

# Depolluphane EpiPlus – triple action to pollution-proof skin



Developed by Mibelle Biochemistry, Depolluphane EpiPlus is an innovative active ingredient that protects skin from urban pollution. It not only provides protection from environmental aggressors but also safeguards skin against the long-term epigenetic changes caused by pollution.

As a result, multi-level protection is needed to shield the skin from unwanted exposure to pollutants, to detoxify skin by neutralising dangerous chemicals that manage to enter the epidermis and to prevent long-term epigenetic changes caused by pollution.

pollutants as well as intrinsic reactive molecules.

An artichoke extract was chosen for its capabilities to protect skin cells from epigenetic changes caused by pollution. To produce Depolluphane EpiPlus, the organic cress sprout and the artichoke extract are sprayed on a carrier that is based on a mixture of different polysaccharides. This smart polysaccharide complex performs various functions on the skin. Its film-forming capability shields the skin from unwanted exposure to pollutants, while the biochemical activity enhances the skin's immune function and helps to strengthen the skin barrier.

The contribution of air pollution is a major area of concern when it comes to skin ageing. Particulate matter (PM) – particles sized between 0.1µm and 10µm – contains toxic compounds such as heavy metals and allergens and can penetrate the pores. In combination with exposure to UV light, PM causes oxidation within the skin, which leads to the formation of reactive oxygen species, inflammation and the loss of collagen (see Figure 1). The result is irritated, uneven skin that will age more rapidly.

Recent research has shown that there are added dangers – continuous exposure to air pollution causes epigenetic changes in our cells that can persist long term even after harmful exposure desists. Epigenetics can be explained as being a structure above the genome (epigenetics = 'on top of genetics'), which regulates gene expression without changing the DNA code.

DNA, which makes each individual unique, holds the instructions for building all of the parts of the body and is wrapped around proteins known as histones. Epigenetic regulation works by covering DNA and histones with chemical tags (see Figure 2). These marks, which for example include histone methylation, acetylation and phosphorylation, make some genes either readable or illegible without changing the DNA sequence.

**DID YOU KNOW?**  
 Even when smog isn't glaringly visible, the skin is exposed to as many as 224 chemicals that can damage it. This is why it needs a second line of defence, to fortify the natural skin barrier in order to combat pollution particles. Source: [www.byrdie.com](http://www.byrdie.com)

### A powerful combination

Depolluphane EpiPlus [INCI: (Lepidium sativum sprout extract (and) Cynara Scolymus (Artichoke) Leaf Extract (and) Pullulan (and) Sodium Carboxymethyl Betaglucan (and)

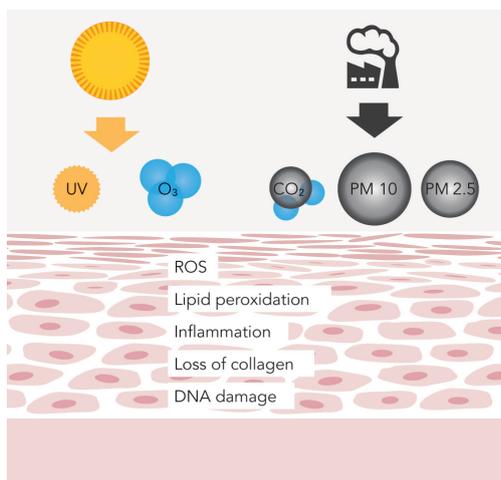
Caesalpinia Spinosa Gum (and) Maltodextrin (and) Aqua / Water)] contains a purified extract of garden cress sprouts, which includes sulforaphane, a well-known activator of the detoxification system of the cell. It enhances the resistance of skin cells against environmental

