Cosmeceuticals for Asians who are living in the Tropics

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Summary

There are many differences in environment between tropical and subtropical country. So are between skin color and aesthetic behavior of Asians and Caucasians. Not all cosmetics which are suitable for Caucasians in subtropical countries are also suitable and safe for Asians, especially who are living in tropical countries.

Tropical climate, with high temperature and humidity, make Asian skins become more oily and humid. Asian skins in the tropics were exposed by UV radiation from the sun more intensely because of the geographical location of their countries. So Asian skins in the tropics need a total UV protection (include UV A and UV B protection) because UV radiation has been implicated in the formation of sunburn, free radicals, skin cancers, suppression of the immune system and aging skin.

Cosmeceuticals contain active ingredients such as sunscreens, vitamins, antioxidants, and skin lightening can help maintaining skin and protect skin from various insults. Some cosmeceuticals need a proper delivery system, and then it could enhance the skin quality.

Regarding the influence of cosmetics products for Asian skins in the tropics, factors to be considered are environment factor, human factor, cosmetic factor, and interaction of these three factors.

Riassunto

Molte sono le differenze rilevabili tra l’ambiente tropicale e subtropicale. Lo stesso dicasi per il colore della cute degli Asiatici rispetto ai Caucasici. Pertanto non tutti i prodotti cosmetici adatti ai caucasici che vivono nelle regioni subtropicali sono adatti e sicuri per le popolazioni asiatiche che vivono nelle regioni tropicali.

Il clima tropicale, con l’elevata temperatura e l’alta umidità fa sì che la cute degli asiatici sia più oleosa e umida. Inoltre, proprio a causa delle diverse condizioni ambientali, la cute asiatica nei tropici è esposta più intensamente ai raggi UV, pertanto deve essere maggiormente protetta sia dagli UVB che dagli UVA per evitare scottature, iperformazione di radicali liberi, tumori cutanei, foto immunosoppressione ed invecchiamento precoce.

I moderni cosmeceutici contengono sia filtri solari che vitamine, antiossidanti e sbiancanti in grado
di proteggere la cute dall’aggressività dell’ambiente ed alcuni di essi necessitano di veicoli adatti per esaltarne le funzioni.
Per quanto concerne l’attività esercitata dai prodotti cosmetici sulla cute asiatica, deve sempre essere tenuto nel dovuto conto fattori come quello ambientale, umano, e cosmetico e la loro interazione.
INTRODUCTION

Cosmetics are becoming of more importance in daily life; they are used regularly by increasing number of people and very large quantities are consumed each year. The main purpose for using cosmetics in modern society are for personal hygiene, to enhance attractiveness through use of makeup, to improve self esteem and promote tranquility, to protect skin and hair from damaging ultraviolet light, pollutants, and other environmental factor, to prevent aging, and in general to help people enjoy a more full and rewarding life (1).

There are many cosmetics distributed in the market today, with their interesting advertisement and selling dreams. Unfortunately, not all cosmetics are safe to be used. Some of them cause damages on the skin, such as irritation, allergy, hyperpigmentation (black spots), and even damages on the systemic function (2).

Papers or researches on tropical environment, cosmetics, and their effects to the skin are very rare (3,4). Most researchers are from subtropical countries and their subjects are their own environment which is different from tropical environment (2).

Beside the differences in environment between tropical and subtropical countries, there are also differences between the ethnic skin color and aesthetic behavior of the Asians (Orientals) and Caucasians. Therefore, if we want to create or select safe cosmetics for Asian skins, especially in tropical countries and suitable for their aesthetic demand, we have to consider four factors which are influencing effects of cosmetics on the skin: (1) environmental factor; (2) human factor; (3) cosmetic factor; and (4) interaction of these three factors. Tranggono, on 1983, created this concept and named the concept as “The Science of Beauty” (2, 3).

Asia as Compared to Europe (the Nature and Skin color)

Asian countries which lie near or on the equator such as Indonesia, Malaysia, the Philippines, Thailand, Singapore, and Brunei Darussalam, have similar nature or environment: they are tropical countries. They are hot countries with temperature varies between 25 – 40°C and their relative humidity are high (75 – 80%) because they are surrounded by water (archipelago). The sun shines all over the year. There are only two seasons, dry and rainy season, in which the sun still shines blazingly except when the weather is cloudy or rainy. The sun heat, the UV sunrays and the high humidity, will adversely affect the skins as well as cosmetics and cause various conditions and problems (2).

