

FORMULATION AND EVALUATION OF HERBAL ANTI-WRINKLE MOISTURIZER USING SHATA DHAUTA GHRITA BASE

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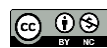
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ABSTRACT

Aging is an inevitable biological process characterized by progressive structural and functional changes in the skin, leading to the formation of wrinkles, fine lines, and loss of elasticity. The present study was aimed at the formulation and evaluation of a herbal anti-wrinkle moisturizing cream using Shata Dhauta Ghrita (SDG) as a base, incorporating natural ingredients with known antioxidant, emollient, and skin-rejuvenating properties. SDG was prepared by the traditional method of washing cow ghee 100 times, resulting in a soft, cream-like base suitable for topical application. The herbal cream was formulated using ingredients such as almond oil, chironji oil, coconut oil, aloe vera gel, glycerin, vitamin E, beeswax, and borax through an emulsification technique. The prepared formulation was evaluated for various physicochemical and microbiological parameters including organoleptic properties, homogeneity, pH, spreadability, viscosity, washability, microbial load, and skin irritation test. The pH of the formulation was found to be in the range of 5.5–6.5, indicating compatibility with skin. The viscosity ($\approx 21,000$ cps) and spreadability were within the acceptable range, ensuring ease of application. The formulation showed good homogeneity, was easily washable, and exhibited no signs of irritation during the patch test. Microbial studies confirmed that the product was within acceptable limits for topical use. The presence of natural antioxidants and moisturizing agents in the formulation contributes to hydration, protection against oxidative stress, and improvement in skin texture. Overall, the developed herbal cream demonstrated satisfactory stability and performance, suggesting its potential as a safe and effective anti-wrinkle and moisturizing formulation for maintaining healthy and youthful skin.

KEYWORDS: Anti-aging, Anti-wrinkle cream, Shata Dhauta Ghrita, Moisturizer, Antioxidants.

INTRODUCTION

Aging is a natural biological process that affects every individual over time. While it is inevitable, the desire to maintain youthful, healthy skin has driven the development of anti-aging and anti-wrinkle solutions.^[1] Anti-aging refers to a broad category of treatments, products, and practices aimed at slowing, preventing, or even reversing the physical signs of aging.^[2] These signs include fine lines, wrinkles, sagging skin, age spots, and loss of elasticity and hydration.^[3]

Anti-wrinkle care is a more specific subset within the anti-aging domain, targeting the reduction and prevention of wrinkles creases or folds that form on the skin due to factors such as age, repeated facial movements, sun exposure, and a decline in collagen and elastin production.^[4] Modern advancements in dermatology and cosmetic science have led to a wide array of anti-aging and anti-wrinkle products and treatments, including: Topical creams and serums (often containing ingredients like retinol, hyaluronic acid, peptides, and antioxidants), Non-invasive procedures (such as Botox, dermal fillers, and laser therapy), Lifestyle adjustments (healthy diet, sun protection, hydration, and avoiding smoking).^[5,6]

Mechanism of wrinkle formation

The mechanism of anti-aging and anti-wrinkle interventions involves slowing, preventing, or reversing visible signs of skin aging primarily wrinkles, fine lines, and loss of elasticity.^[7] These mechanisms typically work by influencing cellular repair, collagen production, oxidative stress, and hydration.^[8] Here's a breakdown of the biological and biochemical mechanisms behind the most effective anti-aging and anti-wrinkle strategies:

1. Stimulation of Collagen and Elastin Production

Collagen and elastin are key structural proteins in the skin that give it strength and elasticity. As we age, collagen production slows down, leading to sagging and wrinkles. Retinoids (e.g., retinol) and treatments like micro needling or laser therapy stimulate fibroblasts to produce more collagen and elastin.^[9]

2. Neutralization of Free Radicals (Antioxidant Action)

Free radicals, generated by UV exposure, pollution, and metabolism, damage DNA, lipids, and proteins in skin cells. Antioxidants (e.g., Vitamin C, Vitamin E, CoQ10, Resveratrol) neutralize these free radicals and prevent oxidative stress, slowing skin aging at the cellular level.^[10]

