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A Review On Cosmeceuticals

Baljinder Kaur Bansal[1], Prashant Singh[2], Prof. Dr. Biswajit Das[3]

[1]Scholar, One beat college of medical sciences, Bhira, Uttar Pradesh,262901

[2]Associate Professor, One beat college of medical sciences, Bhira, Uttar Pradesh,262901

[3] Principal, One beat college of medical sciences, Bhira, Uttar Pradesh,262901

Abstract

Cosmeceuticals are products that combine cosmetics and biologically active substances, claiming therapeutic or pharmacological benefits. They are used to treat dermatological conditions, nourish the skin, and enhance its appearance by improving tone, texture, and brightness, and reducing wrinkles. Unlike traditional cosmetics, cosmeceuticals aim to provide both aesthetic and skin health benefits. Herbal cosmeceuticals are particularly popular due to their safety and antioxidant properties. However, the Federal Food, Drug, and Cosmetic Act does not officially recognize the term cosmeceuticals, and the FDA does not require pre-market review or verification of manufacturers' claims. While safety testing is standard for both cosmetics and cosmeceuticals, efficacy testing of active ingredients is not mandatory. Cosmeceuticals are limited to topical applications like ointments, lotions, and creams.

KEYWORDS: Cosmeceuticals, Performance cosmetics, functional cosmetics, dermaceuticals, active cosmetics, nutricosmetics

1. INTRODUCTION

Since prehistoric times, beauty has been highly valued, and the desire to appear attractive and healthy has only increased. Today, fitness, health, appearance, and self-presentation are considered key aspects of personality, often influencing how individuals are perceived socially and professionally. This emphasis is amplified by the media, which promotes the idea that physical appearance is essential for acceptance and success.

However, as average lifespans have increased, factors such as sedentary lifestyles, overeating, genetics, pregnancy, and aging contribute to changes in facial and body appearance, often affecting individuals self-esteem and sense of identity.[1] The cosmetic surgery market in the UK, reflecting a 47.4% growth from 2005. This dynamic

market continues to expand, driven by advancements in technology, particularly non-surgical treatments, which offer shorter recovery times and allow patients to return to work quickly.

Effective communication remains a critical challenge in cosmetic surgery. A thorough consultation is essential, providing patients with accurate and realistic information about expected outcomes. This is especially important for individuals seeking minimally invasive procedures to manage natural aging.

Objective assessment of cosmetic outcomes requires scientific methods to compare results with baseline images. Non-surgical, biophysical techniques now enable tracking of vital skin characteristics over time, facilitating the evaluation of skin maintenance, improvement, and recovery after product application or aesthetic procedures. To ensure reliable results, standardized protocols and appropriate statistical analyses are essential, maintaining high scientific and clinical standards in cosmetic practice. [2-4] As a result, more people are now opting for non-invasive procedures over traditional surgery. While it is often said that beauty is in the eye of the beholder, in the cosmetic industry, the ultimate driving force is profit. Much of the revenue flows into the hands of cosmeceutical corporations, their shareholders, and celebrity-endorsed doctors.

The cosmetics industry has evolved far beyond offering products like lash-extending mascaras and vibrant lipsticks. Today, it promises more than just concealing imperfections—it aims to treat and reduce skin blemishes, blurring the line between beauty products and therapeutic solutions.[5]

Cosmetics are chemical formulations applied to the human body to enhance appearance or fragrance. They encompass a wide range of products, including lotions, powders, perfumes, lipsticks, nail polishes, and skin care creams. Additionally, cosmetics extend to items like hair dyes, gels, sprays, deodorants, hand sanitizers, bubble baths, bath oils, salts, and baby care products.

