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mibelle**biochemistry**



## NanoWhite

Triple activity for skin brightening



# NanoWhite

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### Whitening with Protecting Properties

NanoWhite is a liposomal preparation combining powerful whitening ingredients and anti-oxidants for a strong brightening effect.

With age, stress and pollution, the skin pigmentation process can be disturbed leading to age spots and an uneven complexion. Thanks to its specific composition, NanoWhite regulates this process through complementary pathways:

- Natural arbutin coming from bearberry leaves, strongly inhibits tyrosinase activity which is the key enzyme of the pigmentation process.
- Its safe proven activity is reinforced by reduced glutathione and vitamin C palmitate which have both whitening and anti-oxidant properties.
- The effectiveness of all these components is optimized by the liposomal form.

The whitening effect of NanoWhite has been proven with 3 different methods. Results showed that NanoWhite inhibits both the tyrosinase activity and the activation of this enzyme. NanoWhite is thus a safe yet powerful whitening ingredient ideal to reduce and prevent pigmentation disorders.

### Claims with NanoWhite

- Safely inhibits the pigmentation process\*
- Reduces melanin synthesis\*
- For a luminous even skin tone

\*in vitro

### Applications

- Whitening for face and body
- Anti-aging with an even-toned skin
- Brightening for a radiant and luminous complexion

### Formulating with NanoWhite

- Dermatological tolerance: The dermatological tolerance of NanoWhite has been carefully proven in healthy volunteers with an occlusive photo-patch test.
- Recommended concentrations: 2 - 5%
- Manufacturing of products: NanoWhite can be formulated in emulsions (O/W, W/O) and gels. For cold processes, dissolve NanoWhite in the aqueous phase. In cold/hot processes, add during the cooling phase. Homogenization and temperatures of up to 60°C do not affect the stability of NanoWhite.

### INCI/CTFA-Declaration

Lecithin (and) Arbutin (and) Linolenic Acid (and) Linoleic Acid (and) Tocopheryl Acetate (and) Ascorbyl Palmitate (and) Glutathione (and) Alcohol (and) Aqua/Water

# NanoWhite

## Effective whitening with natural arbutin, glutathione and vitamin C

### Skin Color, Hyper-Pigmentation and Aging

Skin color largely depends on a pigment called melanin. Its production in the skin is activated by sunlight and requires the presence of a key enzyme called tyrosinase. Two major forms of melanin exist in humans: eumelanin (brown to black pigment) and pheomelanin (yellow to red pigment). Each individual has both types of melanin but in different proportions. Thus, skin color depends on the nature, concentration and distribution of melanin.

But factors such as free radicals, hormonal changes and sun exposures can disturb the pigmentation process. Besides, skin's luminosity and uniformity tend to decrease with age. That is the reason why an even-toned skin is perceived as a sign of youth.

### A Combination of Whitening Ingredients

- Used for centuries in herbal medicine, bearberry leaves contain arbutin which strongly inhibits tyrosinase activity. Arbutin is a natural derivative of hydroquinone which offers much higher stability and safety than hydroquinone and allows regular use for a long period of time.

