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Formulation and Evaluation of Anti-aging Cream

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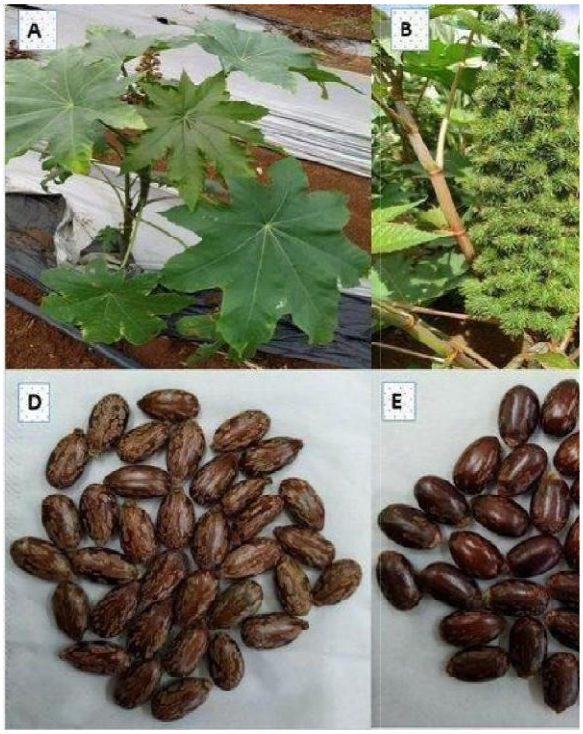
Abstract: *The growing global population has significantly raised the need for vegetable oils for both industrial and household use. Vegetable oils derived from plants have been found to have a high nutritional value. Castor oil is one of the oilseeds with a rich oil content. Its composition of fatty acids is primarily composed of ricinoleic acid as well as additional trace acids including oleic, palmitic, and stearic acid. Castor oil's ricinoleic acid is distinct from other all other vegetable oils, which draws interest from a variety of uses. The main source of triglycerides in Triricinolein makes up the oil. Small biological substances such as phytosterol, carotenoid, tocopherol, tocotrienol, and phospholipid, Castor oil contains phenolic and phytochemical components. Castor oil contains phenolic and phytochemical components. These substances provide stability during oxidation.*

Keywords: Castor oil, ricinoleic acid, tocopherols, phytosterols as fatty acids, and castor oilseed.

I. INTRODUCTION



Skin aging is a complex biological process influenced by intrinsic factors such as age and genetics, as well as extrinsic factors including ultraviolet radiation, pollution, stress, and unhealthy lifestyle habits. Aging skin commonly exhibits wrinkles, dryness, reduced elasticity, and uneven pigmentation due to decreased collagen production and oxidative damage [1]. In recent years, there has been increasing interest in herbal and natural cosmetic products because of their safety, effectiveness, and minimal side effects compared to synthetic formulations [2].

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Among natural ingredients, Castor Oil obtained from the seeds of Ricinus communis has gained significant importance in skincare and cosmetic preparations. Castor oil contains ricinoleic acid, omega fatty acids, vitamin E, and antioxidants that contribute to skin hydration, nourishment, and protection against oxidativestress [3]. Its emollient and anti-inflammatory properties help maintain skin moisture, improve skin texture, and reduce the appearance of fine lines and wrinkles [4].

Anti-aging creams formulated with castor oil are designed to moisturize the skin deeply, promote collagen synthesis, and improve skin elasticity. The incorporation of herbal ingredientssuch as aloe vera, glycerin, and essential oils can further enhance the therapeutic and cosmetic value of the formulation [5]. Due to its excellent moisturizing capacity and skin compatibility, castor oil is considered a promising natural ingredient in the development of herbal anti-aging creams.