A specific subset of cosmetics, make-up, refers primarily to colored products designed to alter or enhance a person's appearance, such as foundation, eyeshadow, lipstick, and blush. While all make-up is cosmetic, not all cosmetics are considered make-up, highlighting the diverse nature of the industry.[6]

Pharmaceuticals, commonly referred to as drugs, are substances designed to combat disease and promote healing. Their primary purpose is to alter the body's structure or function to diagnose, cure, mitigate, treat, or prevent illness, thereby restoring or maintaining health.[7] The term cosmeceuticals refers to products that combine cosmetics and pharmaceuticals. These products contain biologically active ingredients that provide both cosmetic and therapeutic benefits. Unlike traditional cosmetics, which primarily enhance appearance, cosmeceuticals aim to improve skin health by offering pharmacological effects such as reducing blemishes, wrinkles, and signs of aging.[8] A cosmeceutical is a substance with medicinal properties that provides beneficial topical effects and protection against degenerative skin conditions. It bridges the gap between pharmaceuticals and personal care products by combining cosmetic ingredients with therapeutic,

disease-preventing, or healing properties, offering both aesthetic enhancement and skin health benefits.[9] Cosmeceuticals represent the latest advancements in skincare and dermatological product development. These are topical blends of pharmaceuticals and cosmetics, specifically designed to enhance both skin health and appearance. Unlike traditional cosmetics, which primarily clean and beautify, cosmeceuticals offer functional benefits that fall between treatment-focused pharmaceuticals and beauty-focused products.

In the personal care industry, are often used to describe products that provide both aesthetic and therapeutic effects, catering to consumers seeking scientifically backed solutions for skincare and wellness.[10]

Cosmetics, depending on their ingredients, can exert medical or drug-like effects on the skin's biological functions. Cosmeceuticals specifically enhance skin health by preserving the keratin structure, stimulating collagen production, and reducing the harmful effects of free radicals. These actions help maintain skin integrity, improve elasticity, and combat signs of aging and environmental damage.[11-12] Some skincare products go beyond simply coloring or embellishing the skin. Like cosmetics, cosmeceuticals are applied topically and contain active ingredients that influence the biological function of the skin. While cosmetics primarily aim to enhance appearance by providing nutrients for skin health, cosmeceuticals promise additional benefits, such as improving skin tone, texture, brightness, and reducing wrinkles.

The natural personal care market, especially in the realm of cosmeceuticals, is experiencing the fastest growth, driven by increasing consumer demand for products that offer both aesthetic enhancement and therapeutic benefits. [13] Cosmetics and cosmeceuticals are primarily tested for safety, not for efficacy. Many bioactive ingredients commonly found in cosmetics include milk peptides, vitamins, minerals, phytonutrients from herbs, oils, and plant extracts. Botanicals, with a long history of use in traditional cultures, have become a significant component of the thriving cosmetics industry.

Cosmeceuticals are gaining popularity because they offer fewer side effects and the added benefit of multifunctionality. The growing trend of the "beauty inside and out" movement combines topically applied cosmeceuticals with nutricosmetics (nutritional supplements taken orally) to improve both physical appearance and overall health.

In 2002, L'Oreal and Nestle, a collaboration aimed at developing and promoting nutritional supplements designed for aesthetic purposes, further highlighting the integration of beauty and wellness in the industry.[14] The cosmeceutical industry has seen rapid expansion, with both large and small companies now operating in the sector. Notably, men have become increasingly conscious of their appearance, leading to the introduction of many men's beauty product lines. Cosmeceuticals on the market now include anti-wrinkle creams, sunscreens, moisturizers, bleaching agents, medicated lotions, hair growth stimulants, antidandruff shampoos, eye wrinkle creams,

collagen injections, skin care, hair care, and sun care products.

With so many competing options, customers often face difficulty choosing the right products, as they are unsure which will deliver the best results. Many companies now promote the use of plant-based ingredients in their cosmeceuticals. For example, retinoids and retinol (Vitamin A) are well-established for treating skin aging, known to stimulate collagen production and modulate growth factors like TGF-beta.

Growth factors are becoming increasingly popular in cosmeceuticals. Kinetin, a plant-derived growth factor, has shown promise in slowing down cellular aging by affecting biochemical and morphological changes in human fibroblasts. Additionally, alpha-lipoic acid is a potent antioxidant capable of scavenging intracellular free radicals and crossing lipid membranes. Copper peptides have gained recognition for improving skin elasticity, reducing wrinkles, fine lines, roughness, and photodamage, as demonstrated in recent research. These advancements reflect the growing focus on science-backed, active ingredients in cosmeceuticals.[15]

