



PREPARATION AND CHARACTERIZATION OF THE POLYHERBAL ANTI-AGING CREAM

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ABSTRACT :

Skin aging is a multifactorial process influenced by internal and external factors, leading to visible signs such as wrinkles and loss of elasticity. With the growing emphasis on skin health as a reflection of overall well-being, numerous anti-aging strategies have emerged. These include preventive measures, cosmetic interventions, topical and systemic treatments, and invasive procedures. Additionally, herbs like gotu kola, ashwagandha, ginseng, guduchi, and drumstick offer promising anti-aging benefits due to their rich phytochemical content. These herbs not only nourish the skin but also help prevent collagen breakdown, making them valuable in the fight against skin aging.

Keywords : Skin, Aging, Hesperidin, Vitamin C, Anti-Aging, Pigmentation

Introduction:

the skin is the body's largest and most vital organ, serving as a protective barrier against external threats while regulating temperature and enabling sensory perception. It comprises three main layers: the epidermis, dermis, and hypodermis (not detailed here). The epidermis includes squamous cells, basal cells, and melanocytes, each playing a role in protection, regeneration, and pigmentation. Beneath it, the dermis houses connective tissue, hair follicles, sweat glands, and sensory receptors, all held together by collagen, which provides strength and elasticity. Understanding skin structure is essential for maintaining skin health and developing effective dermatological and anti-aging treatments.

the skin is a complex and multifunctional organ composed of three primary layers: the epidermis, dermis, and subcutaneous tissue. Each layer plays a distinct role in maintaining overall health and homeostasis. The dermis contains essential components such as blood vessels, lymph vessels, hair follicles, sweat glands, fibroblasts, collagen bundles, and nerves. The subcutaneous layer provides insulation, stores energy, and cushions the body against



external impacts. Together, these layers enable the skin to perform vital functions, including protection, sensation, temperature regulation, synthesis and storage, absorption, water resistance, and excretion, making it an indispensable part of the human body.

Causes of Skin-Aging :

skin aging occurs through intrinsic, extrinsic, and hormonal factors. Intrinsic aging is a natural, gradual process marked by fine wrinkles, dryness, and reduced elasticity due to cellular and structural changes in the skin. Extrinsic aging is primarily caused by environmental factors such as UV radiation and smoking, leading to deep wrinkles, pigmentation, and loss of elasticity. Photoaging significantly contributes to facial skin aging and increases skin cancer risk. Hormonal aging, particularly during menopause, accelerates the decline in skin quality due to reduced hormone levels. Understanding these mechanisms is vital for developing effective anti-aging and skincare strategies.

Aging skin undergoes several physiological changes influenced by hormonal shifts, especially reduced estrogen, and catabolic factors linked to chronic diseases. Estrogen plays a vital role in maintaining skin thickness, collagen levels, hydration, and barrier function. Postmenopausal aging is often marked by increased sagging rather than deep wrinkles. Common symptoms of aging include fine lines, wrinkles, dullness, uneven skin tone, and dryness—each resulting from slower skin renewal, reduced moisture retention, and structural degradation of collagen and elastin. Recognizing these signs and their underlying causes is crucial for early intervention and effective anti-aging skincare and treatment strategies.

Natural Herbs/plants used for Anti-Aging :

Various plant-derived compounds exhibit significant anti-aging and antioxidant properties. Epigallocatechin gallate and catechins protect against UV damage, while licorice flavonoids help reduce fine wrinkles. Flavonoids, anthocyanins, and catechins—especially from peels—offer strong antioxidant effects. Ginsenosides stimulate collagen synthesis, and acids like caffeic, rosmarinic, and carnolic delay aging. Compounds such as eugenol and cinnamaldehyde, along with basil's phenolics and flavonoids, contribute to maintaining youthful, healthy skin.

Natural herbs offer a promising and holistic approach to anti-aging by supporting skin health, reducing oxidative stress, and enhancing overall well-being. Herbs like ginseng, turmeric, ashwagandha, ginkgo biloba, green tea, gotu kola, holy basil, rosemary, and sage possess antioxidant, anti-inflammatory, and collagen-boosting properties. While their traditional use is well established, continued scientific research is essential to validate their effectiveness and ensure safe, personalized skincare applications.



Drug Profile:

- **Hesperidin:**

Hesperidin is a bioactive flavonoid predominantly found in citrus fruits like lemons and sweet oranges. With strong antioxidant, anti-inflammatory, and immune-modulatory properties, it supports vascular health and is often combined with ascorbic acid to reduce capillary fragility. Sourced mainly from the Rutaceae family, it is abundant in tropical African and Mediterranean regions. Hesperidin holds significant promise in both therapeutic and cosmetic applications for promoting skin and overall health.

- **Vitamin C:**

vitamin C, or ascorbic acid, is a vital nutrient essential for tissue growth, repair, collagen formation, and overall skin health. Abundantly present in citrus fruits, particularly in the peel, it plays a crucial role in protecting cells, supporting the immune system, and maintaining the integrity of skin, bones, and blood vessels. Originating from the Rutaceae family, citrus fruits are a rich source of this potent antioxidant. The aim of this study is the preparation and characterization of a polyherbal anti-aging cream using natural plant extracts. Anti-aging medicine seeks to delay or reverse signs of aging and promote a longer, healthier life. The objectives include extracting active compounds using different solvents from two selected plants, conducting phytochemical investigations, and formulating an effective cream. The goal is to reduce premature aging, nourish the skin, and enhance its appearance naturally. Such herbal formulations are a promising and sustainable alternative in modern skincare.