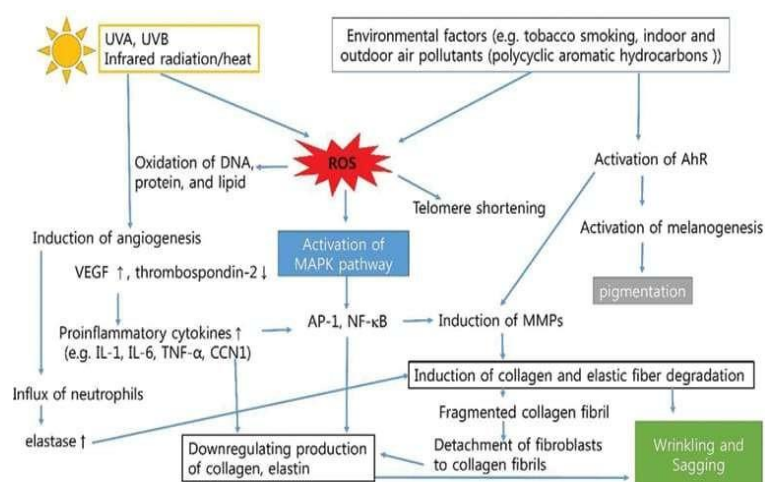


Figure No. 1: Mechanism of wrinkle formation.

3. UV Protection

UV radiation causes DNA damage, breaks down collagen, and leads to pigment irregularities (photoaging). Sunscreens (SPF) physically or chemically block UV rays, preventing photodamage. Reduces wrinkle formation by preserving dermal structure.^[11]

4. Enhanced Cell Turnover

With age, skin cell turnover slows, causing dullness and rough texture. Exfoliants (like AHA/BHA) and retinoids speed up the desquamation (shedding) of dead skin cells and promote new, healthy cells. This results in smoother, brighter, and younger-looking skin.^[12]

5. Improved Skin Hydration and Barrier Function

Dry skin is more prone to visible wrinkles and damage. Hyaluronic acid and ceramides retain moisture and reinforce the skin's lipid barrier. This plumps up the skin, making lines and wrinkles less visible.^[13]

Advantages of Herbal Cosmetics

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

1. Natural products: - Herbal cosmetics are natural and free from all the harmful synthetic chemicals which generally may turn out to be lethal to the skin.^[14]
2. Safe to use: - Natural cosmetics are protected to utilize. They are hypo-allergenic and tested and proven by dermatologists to be safe to use anytime, anywhere. Since they are made of natural ingredients, people don't have to worry about getting skin rashes or experience skin itchiness.^[15]
3. Compatible with all skin types: - No matter if you are dark or fair; you will find natural cosmetics like foundation, eye shadow, and lipstick which are appropriate irrespective of your skin tone. Women with oily or sensitive skin can also use them and never have to worry about degrading their skin condition.^[16]
4. Wide selection to choose from: - These products are more affordable than synthetic ones. They are offered at economical prices and are sold for a cheap price during sales. An estimate of WHO demonstrates about 80% of world population depends on natural products for their health care, because of side effects inflicted and rising cost of modern medicine.^[17]
5. No side effects:- The synthetic beauty products can irritate your skin, and cause pimples. They might block your pores and make your skin dry or oily. With natural cosmetics, one need not worry about these. The natural ingredients used assure no side effects; one can apply them anytime, anywhere.^[18]
6. Cosmeceutical- Cosmeceuticals is fastest growing segment of the beauty industry. Cosmeceuticals are cosmetic pharmaceutical products intended to improve the health and beauty of the skin by providing a specific result, ranging from acne-control and anti-wrinkle effects, to sun protection.^[19]

Disadvantages

1. Preservation and Shelf-Life Issues: -Herbal creams may contain fewer preservatives, leading to a shorter shelf life and higher risk of contamination or spoilage.^[20]

Shata Dhauta Ghrita

Shata Dhauta Ghrita, or "100 times washed ghee," is a traditional Ayurvedic preparation primarily used for skin care.

