mibelle GROUP biochemistry

MelanoBronze

Biomimetic tanning activator

SWISS QUALITY PRODUCT

MelanoBronze
Biomimetic tanning activator

Phyto-Endorphins to Activate Melanin Synthesis
MelanoBronze is a tan activator that is based on an extract of the monk's pepper berries which have ß-endorphin-like activity. MelanoBronze stimulates the natural tanning process either with or without sun. This active ingredient also contains a tyrosine derivative to further boost melanin synthesis.

ß-endorphin, which is an analgesic and euphoria-inducing hormone, has a number of similarities with α-MSH, the hormone that regulates melanin synthesis (which has the same precursor and similar occurrence in the skin). Recent discoveries have confirmed that ß-endorphins play a key role in melanin synthesis and diffusion.

UV radiation initiates melanin synthesis by increasing the production of α-MSH, ß-endorphins and tyrosine. MelanoBronze is able to boost this process thanks to its ß-endorphin-like activity (due to the activation of ß-endorphin's receptors and easier distribution of melanin in the epidermis) and by increasing the concentration in tyrosine. The ß-endorphin-like effect of MelanoBronze is independent of UV radiation, which explains why MelanoBronze offers a tanning effect even without the need for exposure to the sun.

In vitro assays performed on melanocytes showed the capacity of our monk's pepper berry extract to independently stimulate melanin synthesis in a dose-dependent way.

In placebo-controlled clinical studies, MelanoBronze was shown to increase the tanning of the skin in a dose-dependent way either with or without simultaneous UV exposure. Furthermore, our results demonstrated the distinct in vivo tanning efficacy of our monk's pepper berry extract.

Claim Ideas for MelanoBronze
- Boosts natural melanin synthesis
- Improves the skin's own UV defense
- Enhances natural skin tan
- Ensures skin is sun-ready with a protective tan

Applications
- Sun products (pre, during and post treatment)
- Natural tan inducer and accelerator
- Daily care formulas
- BB and CC creams

Formulating with MelanoBronze
- Recommended use level: 2–5 %
- Incorporation: For cold processes, dissolve MelanoBronze into the aqueous phase. In hot/cold processes, add during the cooling phase below 50 °C.
- Thermostability: Temperatures of up to 50 °C for a short time will not affect the stability of MelanoBronze.

INCI (EU/PCPC) Declaration
Vitex Agnus Castus Extract (and) Acetyl Tyrosine (and) Glycerin (and) Alcohol (and) Aqua/Water

β-Endorphins

The happiness biomolecules that induce the tanning process

Melanin is the Body's Own Sunscreen
Melanin is synthesized in melanocytes which are located in the basal layer of the epidermis. This pigment is stored in organelles which are called melanosomes.
Following UV irradiation, melanocytes produce melanin and spread this protective pigment within the skin by transferring it to the surrounding keratinocytes thanks to their numerous dendrites. Inside the keratinocytes, the melanin positions itself around the cell nucleus in order to protect the DNA. UV irradiation will also stimulate the differentiation and migration of keratinocytes to thicken the epidermis so as to ensure an improved protection against radiations. The diffusion of melanin in the epidermis will give the skin a tanned appearance.

Tyrosine is the Precursor of Melanins
Melanin contains two main substances: the black-brown eumelanin and the reddish-yellow pheomelanin. Their biosynthesis can be initiated from either the hydroxylation of phenylalanine to tyrosine or directly from tyrosine.

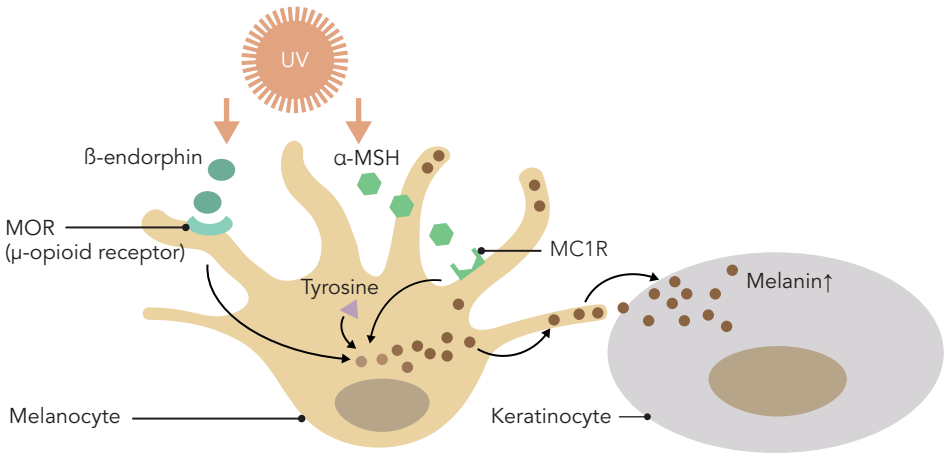
β-Endorphin, the "Happiness" Natural Molecule
β-endorphin is an analgesic (morphine-like) and euphoria-inducing hormone that is naturally produced by our bodies. The word "endorphin" derives from the Greek words *éndon*, which means "from within" and *Morpheús*, the God of sleep in Greek mythology. These words together create "endo(genous) (mo)'rphine".

