



ALGICA® – An anti-pollution agent

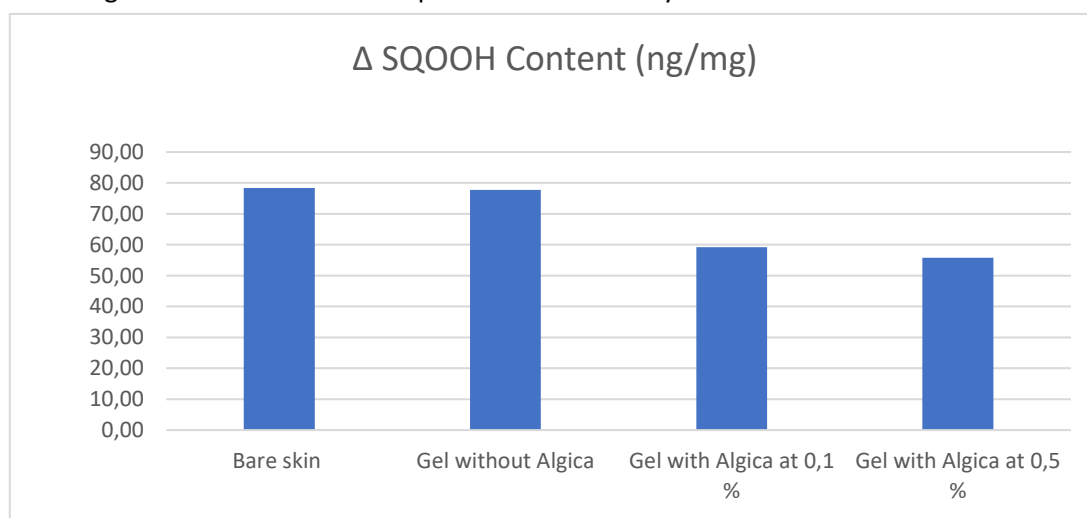
We have conducted three different types of studies to confirm the properties Algica has as an anti-pollution agent. The outcome of the studies shows that Algica in cream formulations works efficiently as an anti-pollution agent. In this document, you will find the conclusions of these three studies. If you want, we can provide you with more detailed information about the studies.

Measure of Squalene Monohydroperoxide increase conducted by ProDERM

Conclusion

In the study, the increased content of Squalene Monohydroperoxide (SQOOH) in the skin was measured after exposure to pollution. Squalene Monohydroperoxide (SQOOH) is increased in the skin when the skin is exposed to pollution as a stress reaction. The results show an average 24 % lower SQOOH content in skin exposed to a gel with 0,1 % Algica and an average 29 % lower SQOOH content in skin exposed to a gel with 0,5 % Algica. As best the 0,1 % Algica gel showed a 47 % lower SQOOH content and the 0,5 % Algica gel showed a 48 % lower SQOOH content.

In conclusion Algica at a concentration of 0,1-0,5 % can prevent an average of 24-29 % of pollution from reaching the skin with results of up to 48 % in the study.



Reactive Oxygen Species (ROS) as contained in the pollutant can react with the different major components of the skin (lipids, DNA, and proteins). The action of ROS on lipids lead to peroxidation products in skin sebum like Malondialdehyde (MDA) and Squalene Monohydroperoxide (SQOOH), that were chosen for this study. (Oxidization of squalene, a human skin lipid: a new and reliable marker of environmental pollution studies D.-M. Pham et al. International Journal of Cosmetic Science, 2015, 37, 357–365)

In the study, the increased SQOOH concentration was measured when pollution was added to:

- Bare skin
- Skin with addition of a gel containing only water and a gelling agent
- Skin with addition of the gel + 0,1 % Algica
- Skin with addition of the gel + 0,5 % Algica



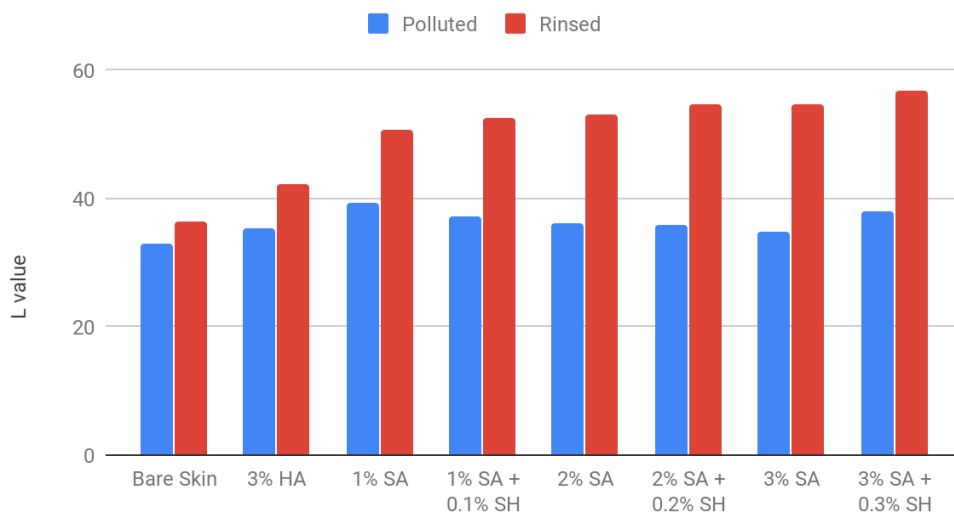
Measure of increased L-value and Nickel-Chelation conducted by external actor

Conclusion

In **L-value tests** Algica shows a **50 % increase** compared to Hyaluronic Acids 20 % increase of the L-value at incorporation levels of 3 %* in volume, which indicates that **2,5 times** more carbon particles are blocked from entering the skin by Algica than **Hyaluronic Acid** and **5 times** more compared to **untreated skin**. In **Nickel-chelation tests** Algica are **blocking 0,7-16 times** more Nickel from entering the skin than Hyaluronic Acid in the pH range 5-7. *3 % equals 3 ml in volume which in mass indicates approximately 0,1 g of Algica and thereby 0,1 % in mass percentage.

L-value

Parameter L, one of the coordinates of the CIE 1976 (L*, a*, b*) color space, is used to express the brightness of the color L*=0 indicates black, L*= 100 indicates white. The increase of the L-parameter of the analyzed area indicates a shift in the color towards white. A Minolta Chromameter CR200 was used for an accurate and objective evaluation of the color of surfaces. The shift in color towards white after rinsing off the cream formula indicates that pollution is adhering to the cream and are thereby hindered from entering the skin. A carbon black powder was used as pollutant in the tests.



Evaluation of L parameter after pollution treatment compared with thereafter rinsing the skin after the pollution treatment when the skin before pollutant treatment has been exposed to different solutions/creams with different percentages of Algica (SA), Hyaluronic Acid (HA) and Rheology modifier (SH) alone or in combinations. In tests it is referred to volume percentages, e.g. 3 % equals 3 ml in volume which in mass indicates approximately 0,1 g of Algica and thereby 0,1 % in mass percentage.

Nickel (Ni)-Chelation

Nickel is a toxic metal that is seen in air pollution. The Nickel-chelation measures how much Nickel (Ni) that is coupled to different dispersions after application on the skin. It thereby indicates an adhesion effect of Ni which means that Ni will adhere to the ingredients in the dispersion rather than entering the skin.