HISTORY

The Egyptians are credited with being the first civilization to recognize the health and cosmetic benefits of beauty products. Around 4000 B.C., Egyptians began using cosmetics for both aesthetic and therapeutic purposes. They applied kohl (a mixture of soot and other ingredients) around their eyes to enhance their appearance and protect against the harsh desert sun, which was also believed to have protective properties against infections. Egyptians also used natural oils, ointments, and perfumes for skin care, as well as henna for hair and nail decoration. These early practices laid the foundation for the development of cosmetics throughout history.[16] The distinction between cosmetics and pharmaceuticals became clearer only in the early 19th century when the first modern pharmaceutical industry began to take shape. Prior to this, the line between products for beauty and products for health was often blurred.

The rapid growth of the cosmeceuticals industry in the 1980s was largely due to the increasing popularity of hydroxy acids, which are naturally occurring fruit acids. These acids were recognized for their ability to exfoliate the skin and prevent wrinkles, a key focus in the burgeoning market for products that offered more than just cosmetic benefits.

In 1961, Raymond Reed, a founding member of the United States Society of Cosmetic Chemists, coined the term "cosmeceuticals" to describe products that blend both cosmetic and pharmaceutical qualities. This concept gained significant attention in 1971 when Albert Kligman, a prominent dermatologist, developed a mixture using retinoic acid. This formulation was found to be effective in improving the appearance of wrinkled and UV-damaged skin, further fueling interest in cosmeceuticals as products that could offer both aesthetic and therapeutic benefits.[17] Dr. Albert Kligman, a renowned dermatologist, made a groundbreaking contribution to the skincare industry by discovering that topical retinoic acid (commonly known as tretinoin) could effectively treat both wrinkles and acne. His work in the 1960s

and 1970s transformed the way skin aging and acne were understood and treated.

Kligman's research demonstrated that tretinoin, derived from vitamin A, could stimulate collagen production and accelerate cell turnover, helping to reduce the appearance of fine lines and wrinkles while also unclogging pores to treat acne. This discovery not only changed the treatment landscape but also laid the foundation for what would become a multi-billion-dollar industry focused on cosmeceuticals.

By popularizing the term cosmeceuticals to describe products that combine both cosmetic and pharmaceutical properties, Dr. Kligman is often regarded as the father of the cosmeceutical industry. His work bridged the gap between skincare and medicine, leading to the development of many products that offer therapeutic benefits beyond simple beautification. but cosmeceuticals first appeared in the world market in 1996.[18-19]

In ancient Egypt, cosmetics were not only used for beautification but were also believed to have medicinal properties. Archaeologists have uncovered several cosmetic jars inscribed with messages like "good for sight" and "stops bleeding," reflecting the early understanding of the therapeutic effects of certain substances. These early cosmeceuticals were developed from natural ingredients and used to address both aesthetic and health-related issues.

The Ebers Papyrus, one of the most famous ancient Egyptian medical texts, written around 1600 BC, contains numerous references to cosmetic formulations with medicinal claims. Among the products mentioned in this papyrus, some were said to "expel wrinkles from the face" and were made from combinations of ingredients like frankincense, balantine oil, rush oil, and wax. These mixtures were believed to have anti-aging effects on the skin.

One of the most beloved preparations, known for its healing properties, was a honey and milk-based remedy. This concoction was said to treat skin disorders and was popular for its moisturizing and therapeutic benefits. These early uses of cosmeceuticals in ancient Egypt laid the groundwork for modern skincare, combining beauty and health benefits in a way that resonates with today's cosmeceutical products.[20]

In ancient civilizations, the use of cosmetics was deeply integrated into daily life, serving both aesthetic and sometimes spiritual or medicinal purposes. Kohl, a dark powder, was one of the earliest forms of eye makeup, commonly used in ancient Egypt. It was applied around the eyes, often in the shape of an almond, and was made from various materials, including copper ore, lead, ochre, ash, burnt almonds, and oxidized copper. The practice of using kohl not only enhanced beauty but also had protective properties against the harsh sun and was believed to ward off evil spirits.

For lips and cheeks, ancient Egyptians used a mixture of red clay and water, creating a natural tint. Henna was used for decorating fingernails, turning them orange or yellow—a custom that was also prevalent in other parts of the world.

