

THE SCIENCE WHITE PAPER SERIES OF
IMAGE SKINCARE:

Lightening Agents for Pigmentation Disorders

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ABSTRACT

Image Skincare offers products with many active, scientifically proven and researched key ingredients to achieve a certain result on the skin. In order to achieve the maximum benefit, not only one key ingredient, but an array of synergistically working ingredients, to target specific skin concerns, is found in every product. This concept is found throughout each and every line and not the name of the product identifies which ingredient is used, but the ingredient listing. All key ingredients are named on the international nomenclature of cosmetic ingredients (INCI) and are furthermore described on product key ingredient manuals. The uniqueness about Image Skincare is the blend of these ingredients into an advanced formulation with a perfectly balanced pH, which dictated the effectiveness of several ingredients. All products follow the concept of the exclusive CPN System™, a unique blending of Correction, Prevention and Nutrition, only offered by Image Skincare. This three in one concept greatly enhances the effect of each product on the skin and achieves results quicker and more profound.

General Findings on Hydroquinone

Even skin tone is a universal sign of youth and beauty. As you age photodamage from the sun and environmental toxins can create dark spots and uneven pigmentation on the skin, along with fine wrinkles and rough skin texture. Hydroquinone is a phenolic compound chemically known as

1,4 dihydroxybenzone. It is used as a skin lightening agent to remove dark spots and hyperpigmentation by inhibiting the enzymatic oxidation of tyrosine and phenol oxidases. At the active site of tyrosinase it covalently binds to histidine or interacts with copper. It suppresses the melanocyte metabolic process by inhibiting RNA and DNA synthesis and eliminates selected melanocytes. The result is a decrease of melanin pigment production, or the production of compounds that create dark spots on the skin

Melasma

Melasma usually affects women over the age of 25, especially after pregnancy or hormonal therapy. Catalysts of melasma can be pregnancy, use of estrogens and progestins, use of cosmetics, and solar exposure. It is believed that most hypigmentation from melasma is a result of overexposure to the UV rays of the sun. This is why it is important why using a skin lightening agent to also use a good sunblock to prevent damage to the healing area.

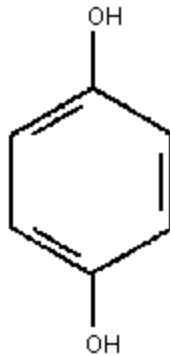


Figure 1: Chemical structure of hydroquinone

Clinical Research

One recent study tested the efficacy and tolerability of hydroquinone as a depigmenting agent in melasma. The

study used 48 patients with ages 19 to 55 years that all had a clinical diagnosis of melasma. The patients were separated into two groups, one to be treated with a hydroquinone 4% treatment and one to be treated with a placebo formulation. Both formulations contained two sunscreens with a sun protection factor (SPF) of 15 in addition to an SPF 30 sunscreen that was used on exposed areas every morning to reduce the influence to UV radiation. The study lasted for 12 weeks during which patients made five visits (one every third week). Patients were instructed to apply the cream twice daily, in the morning and night after cleaning the affected melasma area with water and neutral soap, then to apply SPF 30 sunscreen during the day to the whole face.

Clinical Results

The results showed that there was partial improvement in 90.4% of the cases treated with hydroquinone 4% as early as the 2 visit or after 3 weeks of treatment. The patients in the hydroquinone group continued to improve over the third and fourth visits and by the end of the experiment 38.1% of the patients had a total improvement and 57.2% of the patients had a partial improvement with only 1 patient or 4.8% of the patients showing no sign of improvement from the hydroquinone after the 12 weeks of treatment. The table below shows the results of the efficacy of hydroquinone compared to the placebo treatment after 3,6,9, and 12 weeks of treatment.

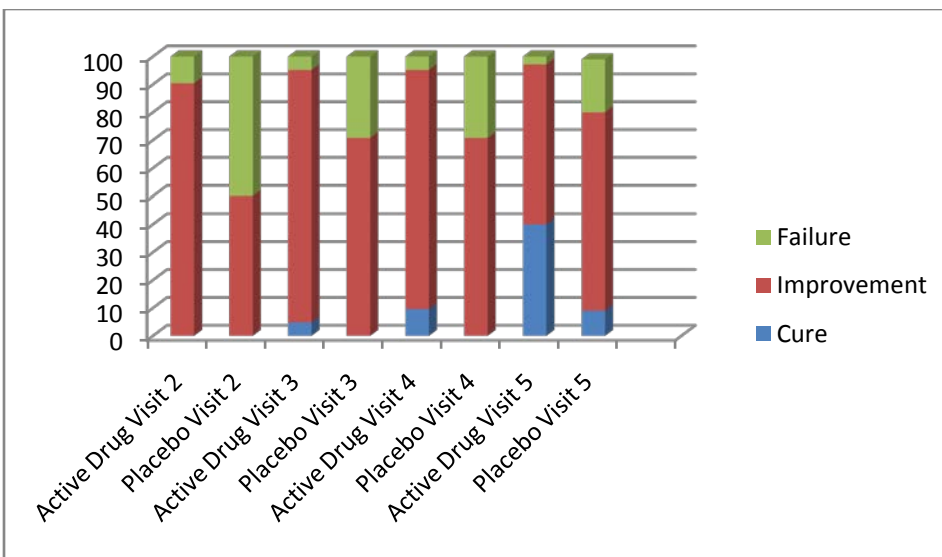


Figure 2: Efficacy of Hydroquinone

The study concluded that hydroquinone 4% is a safe and effective drug for the treatment of melasma and that sunscreens are also important as an additional treatment for preventing repigmentation and improving the appearance of the skin.