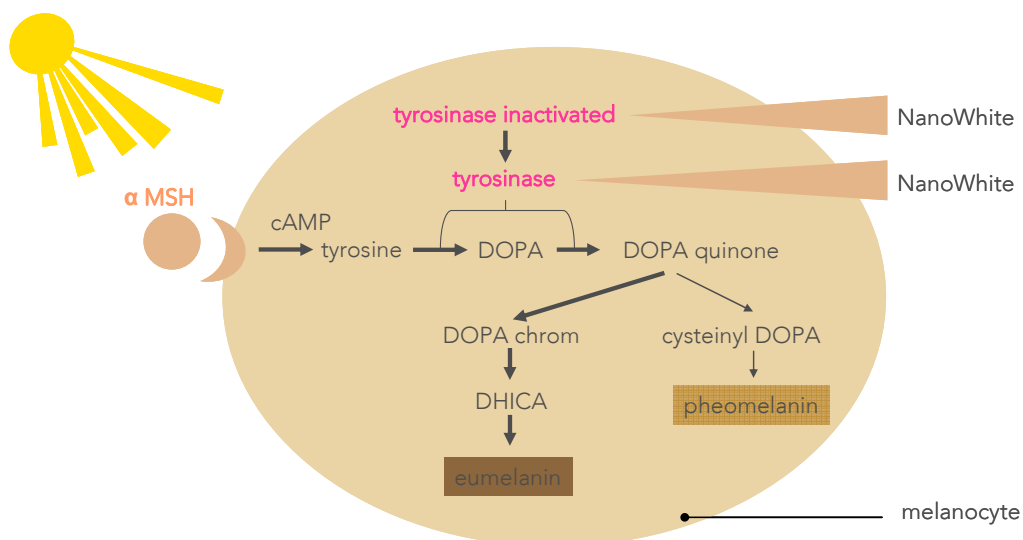
- Reduced glutathione is a tripeptide found in the human body. It is one of the strongest skin's natural antioxidant and its level decreases with age. It inhibits tyrosinase activity thanks to its reduction potential.
- Vitamin C palmitate is the optimal form of vitamin C for topical application. It combines antioxidant, anti-aging and whitening properties and can also lighten the existing dark spots.

### Enhanced Efficiency thanks to the Liposomal Form

The liposomal form has 4 main benefits:

- Protection of the encapsulated materials against oxidation, color change and deactivation
- Possible association of normally incompatible compounds (like water- and oil-soluble components)
- Increase of the bioavailability thanks to the small size of the liposomes and its high affinity to the stratum corneum
- Enhanced and long-lasting activity

### Mechanism of Action of NanoWhite



# NanoWhite

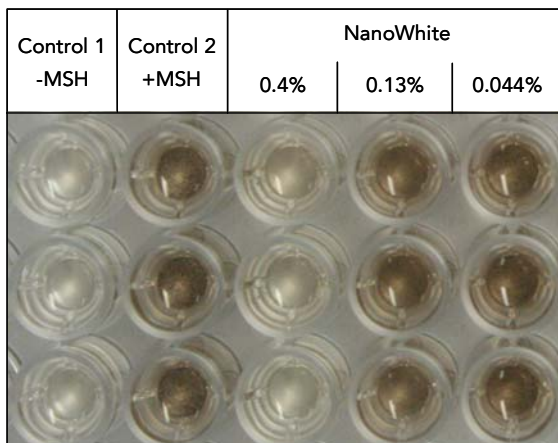
## Study results

### Effect on Melanin Synthesis

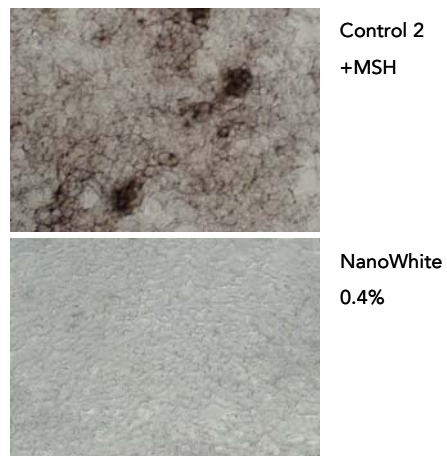
In an in-vitro study conducted on melanocytes, NanoWhite was shown to inhibit melanin formation. Specific cells (B-16 Melanocytes) were cultivated with NDP-MSH, a stable derivative of the natural hormone  $\alpha$ -MSH which stimulates skin pigmentation. The melanin content was determined by measurements of the optical density and the cell viability was evaluated on parallel thanks to the MTT assay. Besides, morphological observations were performed by microscope.

