



## Evolutions of Cosmeceuticals from Cosmetics

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ARTICLE DETAILS	ABSTRACT
<p><i>Article history:</i> Received on 24 February 2021 Modified on 12 November 2022 Accepted on 20 November 2022</p> <hr/> <p><i>Keywords:</i> Cosmetics, Pharmaceutics, EU Regulations, Unani Medicine Plants, Cosmetologist.</p>	<p>Cosmeceuticals, which is the fastest growing segment of the natural personal care industry. These cosmeceuticals, serving as a bridge between personal care products and pharmaceuticals, have been developed specifically for their medicinal and cosmetic benefits. Cosmeceuticals (or alternatively, cosmaceuticals) are topical cosmetic pharmaceutical hybrids intended to enhance the beauty through ingredients that provide additional health related function or benefit. The cosmeceutical concept is used by many skin-care companies; especially those endorsed by dermatologists, to give the impression that the products contain more effective or more biologically active ingredients than just ordinary cosmetics. Hence, anyone can slap the label with tall claims to promote these products saying the products are more beneficial than the existing conventional regulated cosmetic products.</p>

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### INTRODUCTION

#### Definitions of Cosmetics as per EU Regulations

The European Union Cosmetics Directive defines a cosmetic as "any substance or preparation intended to be placed in contact with the various external parts of the human body (epidermis, hair system, nails, lips and external genital organs) or with the teeth and the mucous membranes of the oral cavity with a view exclusively or mainly to cleaning them, perfuming them, changing their appearance and/or correcting body odours and/or protecting them or keeping them in good condition <sup>[1]</sup>." The European Union requires that cosmetic products placed on the EU market be safe; that is, they "must not cause damage to human health when applied under normal or reasonably foreseeable conditions of use." As in the U.S., manufacturers are responsible for ensuring that cosmetic products comply with the law before they are marketed. The manufacturer or importer of cosmetics is responsible for demonstrating that the product is safe for its intended use. Regulations are enforced at the national level, and each country in the EU has an

authoritative body that is responsible for upholding compliance <sup>[2]</sup>.

#### Evolutions of Cosmeceuticals from Cosmetics

The use of cosmetics as a material to improve or preserve the human body's beauty goes back to very early times, they used vegetable leaves, flower, paint, animal component, stones, shell, etc. to decorate the body 'because ancient man treated skin with care because it is easily visible and unprotected and its disorders can be obnoxious, abominable and deadly as well. Regardless of their organic aspects, skin disease or cosmetic disease was called social disease; physicians had to treat these carefully during their early stages themselves <sup>[3]</sup>.' First, the word 'cosmetae' was used to describe Roman slaves whose function was to bathe in perfume for men and women. Ancient Unani literature is full of herbal/traditional cosmetic/cosmeceuticals formulations, cosmetics and cosmeceuticals are considered essential commodities of life in contemporary age, and due to their variety, low cost and protection, these Unani cosmetics and cosmeceuticals can be very good option. In some

contemporary preparations, it can also be incorporated as an adjuvant. Cosmetics (Mawad tajmrl) are external preparations that are applied to the skin, hair, nails for different purposes, such as preserving, covering, coloring, embellishing or enhancing appearance. Cosmetics are referred to as a cosmetic that has or is believed to have medicinal properties. Cosmeceuticals are the mixture of cosmetics and pharmaceuticals, cosmetic disease is an infection that just seems to fuck (It is a condition that is embarrassing, even disfiguring but harmless, causing no physical pain or disability). Not so simple is the line between cosmetic disorders and other illnesses, female hirsutism and leucoderma, and there seems to be some dispute on the status of acne, rosacea, and some forms of psoriasis, on the other hand.