It's made by washing cow's ghee (clarified butter) 100 times with water, and then in a copper vessel to enhance its therapeutic properties, according to some brands.^[21] This process transforms the ghee into a cream-like texture suitable for topical application. Shata Dhauta Ghrita is known for its moisturizing, soothing, and nourishing properties.^[22] It is often used for skin conditions like psoriasis, eczema, rashes, chickenpox scars, and other skin ailments.^[23] Wound healing: It can aid in healing wounds, burns, and cuts, anti-aging to reduce wrinkles and fine lines and act as moisturizer and for its cooling effect on inflamed or irritated skin.^[24]

Pathophysiology of wrinkle

Wrinkle formation is primarily due to a combination of natural aging processes and environmental factors that affect the skin's elasticity and structure. Specifically, wrinkles result from the breakdown of collagen and elastin in the dermis, changes in the dermal-epidermal junction, and the impact of repetitive facial expressions and UV exposure.^[25]

Pathophysiological factors of wrinkle include age related changes by collagen and elastin production declines, and the dermis thins, leading to a loss of elasticity and support, prolonged sun exposure breaks down collagen and elastin fibers, accelerating skin aging and wrinkle formation, repeated facial movements create creases and grooves, which can become permanent wrinkles over time as the skin loses its ability to spring back and dermal-epidermal junction changes, exposure to pollution and other environmental stressors can further accelerate skin aging and wrinkle development, chronic inflammation and oxidative stress can damage collagen and elastin, contributing to wrinkle formation.^[26,27]

Pathophysiology of aging

The pathophysiology of aging, or the underlying biological mechanisms of the aging process, involves a multitude of factors that lead to a gradual decline in physical function and increased susceptibility to age-related diseases.^[28] It's a multifaceted process that affects various levels, from the cellular and molecular to the organ and tissue level. This decline is driven by the accumulation of damage, the weakening of physiological reserves, and the breakdown of cellular and molecular processes.^[29] Aging pathophysiology involves accumulation of damage, DNA damage, protein misfolding and aggregation, and lipid peroxidation, decline of cellular function, reduced cell proliferation and repair, and the accumulation of senescent cells, changes in tissue architecture and function, such as decreased collagen synthesis and increased fibrosis, decline in organ function, reduced functional reserve, and increased susceptibility to age-related diseases, decline in the body's ability to maintain a stable internal environment (homeostasis) under various stress conditions, cellular senescence, inflammation, hormonal changes.^[30]

MATERIAL REQUIRMENT

Table No. 1: Formulation and Preparation of Shatdhauta Ghrita-Based Herbal Cream.

S.No	Ingredients	Function	Quantity (% w/w)	Quantity (g/mL)
1	Ghee (Shat Dhat Method)	Base	30%	15 g
2	Almond Oil	Emollient, Nourishment	10%	5 mL
3	Chironji oil	Antioxidant, Anti-Microbial	10%	5 mL
4	Coconut oil	Hydration, Cooling Agent	1%	0.5 mL
5	Aloe Vera Gel	Soothing, Hydration	15%	7.5 g
6	Glycerin	Humectant, Moisture Retention	3%	1.5 mL
7	Vitamin E	Antioxidant, Anti-Aging	1%	0.5 mL
8	Beeswax	Emulsifier, Stabilizer	2%	1 g
9	Borax	Emulsifier, pH Stabilizer	1.5%	0.75 g
10	Distilled Water	Solvent, Adjusting Consistency	q.s	q.s

METHOD

Preparation of Shatdhauta Ghrita (100-Times Washed Ghee)

Shatdhauta Ghrita (SDG) was prepared using the traditional mortar and pestle method. Cow ghee (15 g) was placed in a sterile porcelain mortar, and an equal volume of distilled water was added. The mixture was triturated in a circular motion for 4–5 minutes, followed by decantation of the supernatant water. This washing process was repeated 100 times, replacing the water at each step. The final SDG exhibited a soft, white, and creamy consistency, confirming its transformation into a topical emollient base. The prepared SDG was stored in a sterile container at room temperature (~25°C) for further formulation

Formulation of Herbal Cream

1. Preparation of Oil Phase

Beeswax, almond oil, and chironji oil, glycerin were taken in a beaker and heated to 70–75°C under continuous stirring to ensure uniform melting.

