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# An Opinion on Cosmeceuticals to Provide a Biological Effect



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## ABSTRACT

The use of cosmeceuticals has drastically risen in recent years. These are significantly used for increases the clinician in improving the treatment of skin, hair, and other condition, which are the fastest growing segments of the natural personal care industry. They are applied topically as cosmetics but contain ingredients that influence the skin biological function. In this review article which includes certain therapy such as anti-aging therapy, Hyperpigmentation, youthful appearance. As baby boomers begin to reach retirement age. Cosmeceuticals undergo to determine safety but claim of efficacy largely. In cosmeceuticals product does not produce placebo effect because applied on the skin there is no effect. Which maintain through sustain use. Which involve – antioxidants, Niacinamide, Depigmenting agent, Topical peptides. The cosmeceuticals product design to help enhance your physical appearance along with our inner beauty, nutrients are required to retain its natural beauty. The cosmeceuticals product are most beneficial than cosmetics because it provides beauty as well as therapeutic effect. Careful preclinical or clinical evaluation of efficacy and safety is a prerequisite for the development of a specific cosmeceutical product. This article reviews some of the ingredients that are currently in use or might be potential candidates in cosmeceuticals of different categories.

## INTRODUCTION

Cosmeceuticals or cosmeceuticals are cosmetic pharmaceutical hybrid intended to enhance the beauty through ingredients that provide additional health related function or benefits.<sup>1</sup> Which provides beauty and cleans the skin. The first recorded use of cosmetics is attributed to Egyptians in 4000 B.C. The ancient Sumerian, Babylonians, and Hebrews also applied cosmetics.<sup>2</sup>

‘Cosmeceuticals’ which is the fastest growing segment of the natural personal care industry. The term “cosmeceutical” coined in 1961 by Raymond Reed, was used to describe “active” and science-based cosmetics. The word and concept were further popularized by Cosmeceutical products first appeared in the world market only in 1996.<sup>3</sup> The purported drugs like effects are unproven, and the term is neither recognized by the United States Food and Drug Administration (FDA) nor by any other regulatory body. Between 1996 and 2007, out of over 837 articles published in reputable journals, and over 600 have used the word cosmeceuticals as an authentic term.<sup>4</sup> Cosmeaceutically active ingredients are constantly being developed by big and small corporations engaged in pharmaceuticals, biotechnology, natural products, and cosmetics, while advances in the field and knowledge of skin biology and pharmacology have facilitated the cosmetic industry’s development of novel active compounds more rapid<sup>5</sup>. Consumers are always interested in maintaining a youthful appearance, and as the global population's median age increases, this market is increasingly expanding. Interest by developing formulations to improve the appearance of UV-damaged and wrinkled skin using retinoic acid as the active ingredient.

The concept of beautifying is not restricted to women alone, even men have become aware of their look. Nowadays advertisements of many anti-wrinkle and fairness cream are aimed at men. Key cosmeceuticals used by men include hair growth products, anti-aging, antiperspirant, athlete's foot and astringents. Cosmeceutical most commonly used by women include anti-Cosmeceuticals have become established tools in the treatment of photoaging in

Dermatologic practices, their general application to wound healing has yet to be fully explored. Wound healing is a complex process that, when impaired, results in many untoward effects such as ulcers, dehiscence, hypertrophic scars and keloids. Cosmeaceutically active ingredients are constantly being developed by big and wrinkles, anti-cellulite, hair removal, tanning skin whitening, antioxidants, and cell recovery products. Desirable features of Cosmeceuticals agents

are efficacy, safety, formulation stability, novelty, and patent protection, metabolism within skin and inexpensive. small corporations engaged in pharmaceuticals, biotechnology, natural products, and cosmetics, while advances in the field and knowledge of skin cream containing a hormone such as oestrogen results in a fresh appearance with a rejuvenating effect.<sup>6</sup>

## **CLASSIFICATION OF COSMECEUTICALS<sup>7</sup>:**

Cosmeceuticals basically can be classified into following categories:

- 1) Skin cosmeceutical product- Anti-aging creams, Moisturizers, Facial products and Lotions.
- 2) Hair cosmeceutical product- Gel and creams, Hair colorants and Dyes, Shampoos, Growth Stimulators and Conditioners.
- 3) Others- Lipstick, Nail polish, Toothpaste and Powders

On the basis of

1. According to the part of body
  2. According to physical characteristics
  3. According to purpose
1. 1. According to the part of body parts of cosmetics:-

A) Parts of cosmetics

a) Power compact:

Ex- face powder, body powder, face pack

b) Creams:

Ex- vanishing cream, cold cream, cleansing cream, moisturizing cream

c) Lotion:

Ex- skin lotion, astringent lotion

d) Colorants:

Ex-lipsticks, rouges

B) Cosmetics for hair

a) Hair remover:

Ex-Depilatories, Epilatories, Shaving cream

b) Hair wave preparation:-

Ex- hairdressing, hair conditions

c) Shampoos:

Ex- anti-dandruff shampoo, conditioner

d) Eyelash preparation:

Ex- mascara,

C) Cosmetics for nails:

Ex-lacquers, lacquers remover, nail polishes, nail remover.

