

Relax your skin with Pinolumin and enjoy a flawless complexion

Swiss stone pine extract for an even skin tone: Pinolumin is a concentrated extract of the Swiss stone pine. In cell culture assays, the extract showed an anti-inflammatory effect and a specific inhibition of the activation of sensory neurons. In clinical studies these calming and soothing properties were found to significantly improve skin tone evenness and radiance

Swiss stone pine – the queen of the Alps

The Swiss stone pine (*Pinus cembra*) grows in the Alps and the Carpathian Mountains of central Europe. It symbolises high mountains as it typically grows at altitudes of 1,500 - 2,500 metres where winters are particularly long and harsh. Therefore, the Swiss stone pine has to be highly resistant to extreme temperatures up to -50°C as well as strong winds. Despite this rough environment, the Swiss stone pine lives up to 1200 years. The Romans used the pine cone of this resilient tree two thousand years ago as an icon for their invincibility. For centuries, the wood from Swiss stone pine has been used for carving sculptures due to its tender yet long lasting characteristics. It is also often used to make beds and bedroom furniture, and the shavings are sometimes used as pillow fillings. Interestingly, research has revealed that the wood of Swiss Stone Pine fosters relaxation and deep sleep phases and can help to reduce mental and physical stress.

When sleeping in a Swiss stone pine bed heart beat frequency can be reduced, saving 3500 beats per day, which roughly corresponds to one hour less stress per day. But what is the secret of this special tree that helps us to relax?

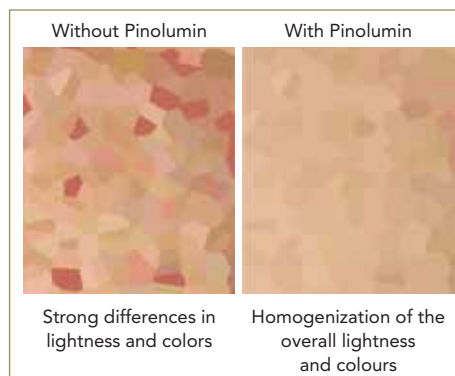
Swiss stone pine wood and needles contain high concentrations of pinosylvin, a molecule similar to resveratrol. The function of pinosylvin is mainly to protect the tree from fungal infections as it possesses potent antibacterial and antifungal activities, more potent than resveratrol against certain types of yeast. Swiss stone pine produces more pinosylvin upon encountering various external stresses such as UV light, high ozone concentrations and infection as well as wounding. Interestingly, pinosylvin is not only important for the health of the Swiss stone pine, it also has beneficial effects on our cells that have been scientifically proven. For example, pinosylvin was

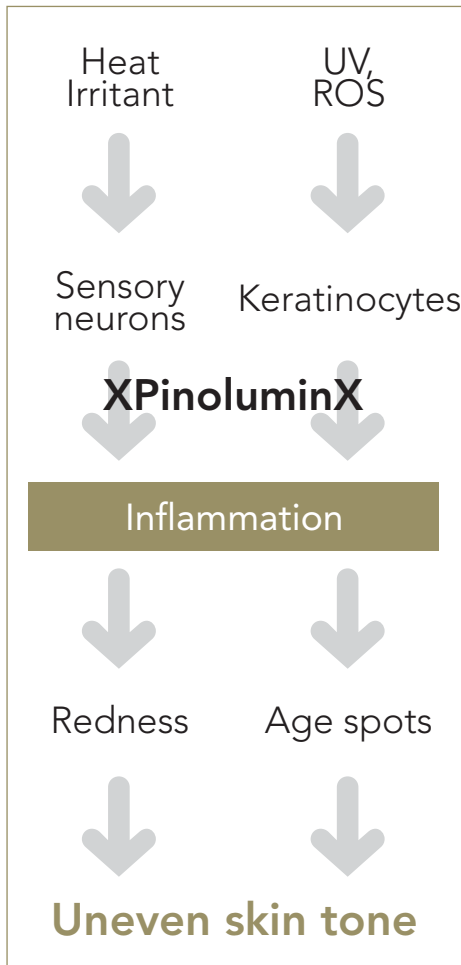
shown to neutralise free radicals, inhibit inflammation and block pain receptors present in the skin. This makes it an ideal molecule to calm overreactive skin that is easily irritated by environmental stimuli. Mibelle Biochemistry has developed Pinolumin, an extract from Swiss stone pine wood that contains pinosylvin, to capture the beneficial effects of this protectant molecule.