Therefore, the preparation of an anti-aging cream containing castor oil represents a costeffective and natural approach in modern cosmetology for maintaining healthy, youthful, and radiant skin.
An anti-aging cream is a semisolid emulsion intended for external application to reduce signs of aging and improve skin appearance. Formulation of anti-aging cream using castor oil involves incorporation of suitable emulsifying agents, stabilizers, preservatives, humectants, and fragrances to obtain a stable and cosmetically acceptable product. Evaluation of the prepared cream is essential to ensure its quality, stability, safety, and efficacy.[6]

The present study focuses on the formulation and evaluation of an anti-aging cream containing castor oil. The prepared formulation is evaluated for various physicochemical parameters such as pH, viscosity, spreadability, homogeneity, stability, irritancy, washability, and phase separation. The objective of the study is to develop a safe, stable, and effective herbal anti-aging cream with enhanced moisturizing and skin rejuvenating properties. [7]

II. CONTEXT

Castor oil is produced mainly in China, Brazil, and India, and it has numerous industrial applications. According to the Merck report (2015), castor oil serves as an important raw material for the synthesis of chemical derivatives used in the production of lubricants, coatings, dispersants, and surfactants. It is also widely used in the polymer industry because it acts as a key component in the manufacture of commercially significant polymers.
One of the major industrial uses of castor oil is as a feedstock in the production of nylon. It is the principal raw material for the manufacture of sebacic acid, which is an essential ingredient in the production of synthetic fibers and resins. In addition, castor oil is used in the preparation of synthetic leather, plastics, and oilcloth, demonstrating its importance in the chemical and textile industries. [8]
Castor oil is also valuable as a lubricant because of its high viscosity and stability. It is used in metal drawing processes, molds, hydraulic fluids, and two-cycle engine fuels. Sulfated castor oil, commonly known as Turkey-red oil, is utilized for coloring and polishing fabrics. Dehydrated castor oil is used in the production of polymers and copolymers, while its dried form is applied in varnishes, enamels, putties, caulks, and oil-based paints, where it functions as a drying oil.
Another modified form, oxidized castor oil or blown oil, is used as a plasticizer in products such as lacquers, coat textiles, and oilcloth. Beyond industrial uses, castor oil also plays a role in food, pharmaceutical, and cosmetic industries. It is employed as an ingredient, processing aid, or intermediate in several products. In food processing, castor oil is used as a release agent on food-contact surfaces such as conveyor belts to prevent sticking. Its high viscosity also makes it suitable as an anti-sticking agent in hard candy production. [9]
Medicinally, castor oil has been recognized for its strong purgative and laxative properties for many years. In agriculture and pest control, castor oil is commonly used in fly strips as a pesticide application, usually in its oxidized form. Additionally, its preservative nature allows it to be used in rubber treatment and embalming fluids.

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According to Mc-Davit (2010), castor oil was included in the EPA registration assessment work plan for flower and vegetable oils. Unless otherwise specified, the reported values generally refer to raw, untreated, or unprocessed castor oil. When data for raw castor oil are unavailable, values for ricinoleic acid, the major component of castor oil, are used instead. If no data are available for either form, the parameter value is recorded as "Not Found."[10]

III. PHYSIOLOGY OF SKIN

Epidermis :-

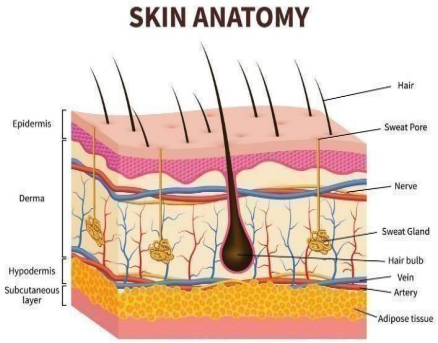
The epidermis is the most superficial layer of the skin and is composed of stratified keratinized squamous epithelium, which varies in thickness in different parts of the body. It is thickest on the palms of the hands and soles of the feet. There are no blood vessels or nerve endings in the epidermis, but its deeper layers are bathed in interstitial fluid from the dermis, which provides oxygen and nutrients, and drains away as lymph. [11]