2. Preparation of Aqueous Phase

A separate beaker was used to heat distilled water and borax to 70–75°C while stirring continuously until the borax was completely dissolved. Aloe vera gel, papaya extract, lemon juice and preservative were then added to the heated aqueous phase with gentle stirring.

3. Emulsification

The heated aqueous phase was slowly added to the oil phase under continuous stirring at 600–800 RPM to form an emulsion. The mixture was homogenized at 8000–10000 RPM for 5–10 minutes to ensure uniform dispersion of all ingredients.

4. Incorporation into Shatdhauta Ghrita Base

The prepared emulsion was allowed to cool to 40–45°C before being gradually incorporated into the pre-prepared Shatdhauta Ghrita base. The formulation was mixed thoroughly until a uniform cream consistency was achieved.

5. Final Cooling and Storage

The final formulation was allowed to cool to room temperature and then stored in airtight containers under cool and dry conditions for further evaluation.

EVALUATION TEST FOR HERBAL MOISTURIZING CREAM

1. Organoleptic Evaluation: Parameters like color, odor, texture was carried out Color and texture were evaluated by visual and touch sensation respectively. The Odor was inspected by sensing the formulation.
2. Appearance & Homogeneity: Appearance and Homogeneity was evaluated by visual inspection.
3. Patch Test:

Choose a Test Area: - Wrist

Clean the Area: - Wash with mild soap and water than pat dry



Figure No. 2: Shatdhauta Ghrita-Based Herbal Cream

Apply the Cream: - Dab a small amount of the cream (about the size of a pea) on the wrist area.

After that leave it open to air.

Wait and Observe: - Leave it on for 24 hours. Avoid washing the area during this time Check for Reactions: - Look for redness, itching, swelling, blistering, or rash. If any of these occur, do not use the cream.

If no irritation appears, then it is safe to use on your face.

4. pH: The ph. of the herbal moisturizing cream was calculated by using ph. paper. It is between 5.5 to 6.5
5. In vitro occlusion test: In vitro occlusion tests evaluate a cream's ability to prevent water evaporation from the skin. A common method involves placing a sample on a filter paper covering a beaker of distilled water, then measuring the water flux over a set period. A higher occlusion factor indicates better moisture retention and skin hydration
6. Washability tests: washability test for a cream assesses how easily it can be removed from the skin with water. This test is crucial for understanding the cream's formulation and its user experience, as it reflects how easily the product can be washed off. A small amount of the cream is applied to the skin, typically the hand. The cream is then washed off under running tap water, with minimal force. The cream is considered easily washable if it is completely removed, leaving a non-greasy skin surface.
7. Spreadability Test: Take 2 glass slides, place 0.5 g cream on slide, and place another slide on top. Apply 50 g weight for 1 minutes and measure the distance moved by the upper slide. Measure the distance moved by the upper slide. Formula:

$$S = (M \times L) / T$$

Where: M = Weight (g)

L = Length moved (cm) T = Time (sec)

$$S = \text{Spreadability } 50 \times 8.5 \div 60 = 7.083 \text{g.cm/sec}$$



8. Viscosity Determination: Measure viscosity using Brookfield Viscometer. Use Spindle No. 3 or 4. Set speed at 10 rpm or 12 rpm. Record viscosity reading in cP (centipoise). Herbal Anti-wrinkle moisturizer should ideally have a thin-viscous consistency typically ranging between 20,000 and 50,000 cps. The viscosity of the herbal Anti-wrinkle moisturizer was found to be 21,425 cps, indicating good consistency and suitable viscosity for topical application.

SUMMARY

S. No.	Evaluation Parameter	Result
1.	Colour	Lite cream
2.	pH	5.5-6.5
3.	Spreadability	Good
4.	Viscosity	21062 cps
5.	Homogeneity	Homogeneous
6.	Washability	Easily washable
7.	Irritancy	No irritation
8.	Stability	Stable

CONCLUSION

The prepared Herbal Anti-wrinkle moisturizer was compared with various parameters like color, odor, washability, pH, microbial testing, irritability, washability, and found to be satisfied with all required characterization. Thus, the developed formulation can be used as an effective herbal moisturizing cream for using it to bear a healthy and glowing face.

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