

Bioactives

ALPHA-ARBUTIN



Superior skin lightening enhancer
for a perfect, even tone



The quest for an even skin tone

In many regions of the world, the concept of beauty is inseparably linked to an even skin tone. The biggest concern for consumers is finding the right product. DSM has addressed this demand with ALPHA-ARBUTIN, which has proven itself the perfect choice for those seeking an even skin tone. Thanks to its high efficacy, ALPHA-ARBUTIN has gained wide acceptance and is rated highly by people from all walks of life.

Cosmetic products with ALPHA-ARBUTIN typically inhibits tyrosinase, one of the major enzymes involved in the formation of skin tan and age spots. The first visible results can be expected after four weeks, in contrast with other Arbutins like Beta-Arbutin, which take longer to achieve results. In vivo studies also demonstrate that ALPHA-ARBUTIN reduces the degree of skin tanning after UV exposure and helps to minimize the appearance of liver spots.

Key facts

UNIQUE PRODUCT FEATURES

- Scientifically proven effects at low concentrations
 - More effective at 1.0% than Beta-Arbutin *in vivo*
 - 9x more effective than Beta-Arbutin *in vitro*
 - Outstanding tyrosinase inhibition activity *in vitro*
- Highly pure biosynthetic active ingredient
- High performing enzyme related biotechnology

BENEFITS

- Ensures an even skin tone
- Reduces the degree of skin tanning after UV exposure
- Helps to minimize the appearance of liver spots

COSMETIC APPLICATION

- Even skin tone care
- Age spot treatment
- BB/CC creams

SUGGESTED CONCENTRATION

- Up to 2% for face and neck preparations

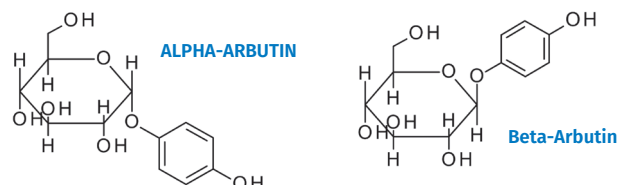
INCI NAME (ACTIVE)

Alpha-Arbutin

Mechanism

ALPHA-ARBUTIN has been specially developed to ensure an even skin tone. Unique, high-performing, enzyme-related biotechnology guarantees high purity, addressing increased consumer awareness about safety and efficacy.

Structurally, ALPHA-ARBUTIN (chemical name: 4-hydroxyphenyl- α -D-glucopyranoside) is an α -glucoside compared to the β -form of the related beta-arbutin.



The α -glucoside bond offers higher efficacy than the β -form. In vitro tests show that ALPHA-ARBUTIN exhibits impressive tyrosinase inhibition and is nine times more effective than Beta-Arbutin. Very low IC₅₀ values (the concentration that produces a 50% inhibition of human tyrosinase) indicates the power of ALPHA-ARBUTIN.

ALPHA-ARBUTIN: IC₅₀ = 1.0 mMol Beta-Arbutin: IC₅₀ = 9.0 mMol

The outstanding efficacy of ALPHA-ARBUTIN is due to its perfect affinity to the active site of tyrosinase. DFT (density functional theory)-optimized structures and ESP (electrostatic potential) calculations on ALPHA-ARBUTIN, Beta-Arbutin, and the substrate of tyrosinase, tyrosine, reveals that the ESP for ALPHA-ARBUTIN is similar to that of tyrosine. The ESP potential for Beta-Arbutin indicates potential difficulties when binding to tyrosinase, meaning the inhibitory activity of Beta-Arbutin is low.¹

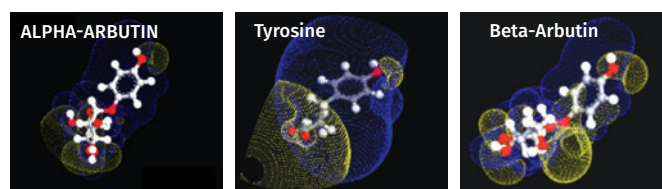
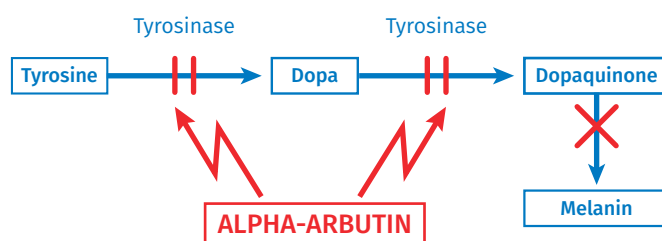


Figure 1: DFT (density functional theory)-optimized structures and calculated ESP's. The yellow dots represent the negative regions and the blue dots represent the positive regions of the electrostatic potential.