In ancient China, nail color was crafted from a mixture of egg whites, Arabic gum, beeswax, and gelatin, creating vibrant hues. This practice spread

to other parts of Asia and became a symbol of status and beauty.

As cultures blended and traded, especially in the Mediterranean region, the Greeks began adopting Egyptian cosmetic practices. They used makeup not for spiritual reasons, as the Egyptians did, but for beautification and social status. They refined the cosmetic traditions and started to use cosmetics more for personal enhancement.

When the Romans emerged, they continued to use cosmetics but took them a step further by creating more complex formulations. They were known to mix sheep fat with blood for nail paint and indulged in unconventional beauty rituals, such as bathing in dirt and crocodile feces, which they believed could have aphrodisiac or therapeutic effects.

These ancient cosmetic practices laid the foundation for modern cosmetics, evolving through the centuries and becoming a significant aspect of both beauty and health in societies around the world.[21]

CLASSES OF COSMECEUTICAL

Major Classes of Cosmeceuticals are as follows

Sunscreens

Over-the-counter (OTC) cosmeceuticals, particularly those offering sun protection, are essential in daily skincare routines. Their sun protection value (SPF) must be demonstrated through rigorous in vitro (laboratory-based) and in vivo (human-based) research to ensure they provide the promised protective benefits against harmful ultraviolet (UV) radiation.

Dermatologists emphasize the importance of these formulations for everyday use, as they help prevent skin damage, reduce the risk of skin cancer, and slow down the aging process caused by sun exposure. These products typically include ingredients like sunscreen filters, which are specifically designed to block or absorb UV radiation.[22]

Additionally, cosmeceuticals that are designed to meet individual preferences, such as texture, scent, and ease of application, help increase user compliance. When consumers find products that feel pleasant and align with their preferences, they are more likely to use them consistently. This improved adherence is crucial for the effectiveness of daily skincare products, especially those aimed at long-term protection and skin health.

In summary, the development of effective OTC sun protection cosmeceuticals combines the need for scientifically proven efficacy with consumer-friendly formulations to ensure that these products are both effective and widely used.[23]

Retinoids

Vitamin A and its derivatives are essential for maintaining healthy skin, and they are commonly used in cosmeceuticals for their various skin benefits. There are two main types of Vitamin A derivatives: natural and synthetic.

- Natural Derivatives:
- Retinol: A form of Vitamin A that is naturally found in animal sources, such as liver, dairy, and eggs. It is widely used in skincare products for its ability to promote

cell turnover, reduce wrinkles, and improve skin texture and tone.

- Retinyl Palmitate: This is the ester form of retinol, which is often found in skin care products. It is a gentler version of Vitamin A, suitable for those with sensitive skin.
- Beta-Carotene: A plant-based precursor of Vitamin A (a carotenoid), beta-carotene is found in colorful fruits and vegetables like carrots, spinach, and sweet potatoes. It provides antioxidant benefits and can help protect the skin from free radical damage.[24]

➢ Synthetic Derivatives:

- Tretinoin (Retinoic Acid): A synthetic form of Vitamin A used primarily for treating acne and signs of aging, such as wrinkles and fine lines. Tretinoin directly influences skin cell turnover and promotes the renewal of the skin.
- Isotretinoin: A more potent form of retinoid, primarily used to treat severe acne. It reduces the size and activity of sebaceous (oil) glands in the skin.
- Adapalene: A synthetic retinoid used primarily to treat acne. It has a similar effect to tretinoin but is considered less irritating, making it a popular choice for those with sensitive skin.
- Tazarotene: Another synthetic retinoid used to treat acne and signs of aging. It is more potent than tretinoin but can be irritating for some individuals, so it is often used in lower concentrations.[25]

Benefits of Vitamin A Derivatives in Cosmeceuticals:

- Anti-aging: Vitamin A derivatives stimulate collagen production, reduce the appearance of fine lines, wrinkles, and dark spots, and improve skin texture.
- Acne treatment: They help in reducing clogged pores and inflammation, making them effective for treating acne and preventing breakouts.
- Hyperpigmentation: They are used to even out skin tone by reducing the appearance of dark spots, sunspots, and melasma.
- Skin repair: Vitamin A derivatives help speed up the skin's natural healing process, making them valuable for post-procedure care or skin conditions like acne scars.