There are differences in many aspects between Asians and Caucasians skin; the most visible are their skin colors. Some differences between light skin (Caucasians) and dark skin (Asians and Africans) present in table 1 (5).

By ethnic, the people of Asia have Asian or Oriental skin, which are brown in color and contain more melanin pigments as compared to Europeans (Caucasians) (6, 7). The Asian skin black brown melanin pigments, called eumelanins (8), are larger (in singles or in groups), more solid, and difficult to degrade, causing the brown skin color darkened easily by UV radiation.

On the contrary, the countries in Europe are in subtropical region. They have four seasons: spring, summer, autumn, and winter. Practically, the sun shines only around 25% of the whole year. Air humidity is low because they are continents. The people in these countries have fair or white skins due to the lack of melanin pigments. Their reddish brown melanin pigments, called phaeomelanins (8) are small and easily degraded (6, 7), causing their skins difficult to become tanned even though after sunbathing or UV radiation.
Table I
Differences between light and dark colored skin (from Caucasian to Black)

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Light skin</th>
<th>Dark skin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Color</td>
<td>Group melanosomes</td>
<td>Individually dispersed melanosomes</td>
</tr>
<tr>
<td>MED</td>
<td>2-3</td>
<td>13-15</td>
</tr>
<tr>
<td>(Likelihood of photodamaged)</td>
<td>Significant changes in epidermis and dermis</td>
<td>Marginal changes in epidermis and dermis</td>
</tr>
<tr>
<td>UV-induced immune system suppression</td>
<td>Susceptible</td>
<td>Susceptible</td>
</tr>
<tr>
<td>Sweat glands</td>
<td>Fewer apocrine-ecrine mixed glands</td>
<td>More apocrine-ecrine mixed glands</td>
</tr>
<tr>
<td>Incidence of severe acne</td>
<td>Greater</td>
<td>Less</td>
</tr>
<tr>
<td>Response to irritation</td>
<td>Predominantly erythema</td>
<td>Predominantly hyperpigmentation</td>
</tr>
<tr>
<td>Stratum corneum thickness</td>
<td>7.2 microns</td>
<td>6.5 microns</td>
</tr>
<tr>
<td>Stratum corneum layers</td>
<td>17</td>
<td>22</td>
</tr>
<tr>
<td>Skin penetration</td>
<td>Compound dependent</td>
<td>Compound dependent</td>
</tr>
<tr>
<td>Water-barrier properties of skin</td>
<td>Greater</td>
<td>Less</td>
</tr>
<tr>
<td>Cutaneous blood vessel reactivity</td>
<td>Greater</td>
<td>Less</td>
</tr>
<tr>
<td>Susceptibility to stinging, burning, itching</td>
<td>Greater</td>
<td>Possibly yes</td>
</tr>
<tr>
<td>Sensitive skin in subpopulations</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Common formulation problems matching</td>
<td>Shine, feel, frequent acne breakouts</td>
<td>Ashy skin, oily appearance, poor color, occasional acne breakouts</td>
</tr>
</tbody>
</table>

Source: Stephen & Oresajo (1994)

As far as aesthetic behaviour are concerned, however, Asians have a tendency of opinion that fair or white skin is a beautiful one, while Caucasians have a tendency of opinion that tanned skin is healthy, beautiful and prestigious because only rich people can make their skins tanned, either by sunbathing or going to tanning salons and the use of photosensitizing agents (2). Berardesca et al (1995) reported that most prominent characteristic of racial and ethnic groups is skin color differences, but documented of anatomical and structural differences are only minimal. Some aspects of skin physiology may indeed have practical implications on the racial incidence and prevalence of some diseases, including skin cancer, acne, and pigmentation disorders. These functional differences in skin responses exist, at least between black and white skins. These changes could be related to functional alteration in both skin barrier and response to irritants (9). Tranggono et al (1997) found that the darker the skin colors among Indonesians, the higher the transepidermal water loss (TEWL) (10).