D) Cosmetic for hygiene:

a) Dental

Ex- toothpaste, paste dentifrices, lotion, mouthwashes.

b) Bath

Ex- soap, bath salts

2) According To Physical Characteristic

A) Emulsion:

Ex- water in oil, oil in water, thin, thick emulsion

B) Suspension:

Ex- water in oil, oil in water

C) Lotion:

Ex- calamine lotion, nourishing lotion

D) Soaps:

Ex- baby soap

3) According To Purpose

- 1) Protective – sunscreen lotion
- 2) Nourishment- hair oil , lotion
- 3) Decorative – lipstick, mascara
- 4) Cleansing- cleansing milk
- 5) Curative- dentifrices, astringent

### **SKIN COSMECEUTICALS <sup>8</sup>:**

These are skin-care products that go beyond colouring and adorning the skin. Such products improve the functioning/texture of the skin by encouraging collagen growth by combating harmful effects of free radicals, thus maintaining keratin structure in good condition and making the skin healthier. OLAY vitamin line, which includes vitamins A, C, D, E, selenium, and lycopene, pycnogenol plus zinc and copper, is a well-known skin care line. The treatment of aging skin with a cream containing a hormone such as oestrogen results in a fresh appearance with a rejuvenating effect.

#### **Sunscreens**

Regular use of an effective sunscreen is the single most important step to maintain healthy, youthful-looking skin. Mainly, it is the effect of ultraviolet (UV) light from the sun that causes most of the visible effects of ‘aging’ skin. Traditional chemical sunscreens act primarily by binding skin protein and absorbing UVB photons (280-320 nm) and most are based on para-aminobenzoic acid (or its derivatives), cinnamates, various salicylates and benzophenones, benzoylmethane, anthraline derivatives, octocrylene, and homosalate. Avobenzone is a benzophenone with excellent UVA protection. Physical agents or sun blocks, act as barriers, which reflect or scatter ray.<sup>9</sup>

## **Moisturizers**

Moisturizers incorporated with emollients help smoothen age lines, brighten and tone skin surface by filling space between non-living outer layer of the skin and lubricating while promoting the retention of moisture in these layers<sup>10</sup>. Ingredients such as black cohosh, soy extract and vitamin A, E found in healthy remedies balancing lotion for menopausal women help diminish the appearance of fine lines and wrinkles while uplifting the neck area and promoting moisture retention.<sup>11</sup>

## **Bleaching agents**

Bleaching agents provide sun protection that blocks formation of skin pigment called melanin apart from bleaching/fading various marks such as brown marks, liver spots, melasma, etc. One of the most commonly used agent is hydroquinone, kojic acid, extract from mushroom, which may be compounded with tretinoin or topical steroids,  $\alpha$ ,  $\beta$  hydroxyl acids, is slightly less effective as an agent compared with hydroquinone. Hydroquinone as an agent maintaining a pH between 4 and 7 and includes a compressed mixture of a synthetic anionic detergent, hydroquinone and its stabilizer, water, a buffer which maintains the pH of the bar and excipients such as waxes, paraffin, dextrin. A buffer to maintain pH between 3.5 and 7.5 thus, the skin bleaching preparation is characterized by an extended shelf life due to the presence of stabilizer and the maintenance of low pH.<sup>12</sup>

Skin care cosmeceuticals some common ingredients are given in table no. 1

## **HAIR CARE COSMECEUTICALS**

Hair is a bodily feature over which a human has direct control in modifying the length, colouring and styling it according to how one wishes to appear. It plays an important role in people's physical appearance and self-perception. Among the earliest forms of hair, cosmetic procedures in ancient Egypt was hair setting using mud and hair coloring with henna<sup>13</sup>.