β-Endorphins and α-MSH Have Similarities
Melanin synthesis is induced by the alpha-melanocyte stimulating hormone (α-MSH). As a response to UV, this hormone is produced in the central nervous system from its precursor – proopiomelanocortin (POMC). POMC is also the precursor of β-endorphins and it was recently discovered that, in the skin, keratinocytes and melanocytes were also able to produce – independently of the central nervous system – POMC and its derivatives. Furthermore, both cells – keratinocytes and melanocytes – were shown to carry the specific receptors of each hormone:
- melanocortin receptor (MC1R) for α-MSH
- μ-opioid receptor (MOR) for β-endorphins*.

β-Endorphins Play an Important Role in Melanin Synthesis and Diffusion
In melanocyte cultures, β-endorphins were found to increase melanin production and also stimulate melanocyte dendricity and proliferation. Therefore, these molecules facilitate the transfer of melanin to the surrounding keratinocytes. In addition, β-endorphins were shown to improve the differentiation and migration of keratinocytes*.

* Bigliardi et al., 2002, J of Recept Signal Trans, 22(1–4): 191–99
** Meier et al., 2000, Phytomedicine 7(5): 373–81

UV Light Triggers Melanin Production



MelanoBronze

Stimulates the tanning process either with or without sun

Monk's Pepper Produces Substances with β-Endorphin Activity

Monk's pepper (chaste tree, *Vitex agnus-castus*, Verbenaceae) is a deciduous shrub that is a native of the Mediterranean region. Its black berries have been used since ancient times as a herbal medicine in order to treat inflammation, the spleen, premenstrual syndrome and injuries.

It was recently discovered that compounds of monk's pepper berries were able to bind to the MOR and exert a β-endorphin-like activity by activating them**. For this reason, these natural molecules are called phyto-endorphins due to their ability to mimic the activity of β-endorphins.

Composition of MelanoBronze

MelanoBronze combines:

- a monk's pepper berry extract whose concentration in markers, notably casticin is carefully controlled.
- acetyl tyrosine, which is a natural amino acid bound to acetic acid. By providing the substrate for the synthesis of melanin, tyrosine speeds the reaction and in doing so increases the concentration of melanin synthesized.

Mechanism of MelanoBronze

UV radiation initiates melanin synthesis by increasing the production of α-MSH, β-endorphins and tyrosine. MelanoBronze is able to boost this process by:

- mimicking an increased release of β-endorphins through the activation of MOR***
- facilitating the distribution of melanin in the epidermis***
- providing additional tyrosine.

***β-endorphin-like activity

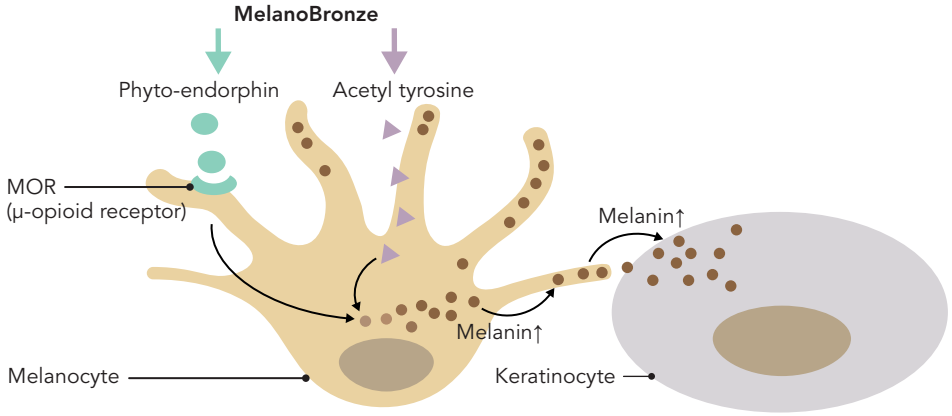
The β-endorphin-like effect of MelanoBronze is independent of UV radiation. This explains why MelanoBronze offers a tanning effect even without the need for exposure to the sun.

