

SKIN LIGHTENING CREAMS

by: ROSNAH ISMAIL

JUNE 2001

131

MPOB TT No. 115 & 116

MPOB INFORMATION SERIES

ISSN 1511-7871

MPOB TT No.115 - Skin Lightening Day Cream

MPOB TT No.116 - Skin Lightening Night Cream

Cosmetic and personal care products broadly can be divided into four main categories, i.e. skin care, hair care, oral hygiene and colour cosmetics. The two most dynamic sectors are skin care and hair care and much of the growth is seen in the Asia Pacific region (Shaw, 1996). Within skin care, the most dynamic product sector is skin lightening (whitening) products, which has experienced explosive growth and continues to be the best selling skin care products throughout Asia (SPC ASIA, 1996). In the last 10 years, sales of skin lightening products in Japan have risen from US\$ 20 million to US\$ 350 million (Blume *et al.*, 2001). For Asian, skin lightening products are used to achieve the beauty ideal of a white and flawless skin, whereas Caucasians use them to treat age spots or freckles.

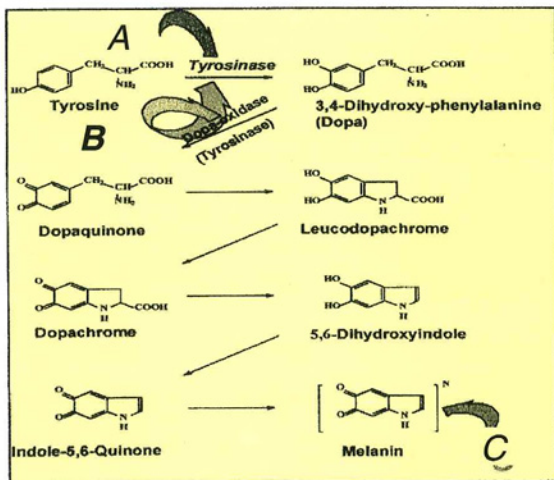
MELANIN BIOSYNTHESIS

Melanin, the skin's natural pigment, is synthesized in melanocytes in varying concentrations, depending on the skin type (genetic disposition) and environmental effects. Melanocytes are cell which occur in the basal membrane of the epidermis, and which accounts for 5% to 10% of the cellular content. The UV light stimulates the cells in the basal layer, causing them to divide more rapidly. The melanocytes are also stimulated at the same time, producing greater quantities of melanin. This is transported into the keratinocytes, where it becomes visible as a skin colour.

The number of melanocytes in human skin is more or less the same, irrespective of skin colour. The colour of the

skin is largely dependent on the quantity and type of melanin produced (black eumelanin or yellow to reddish-brown pheomelanin). Asians and light skin people have a lower level of eumelanin than dark skin people, and correspondingly less protection against the effects of radiation. People with red hair are characterized by pigmentation with pheomelanin, and have no photo-protection. Further, the melanin distribution in the skin also varies. In people with a light skin, the greater part of the pigment lies in the basal layer, whereas in those with dark skin, the melanin is spread throughout, even reaching into the horny layer.

Figure 1 illustrates the pathways of melanin biosynthesis in the melanocytes, which are a chain of oxidative reactions catalysed by enzymes (Zuidhoff, 1999). Tyrosinase, the key



Note: A, B, C indicate skin lightening mechanisms.

Figure 1. Melanin biosynthesis pathways.

ISSN 1511-7871



9 771511 787001

Malaysian Palm Oil Board, Ministry of Primary Industries, Malaysia
P. O. Box 10620, 50720 Kuala Lumpur, Malaysia. Tel: 03-89259155, 89259775, Homepage: <http://mpob.gov.my> Telefax: 03-89259446



enzyme in the synthesis of melanin, is activated when exposed to UV rays and intervenes in several intermediate stages of the pigment formation. So by inactivating the tyrosinase activity or blocking the chain reaction at various points of the pathways, skin lighteners can inhibit or even reverse melanin biosynthesis and are thus useful in whitening or lightening the human skin.

SKIN LIGHTENERS

There are several routes by which we can slow down melanogenesis. The best way is to reduce the amount of UV light that reaches the skin. The UV radiation not only directly stimulates the generation of tyrosinase but also provokes the synthesis of vitamin D which activates tyrosinase and α -MSH (melanocytes stimulating hormone). As a result of UV radiation, oxidative stress is generated which in turn generates inflammation that increases pigmentation. So sunscreens are often included in skin lightening products to reduce UV radiation and thus UV-induced pigmentation.