**Table: 1 List of Cosmeceuticals Ingredients with Their Plant Source<sup>14-15</sup>**

Ingredient	Purported action	Source
<b>Essential fatty acids</b>	Smoothens, moisturizers and protects	Linoleic acid arachidonic acids
<b>Coenzyme Q10(ubiquinone)</b>	Cellular antioxidant	Naturally occurring in skin
<b>Aloe Vera</b>	Softens skin	<i>Aloe vera</i>
<b>Allantoin</b>	Soothers	<i>Comfrey</i>
<b>Arnica</b>	Astringent and soother	<i>Montana</i>
<b>Ginkgo</b>	Antioxidants that smoothes, rejuvenates and promoter	<i>G.biloba</i>
<b>Cucumber</b>	Cools refreshes and tightens pores	<i>Cucumber</i>
<b>Witch hazel</b>	Tones	<i>H. virginiana</i>
<b>Kinetin</b>	Free- radicals scavengers and antioxidant	<i>Plant and yeast</i>
<b>Centella</b>	Skin conditioning agent. Increases collagen product of improve texture and integrity of the skin	<i>C. asciatica</i>
<b>Ivy</b>	Stimulates circulation and help other ingredients penetrate the skin	<i>Hedera</i> spp
<b>Boswellia</b>	Anti-inflammatory and anti-aging	<i>B.serrate</i>
<b>Turmeric oil</b>	Antibacterial and anti-inflammatory	<i>C.longa</i>
<b>Lycopene</b>	Smoothes skin, promotes cell renewal and improves circulation to the skin	<i>Olive leaf</i>
<b>Coriander seed oil</b>	Anti-inflammatory	<i>C. sativa</i>

<b>Horse chestnut extract</b>	Supports blood circulation, wound healing effect, and anti-inflammatory	<i>A. hippocastanum</i>
<b>Dry extract from yarrow</b>	Treatment of oily hair	<i>A. millefolium</i>
<b>Epigallocatechin gallate</b>	Antioxidant	<i>C. sinensis (Green tea)</i>
<b>Stearic and oleic acids</b>	Potent free-radical scavengers	<i>B. parkii</i>
<b>Vitamin E</b>	Potent Antioxidant	<i>H. annuus (Sun Flower)</i>
<b>Homocysteine, allicin</b>	Antioxidant and skin conditioning agent	<i>A. sativum(Garlic)</i>
<b>Curcumin, Zingiberine</b>	Antibacterial and anti-inflammatory	<i>C. longa (Turmeric)</i>

## COMMONLY USED SKIN COSMECEUTICALS

### HydroxyAcid:

Hydroxy acid also referred to as fruit acids; they are a common ingredient found in many cosmeceutical products. Examples include citric acid, malic acid, and lactic acid. AHAs improve skin texture and reduce the signs of aging by promoting cell seeding in the outer layers of the epidermis and by restoring hydration.

### Botanicals:

Botanicals comprise the largest category of cosmeceutical additives found into the marketplace today. Some botanicals that may benefit the skin include green tea extract, ferulic acid, and grape seed extract.<sup>16</sup>

### Ferulic acid:

This compound, which is derived from plants, is considered to be a potent antioxidant and has been shown to provide photoprotection to skin.<sup>17</sup>

### **Depigmenting Agent:**

Skin-lightening agents. Common depigmenting ingredients include hydroquinone, ascorbic acid (vitamin C), kojic acid, and licorice extract (glabridin).<sup>18</sup>

### **Hydroquinone<sup>19</sup>:**

Hydroquinone is the skin lighting agent, conc. between 1.5% and 2%. The study based on animal model utilizing long- term exposure at high dosages at carcinogenic.<sup>20</sup>

### **Exfoliants:**

Exfoliants promote skin turnover by removing adherent cells in the stratum corneum. Common exfoliants found in cosmeceutical preparations include salicylic acid (SA), lactic acid, and glycolic acid. There are concerns that repeated use of SA and AHAs could cause the dermis and epidermis to be more vulnerable to penetration by UV radiation.<sup>21</sup>

### **Topical Peptides:**

Topical peptides are regarded as cellular messengers that are formed from amino acids and are designed to mimic peptide fragments with endogenous biologic activity. These pentapeptides (e.g. KTTKS) are comprised of a subfragment of type I collagen propeptide, and play a role in signaling fibroblasts to produce collagen in the skin, which can improve the appearance of wrinkles.<sup>22</sup>

### **Retinoid:**

Retinoid are among the most common ingredients found in cosmeceuticals. In fact, they are the most studied and have the most data behind them. They consist of natural and synthetic derivatives of vitamin A that reduce hyperpigmentation and inhibit enzymes from breaking down collagen.<sup>23</sup>

### **Antioxidants<sup>24</sup>:**

Antioxidants reduce free-radical damage, thereby preventing impairment at the cellular level. They inhibit inflammation, which leads to collagen depletion, and they offer protection against

photodamage and skin cancer. Common antioxidants include alpha-lipoic acid (ALA), L-ascorbic acid (vitamin C), niacinamide (vitamin B3), N-acetyl-glucosamine (NAG),  $\alpha$ -tocopherol, and ubiquinone.

