washing with tap water.

8) Anti-oxidant Test

2, 2-Diphenyl-1-picrylhydrazyl (DPPH) radical scavenging activities of the ethanol extract of raspberry and grape seed extracts in alone and combination were investigated. Stock solution of DPPH (100 mmol/L, 33 mg in 1L) was prepared

in methanol and labeled as control. The absorbance of control was measured using a UV-visible spectrophotometer at 517 nm. 5 ml of control as stock solution was added to 1 ml of test sample dissolved in

ethanol at different concentrations (50, 100, 200 µg/ml). An equal amount of ethanol was added to the control. After 30 minutes absorbance of all three test samples were measured at 517 nm spectrophotometrically. The scavenging activity was calculated using the formula:

% Scavenging activity:

[(A517control)-(A517sample)/A517control)x100]

Control = stock solution of DPPH, Ascorbic acid was

used as a standard.

CONCLUSION

The present work focuses on the potential of herbal extract for cosmetic purposes. The use of bioactive ingredients influences the biological function of skin and provides nutrients necessary for healthy skin. The study revealed that the formulated herbal information using turmeric rhizome as an extract is effective as an antiseptic cream and defends against pathogenic bacteria from the results we could say the cream-based formulation is good in appearance, safe, does not produce any toxic or adverse reaction and is found to be effective.

The image of the formulated herbal anti-oxidant cream are displayed as :

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