Dermis :-

The dermis is tough and elastic. It is formed from connective tissue and the matrix contains collagen fibers interlaced with elastic fibers. Rupture of elastic fibers occurs when the skin is overstretched, resulting in permanent striae, or stretch marks, that may be found in pregnancy and obesity. Collagen fibers bind water and give the skin its tensile strength, but as this ability declines with age, wrinkles develop. Fibroblasts, macrophages and mast cells are the main cells found in the dermis. Underlying its deepest layer there is areolar tissue and varying amounts of adipose (fat) tissue.[12]

Subcutaneous gland :-

These consist of secretory epithelial cells derived from the same tissue as the hair follicles. They secrete an oily substance, sebum, into the hair follicles and are present in the skin of all parts of the body except the palms of the hands and the soles of the feet. They are most numerous in the skin of the scalp, face, axillae and groins. In regions of transition from one type of superficial epithelium to another, such as lips, eyelids, nipple, labia minora and glans penis, there are sebaceous glands that are independent of hair follicles, secreting sebum directly onto the surface .[13]



1. Advantages of Castor Oil in Anti-Aging Cream :-
2. Deep moisturization of skin
3. Rich source of fatty acids and antioxidants
4. Improves skin elasticity
5. Reduces fine lines and wrinkles
6. Enhances collagen production
7. Protects skin from oxidative damage
8. Possesses anti-inflammatory activity

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Skin anti aging strategies: -

- Skin aging is a part of the natural "aging mosaic" that occurs in humans and takes varied forms throughout time in various organs, tissues, and cells. The skin offers the first visible indications of the passage of time, whereas the aging signals of internal organs are concealed by the ambient "eyes." [14-15]

- Exogenous or extrinsic variables (chronic light exposure, pollution, ionizing radiation, chemicals, toxins) and endogenous or intrinsic factors[16-18] (genetics, cellular metabolism, hormone and metabolic processes) combine to influence the complicated biological process of skin aging. Together, these variables result in cumulative physiological and anatomical changes, progressive alterations in each layer of the skin, and changes in the skin itself.

- Appearance, particularly on the skin areas exposed to the sun[20-22]. A thicker epidermis, mottled coloring, deep wrinkles, laxity, dullness, and roughness are typical characteristics of prematurely photoaged skin, as opposed to thin and atrophic, finely wrinkled, and dry intrinsically aged skin. Sagging is a result of the skin's elasticity gradually declining[25]. In elderly people, slower wound healing and less successful desquamation are correlated with slower epidermal turnover rate and longer cell cycle. When scheduling aestheticprocedures, this information is crucial. Conversely, many of these traits are intended to be used in conjunction with products or processes that speed up the cell cycle, with the idea being that a higher turnover rate will result in better-

- looking skin and quickerloss of fibrillin-positive structures[27] and a decrease in collagen type VII (Col-7), which weakens the connection between the dermis and epidermis of extrinsically aged skin[28].

- The entire face can show signs of aging due to a variety of factors, including gravity, muscular contraction, volume loss, the reduction and redistribution of deep and superficial fat, and the loss of bone support, which can cause the face to sag and change in form and contour. Although aging is not a pathological state, but rather a biological inevitable process, it is associated with a number of skin and body diseases, such as benign and malignant neoplasms and degenerative disorders[29- 31].

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- The aging paradigm, which minimizes age indications on the skin, face, and body and emphasizes health and active living, challenges conventional conceptions of aging as a period of illness. According to this viewpoint, preventative aesthetic dermatology could support the call for healthy aging, treat or prevent specific cutaneous conditions[29-33].

IV. OBJECTIVES

1. Using the extracts to formulate the poly herbal anti-aging cream/lotion.
2. To stop the skin from aging.
3. To slow down the rate of early aging.
4. To hydrate and enhance skin appearance.
5. This study set out to assess the effectiveness of five topical test products designed to lessen the visibility of wrinkles and lines.
6. To improve the moisture content of skin.
7. To lessen the loss of transepidermal water.