In the research between Asian and Caucasian skin, Camel et al (2002) found that difference in SPF (Sun Protection Factor) between Asian and Caucasian skin exist. These differences are clearly present for the high SPF sunscreens and might not be only explained by skin color but also by other internal or external factor affecting skin response to UV (11).
The Impact of Tropical Climate on the Skin and Cosmetics

Tropical climate has an impact on skins, which will become more oily and humid by its sebum and sweat, and easily dirty due to dusts and air pollutants. Many skin diseases caused by fungus or bacterial infection are easily spreading. Sunrays can cause hyper and/or hypo-pigmentation and affect aging process to proceed much faster. Some incompatible cosmetics containing photosensitizing colorants or fragrances will cause negative skin reaction (12, 13, 14). Some sticky or oily cosmetics like moisturizers, foundations, which are good for dry Caucasian skins might be acnegenic for the oily Asian skins in the tropics. Sunscreens containing PABA (Para Amino Benzoic Acid) and its derivatives which are good for Caucasians skins to protect it from cancer and to induce tan, might be dangerous for Asian skins in the tropical countries, since PABA and its derivatives are photosensitizers (14).

As to the cosmetics themselves, the sunrays and the hot and humid climate will cause the cosmetics to deteriorate easily if they are not protected from the tropical environment in their formulation, preservation, manufacturing, and application.

The Danger of Sunlight

The Earth is exposed to a vast amount of radiation, most of it from the sun, and most of it destructive to life. Fortunately, very little of this radiation reaches the Earth's surface. What does reach the surface consists of ultraviolet, visible, and infrared light. The ultraviolet light band (200 – 400nm) has been arbitrarily divided into UVC (200 – 280nm), UVB (280 – 320nm) and UVA (320 – 400nm) (15). The shorter the wavelengths, the more energy there is the light, so the shorter wavelengths are more damaging (16).
UVA light which is less energetic penetrates deeper into the skin (down to the dermis) due to its longer wavelength than UVB light which is penetrates only down to the epidermis (17).

The ozone layer attenuates the shorter wavelengths of the UV light, so that only UVA and UVB light reach the surface (15). However, with increasing damage to the ozone layer caused by man-made gases like flon (chlorofluorocarbon), the filtering efficiency of the ozone layer is decreasing and there is an increase in the very short wavelengths reaching the skin surface which is believed to be induced more cases of skin cancer (1). Ultraviolet radiation has been implicated in the formation of skin cancers, sunburn, suppression of the immune system and skin aging (15).

The total dose of UV radiation and relative amount of UVA and UVB received consists not only of direct but also indirect irradiation, a result of reflection of the radiation from surroundings (white wall, grass, water, sand, etc.). Glass will transmit both UVA and UVB radiation but to varying extent. Water in the atmosphere in the form of clouds can also influence the amount of ultraviolet reaching the Earth’s surface (15).

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**Fig. 2** Penetration of UVA and UVB in the skin FR/ROS generated. Source: Herrling, T. et al, 2006. SÖFW Journal, July.
Solar radiation also damages skin by free radicals formation, especially oxygen free radicals. Oxygen from the air plus absorbed UV of sunlight produces peroxidation of extra cellular skin lipids. From this reaction, oxygen free radicals are formed (16,18). These oxygen free radicals will disrupt cell membranes, depolymerize hyaluronic acid, degrade collagen, change elastic fibers and break DNA, finally some diseases and damages appear on the skin, for instance premature aging and cancerous changes of skins (16). The magnitude of harmful UV radiation depend upon humidity, latitude, altitude, season, time of the day, condition of one’s immediate environment, which mostly depend upon geographical location. The closer to the equator, the greater will be the exposure to the sun. Therefore, in the tropical countries, especially during day time, it is very important to protect our skins from sunrays (2). The pictures below shows that the UV erythemal index in tropical countries tend to high all over the year, whether the sun is on the tropics, on the northern hemisphere or on the southern hemisphere.

Naturally, our skins have a system to protect their self from sunrays. The stratum corneum as the outermost layer of the skin provides some protection against UV radiation by reflecting the light. Melanin is a skin pigment which gives a physiochemical defense against the sun’s damaging rays. The structure of melanin absorbs both UV and visible light. It is not only the quantity of melanin pigment, but also where and how it is dispersed in the skin (16).