Efficacy

In vivo

One-month efficacy study

Four emulsions containing ALPHA-ARBUTIN, Kojic acid, Beta-Arbutin and Hydroquinone at 1% use level respectively were applied twice a day for one month on the forearm of 80 women of Chinese descent. The parameter L which represents the lightness of skin was determined by means of chromameter.

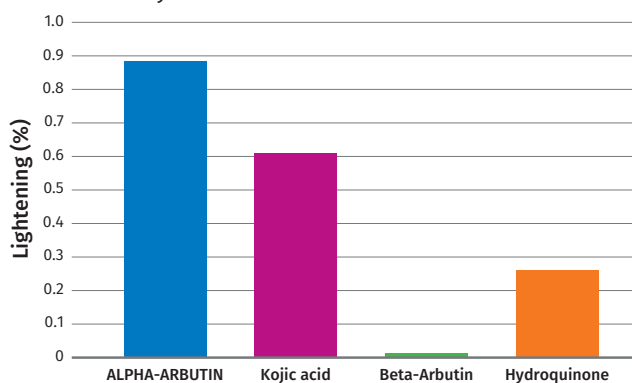


Figure 2: Interaction curve for parameter "L": treated zone vs control, difference M1 = after one month / M0 = start (%)

ALPHA-ARBUTIN outperforms competitive benchmarks.

Skin tanning reduction after UV exposure

A double blind study was performed on 23 healthy volunteers. The inside of the upper arm of each volunteer was irradiated with ultraviolet rays (1.4 MED) using a solar simulator, and immediately thereafter test samples with ALPHA-ARBUTIN (1% and 2%) were applied twice a day for two consecutive weeks. Skin color (ΔL value) was evaluated by means of chromameter one and two weeks after the end of UV exposure.

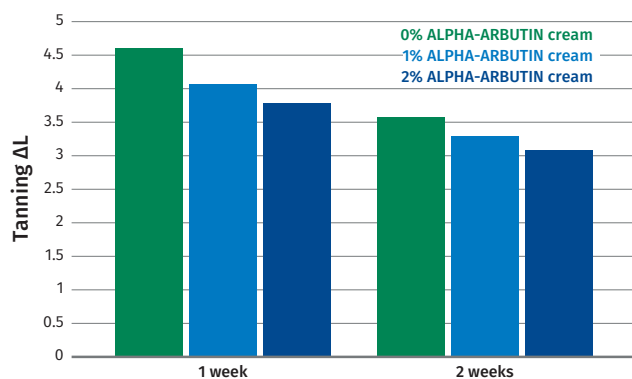


Figure 4: ΔL values for ALPHA-ARBUTIN creams one and two weeks after UV exposure

ALPHA-ARBUTIN reduces the degree of skin tanning after UV exposure.

Liver spot study

A three-month study was performed on 26 women (aged between 40 and 65) with liver spots. Creams including test substances were applied twice daily on different test areas. After three consecutive months of application, the liver spot reduction efficacy was evaluated with the eye using the following five-grade scale: markedly improved, slightly improved, ineffective and aggravated. 53.7% of the panellists reported a markedly improved or improved condition with ALPHA-ARBUTIN against only 30.6% for Beta-Arbutin.²

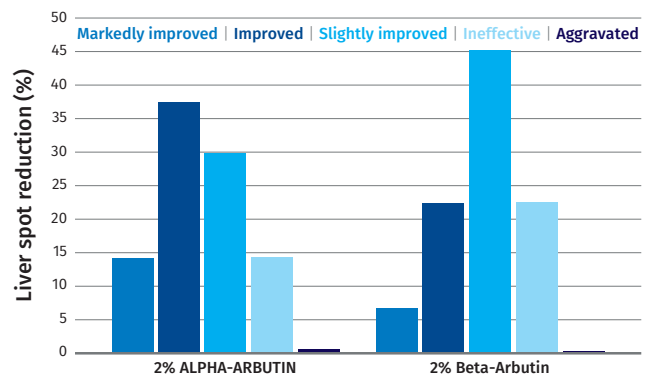


Figure 3: Satisfaction quotients relating to the evaluation of the liver spot reduction

ALPHA-ARBUTIN helps to minimize liver spots.

1 Sugimoto Kazuhisa et al., Ezaki Glico Co., Ltd., Biochem. Res. Lab., JPN

2 H. Ziegler et al., "The More Effective, Faster and Safer Approach to Skin Lightening and Liver Spot Minimizing," PERSONAL CARE (Jan 2003): 15-18

For more information, please visit www.dsm.com/personal-care

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