V. LITERATURE AND SURVEY :-

SR.NO	Author	Title	Summary
1.	Mohammad Mahdi Parvizi, Nasrin Saki, Soodabeh Samimi et al.	Efficacy of Castor Oil Cream in Treating Infraorbital Hyperpigmentation	Clinical trial on 25 patients showed that castor oil cream reduced wrinkles, skin laxity, and pigmentation around the eyes. The study concluded that castor oil cream may help improve signs of skin aging.
2.	Kathleen Girdler, Angelica Cabatu, Hailey Olds, Geoffrey A Potts	Use of Castor Oil in Dermatology: A Narrative Review	Review article explaining dermatological uses of castor oil. Authors reported that castor oil improves hydration, elasticity, and signs of aging because of antioxidant and moisturizing effects.
3.	Celine Phong, Victor Lee, Natasha Mesinkovska et al.	Coconut, Castor, and Argan Oil for Hair in Skin of Color Patients	Systematic review discussing cosmetic uses of castor oil. Researchers found limited but positive evidence for improving skin and hair quality due to moisturizing action.

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4.	Monice M Fiume et al.	Re-Review Summary of Ricinus Communis (Castor) Seed Oil and Ricinoleates as Used in Cosmetics	Safety review of castor oil in cosmetic products. The paper concluded that castor oil is generally safe as a skin-conditioning ingredient in creams and lotions.
5.	Various researchers	Herbal Ingredients in Anti-Aging Cream Formulations	Review of herbal ingredients used in antiaging creams. Plant oils such as castor oil were noted for antioxidant and collagen-supporting properties helpful in reducing wrinkles and skin dryness.
6.	Medical News Today Editorial Review	Benefits of Castor Oil for Face and Skin	Article summarized cosmetic benefits of castor oil including hydration, inflammation reduction, and skin softening. It highlighted its use in moisturizers and anti-aging products.

VI. DRUG PROFILE

Synonyms: – Ricinus communis, the castor bean or castor oil plant.

Biological Source :-Castor seed oil is extracted from dried seeds of species of Ricinus communis.

Family – Euphorbiaceae

Chemical constituent -

Castor oil is mainly composed of fatty acids and neutral lipids, particularly triglycerides. It also contains several minor biologically active compounds, including carotenoids, phenolics, phospholipids, phytochemicals, phytosterols, tocopherols, and tocotrienols. The common name of the castor plant is *Ricinus communis*, an annual oilseed crop belonging to the Euphorbiaceae family. Although it is commonly called the castor bean, it is not a true bean. Castor plants grow best at temperatures around 20°C, while temperatures below 12°C or above 25°C can negatively affect germination and yield.

Castor oil, also known as ricinus oil, phorboyl, or tangantangan oil, is extracted from castor seeds through either cold or hot pressing methods for medicinal and industrial purposes. Chemically, castor oil is a triglyceride rich in ricinoleic acid, specifically the glyceride of 12hydroxy-9-octadecenoic acid. Its fatty acid composition mainly includes ricinoleic acid (about 87%), along with smaller amounts of oleic acid (7%), stearic acid (3%), palmitic acid (2%), and linoleic

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acid (1%). Trace amounts of dihydroxystearic acid are also present. Due to its unique composition, castor oil has long been used as a traditional remedy for various health and skin-related problems.

The oil extracted from castor seeds possesses strong antioxidant properties and is widely used in cosmetic and pharmaceutical industries. Castor oil contains a high concentration (80–90%) of unsaturated fatty acids, especially ricinoleic acid, which contributes to its medicinal and industrial importance. Triglycerides in castor oil contain ricinoleate and possess three functional groups that can be chemically modified into several useful derivatives. Because of these beneficial properties, castor oil serves as an important raw material in the production of cosmetics, medicines, lubricants, and other industrial products.