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**Reaction between UV Rays and Oxygen from the Air within the Skin**

- Oxygen from the air
- UV rays absorption
- Sunscreen protection
- Lipid peroxidation on the skin surface
- Free radicals from oxygen (ROS)
- Antioxidant protection
- Degradation of collagen
- Depolimerise of Hyaluronic acid
- Attack DNA
- Change of elastin fibers
- Destruction of cell membrane
- Resulted in more other diseases

Fig. 3 Reaction between UV rays and Oxygen from the air within the skin. Source: Purcell, H.C. 1994, Cosmetics & Toiletries Manufacture Worldwide (with modification).
Cosmeceuticals for Asians who are living in the Tropics

World Erythemal UV-Index on January 6, 2009

Erythemal UV index
SCIAMACHY - KNMI/ESA
Clear-sky
6 January 2009

Source: http://www.temis.nl/uvradiation/UVindex.html

Fig. 4 World erythemal UV index on January 6, 2009 when the sun is on the southern hemisphere. Source: http://www.temis.nl/uvradiation/UVindex.html

World Erythemal UV-Index on August 6, 2009

Erythemal UV index
SCIAMACHY - KNMI/ESA
Clear-sky
6 August 2009

Source: http://www.temis.nl/uvradiation/UVindex.html

Fig. 5 World erythemal UV index on August 6, 2009 when the sun is on the northern hemisphere. Source: http://www.temis.nl/uvradiation/UVindex.html
Beside the stratum corneum and melanin as the natural skin protector, there are two kinds of sun protection: (1) physical protection by using umbrella, broad brim hat, etc.; (2) chemical protection by using sunscreen cosmetics (non-PABA containing) (2).

Both UVA and UVB irradiation are very damaging to the skin (15, 17). Then, the need for broad-spectrum UV protection is now generally recognized. With broad-spectrum UV protection there is a need to harmonize the assessment of UVA protection in addition to the Sun Protection Factor (SPF) (19).

The Sun Protection Factor (SPF) of sunscreens is an international accepted standard by which the efficacy of sunscreens is assessed. It is based solely on prevention of erythema (sunburn) which is principally induced by UVB. Whereas SPF may indicate protection against UVB, it cannot be used as an indicator of the damages resulting from UVA exposure, as erythema is predominantly a response to UVB. Consequently, existing in vivo indices are not fully satisfying: SPF only reflects protection from UVB light and PPD PF (Persistent Pigment Darkening) is only restricted to the UVA part of sun spectrum (20).

The present research to fulfill the requirement of assessing broad-spectrum UV protection is the method by creation of free radicals (ROS) by means of UVA/UVB radiation, to measure the protection provided by different commercial sunscreens. The quantitative measurement of free radicals generated in human skin biopsy by means of Electron Spin Resonance (ESR) X-band spectroscopy (15,20). Zastrow et al (2006) propose to name this new protection index Integrated Sun Protection Factor (ISPF) (20).

![Fig. 6 World erythemal UV Index on August 6, 2009](http://www.temis.nl/uvradiation/UVindex.html)
Oxygen, free Radicals, and Reactive Oxygen Species

All molecules are composed of atoms, which are made up of smaller particles called protons, neutrons, and electrons. Those electrons should be paired when they react with other electrons in another molecule to keep the molecule stable. The oxygen molecule has two unpaired electrons, which makes it unstable and enters into free radical reaction. A free radical is any atom or molecule that has one or more unpaired electrons and is capable of independent existence. A free radical can react actively with other nearby molecules to alter or destroy them (16).

Free radicals can be endogenously or exogenously derived (Halliwell et al, 1985). Endogenous free radicals are produced in the various cellular organelles such as mitochondria, ATPases in the membrane systems, peroxisomes, and endoplasmic reticulum, from the physiological pathway. The free radical molecules are normal intermediates in the electron transport system of the mitochondria which is coupled to the citric acid cycle. The free radical molecules are neutralized in the system. However, the free radical molecules may escape from the mitochondria and cause damaging reaction in the cytosolic or the adjacent structures (20). If the free radical oxygen escapes from the electron transport system, it may enter other reactions that reducing one electron of the oxygen and results in forming the reactive oxygen species (ROS) such as superoxide anion radical (O$_2^-$), hydrogen peroxide (H$_2$O$_2$), hydroxyl radical (·OH), and singlet oxygen (O$_2^*$) (16, 21). Free radical molecules also may arise from exogenous sources such as air pollutant, cigarette smoke, ozone, and radiation (especially UV radiation) (20).