**Tamarind:** Tamarind or *Tamarindus indica* L. of the *Fabaceae*, subfamily *Caesalpinoideae* consists of amino acids, fatty acids and minerals of tamarind plant parts.

**Vitamin C:** Vitamin C is necessary for the hydroxylation of proline, procollagen, and lysine.

**Vitamin E:** (Alpha-tocopherol) is the major lipophilic antioxidant in plasma membranes and tissues.

### COSMETIC VS DRUG<sup>25</sup>

There are multiple slightly variable definitions of both ‘drugs’ and ‘cosmetics’, but some commonalities do exist explained in (Table2). The term cosmetic refers to a preparation designed to enhance the body superficially to hide a real comprehended deficiency or flaw, by direct application. This application is considered to be decorative, lacking in depth or significance, as opposed to a response to a medical requirement. The definition of a drug is more complex. Generally, a drug is a chemical substance which, when absorbed into a living organism, alters normal function. The pharmacology definition of a drug will apply—"a chemical substance used in the treatment, cure, prevention or diagnosis of disease or used to otherwise enhance physical or mental well-being, for a limited duration or indefinite period of time.

**Table 2: Comparison between drug and cosmetic product<sup>26-27</sup>**

Sr. no.	Drug product	Cosmeceutical product
1.	Pre-approval is necessary	No pre- approval is not necessary
2	Predetermined end point according to class of drugs	No predetermined end point according to active ingredients
3	Premarket application is must with safety and efficacy studies	Not necessary to do pre-market application
4	Cost of new drug development is \$ 800 m	Cost of cosmetic development is \$ 2-\$ 3 m only

5	Claims are monitored strictly	Claims are seldom monitored
6	Strict control on manufacturing practice and inspections followed	Should follow GMP but not strict
8	Pharmacokinetics, pharmacodynamics, and drug-drug interactions, etc.	Great latitude of documentation
9	Time of drug development is 7-15 years	Development of cosmetic using breakthrough technology is 3-5 years

## TOXICITY OF COSMECEUTICALS<sup>29</sup>

The term ‘natural’ is frequently used for most components of cosmeceuticals and willingly or unwillingly connotes safety. This is far from the truth. Carbaryl, the only constituent of veterinary cosmeceuticals with documented toxicity profile, has an oral LD50 of 100 mg/kg in not accumulate, low doses have been known to cause dermal and eye irritation in rabbits despite the dermal LD50 in rabbits is quoted as >2000 mg/kg . Vitamin E has been shown to cause a significant increase in contact dermatitis, while the antioxidant P-hydroxyanisole increases skin pigmentation. Some component peptides have also been shown to be carcinogen Microbial contaminants have been reported with unfavourable consequences. The broad categories of cosmeceuticals are antioxidants, growth factors, peptides, anti-inflammatories/botanicals, polysaccharides, and pigment lightening agents.<sup>30</sup>

## COMMON MYTHS AND MISCONCEPTIONS<sup>31</sup>

- Cosmeceuticals and cosmetics are regulated as drugs.
- Cosmeceuticals claims in labeling and advertising are substantiated and approved before market.
- Cosmetic ingredients undergo premarket testing and review by the FDA for safety.
- Cosmetic ingredients undergo premarket testing and review by the FDA for efficacy.

## REGULATORY ASPECTS OF COSMECUTICS<sup>32</sup>

Drug products have stringent regulatory requirements. According to regulatory aspects of drug products, cosmeceutical products are compared and tabulated in Table 2. The claims made about

drugs are subject to high scrutiny by the Food and Drug Administration (FDA) review and approval process, but cosmetics are not subject to mandatory FDA review. Much confusion exist regarding the status cosmeceuticals.<sup>1</sup> This term has found application and recognition to designate the products at the borderline between cosmetics and pharmaceuticals.<sup>18</sup> Cosmeceuticals are not subject to FDA review and the Federal Food, Drug and Cosmetic Act do not recognize the term itself<sup>22</sup>. It is also often difficult for consumers to determine whether ‘claims’ about the actions or efficacies of cosmeceuticals are in fact valid unless the product has been approved by the FDA or equivalent agency.<sup>30</sup> Some experts are calling for increased regulation of cosmeceuticals that would require only proof of safety, which is not mandatory for cosmetics. Some countries have the classes of products that fall between the two categories of cosmetics and drugs: for example, Japan has ‘Quasi-drugs’; Thailand has ‘controlled cosmetics’.<sup>33-34</sup>