VII. FORMULATION OF ANTI AGING CREAM

Procedure:

Step 1: Preparation of Oil Phase

1.Take a clean beaker 2.

Add:

- Stearicacid
- Cetylalcohol
- Castor oil
- Heat on a water bath at **70–75°C** until completely

Step 2 – Preparation of Water Phase

1. Take another clean beaker.
2. Add purified water.
3. Add glycerin and sorbitol, then stir properly.
4. Add triethanolamine slowly with continuous stirring.
5. Heat this phase to **70–75°C**

Step 3 – Emulsification

1. Slowly add the water phase into the oil phase with continuous stirring.
2. Stir continuously for **10–15 minutes** until a uniform cream forms.

Step 4 – Cooling

1. Allow the cream to cool at room temperature.
2. Continue gentle stirring during cooling to obtain a smooth texture.

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Step 5: Final Adjustment

1.Adjust pH to 5.5–6.5, mix thoroughly, and ensure uniform consistency

Step 6 – Filling

Transfer the prepared cream into a clean airtight container.
Store in a cool, dry place.

VIII. FORMULATION TABLE

	SR.NO INGREDIENTS	F1 (25gm)	F2 (25gm)
1.	Stearic acid	4.5g	3.5gm
2.	Cetyl alcohol	3.5gm	3.5gm
3.	Castor oil	3.5gm	4.0gm
4.	Sorbitol	1.0gm	1.0gm
5.	Triethanolamine	1.0gm	1.0gm
6.	Glycerine	2.0gm	2.5gm
7.	water	12ml	13ml

Anti Aging cream

IX. EVALUATION PARAMETERS

A. Physical evaluation –

The castor seed oil cream was tested for odour, appearance, and homogeneity thro ugh visual observation and touch.

1.Colour -The colour of theanti aging cream was observed by visual examination i.e.white colour.

2.Odour -The odour of cream was found to be characteristics.

3. Appearance - The appearance of cream was examined visually. The cream having a semisolid state.

4.**Consistency**- The formulation was examined by rubbing cream on hand manually.

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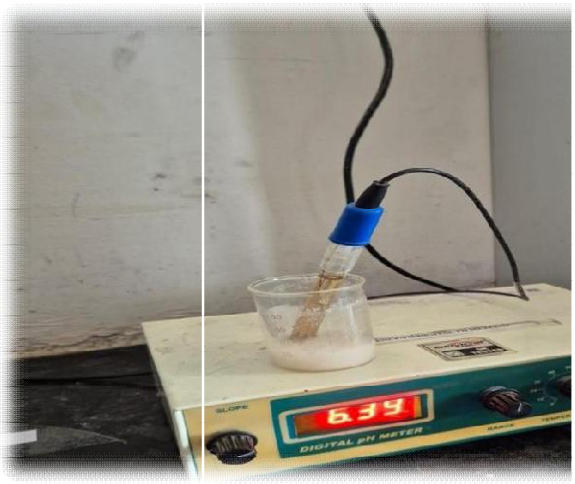
1.PH of cream:

The pH of theanti aging cream was determined using a Digital pH meter. 1gm of sample dissolve into 10ml of distilled water and then electrical rod dipped into this solution further check the pH of cream



PH of cream

2. Spreadability Test:

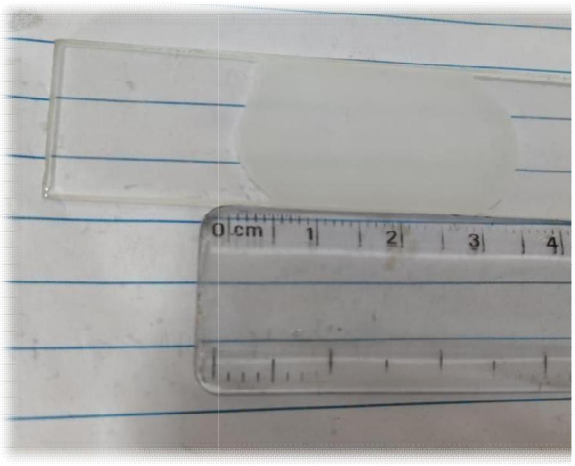
Take 1gm of anti-aging Cream between glass slide,forming a thin layer. Take 20gm of weight on the Top Slide for 5min to allow uniform spreading. Then remove weight