While both natural and synthetic forms of Vitamin A derivatives are highly beneficial for the skin, synthetic derivatives tend to be more potent and are used for targeted treatments in dermatology. Natural derivatives are often found in over-the-counter skincare products and are gentler for everyday use.[26-27]

Moisturizer

Emollients, occlusives, and humectants are the three main types of ingredients commonly found in moisturizers. Each of these plays a unique role in hydrating and protecting the skin, and together they help treat various skin disorders by addressing different aspects of skin moisture balance. Let's break down the functions of each:

➢ **Emollients**:

- **Function**: Emollients help to soften and smooth the skin by filling in the gaps between skin cells. They are usually oils, lipids, or fatty substances that create a smoother skin surface, improving its overall texture and feel.
- **Benefits**: Emollients help reduce roughness and irritation and make the skin feel soft and supple. They are particularly helpful for dry, flaky, or irritated skin by enhancing the skin's barrier function.

➢ **Occlusives**:

- **Function**: Occlusives create a physical barrier on the skin's surface, preventing water loss and locking in moisture. These ingredients are typically thick and greasy, forming a layer that prevents transepidermal water loss (TEWL), which helps maintain hydration in the skin.
- **Benefits**: Occlusives are particularly beneficial for very dry or compromised skin, as they form a barrier to keep moisture from evaporating. They also help protect the skin from environmental irritants.[28]

2. **Humectants**:

- **Function**: Humectants attract and retain water from the environment or deeper layers of the skin into the outer layer. They help the skin absorb moisture and keep it hydrated by pulling water into the skin.
- **Benefits**: Humectants are highly effective for hydrating the skin and are often used in moisturizers for their ability to draw moisture into the skin. They work best in combination with occlusives to trap the moisture they attract.

moisturizers containing a combination of emollients, occlusives, and humectants offer comprehensive care by not only hydrating the skin but also protecting it from environmental damage and preventing moisture loss. These properties make them highly effective for treating a wide range of skin conditions, from dryness to more chronic skin disorders like eczema and psoriasis.[29]

SKIN CARE COSMECEUTICALS

Skin care and cosmetics have indeed become integral to many people's daily routines as they help maintain the skin’s health and appearance. The skin, being the body’s largest organ, plays a vital role in protecting the internal body from external threats, including harmful environmental factors such as UV rays, pollution, and chemicals. However, prolonged exposure to the sun’s ultraviolet (UV) rays can cause significant skin damage, accelerating aging and contributing to various skin issues such as wrinkles, hyperpigmentation, and inflammation.[30]

➢ **Free Radical Formation**: UV radiation from the sun generates free radicals, highly reactive molecules that damage skin cells by attacking the skin’s structural proteins and lipids. This oxidative stress can lead to inflammation and the breakdown of skin tissue.

➢ **Collagen and Elastin Breakdown**: Collagen and elastin are two essential

proteins in the skin that provide structure, strength, and elasticity. UV exposure triggers the activity of enzymes, which break down these proteins, leading to skin sagging, loss of firmness, and the formation of wrinkles. Over time, this loss of collagen and elastin fibers reduces the skin's suppleness and integrity.[31]

Plant Extracts and Antioxidants for Skin Protection:

To combat these effects and maintain healthy, youthful-looking skin, many skincare products incorporate plant extracts and antioxidants derived from natural sources. These ingredients help protect the skin from UV-induced damage and promote overall skin health.

- **Antioxidants**: Antioxidants are compounds that neutralize free radicals, reducing oxidative damage to the skin. They play a key role in preventing premature aging and maintaining the skin's health. Some well-known antioxidants used in skincare include:
- **Vitamin C**: Known for its ability to brighten the skin and promote collagen production, vitamin C is an effective antioxidant for reducing the signs of UV-induced aging.
- **Vitamin E**: Often used in conjunction with vitamin C, vitamin E helps protect the skin from UV damage, improves hydration, and reduces inflammation.
- **Green Tea Extract**: Rich in polyphenols, particularly epigallocatechin gallate **(EGCG)**, green tea has strong antioxidant properties that can reduce inflammation and protect against UV-induced oxidative stress.
- **Resveratrol**: Found in grapes and red wine, resveratrol has been shown to have anti-aging properties by protecting against sun damage and improving skin texture.