#### **Pre and Post Hippocratic Cosmeceuticals:**

Early Egyptian men and women used scented oils, ointments (to clean and soften skin and mask body odor), dyes and paints (to color Hamiduddin et al.: Evolution of cosmetics and cosmeceuticals in Unani medicine skin body and hair, lips and cheeks polish, henna nail stain, kohl/Eye liners) as early as 10,000 BC [4]. Cosmetics were an important part of Egyptian culture. Egypt discovered the first archaeological evidence for its use around 4000 BC. In practice, the use of perfumes, oils and the burning of aromatic incense were burned in ancient times by Egyptians, a mixture of fragrant, gum resin and wood. Copper was used as eye colors, as well as lamp black (Kajal) was widely used for eyes dying of red hair. A Cleansing cream was used, made from animal or vegetable oil combined with powdered lime, and perfumed salve oil soaked in fragrant wood. As a moisturizer, perfumed oil was used. There were people of all ages or genders using makeup. Mouth fresheners and perfumes are also used by Egyptians. Incense cubes were prepared by combining grounded gums and plants with honey, a similar method that was adopted by the Greeks and Romans by the Babylonians [5]. There is some evidence of cosmetic use in China around 3000 BC. Chinese people used to leave their fingernails dirty. The Chou Dynasty Royals used to wear gold and silver, and later black or red. They used fragrance and incense, imported Jasmine-scented sesame oil from India, rose water from Persia by the silk route and Indonesian aromatics via India. A separate section on 20 essential oils is also included in *Materia Medica Pen Ts'ao*, which was published in China during the 16th century,

describing 2000 herbs. The ancient Chinese people often used to paint their finger nails and their brightness of color symbolized the individual's status. Similarly, the earliest evidence of the use of lipsticks was found in Japanese Geisha (Traditional Japanese female entertainers) who used crushed safflower petals on lips and also used it as an eyebrow outliner. Henna has been used in India since 4<sup>th</sup> or 5<sup>th</sup>; centuries have been used either as a hair dye or in the art / painted on the hands and feet, especially before marriage, it was also used in North African. Unique bathing cosmetics in the form of *Ubton* are commonly used in India and during their wedding; newly married brides use turmeric preparations. In the earlier days, India was also famous for using Itr, (scent in a distilled form) made from fragrances of different Indian flowers. In Hindu culture, the use of kajal also has a long history.' In many respects, the ancient Greeks learned from the Egyptians and even coined the word "cosmetics" which means "the art of decorating." Cosmetology in ancient Greece evolved not only in the decorative direction, but also therapeutically. 'Ancient Romans used oil and animal fat for cosmetic purposes (to maintain hair style and shape) [6].' The Roman bath is still very famous where the body of the men was steamed, some special massage with oils and perfumes is rubbed into the skin. In ancient Greek culture, Luffah / Yabrooj (*Atropa belladonna* Linn.) is known as ladies killer because of its alkaloid atropine, a pupil dilator used as an eye drop. 'Ancient Greek was rich in fragrance; incense, perfumes, spices, and aromatic medicine are described by world aromata. Megaleion, produced by Megallus, contains burnt resin, cinnamon, myrrh and cassia and was used for wound and inflammation treatment. The Greco-Arabian doctor's work in the cosmetics/cosmeceuticals field is listed below in the chronological order [7].

#### **Hippocrates (Buqrat) 460- c. 370 BC**

For good health and appearance, Buqrat has promoted the benefit of food, exercise, sunshine, baths and massage. Hippocrates left a lot of data on the use of medicinal plant as mentioned by Hamiduddin et.al.: Evolution of Cosmetics and Cosmeceuticals in Unani Medicine. A work in four volumes containing recipes for ointments and masks based on vegetable raw materials for skin, nails and hair care, was developed by Diocles, his disciple. For example, the almond oil lotion with milk, white lead face powder, tooth

powder of pumice and crushed horns, left work detail of daily care in Rome *Pliny* the Elder [8-9].

#### 'Galen (129 AD - c.E216) / *Jalinūs*:

The Roman physician was the creator of the first cosmetology textbook. He was the first to divide decorative cosmetics (masking the skin's deficiencies) and therapeutics (to preserve the skin's natural beauty) on a scientific basis. Galen invented the idea of cold cream and the first cooling ointment. He gave the idea of melting together bees wax, almond oil and oil of rose/rose water to make cold cream in Galens formula of cream (*Ceratum refrigerans Galeni*) 'Cosmetics were used from ancient times in Middle East / Persia. Cosmetics were restricted in some areas, particularly after Arab converted to Islam, if they were to disguise the real look in order to mislead. Cosmetic use has increased as all branches of Islam, whether physical or spiritual, promote purity and cleanliness. The rise of Islam in the Arab region is increasing the importance of personal hygiene and the use of fragrance has gained popularity. Deodorants and anti-sweating are not new cosmetics, they appeared many centuries ago. The form changes, but there is a similarity in some aspects [9]. There was no distinction between odor removers and anti-sweating materials in the number of Arab physicians. For several centuries, this classification remained as such, containing smell removers and sweat-sealers. They contained a high ratio of aromatic deodorant oils. This has been demonstrated by works by (Razes), (Avicenna) and (Ibn al-Tilmidh): "Many progress in manufacturing perfume, were transferred from the Islamic world to medieval Europe". In relation to cosmetology and cosmeceuticals, the Arab and Persian have a bright history. The contribution of Greek-Arabic and Persian physicians in this field is immense. Several formulations for body organs such as head, hair, skin color, glowing of bushra (skin), beautification of lips and eyes etc. have been added by various physicians of Unani Tibb have for many centuries. In cosmetic ingredients, these formulations and drugs are mentioned specifically.

