TO COMBAT OXIDATIVE STRESS AND POLLUTION

Ingredients | KeraGuard is a natural ingredient from Mibelle Biochemistry that offers proven protection from pollution for hair repair and protection from colour fading in leave-on and rinse-off products.

photos: Mibelle Biochemistry, Conrado (woman), Shutterstock.com

AUTHOR:
Beata Hurst, Head of Marketing, Mibelle Biochemistry, Buchs Switzerland
www.mibellebiochemistry.com

A woman's hair is the first and most noticeable part of her beauty, and it sets the tone for her entire look and feel. Beautiful and healthy hair enhances one's personality and radiates confidence, but the effects of daily oxidative stress factors resulting in hair damage are emerging as an increasing concern and growing trend in hair care.

Hair exposure to physical and chemical stress factors

Hair is constantly exposed to a variety of stress factors. There is physical stress, such as blow drying, and also environmental stress factors, such as ROS, UV radiation and pollution. In addition, there is chemical stress, which includes colouring and straightening. All of these different factors induce structural damage to the F-layer, the outermost protective layer of the hair, as well as to the hair fibre (see fig. 1). As a result, the hair becomes more porous, brittle, dull looking and is thus even more exposed to further damage.

A smart ingredient fusion counters hair damage

The antioxidant complex **KeraGuard** is a smart fusion of tara tannins and organic sunflower sprout extract that has been designed to counter all of these harmful effects. Tara tannins are extremely potent antioxidants and radical scavengers that naturally bind to the protein structure of the hair. In combination with the compounds in sunflower sprouts, they are capable of neutralising all of the negative daily effects on hair. In addition, the antioxidant complex helps to repair the hair and make it healthy and lustrous. In comprehensive ex-vivo studies, **KeraGuard** was shown to repair chemically treated hair and to protect hair against physical stresses. Furthermore, the ingredient was shown to protect dyed hair from colour fading as well as to reduce the damaging effect of heat on the hair cuticle scales.

How does pollution affect our hair?

The consequences of rising pollution levels are also significantly impacting both the short-term and long-term health of our hair. Air pollution is directly in contact with our hair and contributes to hair damage on a daily basis. The main sources of pollution are industrial combustion (diesel exhaust, fumes and coal), traffic and construction works. Air pollution consists of gases and very fine particles, which are called particulate matter (PM). In combination with exposure to UV light, PM causes oxidisation reactions (carbonylation) within the hair protein, which lead to the hair becoming damaged and more fragile. Therefore, carbonylation of the hair keratin can be used as a marker for oxidative damage caused by pollution and UV light.

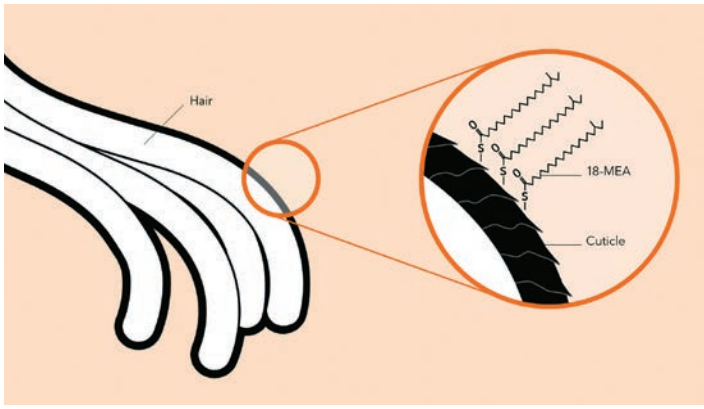

Fig. 1: Pollution damages the F-layer and the hair fibre

A fusion of **tara tannins** and organic **sunflower sprout extract** counters harmful pollution effects

AIR POLLUTION contributes towards **hair damage** on a **daily** basis

KeraGuard leads to **less particulate matter deposition** and hair surface damage

Testing the efficacy of the antioxidant complex

Strands of natural Caucasian hair were incubated for a period of one hour prior to stress application in 0.5% **KeraGuard** in H_2O, followed by rinsing, or 0.5% of the active

"THE ANTIOXIDANT COMPLEX NEUTRALISES THE NEGATIVE DAILY EFFECTS ON HAIR"

Beata Hurst, Head of Marketing, Mibelle Biochemistry

DOWNLOADS
Additional information at
www.cossma.com/qr00296
Your access codes for **June**:
User name: **cossma6**
Password: **hair**

ingredient without rinsing. H_2O served as a control (with and without stress). Pollution stress consisted of 15 minutes incubation with a particulate matter solution (Particulate Matter HAP from European Reference Material CZ100). Following this, the hair strands were irradiated with UV-A (LED, 365 nm) for 6 hours.