Following UV-exposure, free radicals and reactive oxygen species (ROS) play a major role in producing lipid radicals (L') that seem to be responsible for the destruction of the cell membrane and ultimately the cell (22). Superoxide is known to attack unsaturated fatty acids in the cell membrane causing them to break down. The attack of superoxide on the fatty acid is a sequential process that produces a lipid peroxide and therefore the process is called lipid peroxidation. The three major steps in lipid peroxidation can be diagrammed as follows (16):

1. Polyunsaturated fatty acid (PUFA) + Superoxide → Lipid free radical (LFR)
2. LFR + Oxygen → Peroxyl lipid radical
3. Peroxyl lipid radical + PUFA (New) → Lipid hydroperoxide + LFR (New)

Superoxide can be destroyed by the enzyme superoxide dismutase before it can be converted to hydroxyl radical.

Hydrogen peroxide is dangerous because it diffuses into cells, particularly into the nucleus to react with DNA, and also reacts with proteins to cross link and denature them. The whole process of inflammation in the skin is attended with free radical and hydrogen peroxide formation. Two major enzymes control the level of peroxides in the body are catalase and glutathione peroxidase (16).

Hydroxyl radicals attack lipids and produce lipid peroxides, cross link the proteins, and attack DNA. Vitamin E in the cell prevents hydroxyl radical action by quenching it and stops chain reactions in cases of lipid peroxidation. Vitamin C enters into the reaction by regenerating active vitamin E. No antioxidant enzymes are included in this list because the reaction of the hydroxyl radical is too fast for enzymatic reaction (16). Singlet oxygen targets many tissue and cellular components, especially those in the skin, causing severe structural changes. It can react with proteins, carbohydrates, lipids, and a variety of other compounds. Beta carotene is a major previtamin that protect us against singlet oxygen (15).
Safe Cosmetics for the Tropics

Nowadays, more and more people concern about their health in using cosmetics. They looked for cosmetics which are safe (non-negative effects) as well as beneficial (positive effects) for their skin.

There are several requirements for safe cosmetic materials to be used for cosmetics in the tropics (12, 24):
1. They have to be non-toxic.
2. They have to be non-irritant, do not irritate the skin.
3. They have to be non-photosensitizing, do not react with sunlight which results in photosensitivity reactions like hyperpigmentation or melasma.
4. They have to be non or hypo-allergenic, do not cause allergy or only cause minimal allergy reaction.
5. They have to be non-acnegenic, do not stimulate or causing acne.

Cosmedics or Cosmeceuticals

By definition, as stated in the Federal Food, Drug and Cosmetic Act, USA (1938), cosmetics are: "Articles intended to be rubbed, poured, sprinkled, or sprayed on, introduced into, or otherwise applied to human body or any part thereof for cleansing, beautifying, promoting attractiveness, or altering appearance, but must not influence the physiology of the skin (25).

The definition is good enough, but seems to be out of date as compared to the development of science and technology of cosmetics. Relevant to this, Lubowe in 1955 (25), Faust (26), Kligman in 1982 (27), and many other cosmetologists, disagreed with the above mentioned definition that cosmetics must not influence the skin physiology. Cosmetics, however, are chemicals, and any chemicals, even water, which are applied to the skin, must introduce any effect, either positively or negatively. They will never be indifferent.

If that is the dispute, why not letting cosmetics introduce positive effects on skins by adding to them some pharmaceutically active beneficial components to improve imperfect skin health and beauty such as ceramide, jojoba, to maintain good skin condition such as liposomes and vitamin E, or to treat skin damages caused by incompatible cosmetics, for instance acne by sulphur, hyperpigmentation by vitamin C and E, dandruff by coal tars, hair loss by plant extracts, etc (2).

Such cosmetics have been called Cosmedics, an abbreviation of Medicated Cosmetics (25,26), and later on since 1990 have been called Cosmeceuticals (27). Vermeer and Gilchrest (1997) recently concluded that cosmeceuticals already exist and are in fact desirable. They are an intermediate between drugs and cosmetics in their safety profile for consumers, but have an acceptable risk for normal and near normal skin. They differ from cosmetics in having a defined well documented, a beneficial effect on the skin or its appendages (28).

Active Ingredients for Cosmeceutical

Cosmeceuticals actives fall into a variety of categories, among others are: sunscreens, antioxidants, vitamins, skin lightening agents and skin exfoliants.

1. Sunscreen (29,30):

1. Chemical Sunscreen:

- Among others are: Para-aminobenzoic acid (PABA), Avobenzone, Homosalate, Methyl anthranilate, Octocrylene, Octyl methoxycinnamate, and Phenylbenzimidazole sulfonic acid.
- Some of chemical sunscreens like PABA are photosensitizer which not suit to use in tropical countries where the sun shines
Cosmeceuticals for Asians who are living in the Tropics

2. Physical Sunscreen:
   - Physical sunscreens like titanium dioxide and zinc oxide give a broad spectrum protection of UV radiation.

