

THE SCIENCE SUPPORTING SKINCEUTICALS LIGHTENING PRODUCTS

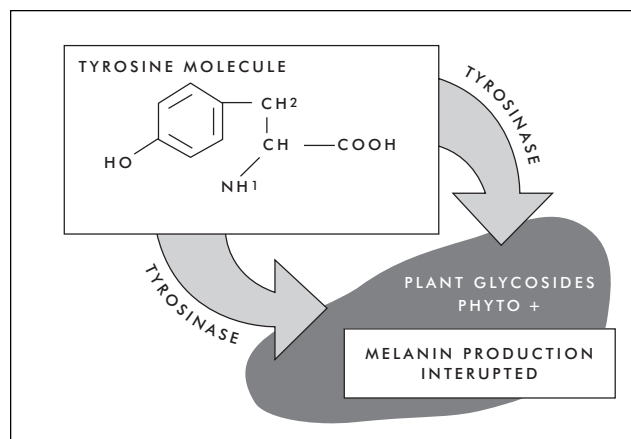
ABSTRACT

The enzyme tyrosinase converts the amino acid tyrosine into melanin in the skin. Hyperpigmentation can result when too much melanin is produced. Ingredients such as arbutin, kojic acid, and thymol inhibit or suppress tyrosinase, preventing the appearance of additional pigmentation.

HOW SKIN COLOR IS FORMED

Normal skin color is formed by melanin, a natural pigment that also determines hair and eye color. In the skin, the enzyme tyrosinase biochemically converts the amino acid tyrosine into melanin. Hyperpigmentation occurs when too much melanin is produced and forms deposits in the skin.

The cells that make pigment are called melanocytes. They are located at the bottom of the epidermis. Melanocytes produce melanosomes, which are passed onto other cells of the epidermis and make their way up to the top layer of skin. Synthesis of melanin occurs exclusively in melanosomes.



When too much melanin is produced, deposits are formed and hyperpigmentation appears in the skin. Phyto + contains natural plant glycosides – extracts shown to interfere in the process that causes melanin to appear in the skin, preventing further accumulation of excess melanin and discoloration.

Hyperpigmentation is not a medically harmful condition. However, it always is advisable to have new brown spots checked by a dermatologist to make sure they are not skin cancers.

Hyperpigmentation is a common clinical condition for which many people seek remedies because they view it as being cosmetically displeasing. It can affect people of all skin colors and races, and tends to increase as we age. For example, almost all African-American infants become darker shortly after birth. Freckles — small, flat tan-to-black spots that can be anywhere on the body — also become more permanent during the first or second decade of life. Often hereditary,

freckles also can darken with sun exposure and fade with less sun exposure.

Age spots or liver spots are small, mottled or darkened patches of skin which appear in older adults — especially on the face, the backs of hands, and arms in individuals who have been exposed to the sun. The medical name for this condition is solar lentigines.

Hyperpigmentation also results from inflammation or other skin insults. For example, skin diseases such as acne or shingles may leave darkened spots. Scars from skin injury or surgery also may become hyperpigmented. Cosmetic procedures — including laser resurfacing, laser hair removal, chemical peels and dermabrasion — also may leave the affected area darker than the normal skin color. All these conditions may be categorized as post-inflammatory hyperpigmentation.

In addition to hyperpigmentation, many women suffer from melasma, a hormonal mask-like skin condition that often results from birth control pills and/or pregnancy. Melasma appears as blotchy brown spots — most often on the cheeks, forehead and temples of the face, but also on the abdomen and other areas. Chloasma is another name for melasma.

SKIN LIGHTENERS

Hydroquinone

Hydroquinone is a common ingredient in skin lightening products. It is available over the counter in concentrations up to 2 percent, and can be prescribed in concentrations up to 4 percent. However, hydroquinone can be very irritating at high concentration, can cause ochronosis with prolonged use, and is tumorigenic in rats. (Maeda and Fukada, *J Pharmacol Exp Ther*, 1996.)

Uva-Ursi Extract/Arbutin

Arbutin is a plant glycoside and skin lightener found in a natural plant, Uva-Ursi (which also has antioxidant properties). Arbutin is a natural hydroquinone molecule attached to a sugar molecule ($C_6H_6O_6$) which makes it water soluble. Arbutin helps prevent additional brown spots from occurring by stopping the production of melanin. Specifically, arbutin works by suppressing tyrosinase, the enzyme that biochemically converts tyrosine into melanin in skin.

Uva-Ursi also contains three strong antioxidants: ferulic acid, caffeic acid, and chlorogenic acid. These antioxidants neutralize oxygen free radicals that can damage skin. The three acids also act as intermediary acids which produce three

flavonoids —myricetin, quercetin and rutin — which help protect skin.

Kojic acid

Kojic acid is a skin lightener produced from fungus. Discovered in Japan in 1989, it has been used with excellent results to lighten skin and reduce brown spots. Like arbutin, it blocks the formation of melanin pigment in skin cells.

Thyme Extract/Thymol

Thyme, an herb plant indigenous to the Mediterranean, is known for its antiseptic and soothing properties. Thyme extract contains thymol, which has strong antiseptic and antioxidant properties, and helps to prevent future oxidative breakdown of cells. Thymol stops the production of melanin by inhibiting tyrosine conversion from tyrosine to 3, 4-Dihydroxyphenylalanine (Dopa), which is the first step in the biochemical path to melanin. Importantly, thymol does not damage the melanocytes, the factories that make melanosomes where melanin synthesis occurs.

Cucumber Extract

The bitter part of the cucumber plant which contains curcubitacin (forms A, B, C and D) — known for its emollient and soothing properties. Traditionally, cucumber slices have been used to remove dark circles from the area underneath the eyes.

SKINCEUTICALS SKIN LIGHTENING PRODUCTS

SkinCeuticals formulators have developed several skin lightening products containing these key ingredients.

For more information, or for a complete bibliography of scientific research supporting SkinCeuticals Skin Lightening Products, please visit the SkinCeuticals, Inc. website at www.skinceuticals.com, or call toll free 800-811-1660.