**Cosmetics for beatification of face, body, skin care, hair care and for skin:** Various renowned Arab /Unani doctors and their work on cosmetics and cosmeceuticals are of great importance. Unani physicians have also described cosmetic diseases.

#### **Abu Mūsa Jabir ibn Hayyan (Geber, 721-815, Iraq):**

Jabir developed many techniques, including distillation, evaporation and filtration, which made it possible to collect the odor of plants into a vapor that could be collected in the form of water or oil. The work done by them and the details of their script is huge. Jabir ibn Hayyan have immense role in establishment of the perfume industry [10].

#### **Abu al-Hasan Ali ibn Sahl Rabban al-Tabari (838-870 AD):**

He has included skin, face, *sadyain* (breast), eyes, teeth, *indame nahani ki tangi, zeb wa zeenat* (make-up/beatification) of general skin and *bashra* in the *Tajmil* (beautification/cosmetics) category; his text *Firdous al-Hikmah* contained at least 300 cosmetic formulations distributed in 16 chapters, in which several formulations are those for the personal use of *Omavi* and *Abbasid* caliphates and in *Hammams* in the *Mamulat* (routine use), including after-bath lotions, powders, sprinkles, pastes, sprays, etc.

#### **Abu Yusuf Yu'qub ibn 'Ishaq as-Sabbah al-Kindi (Alkindus 801-873 AD)**

He was an Arabian chemist, he wrote a book on perfumes in the 9<sup>th</sup> century called 'The Kitab Kimiya' al-'litr '(Book of Perfume Chemistry). It describes many essential oil, including imported Chinese camphor. It contained fragrant oils, aromatic waters and salves recipes [11]. He even mentioned the equipment for perfume making, such as the alembic, which still bears its Arabic name." Al-Kindi carried out extensive research and experiments on various plants and other sources and on their combinations to produce different scents and their product. He mentioned in detail many recipes for a wide range of perfumes, cosmetics and pharmaceuticals. "Several witnesses reported his work on *ghaliya* (Fragrant powder) and perfumes containing amber, musk and other ingredients. He also discloses a list of technical names of drugs and devices. Al-Kindi played an immense role in establishing the perfume industry that he can be considered the real founder [12].

#### **Abu Bakr Muhammad ibn Zakariyya al-Razi (Zakariya Razi)/ Razes (854-925):**

He had established a chapter on cosmetology and principles for beatifications under the name "*Zeenat wa arash*" in his famous book "Kitab al-Mansuri". It was first separate chapter / writing in cosmetology. Taqaseem al-Ilal written by

Zakariyya al-Razi (854-925 AD) is a great and very famous book in Unani medicine. In this book 105<sup>th</sup> chapter is specially related to cosmetology. He mentioned all types of hair cosmetics like dyes (black, white, brown, red) hair conditioner, hair straighten, hair protector, hair stronger, hair longer, rapid hair grower, hair remover / depilatories, hair thinner, epilatories. In *Al-Hawi Fil Tib* he describes the treatment of alopecia areata and medina worm or Dracunculiasis. It mentions the XXIII volume of *Al-Hawi* by *al-Razi* is related to Qawanin of Makulat-o-Mashrubat (diet & beverage) and certain Usul-i-Ilaj (principals of treatment), hair and skin cosmetic diseases [13]. It is divided into two volumes, one is related to the principal of drinks and the second is related to hair and skin disease, particularly eczema and its types with very good experienced remedies [14].