Results showed that 0.4% NanoWhite inhibits melanin formation by 74%. Besides, this inhibition of the pigmentation process is dose-dependant and is not due to a cytotoxic effect as shown in the MTT assay.

### Inhibition of Melanin Production



### Visualization of Melanocytes



B-16 melanocytes, 20x magnified

# NanoWhite

## Study results

### Double Effect on Human Tyrosinase Activity

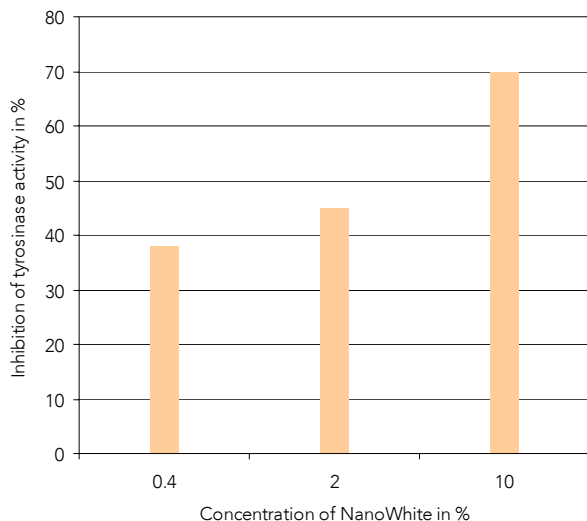
The NanoWhite mechanism on tyrosinase activity was studied thanks to two in-vitro tests. Assays were performed by using Normal Human Epidermal Melanocytes (NHEM) with different concentrations of NanoWhite against controls. The tyrosinase activity was determined by measuring the melanin content (optical density).

In the first study, tyrosinase was extracted from NHEM and incubated with NanoWhite. L-DOPA (enzyme substrate) was then added to start the tyrosinase reaction. Results showed a dose-dependant inhibition of melanin formation. NanoWhite can thus directly inhibit tyrosinase activity.

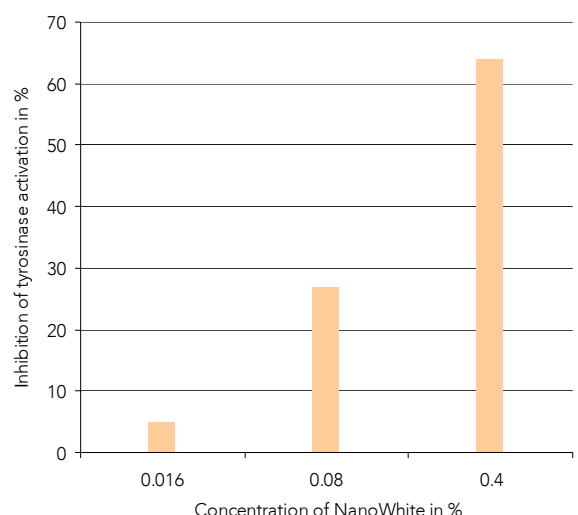
The second study was performed on "pre-treated" NHEM. This pre-treatment consisted in incubating NHEM with NanoWhite for a specific time. The aim was to evaluate the effect of NanoWhite on formation and/or activation of tyrosinase. After this incubation time, cells were rinsed and lysed in order to release the eventually produced tyrosinase. Then L-DOPA (enzyme substrate) was added. Results showed again a dose-dependant inhibition effect meaning that NanoWhite can also inhibit the formation and/or activation of tyrosinase.

As a conclusion, these 2 studies show that NanoWhite can inhibit both the tyrosinase activity and the activation of this enzyme. Thus, NanoWhite can regulate the tyrosinase activity and prevent pigmentation disorders.

Inhibition of Tyrosinase Activity



Influence on Tyrosinase Activation



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### Marketing Benefits

- Targeted action thanks to the liposomal form
- Protective properties thanks to its high content in anti-oxidants
- Ideal for a daily use

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