The following different analyses were performed:

1. Carbonylated proteins from the hair strands were labeled, extracted and quantified by high-resolution electrophoresis.
2. In situ labeling replaced carbonylated proteins on hair strands with specific red fluorescent probes. The hair images were then collected by epi-fluorescence microscopy.
3. Scanning electron microscopy of the hair strands was performed.

AIR POLLUTION is associated with **premature skin ageing** and, over the longer term, **damaging effects on hai**r

In treated strands, **carbonylated proteins** were significantly **reduced**

Results (see fig. 2) showed a significant reduction of carbonylated proteins in hair strands that were treated with 0.5% **KeraGuard**, even when rinsed off. This efficacy was confirmed by the in situ labeling of the carbonyls, which allows the visualisation of hair keratin oxidation: red-labeled damaged proteins were reduced in the presence of the active ingredient. In addition, the scanning electron microscopy images showed less particulate matter deposition and hair surface damage when using 0.5% of the ingredient, even when it was rinsed off.

Market potential

A 2016 report* from the **World Health Organisation** stated that 92% of the global population is affected by excessive air pollution. Besides the obvious damage to the respiratory tract, air pollution is also associated with skin problems, such as premature skin ageing, and over the longer term, its damaging effects on hair. Therefore, there is a huge potential for expansion for hair care products and ingredients that offer comprehensive protection from UV, free radicals and PM. **KeraGuard**, which is a natural ingredient that combines tara tannins derived from Caesalpinia spinosas pods and organic sunflower sprout extract, offers pollution protection and was also shown to repair damaged hair and protect hair from colour fading. Significantly, it performs effectively in leave-on and rinse-off formulations. □

*http://www.who.int/mediacentre/news/releases/2016/air-pollution-estimates/en/

Additional information can be found on the Internet – see download panel

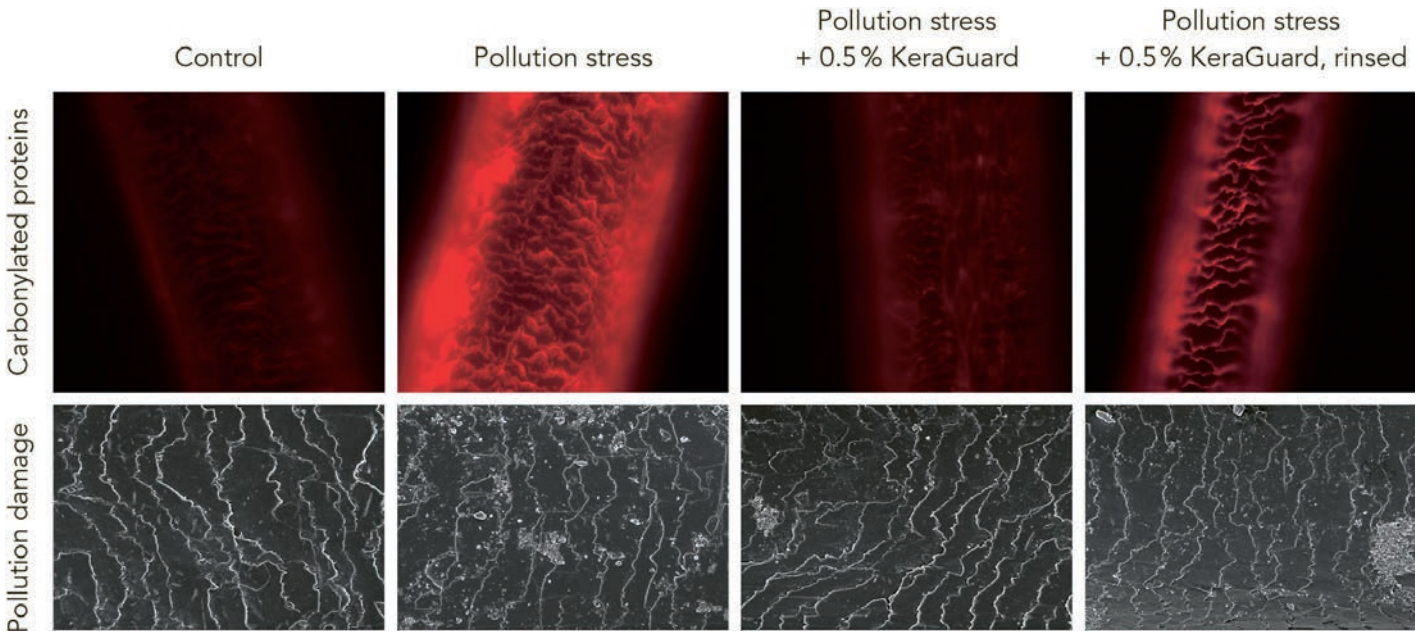

fig. 2: A reduction of carbonylated proteins in hair strands treated with KeraGuard