**Abu Mansur al-Hasan ibn Nuh al-Qumri (d. shortly after 990 AD):**

He was Ibn Sina's teacher and was court physician to Prince al Mansur, to whom he dedicated the only treatise he preserved, the *Kitab al-Ghina wa-al-muna* (The Book of Wealth and Wishes), which was also known after its dedicatee as *al-Shamsiyah al ManWuriyah* (The Mansurian Sunshade).

**Ali Ibn Abass al-Majusi al-Ahwazi (died 982-994):**

He is mentioned in this cosmeceuticals. His special book '*Al-Kahhala fi kamil al-Sina*' al Tibbiya 'is related to ophthalmology in detail, with prevention and treatment, many kinds of eye diseases are described in it. In this book, some cosmetics are also mentioned, he mentioned treatment methods such as *natf al-Sha'r* (picking of eye iashes), *tanqiae badan* and formulation of entropian such as purgative drug's *matbukh* (decoction), *tila of dame zifda'* (laminent of frog blood) consists mainly of *naushadar* and *jund bedastar*. There is also mention of conditions such as excessive eye lashes and for this management process [15, 16]. He also mentioned the treatment of eye brow baldness and eye lashes such as the application of *marham dakhiliyun* after purgative therapy. The most useful eye cosmetics were mentioned as single drugs, are *zarawand* and *haiyul aalam*. The Arabic text of this book was published in 1997 by Wazarah al-Saqafah wa al-Irshad al-Islami Dimashq. Majusi in '*Kamil as-Sana'ah*' described differential diagnosis of lepromatous and tuberculoid leprosy [17].

**Abu'al Qassim al-Zohrawi or Abulcassis (936-1013 AD):**

He was a cosmetologist and an Arab doctor, and he wrote a voluminous 30-volume medical encyclopedia *Kitab al-Tasrif li man'Ajiza'An al-Ta'lif*. The benefits of suntan lotions were mentioned by *Al-Zohrawi*, he contributed to making under-arm deodorants, hair removal sticks, hand lotions, hair dyes for blond & black hair and for hair care, even to correct kinky or curly hair describing their ingredients in detail. He suggested cinnamon, nutmeg, cardamom, chewing on cilantro leaves, fried cheese seasoned with powdered cloves in olive oil for bad breath. He included methods to reinforce the gums and bleach the teeth. He mentioned perfumes, fragrant aromatics and incense, perfumed stocks rolled and pressed into special moulds (perhaps the initial antecedents of the present day lipsticks and solid deodorants). For medication and beautification, he used oily substances (Adhan) [18].

*Al-Zohrawi* separate cosmetics, such as *Advia Muzayyenah / Adwiyat al-Zinah*, as a branch of medication and the drugs used to enhance beauty. The care and beautification of hair, skin, teeth and other parts of the body, within the boundaries of Islam, was defined on the basis of 'Hadiths al-Zohrawi. For cold relief, he suggests "Muthallathat", made from camphor, musk and honey, just like Vicks Vapour Rub [19-21]. Other cosmeceutical forms considered twentieth-century were already present in Muslim Spain and include nasal sprays, mouth washes, and hand creams are described by al-Zohrawi. He suggested keeping clothes in a nook filled with incense ("Lenor") to provide the clothes with fragrance. It is not a recent tradition to take flowers to the sick in hospital; al-Zohrawi advocated this custom thousand years ago

**Ibn Sina, al-Shaykh al-Ra'is Abu'Ali al-Husayn ibn 'Abd Allah /Avicenna (980-1037 AD):**

Ibn Sina introduced by distillation the process of extracting oils from flowers. He improves distillation, the procedure. Liquid perfumes used prior to his discovery were mixtures of oil, crushed herbs and petals that made a good blend. Rose water was more delicate, and distillation technology became widespread immediately, significantly influencing western perfumery and scientific developments, particularly chemistry. "Ibn Sina explains, with preventive measures as a warning, the treatment

of various skin diseases. First, he suggested that "cosmetic skin defects are associated with the protection of internal organs." Avicenna in the third article of al-Qanun fi'l Tibb's fourth book under the title "In treating bad skin smell in general." and "a chapter: in describing a powder which perfumes body and benefits hot tempered people". He encouraged bathing, eating in manner and quantity what is digestible, eating what body can perfume and remove sweat odor on empty stomach, such as Cubeb Pepper, Cassia-tree, Parsley, Artichoke, Asparagus, and plants that expel urine and cleanse blood from stink. He also urged Yemen alum and iris syrup water and butcher's broom water to cover the body. He also used liniment of butcher's broom and white sandal, butcher's broom oil, rose oil used medication that blocks pores and prevents sweat, such as burnt lead, zinc, and alum [22].