MelanoBronze versus DHA

Dihydroxyacetone (DHA) is a sugar that colors the skin by interacting with the proteins of the dead cells that form the stratum corneum. Unlike melanin, the pigments formed do not protect the body against UV radiation. In addition, they are eliminated quickly from the skin surface due to the natural desquamation process. Compared to DHA, MelanoBronze offers the following advantages:

- protective effect against UV radiation
- a natural, healthy-looking and even skin tone
- long-lasting.

Mechanism of MelanoBronze



MelanoBronze
Study results

Stimulation of Melanin Synthesis by the Monk's Pepper Berry Extract Alone

The capacity of the monk's pepper berry (MPB) extract to stimulate melanin synthesis was analyzed in a cell culture of melanocytes.

Normal human melanocytes (NHEM-2) were incubated either with or without different concentrations of MPB extract. Following this, melanin was extracted and its concentration was determined by using a colorimetric method.

Results showed that the MPB extract significantly increased the melanin synthesis and in a dose-dependent way:
- +12 % with 0.125 % MPB extract
- almost +47 % with 0.25 % MPB extract.

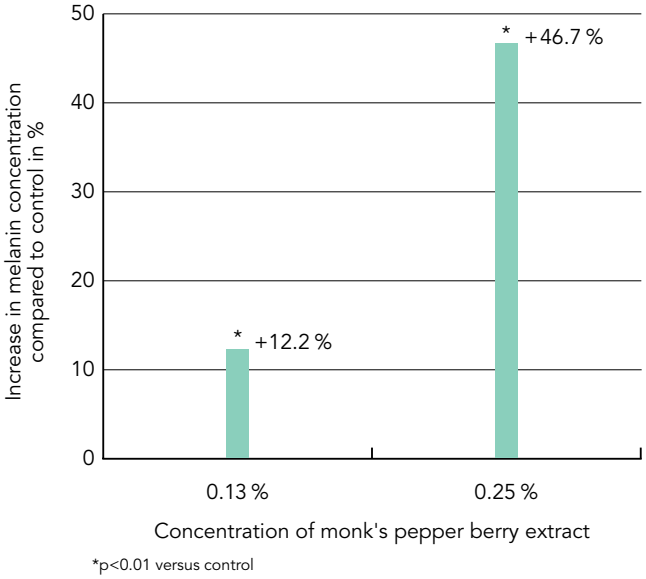
Tanning Effect without Sun Exposure

Twenty volunteers (12 women and 8 men) aged between 23 and 44 years applied the following test products twice daily for a period of 28 days to the inner side of their forearms:
- a 2 % MelanoBronze cream
- a 5 % MelanoBronze cream
- the corresponding placebo cream.

The tanning of their skin was evaluated by measuring the skin lightness (L*) with a chromameter. A decrease in the L* value indicates a tanning effect.

Results showed that compared to the placebo, in spite of the absence of sun, MelanoBronze increased the tanning of the skin in a dose-dependent way.

Increase in Melanin Synthesis by the MPB Extract



*p<0.01 versus control

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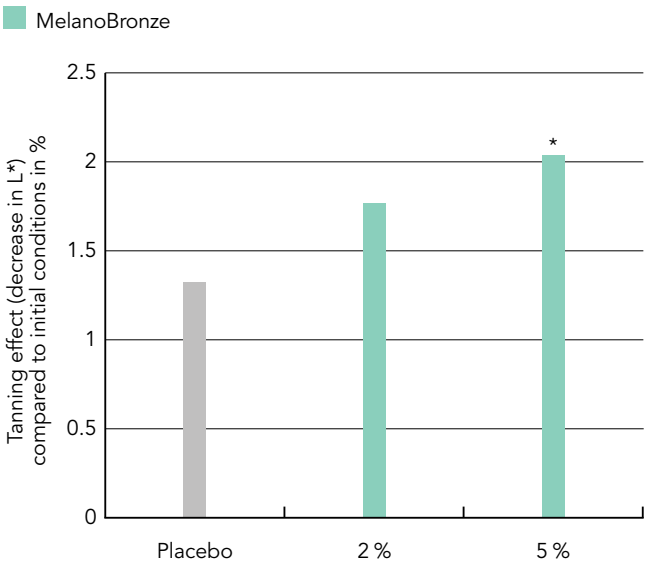
Tanning Effect without UV Exposure