Record the time (seconds) it takes foe upper slide to move a fix distance.[19]

Spreadability can be expressed as,

$$S = m \times L / T(sec)$$

Where, m= weight applies to upper slide
L = length moved on the glass slide
T= Time take



Spreadability of cream

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3.Viscosity test:

The viscosity of anti aging cream is determined by using Brookfield viscometer.[23]

Procedure:

Mix the cream sample gently and maintain at 25 °C.
Fill the sample in a clean beaker without air bubbles.
Select suitable Brookfield spindle (commonly RV spindle for creams).
Attach spindle and immerse up to the marked level.
Set required speed (e.g., 10 rpm).
Start the viscometer and allow reading to stabilize.

Record:

Viscosity (cP/mPa·s)
Spindle number
Speed (rpm)
Temperature
Torque %

Viscosity of cream

4) Irritability test:

Take the small amount of sample and applied on the hand and kept the cream as it is for 30 min to observe the Redness, Swelling and Irritation on hand.

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Irritation testing of cream

5) Washability test

Apply a measured amount of anti aging cream(e.g.,1gm) evenly on a glass slide or small sin area. Allow it to sit for 30 minutes to mimic absorption time. B. Washing: Wash the area using. Distilled water +Mild soap +water. Use a wet cotton ball or sponge and gently rub the area in a consistent circular motion.

Washability of cream

6) Homogeneity:

The formulation was tried for the uniformity by visual appearance and by touch.

Stability Study:

Store the anti aging cream at different conditions and check it periodically for changes in appearance, pH, viscosity, and stability. Record any changes to determine whether the cream remains stable over time

Evaluation studies of formulation batches:

SR NO	EVALUATION PARAMETER	F1	F2
1.	Appearance	White	white
2.	pH	6.39	5.59
3.	Washability	Washable	Washable

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4.	**Spreadability**	**0.31 cm**	**0.2 cm**
5.	**Irritability**	**No Irritable**	**No Irritable**
6.	**Homogenisity**	**Homogenous**	**Homogenous**
7.	**Stability**	**Stable**	**Stable**
8.	**Viscosity**	**30000 cp**	**40000 cp**

IX. RESULT

The preformulation study like a Physical study and Analytical characterization of sample including Physical evaluation, Determination of pH, Spreadability, Stability Study, Removal of cream, Irritancy

1. **Physical study-**

a Colour- whitecolour.
b Odour -Characteristic
c Apperience- Semisolid
d Consistency-Smooth consistency.

2. **pH-7.15**

3. Spreadable- Easily spreadable.

4. Stability- Stable.

X. CONCLUSION

In conclusion, one of the most extensively planted seeds is corn. Its seeds are tested to see if they have any biological effects. High levels of antioxidant activity were demonstrated by the castor seed extraction oil and cream formulation made from it. It was discovered that the cream, which was created in accordance with the findings, might be applied to the skin and have anti-aging properties. The study concluded with the use of castor seed extraction oil in cosmetic goods; additional skin-related research will be carried out in subsequent studies.

The popularity of natural substances in reducing the effects of aging on the skin is demonstrated by their usage in skin protection, particularly in topical antioxidant applications. Therefore, the synthesis and assessment of an anti-aging cream containing oil from castor seed extract is the goal of this study work. Antioxidant-rich castor seeds thicken and promote collagen to minimize wrinkles and fine lines, enhancing skin suppleness and promoting healthy skin. Antioxidants shield the skin from UV damage by fending off the sun's harmful rays.

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