#### **Abu Sahl'Isa ibn Yahya al-Masihi al-Jurjfuni (972- 1010 AD):**

He wrote *Al-mi'a fi-l-sana'a altabi'iyah*. The chapter 19<sup>th</sup> is about scents and clothing. In this segment, he mentioned scents such as *mushk, anbar, ood, kafur, lazina, za'faran* sandal; around 20 cosmetic-related oils such as *roghane-gul, roghane-nargis, roghane-hina* etc. and other appropriate cosmetics/cosmeceutical and dressings [23].

#### **Ahmad Ibn Ahmad Qalyubi (d.1049):**

He wrote the book "*Tadhkira fi al-Tib wa al-Hikma*". The 10<sup>th</sup> chapter of which is specially related to cosmetology which is further divided into three sub chapters; first is cosmetology related to external and internal parts of the body. Second is related to hair cosmetics and third is related to cloth and its cleansing."

#### **Sharaf al-Din Isma'il ibn Husayn Jurjani, [d.1135 A.D.]:**

He set up 37 chapters (*Abwab*) on *arastagi, tazaeen* and *tajmeel* of skin and other organs in 8<sup>th</sup> chaptet of *Dhakhira Khawarizm Shahi* title "Pakizgi aur arastagi wa perastagi zahire jism kharajan wa dakhilan" and reported hundreds of formulations concerning this title. It involves hair dying and oiling formulations and procedures for foot care and nails, also for the fissure in the foot sole, for making the palm/hand soft and smooth, etc. He presented separate male and female formulations [24].

#### **Abu-Marwan 'Abd al-Malik ibn Abi al-'Ala' Ibn Zuhr (1094-1162 AD):**

He wrote *Al-Taysir fil Mudawat wal-Tadbir* (Book of Therapeutics and Diet Simplification). His name was Latinized as Abumeron, Avenzoar, etc. In his book, he mentions cosmetology as a case study. He has a surgical specialty. Centered on organological disorders, he discusses cosmetology. He listed various kinds of Surma (Kohl) ate Ismad maghsul, Tutia, Zare ward and Lajward, the most widely used single drugs for different stages of life. He mentions skin cosmeceuticals for dryness and its associated cosmetic problems in Unani medicine [25]. He also mentioned the cracking, scaling and brittling of cosmetics for nails, along with the cracking of soles and other details. Another book is *Kitab al zinah* (also known as *Kitab al-iqtisad*) by Ibn Zuhr in cosmetology with a complete explanation of cosmetology, according to Ibn abi usaiba. It includes cosmeceuticals for hair, nails, skin such as namash, kalaf barash, etc. The therapy and management treatise in *al-Taysir* explains pityriasis versicolor, purpura, scabies. He identified pityriasis complex and called it al-Ibria affecting the head scalp and suggested treatment with tar which is accepted as best treatment in contemporary age in the form of tar soap.

#### **Said bin Hibat Allah (1073-1165 AD):**

He wrote a book *Al-Mughni fi al-Tibb* that describes cosmetology. For those diseases that lead to cosmetic issues, he brings up two special chapters. Various formulations of the Namsh (naevus), Kalaf (melasma/cholasma), Barash (lentigo/ ephelis/ ephelides), khilan (mole) are mentioned in it. The formulation of baldness like marahim mulhima and zamade muhallil after tanquiae badan are also mentioned. For the first formulation of Kalaf, seems drug-containing e.g. Shiyafe mamisa, Aarade masur, Aarade baqila, Mamiran, Zarawand, Za'faran, Tukhme kharpaza, Bans ki jad ka chilka (Rind of Bamboo root), Maghze badam talkh. These ingredients should be clean and after grinding should be triturate with honey and apply as paste for whole night and clean at morning with bhusi water. Many other cosmetic issues are also reported, such as skin cracking, excessive sweating, baras wa bahaq (Vitiligo and pitryasis alba). It lists a detailed overview of the disease and its treatments. In 1999 the Arabic text of Beirut Dar al-Nafae was published.