Plant Extracts:

- **Aloe Vera**: Known for its soothing properties, aloe vera helps reduce inflammation caused by sunburn and supports skin healing.
- **Chamomile Extract**: Often used for its calming and anti-inflammatory effects, chamomile extract can help soothe irritated skin and reduce redness from UV exposure.
- **Ginseng**: This extract is believed to stimulate collagen production, improve skin elasticity, and reduce the appearance of fine lines.
- **Polyphenols**: These are plant-based compounds found in fruits, vegetables, and teas, and they have been shown to have strong antioxidant and anti-inflammatory effects. Polyphenols help prevent skin aging by neutralizing free radicals and enhancing skin resilience.[32]

Benefits of Plant-Based Antioxidants in Skin Care:

- **Prevent Premature Aging**: By protecting the skin from oxidative stress caused by UV exposure, plant-based antioxidants help reduce the formation of wrinkles, fine lines, and sagging.

- **Improve Skin Tone and Texture**: Ingredients like vitamin C and green tea extract can help brighten the skin and even out skin tone by reducing hyperpigmentation.
- **Boost Skin's Natural Repair Mechanisms**: Many antioxidants promote collagen production, which helps maintain the skin's strength and elasticity. Collagen and elastin are vital for keeping the skin youthful and supple.
- **Calm and Soothe**: Anti-inflammatory plant extracts can soothe irritated skin, reduce redness, and minimize sunburn effects.

Incorporating skincare products with plant extracts, antioxidants, and other protective ingredients into a daily routine can significantly improve the skin's appearance, delay the signs of aging, and reduce the harmful effects of environmental exposure. Maintaining skin health and integrity requires consistent protection and care, especially from external stressors like UV radiation.[33]

Several botanicals have been extensively studied for their clinical effectiveness in treating extrinsic aging, which includes aging caused by environmental factors such as UV radiation and pollution. The following botanicals are among the most significant in dermatology, particularly in cosmeceuticals:

1. **Green Tea**: Rich in antioxidants, particularly epigallocatechin gallate (EGCG), green tea helps to protect the skin from oxidative damage, reduces inflammation, and supports collagen production.
2. **Black Tea**: Known for its polyphenols, black tea helps protect the skin from oxidative stress, prevent premature aging, and reduce the appearance of fine lines and wrinkles.
3. **Soy**: Soy contains isoflavones, which have been shown to promote skin elasticity, reduce wrinkles, and help with moisture retention by stimulating collagen production.
4. **Pomegranate**: Pomegranate extract is rich in antioxidants, particularly ellagic acid, which can protect against UV damage, reduce inflammation, and improve skin tone.
5. **Date**: Dates are high in polyphenols and flavonoids, which protect the skin from oxidative stress and support its natural regeneration.
6. **Grape Seed**: Grape seed extract is loaded with proanthocyanidins that help prevent skin aging, reduce oxidative damage, and enhance collagen synthesis.
7. **Horse Chestnut**: Known for its anti-inflammatory and antioxidant properties, it helps reduce the appearance of varicose veins, promotes skin circulation, and enhances skin tone.
8. **German Chamomile**: Chamomile is commonly used to soothe irritated skin and

has anti-inflammatory, antioxidant, and skin-healing benefits.

9. **Curcumin**: Found in turmeric, curcumin is a potent antioxidant and anti-inflammatory that can reduce pigmentation, protect against UV damage, and improve skin tone.
10. **Comfrey**: Comfrey contains allantoin, which promotes skin healing, reduces irritation, and helps regenerate skin tissue.
11. **Allantoin**: A compound often derived from comfrey, allantoin helps to soothe and heal the skin, promoting cell regeneration and moisture retention.
12. **Aloe Vera**: Aloe vera is well known for its soothing, anti-inflammatory, and moisturizing properties, making it ideal for treating sunburns and reducing the effects of UV exposure.