### Tested and proven effective

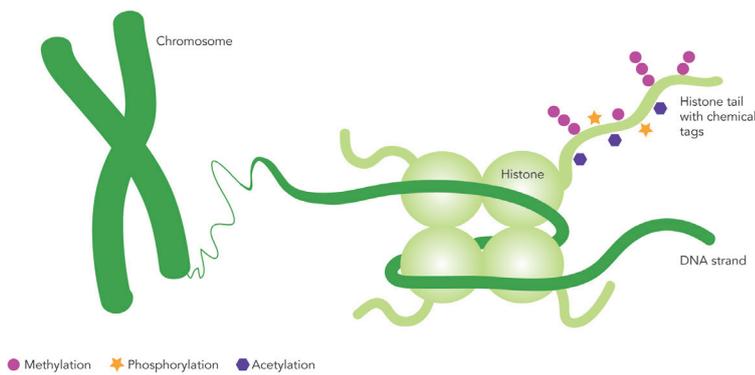
*In vitro* studies demonstrated that cress sprout extract is indeed able to activate the expression of detox enzymes in skin cells and reduces the formation of protein carbonylation caused by particulate matter (data not shown). The artichoke was shown to prevent long-term epigenetic changes caused by urban pollution.

For the first time, Mibelle Biochemistry could show a change in histone modifications in keratinocytes caused by long-term exposure to different types of pollution. These histone modification changes were highly reduced when the artichoke extract was present, similar to the modification levels of control cells that had not come into contact with urban dust. Figure 3 depicts two examples of the histone modifications, namely Histone 3 lysine 27 dimethylation (H3K27me2) and Histone 3 lysine 4 dimethylation (H3K4me2). However, there were more than 10 other such histone modification changes that were caused by urban dust which

**Figure 1:** Different pollutants attack our skin on a daily basis. Exposure to UV exacerbates the harmful effect of pollution on skin, leading to skin damage, inflammatory reactions and skin ageing



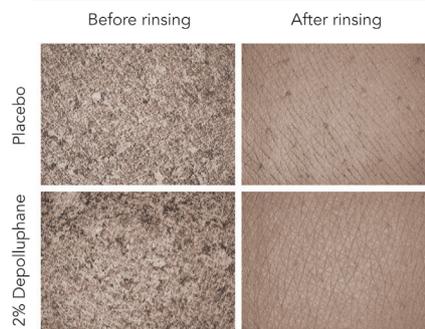
**Figure 2:** Our DNA is wrapped around proteins called histones. These histones can be chemically modified to epigenetically control gene expression, i.e. the genes are switched on or off



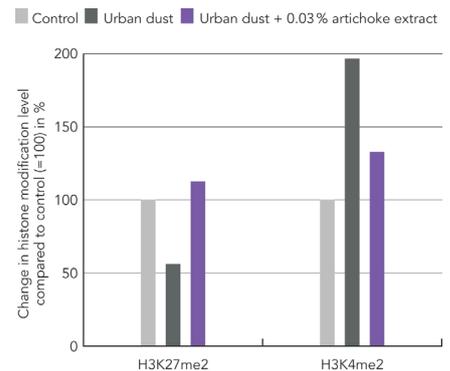
were all less pronounced when the artichoke extract was present. This demonstrates the protective effect of Depolluphane EpiPlus on skin cells against the long-term epigenetic changes caused by air pollution.

In a placebo-controlled clinical study, the polysaccharide complex prevented the adhesion of microparticles mimicking particulate matter and promoted a significantly more efficient removal of these microparticles (see Figure 4).

**Figure 4:** The smart polysaccharide complex prevents microparticle adhesion and facilitates their removal from the skin



**Figure 3:** Long-term exposure to urban dust changes the epigenetic histone modification signature of keratinocytes. Treatment with 0.03% artichoke extract prevented these epigenetic changes



This data shows that Depolluphane EpiPlus ensures complete protection from pollution – immediately and in the short and long term.

Depolluphane EpiPlus is available in South Africa from Carst & Walker, the approved South African agent for Mibelle Biochemistry. •

**Carst & Walker** - [www.carst.co.za](http://www.carst.co.za)  
**Mibelle Biochemistry** - [www.mibellebiochemistry.com](http://www.mibellebiochemistry.com)



## Depolluphane EpiPlus Triple action to fight urban pollution

- Prevents skin from epigenetic changes
- Shields skin against particulate matter
- Activates the skin's detoxification system

SWISS  
QUALITY  
PRODUCT

[www.mibellebiochemistry.com](http://www.mibellebiochemistry.com)