*p<0.05 versus placebo

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Increased Tanning Effect when Exposed to UV Light

Twenty volunteers (8 women and 12 men) aged between 20 and 55 years applied the following test products twice daily for a period of 7 days to the inner side of their forearms:

- a 2 % MelanoBronze cream
- a 5 % MelanoBronze cream
- a cream with acetyl tyrosine in the same concentration as in 5 % MelanoBronze
- the corresponding placebo cream.

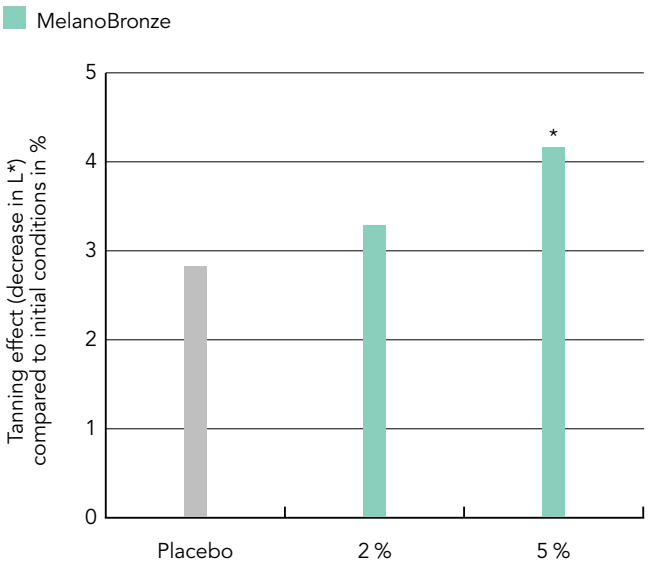
The skin tanning process was initiated with UV irradiation of 1.1 MED once daily.

The tanning of their skin was evaluated by measuring the skin lightness (L*) with a chromameter. A decrease in the L* value indicates a tanning effect.

Results showed that compared to the placebo, in the presence of sun, MelanoBronze further increased the tanning of the skin in a dose-dependent way (see the graph on the left).

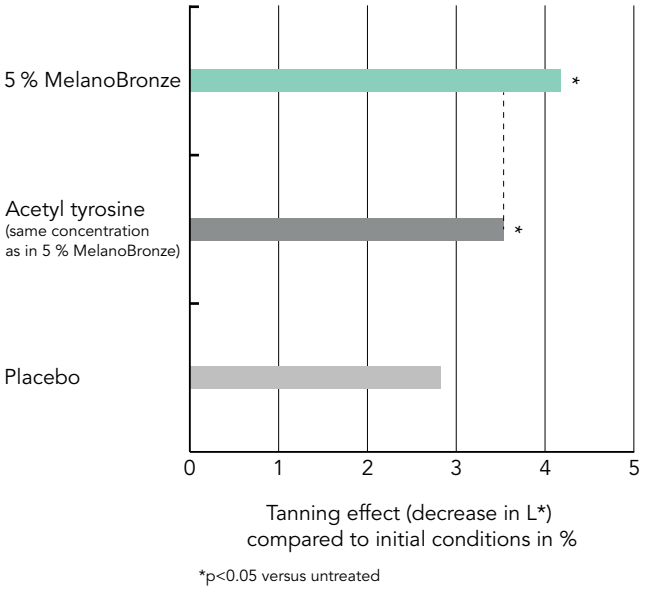
Furthermore, the comparison between the effect of 5 % MelanoBronze with the same concentration of acetyl tyrosine alone demonstrates the distinct in vivo tanning efficacy of the MPB extract (see the graph on the right).

Tanning Effect in the Presence of UV Light



*p<0.05 versus untreated

Contribution of the MPB Extract



*p<0.05 versus untreated

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Applications

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- BB and CC creams

Marketing Benefits

- Based on a Mediterranean plant that has β-endorphin-like activity
- Tested on both women and men
- Preservative-free

Innovating for your success

Mibelle Biochemistry designs and develops innovative, high-quality actives based on naturally derived compounds and profound scientific know-how. Inspired by nature – Realized by science.

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