These botanicals, when incorporated into skincare products, can address various extrinsic aging factors such as wrinkles, fine lines, hyperpigmentation, and loss of elasticity. Clinical trials and studies have shown their potential in treating and preventing the signs of aging, making them key ingredients in the formulation of cosmeceuticals.[34]

HAIR CARE COSMECEUTICALS

Humans have long had the ability to control their hair's appearance, whether through length, color, or style, allowing individuals to express themselves in various ways. This control over hair has significant implications for personal identity and cultural norms. Throughout history, cultures like the ancient Greeks and Romans used various tonics and ointments to beautify their hair and treat scalp diseases. Natural substances such as mud and henna were used for coloring and styling.

The distinction between cosmetics for beauty and medical treatments began to emerge with figures like Henry de Mandeville, who made clear the difference between beauty agents and medicines. However, the rise of cosmeceuticals cosmetics with physiologically active ingredients—has blurred the line between beauty and therapeutic treatments.

Today, shampooing is the most common form of cosmetic hair treatment, traditionally aimed at cleansing the scalp and hair. Modern shampoos, however, have evolved beyond simple cleansing to address various hair care issues, including oily hair, dandruff, and hair loss, such as androgenic alopecia (male or female pattern baldness). The formulations now include ingredients targeting these specific problems. For example, extracts such as yarrow (Achillea millefolium) have been used to treat oily hair due to their astringent properties.

As the cosmetic industry continues to develop, the use of bioactive compounds, often found in cosmeceuticals, plays a vital role in enhancing hair health and addressing specific scalp conditions. These advances show how the lines between cosmetics and medical treatments are increasingly becoming intertwined, particularly in the realm of personal care products.[35]

COLOUR COSMECEUTICAL

The color of a cosmetic product plays a crucial role in its appeal and marketing success, especially in a society where social media amplifies concerns

about body image. The color cosmetics sector, which includes products such as lipstick, blush, and eyeshadow, is growing rapidly as more people seek to enhance their appearance using makeup.

Cosmetics can generally be classified into two categories based on how they interact with the skin: leave-on products and rinse-off products. Leave-on products like lipstick, body lotion, and creams stay in contact with the skin for an extended period, while rinse-off products like shampoo, soap, and gels are applied and then removed.[36]

Colorants, or coloring agents, are a fundamental component of cosmetics, and they can be categorized based on several factors: color, solubility, structure, source, and application technique. The two main types of colorants are dyes and pigments:

- Pigments are typically insoluble and remain in particle form. They are widely used in products like toothpaste, blush, and decorative makeup.
- Dyes, on the other hand, are soluble—either in water or oil. They are found in various skin care items and toiletries, such as body lotions or shampoos.

While both dyes and pigments have specific applications, synthetic dyes tend to be more commonly used in the industry. They are favored over natural dyes (which are derived from plants, animals, and minerals) due to their lower cost and superior stability. Synthetic dyes often have greater brightness, longer-lasting effects, and better resistance to environmental factors such as light, heat, or pH variations that may occur during manufacturing.

Overall, the choice of colorants influences not only the visual appeal of the product but also its durability and performance, making it an important consideration in cosmetic formulation and marketing strategies.[37]

CONCLUSION: - The cosmeceutical sector has experienced impressive growth, with the market in the USA alone reaching approximately $8.2 billion in earnings. This growth is largely driven by an aging population seeking noninvasive alternatives to traditional anti-aging treatments. As consumers increasingly turn to cosmeceuticals for solutions to skin aging and related concerns, the demand for these products is expected to continue rising.

Despite the growth of the industry, there remains a lack of robust scientific research in the field. Specifically, there is a need for more randomized, placebo-controlled trials that can provide reliable evidence on the efficacy and safety of cosmeceutical products. Much of the scientific foundation for the development of these products is currently driven by industry research rather than independent academic studies.

As the cosmeceutical market continues to expand, so too must our understanding of the science behind these products. Dermatologists and other skincare professionals have a responsibility to stay informed about the latest research and advancements in the field in order to provide accurate advice to patients. This knowledge is essential for helping patients navigate the vast array of products available,

ensuring that they use products that are both safe and effective.

As leaders in dermatology, our role extends beyond simply recommending products—it involves educating patients about the science of cosmeceuticals, addressing potential risks, and offering guidance on how these products can complement a comprehensive skin care regimen.

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