II. Antioxidants (31,32,33), among others are:
   - \(\alpha\)-Lipoic Acid. Ubiquinone (Coenzyme Q10), and Oligomeric proanthocyanidins (OPC) from Grape (Vitis vinifera) seed extract.

III. Vitamins:
1. Retinoid (34):
   - Topical usage of retinoids has shown a high degree of efficacy against acne, photodamage, and psoriasis.
   - Two negative effects associated with topical retinoids are irritation and teratogenic effect.

2. Vitamin C (35):
   - A naturally occurring antioxidant incorporated into cosmeceuticals for the purpose of preventing and treating sun damage skin. Vitamin C is essential for collagen biosynthesis, and also appears to influence elastin biosynthesis.

3. Vitamin E (36):
   - The major antioxidant role is generally considered to be the arrest of chain propagation by scavenging lipid peroxyl radicals.

IV. Skin Lightening Agents (37):
1. Kojic acid:
   - A tyrosinase inhibitor derived from fungal species such as Aspergillus and Penicillium.

2. Licorice extract - glabridin:
   - Obtain from the root of Glycyrrhiza glabra linneva, its main active ingredient is about 10-40% glabridin.

3. Bearberry and arbutin:
   - The main constituents of bearberry (Arctostaphylos uva ursi) are arbutin (hydroquinone-beta-D-glucopyranoside) and methyl arbutin, both with skin lightening properties occurs via inhibition of melanosomal tyrosinase activity.

4. Paper mulberry:
   - Paper mulberry extract is a tyrosinase inhibitor, which is isolated from the roots of Broussonetia papyrifera.

5. Niacinamide:
   - Niacinamide affects pigmentation by inhibiting the transfer of melanosomes from the melanocyte to the epidermal keratinocytes.

8. Azelaic acid:
   - Its lightening effect appears to be selective and most apparent in highly active melanocytes, with minimal effects in normally pigmented skin.

V. Skin Exfoliants (38,39):
1. Alpha Hydroxy Acids (AHAs):
   - Topically applied low concentrations of AHAs can reduce the thickness of the hyperkeratosis stratum corneum by reducing corneocyte cohesion in the lower levels of stratum corneum. When applied in higher concentrations and at low pH values, these same AHAs can cause epidermolysis. This effect can then produce varying degrees of exfoliation of the skin.
   - AHAs can also increased moisturization.

2. Beta Hydroxy Acids:
   - Salicylic acid is a phenolic aromatic acid, fat soluble, and this property makes it useful in patient with oily skin.
   - Salicylic acid is used in cosmetic formulations in a wide range of cosmetic products at concentrations ranging from 0.0008% to 3%.
Delivery Systems

To exert effects in the deeper living layers of skin requires that cosmetics or cosmeceuticals penetrate the stratum corneum barrier and reach the target tissue in sufficient concentration to be effective. Penetrating the barrier at a rate sufficient to deliver an effective concentration at a target site below the stratum corneum is difficult (40). So, proper delivery system to the skin is a prerequisite for cosmetics/cosmeceuticals formulation. Delivery systems come in all shapes and sizes. Possibilities range from traditional liposomes and natural materials to synthetic structures designed specifically for controlled release. The different properties of delivery systems and their capability of controlled release lend varied benefits to cosmetic products (41). Some examples of delivery systems are: liposomes, NANOTOPES™, and GLYCOSPHERE® (41, 42, 43).

CONCLUSIONS

Asian tropical countries have relative high temperature, humidity and also UV exposure and those environment factors make Asians who are living in the tropics have more oily and moist skin with brown color which is easily darkened by UV radiation. Asian skins in the tropics were exposed by UV radiation from the sun more intensely because of the geographical location of their countries. So they need a total UV protection (include UV A and UV B protection) because UV radiation has been implicated in the formation of sunburn, free radicals, skin cancers, suppression of the immune system and aging skin.

Regarding the influence of cosmetic products for Asian skin in the tropics, factors to be considered are environmental factor, human factor, cosmetic factor, and interrelation of these three factors.

Cosmeceuticals contain active ingredients such as sunscreens, vitamins, antioxidants, and skin lightening can help maintaining skin and protect skin from various insults. Some cosmeceuticals need a proper delivery system, and then it could enhance the skin quality.
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