Kojic Acid

Kojic acid is a naturally occurring hydrophilic fungal derivative that is used as a lightening agent for hyperpigmentation of the skin. The name is Japanese and comes from the word "koji" meaning "culture". Kojic acid is produced by biologically fermenting bacteria on different carbohydrates such as rice and soybeans.

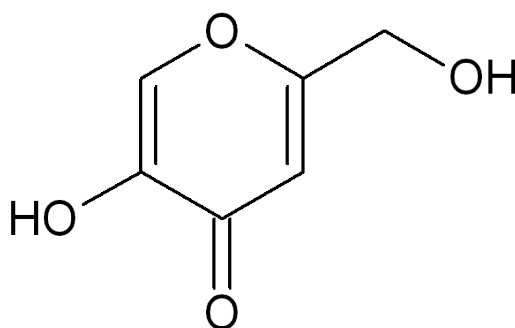


Figure 3: Chemical structure of Kojic Acid

Hyperpigmentation of the skin happens when too much melanin is produced in a concentrated area. This process is usually a result of sun damage or too much exposure to UV rays. Skin color is determined by the quantity of melanin in the skin. Melanin is biologically synthesized in the melanosome of the melanocyte, a process that occurs because of an enzyme called tyrosinase. Kojic acid works as a skin whitening agent because it is known to inhibit tyrosinase. By inhibiting tyrosinase, kojic acid reduces the production of melanin. At the same time, it works to eliminate already existing melanin. Therefore it aids in eliminating age spots on the skin while preventing the production of more melanin to prevent age spots from coming back.

Clinical Research of Kojic Acid

One comparison study showed a combination with 2% hydroquinone, 10% glycolic acid, and 2% kojic acid decreased hyperpigmentation in patients with Melasma better than the same combination without kojic acid. In carefully controlled trials, half of the melasma cleared in 60% of patients using the formula containing kojic acid, compared with 47.5% using only hydroquinone/glycolic acid. In 2 of 40 patients, the kojic acid formula gave a complete clearance. Other studies have shown kojic acid to be found to prevent photodamage and wrinkling of the skin.

Kojic Acid as an anti-oxidant

Additionally kojic acid scavenges reactive oxygen species released excessively from cells or generated in tissue or blood and works as an antioxidant. It has also been found to contain antibacterial properties.

Tricholoma Matsutake Singer Enzyme

The Tricholoma Matsutake, or pine mushroom, is a skin lightening agent native to Japan. Recent studies have examined the lightening properties of the tissue cultured mycelia from this mushroom which was traditionally used by high-caste families in Japan for retaining the whiteness of the skin. It is known in modern cosmeceuticals as an *antioxidant, free-radical scavenger, and anti-inflammatory*.

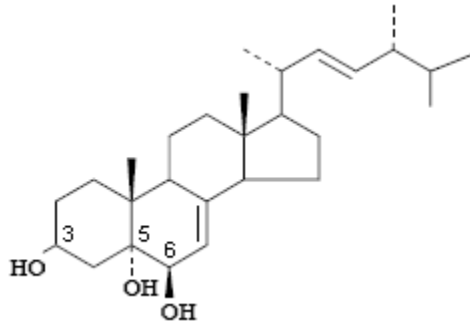


Fig 4: methanol extract of *Tricholoma equestre* (of the same genus as *Tricholoma Matsutake*)

Clinical Research on Tricholoma Matsutake Singer Enzyme

A recent study examined the free radical-scavenging ability (FRSA) and inhibition of nitric oxide (NO) production by various solvent extracts obtained from four grades of pine mushroom. The study found that extracts from first-grade pine mushrooms had greater FRSA than the other grades, which showed sequentially lower FRSA according to the grade of mushroom. Inhibition of NO production showed a similar trend. At a concentration of 2 g/L of extract, the FRSA, which ranged from 30.5% (water fraction) to 60.1% (ethyl acetate fraction), compares favorably to some other medicinal mushroom species, such as *Grifola frondosa*, *Morchella esculenta* and *Termitomyces albuminosus*.

Furthermore, the ethyl acetate and butanol fractions (fractions which had the highest levels of phenolics and flavonoids) both substantially inhibited nitric oxide

production and suggests that matsutake extract may show promise as an anti-inflammatory agent.

Image Skincare offers a wide range of lightening products, with Hydroquinone as well as Hydroquinone free. Find out more about our range of products at www.imageskincare.com or call us at 1-800-7966-7546 (SKIN)

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