Pinolumin reduces skin irritation and inflammation

One reason for irritated skin is the constant activation of pain receptors in the skin. These receptors are present in sensory neurons and react to dangerous changes in the environment such as heat and chemicals with a pain reaction. While an appropriate response can be advantageous, an overreaction of these pain receptors is not. When activated, these receptors not only lead to a sensation of pain and irritation, but the neurons will also release the neuropeptide calcitonin gene related peptide (CGRP), which leads to vasodilation, histamine release and subsequently the activation of inflammatory pathways. A continuous activation of these receptors will lead to constant inflammation in the skin – resulting in redness and skin ageing.

To test the soothing capabilities of Pinolumin, sensory neurons were irritated with capsaicin in the presence or absence





of Pinolumin. Treatment with Pinolumin reduced the capsaicin-induced CGRP release in a significant and dose-dependent manner. This indicates that Pinolumin inhibits the activation of the pain receptor upon neuronal irritation, which suggests that it has a soothing effect. To investigate an additional anti-inflammatory effect of Pinolumin, keratinocytes were treated with an oxidative stress inducer, which leads to an increased production of the inflammatory markers IL-8 and PGE2. Treatment with Pinolumin reduces the inflammation response upon PMA-induced oxidative stress in a dose-dependent manner.

Protection of skin collagen by Pinolumin

When skin gets damaged by UV radiation, the expression of collagen-destroying enzymes, such as MMP-1 is upregulated. To test whether Pinolumin is able to protect collagen, fibroblasts were irradiated with UVA light in the presence or absence of Pinolumin and MMP-1

release was measured. Results showed that Pinolumin inhibited the UVA-induced MMP-1 release in a significant and dose-dependent way, which indicates a protective effect of skin collagen.

Pinolumin reduces redness and brightens age spots

As Pinolumin is able to reduce irritation and inflammation *in vitro*, and molecules similar to pinosylvin have exhibited whitening activity, a placebo-controlled clinical study was performed with 22 volunteers with age spots to determine the anti-redness and lightening activity of Pinolumin. After two months of twice daily application of a cream containing 2% Pinolumin, skin lightness (L^*) significantly increased in age spots by 2.8% while skin redness (a^*) was significantly reduced by 10.5%. The effect was observed in 95% and 77% of the volunteers, respectively.

Pinolumin evens out the skin tone

To investigate whether, in addition to the reduction of age spots, Pinolumin evens out the skin tone on the whole face, another clinical study was carried out to assess skin tone homogeneity. For this, two groups consisting of twenty and twenty-one volunteers applied either a cream containing 2% Pinolumin or the corresponding placebo cream on their whole face twice daily for two months. The heterogeneity of their complexion was analysed by choosing 24 selected locations across the face and measuring on each area the skin lightness (L^*), redness (a^*) and yellowness (b^*). The standard deviation of the 24 measurements was determined as a marker for skin tone homogeneity. The smaller the standard deviation, the more homogeneous is the skin tone. Treatment with 2% Pinolumin improved the skin tone homogeneity of all three colour values compared to placebo.

To summarise, Pinolumin offers a multi-targeted soothing approach for sensitive skin. Pinolumin reveals a flawless complexion by reducing facial redness and age spots, resulting in a more homogeneous and radiant skin.

Mibelle Biochemistry, Stand N20