Materials And Methods:

The materials used for the preparation of polyherbal anti-aging cream include essential chemicals like potassium hydroxide, acetic acid, methanol, and natural ingredients such as orange peel, honey, and oils like sweet almond and wheat germ. Equipment like the Soxhlet extractor, condenser, and magnetic stirrer aid in efficient extraction and mixing. Glassware, including round-bottom flasks, Buchner funnels, and dishes, are crucial for proper handling and filtration of the extracts. Together, these materials enable the formulation of a potent, natural anti-aging cream.

Collection of materials:-

The materials required for this study, including orange peel, chemicals, and equipment, were sourced from local markets and the LCIT School of Pharmacy in Bilaspur, Chhattisgarh. Phytochemical extraction involves isolating bioactive compounds from plant tissues using various solvents. Common extraction methods include maceration, infusion, percolation, digestion, and decoction. More advanced techniques like Soxhlet extraction, microwave-assisted extraction, ultrasound extraction, and supercritical fluid extraction allow for precise isolation of active metabolites. These extracted compounds are then screened for potential bioactivity, such as antioxidant, antibacterial, or cytotoxic effects, essential for developing effective anti-aging formulations.



Phytochemical Extraction:

phytochemical extraction utilizes various techniques to isolate bioactive compounds from plants. Methods such as phytonic extraction with hydrofluorocarbon solvents, expression, effleurage, and solid-phase micro-extraction are employed. The quality of an extract depends on factors like the plant part used, solvent properties (pH, polarity, concentration), extraction procedure, time, and temperature. Conventional solvents like water, chloroform, methanol, hexane, ethanol, ether, and ethyl acetate are commonly used. The successive extraction method, using solvents of increasing polarity (hexane, chloroform, and methanol), ensures complete extraction of compounds over several days, yielding high-quality phytochemicals for further use.

the bark is ground into coarse powder and extracted using the Soxhlet apparatus with 500 ml of solvent. The extraction process is carried out at the appropriate temperature for 72 hours, successively using different solvents, and the extracts are collected separately for further analysis

Macroscopic and Microscopic Examination:

Macroscopic and microscopic examination are essential steps in determining the identity, purity, and quality of medicinal plant materials. Visual inspection offers a quick way to assess characteristics like color, size, and texture, though subjective judgment may vary. Macroscopic analysis provides basic identity based on external features, while microscopic examination is crucial for identifying powdered or broken materials. When used together with other analytical methods, microscopy can offer strong evidence for plant identification. Additionally, tests such as the determination of vein-islets and palisade ratios provide further insights into plant materials' authenticity and quality.

Evaluation of medicinal plants :

The evaluation of medicinal plant materials requires careful macroscopic and microscopic examination. Size, color, surface characteristics, and texture are assessed using tools like graduated rulers and magnifying lenses. Odor is evaluated through gentle crushing or heating the sample. For microscopic analysis, reagents like chloral hydrate TS, lactochloral TS, and lactophenol TS are used to clarify particles, starch grains, and calcium oxalate crystals. Additionally, total ash content is determined by igniting the material in a crucible, ensuring carbon-free ash, and calculating the content per gram of air-dried material, providing insights into the quality and purity of the plant material.

Preparation of Anti – Aging Cream :

In the process of preparing an anti-aging cream, various steps are involved, including the extraction of active compounds and the formulation of the cream. The acid-insoluble and water-soluble ash tests are performed to determine the purity of the herbal material. Phenolic,



flavonoid, and antioxidant content are measured using the Folin-Ciocalteu method, UV-VIS spectrophotometer, and DPPH assay, respectively. For the isolation of hesperidin, two methods are employed: the conventional maceration method with an alkaline solution and the modern Soxhlet extraction method using petroleum ether followed by methanol. Once the hesperidin is isolated, it is purified and characterized. The preparation of the anti-aging cream involves mixing the isolated hesperidin with base oils, shea butter, and wax, followed by combining with honey and distilled water. After heating and mixing, the preservative is added to the cream as it cools, resulting in a final product designed to nourish and beautify the skin.

Preformulation studies are crucial in developing an effective anti-aging cream. These include evaluating organoleptic properties such as color, odor, and texture, determining solubility to avoid crystallization, conducting texture analysis, measuring pH for stability, and assessing drug-excipient compatibility to ensure the cream's stability, bioavailability, and effectiveness.



RESULT :

The results of the formulation evaluation showed that the prepared semisolid creams had acceptable physical appearance, with no phase separation. Spreadability was tested, and the formulation showed good spreadability with consistent results across trials. Extrudability and rheological studies confirmed the ease of extrusion and suitable viscosity for application. Irritancy tests revealed no significant irritation or adverse effects, indicating the formulation's safety for use. These findings confirm the efficacy and stability of the cream.

CONCLUSION :

The study concluded that the formulated anti-aging cream, utilizing herbal extracts, demonstrated good spreadability, consistency, and stability. While natural aging is inevitable, extrinsic aging factors can be prevented through effective formulations. The research emphasizes the potential of natural herbs in combating skin aging, highlighting the need for further investigation into additional herbs for their anti-aging properties. Continued exploration in this field could contribute significantly to skin health and aging prevention strategies.



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CONFLICT OF INTREST :

The author declares that there is no conflict of interest related to the preparation or publication of this article.