The most talked about means of minimizing pigmentation is to reduce tyrosinase activity, *i.e.* by blocking the production of tyrosinase or inhibiting the enzymatic activity of tyrosinase or preventing the uptake of tyrosinase by the melanosomes. Lactic acid and its derivatives suppress tyrosinase production at a genetic level (mechanism A). Ingredients that are extracted from natural resources such as arbutin (from the leaves of the bearberry), licorice extract (from licorice root), ascorbic acid (vitamin C; citrus fruit) and kojic acid (from fermented carbohydrates) have been shown to inhibit the enzymatic activity of tyrosinase (mechanism B). Another approach to reduce the development of pigmentation is to reduce the activity of melanocytes (mechanism C). The best known active based on this mechanism is hydroquinone. It induces skin lightening via denaturation of the pigment, thus resulting in bleaching of the skin. However, it has been reported to cause side effects and permanent

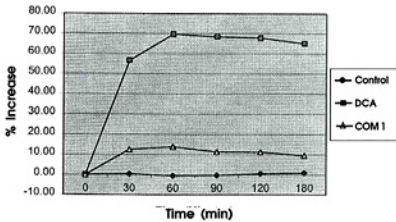


Figure 2. Increase in skin moisture treated with Skin Lightening Day Cream vs. control (untreated) and a commercial.



Figure 3. Skin Lightening Day Cream.

de-pigmentation. For that reason, hydroquinone is banned for use in cosmetics products in most countries of the world.

SKIN LIGHTENING DAY CREAM

The Skin Lightening Day Cream, as the name implies, is used during daytime. It is formulated to contain sunscreen agents for protection against UV radiation as well as skin lightening actives that both suppress and inhibit the enzyme tyrosinase activity.

The presence of a combination of chemical and physical sunscreen agents in the cream provides, by an *in vitro* method (Rosnah, 2001), a sun protection factor (SPF) of 5 with a moderate UVA protection. The presence of tyrosinase suppressor in the form of natural lactates, together with a skin lightening complex containing herbal extracts (as tyrosinase inhibitors), not only lightens the skin but also provides a significant moisturizing effect (Figure 2). This is because lactates are part of the natural moisturizing factor of the skin (Rijsbergen, 2000). Hence, skin lightening day cream is a 3-in-1 functionality cream that provides moisturizing and lightening effect on the skin with protection against UV radiation (Figure 3).

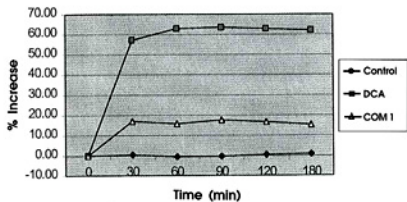


Figure 4. Increase in skin moisture treated with Skin Lightening Night Cream vs. control (untreated) and a commercial product.



Figure 5. Skin Lightening Night Cream.

SKIN LIGHTENING NIGHT CREAM

Skin Lightening Night Cream on the other hand, is a 2-in-1 cream that provides moisturizing (Figures 4 and 5) and lightening effect. It is designed in such a way that a continuous skin lightening process is taking place through the night after the Skin Lightening Day Cream.

REFERENCES

- ASIA PACIFIC SURVEY (1996). *SPC ASIA Oct/Nov 1996*.
- BLUME, G; TEICHMULLER, E E and ORNDORFF, S (2001). Liposomal plant actives for skin lightening. *Personal Care*. April 2001.
- ROSNAH, I (2001). *In vitro SPF Test, 2001*.
- RIJSBERGEN, J M (2000). L(+) .Lactic acid and lactates-natural moisturizers in cosmetics. *SOFW Journal*, 126: 11.
- SHAW (1996). International cosmetics report. *SPC Oct. 1996*.
- ZUIDHOFF, H W (1999). The whitening properties of L(+) lactic acid and lactates. *PURAC Far East*. PCIA 1999.

For more information kindly contact:

Director-General

MPOB

P. O. Box 10620

50720 Kuala Lumpur, Malaysia.

Tel: 03-89259155, 89259775,

Homepage: <http://mpob.gov.my>

Telefax: 03-89259446