## FUTURE PROSPECTS

By the addition of small amount of cosmeceuticals agents to the cosmetic formulations which do not require medical regulations and it would improve the production of Cosmeceuticals that could help to improve the skin, nail, and body mass growth. New challenges will also be presented to government regulatory agencies 315 chemicals with true biological activity are invented and tested.<sup>35</sup>

Cosmeceuticals are not drugs but are claimed to have drug-like effects. The claims are largely unsubstantiated and the term, though misleading, has probably come to stay.<sup>36</sup> The term and the target consumers appear flamboyant enough to withstand Government regulations. In future, more effective formulations containing herbal component may come in trend. The addition of herbal extracts for therapeutic use requires better understanding of the herbal potential.<sup>37</sup> The present trend towards herbal cosmetics with effective therapeutic property will continue and may be some newer herbs will also be placed in cosmetics world. In coming future, the regulatory authorities will need to frame some laws concerned with safety, efficacy and quality assessment of these newer herbal cosmeceuticals. In a free trade world, the benefits and adverse effects of cosmeceuticals are probably optimized by frequent review to inform the clinical and public stakeholders of their uses and limitations.<sup>38</sup> An informed public is the best audience to guide the

science and art of cosmeceutics toward more formal substantiation if not regulation. Perhaps professional and consumer education would better protect consumers who are trying to make sense of this billion-dollar industry. Physicians are in an especially good position to help patients and potential cosmeceutical users.<sup>39</sup> Understanding that, although the great demand of cosmeceuticals has led to development of products to counteract the signs of aging skin, to decrease erythema, and to even out tone and pigmentation.<sup>40</sup> These cosmeceuticals can help protect the skin from photodamage and in some ways repair it through stimulation of new collagen production.<sup>41-42</sup> Using them in conjunction with sunscreens and subscriptions retinoid may enhance results when used as an adjunct to rejuvenating procedures. They can also help to increase tolerability of retinoids by improving the epidermal barrier. With different cosmeceuticals being publicized to impart different effects, an upcoming trend will be the multi-functional cosmetic. The further research in wound healing and biotechnology will serve to expand this field.<sup>43</sup>

## CONCLUSION

The global trend in the cosmetic industry towards developing ‘medicinally’ active cosmetics, and in the pharmaceutical industry towards ‘cosmetically’ oriented medicinal products as part of a current ‘life-style’ ideology. The future promises increasingly sophisticated formulations for cosmetics and skin-care products. Cosmetic companies are finding ways to deliver small-dose ingredients that do not require medical regulations and to introduce steroids and hormones into lip balms, which would result in production of cosmeceuticals that could help to improve body mass, nail, and hair growth. New challenges will also be presented to government regulatory agencies as more chemicals with true biological activity are invented and tested. Claim substantiation and premarketing testing must also evolve to accurately assess efficacy and safety issues with important implications for total body health. The new vehicles and delivery systems combined with established ingredients will alter percutaneous absorption, requiring re-evaluation of substances with an assumed good safety profile. Biotechnology will also compete directly with the pharmaceuticals and cosmetic businesses. The most influential angle over the coming 5 years will be the links between internal health, beauty, and anti-aging. The next big beauty trend will include skingestibles that will promote beauty from the inside out, borrowing of pharmaceutical terms for cosmetic applications, amino peptides to make the skin more elastic,

neuro mediators which are chemicals to tell the brain to be happy and the blurring of boundaries between surgery and cosmetics. The trend towards therapeutic cosmetics assure to result in the need to obtain a better understanding of modern ingredients and assessment technique. The claims made about drugs are subject to high scrutiny by the Food and Drug Administration (FDA) review and approval process, but cosmetics are not subject to mandatory FDA review. Much confusion exists regarding the status of ‘Cosmeceuticals. Although there is no legal class called Cosmeceuticals, this term has found application and recognition to designate the products at the borderline between cosmetics and pharmaceuticals. Cosmeceuticals are not subject to FDA review and the Federal Food, Drug and Cosmetic Act do not recognize the term itself. It is also often difficult for consumers to determine whether ‘claims’ about the actions or efficacies of cosmeceuticals are in fact valid unless the product has been approved by the FDA or equivalent agency. Some experts are calling for increased regulation of cosmeceuticals that would require only proof of safety, which is not mandatory for cosmetics. The regulations of cosmeceuticals have not been harmonized between the USA, European, Asian and other countries.

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