**Muhadhdhib al-Din Abul-Hasan ' Ali ibn Ahmad Ibn Hubal known as Ibn Hubal (1121-1213 AD):**

He mentions many hair cosmetics formulas, such as hair conditioner recipes, Muqawwi-i-sha'r recipes (hair straightening), muhafiz-i-sha'r recipes (hair protector), mutawwili-i-sha'r recipes (hair longer), munbiti-i-sha'r recipes (hair rapid grower), haliq/nura recipes (hair remover/depilator), muraqqiqi-i-sha'r recipes (hair thinner), epilator recipes [26]. Decoction of Zarnikh with nura mukarar. He defines cosmetics/cosmeceuticals for face glow, whitener and redner, sibgha (skin colorant) cosmetics, e.g. yellow and black are described, and many zamad, tila, khizab, nurah, etc. formulations are described. He also mentioned sunburn and air prevention cosmetics; face, lips, palm, and soles cosmetics for prevention of cracking. Tila prepared with murdarsang, buraq, roghane-gul, shuniz with vinegar or mitti, buraq, ushna, tukhme kharpa, kharbaq and irsa, mentioned in a special chapter for acne vulgaris, should be applied as a paste with roghane-gul. He also described the prevention of excessive sweating and produces body fragrance and so many other cosmetics [27].

**Amin al Dawlah Abu al hasan Sa'id bin Hibat Allah bin Ibrahim Ibn al-Tilmidh (1073-1165 AD):**

In his manuscript Pharmacopeia of Ibn al-Tilmidh, written in the twentieth independent chapter (the last) on odor removers and anti-transpirants. One such prescription to hold sweat as mentioned as dry Coriander refined Tanner's Sumach and washed rice ten dirhams each. All of these ingredients are cooked with three pounds of water, until a third of the water remains. It is filtered then. They drink three ounces of it every day. After that, the body is covered with quince fat and Armenian mud, butchers broom is sprinkled over the body, and Tamarisk's crushed leaves, fine as dust, and the body is covered with butchers broom fat and Sanle fat. He mentioned that the body is cleaned with rose fat and butcher broom fat when prescribing medicine to cut sweat, then rose water is poured on it, and it is spread out [28].

**Abu Hamid Muhammad ibn 'Ali ibn 'Umar Najib al- Din al-Samarqandi (d.1222 AD):**

He wrote Al-asbab wa-al-'alamat (causes and symptoms) in which he gave special attention to cosmetology and wrote a specific chapter. The 24<sup>th</sup> chapter 'fi amraz al-Jild wa al-Sha'r wa al-

Zinat wa al-Azafeer wa al-Atraf' is associated with cosmetics further divided into 26 fasl (sub-chapters) particularly cosmetic for hair such as hair protector oil in which Aas, Ward and Murr; longer hair in which Adhane harrah qabiza with Bargetil and Barge kaddu, different recipes for Nura, and dyes (black, white, red and brown) [29-30].

**Ibn Al-Ain Zurbi (d.1153 AD):**

The Risalatul-Shakfa treatise on carbuncles provides a description of carbunculosis, which also deals with skin disease. Beside above mentioned scholars, many Unani physician of Indian subcontinent also have documented cosmetics, for example: Hakim Hasan mirza (1909): In his treatise 'Risala-i-Lakhlakha' , mentioned many recipes of aromatic oils, Itr and its preparation methods with images of manufacturing bhatti, Manjan (Sanoon), few khamira, missi preparations and formulation for removing bad breath [31-32].

**CONCLUSION**

Cosmeceuticals, which is the natural personal care industry is fastest growing segment. These cosmeceuticals were specifically developed for their medicinal and cosmetic benefits, serving as a bridge between personal care products and pharmaceuticals. Cosmeceuticals (or, alternatively, cosmaceuticals) are topical pharmaceutical cosmetic hybrids intended to improve beauty through ingredients that provide additional function or benefit related to health. Many skin care companies use the cosmeceutical term, especially those endorsed by dermatologists, to give the impression that the products contain ingredients that are more powerful or more biologically active than ordinary cosmetics. Therefore, to sell these products, anybody can slap the label with tall statements saying the products are more effective than the new traditional controlled cosmetic products.

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