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Dark circles eraser for a fresh gaze

Fatigue, stress, overwork, UV exposure, heredity and skin ageing are all factors that can cause under-eye circles to emerge, dulling the appearance of the eye area. With Adipoless™, Seppic offers an alternative to these unsightly shadows by using the latest technological advances in cutaneous efficacy testing to bring to light the new anti-dark circle properties of this cosmetic ingredient, Quinoa extract.

The eye contour is a particularly fragile area that easily betrays signs of fatigue or ageing: circles form under the eyes and the vitality of this facial zone is diminished. Depending on skin type, ethnicity, age and lifestyle, under-eye circles can take on different visual characteristics. Three types have been identified and they sometimes even coexist.

Brown circles are the result of post-inflammatory hyperpigmentation (frequently seen in people with atopic or allergic skin conditions) or are caused by a genetic predisposition (especially common among people with dark skin or of Mediterranean origin). They may also form as a result of dermal deposits of melanic pigments, which may be congenital or appear due to the influence of multiple factors (sun exposure, ingestion of medicine, or drugs).

Hollow dark circles comprise a second category. These are closely linked to ageing as muscles migrate toward the bottom of the face, fat tissue disappears and skin becomes thinner overall. These changes—brought about by the skin's fragility and lack of elasticity – cause the formation of a 'depression' under the eyes, accentuating the appearance of dark circles.

Finally, 'blue' circles, which are universally present in the population, are caused by a microcirculation deficit. The eye contour is served by a dense network of capillaries that tends to stretch out as blood circulation slows and becomes permeable. On the one hand, the red blood cells stagnate in the blood vessels and are less oxygenated: the hemoglobin they contain takes on a purplish tint, accentuating the colour of dark circles. On the other hand, the red blood cells spread to the dermis, which amplifies this phenomenon. The thickness of the skin also influences the visibility of the underlying capillary network. The skin is three times thinner around the eye contour than over the rest of the face, which plays a role in the perception of dark circles. In particular, Adipoless targets this type of dark circle revealing beautifully revitalised eyes.

Quinoa extract

Adipoless (now referred to as 'the quinoa extract') is made with an extract from organically grown quinoa – that is, without herbicides, pesticides or fertilsers. Quinoa is an ultra-nourishing cereal that was commonly referred to as the 'mother of all grains' by the Incas. Some 5000 years ago, it was already the core component of their diet. Rich in bioavailable minerals (iron, magnesium, zinc, manganese), trace elements, vitamins, unsaturated fatty acids and especially in eight essential amino acids, Quinoa has cosmetic properties, notably visibly reducing dark circles, as Seppic has demonstrated.

A clinical study has shown that the quinoa extract helps reduce the appearance of 'blue' circles, thanks to a three-point strategy: protected vascular walls, limited development of the vascular network and preserved elastic properties of the dermis (mode of action proven by *in vitro* modelling).

Clinical effectiveness

The anti-dark circle activity of the quinoa extract was clinically proven, thanks to the *in vivo* imaging method TiVi600 (polarised light spectroscopy), that makes it possible to map the red blood cells found around the eye contour. While skin cells directly reflect polarised light, blood cells diffuse light in a specific manner. The TiVi index links the intensity of the red colour obtained on the photographs to the

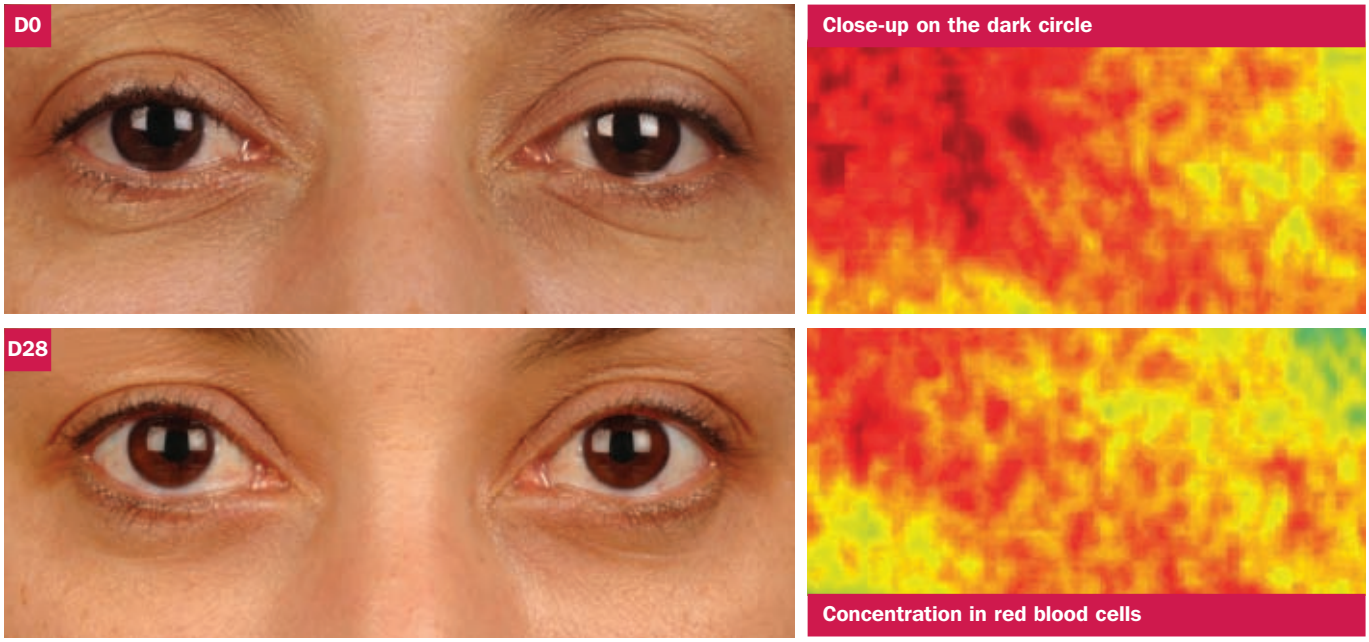

Figure 1: In vivo *evaluation of dark circle reduction (Tivi 600) by mapping red blood cells after 1 month of treatment.*

concentration of red blood cells in the eye contour (expression of results in arbitrary units).

A double-blind clinical trial was conducted by an independent-expert company for 28 days on a mixed panel of 40 volunteers versus a placebo, with a twice-daily application under both eyes.

The resulting images show that the red colour was reduced after only one month of treatment. This reflects a reduction in the quantity of stagnant red blood cells found both in the capillaries and dermis, which is the direct consequence of less permeable blood vessels. At a dosage of 2%, the quinoa extract visibly reduces the intensity of dark circles along the eye contour after just 28 days (Fig. 1).

On average, there was a significant decrease of 16 arbitrary units in red blood cell concentration as compared with the placebo (Fig. 2). The quinoa extract made it possible to diminish the colour of dark circles in 90% of the volunteers. Of these, 61% achieved a better than average result (17 a.u.). Dark circles are less blue and less pronounced while the eyes appear less affected by fatigue.

Blue circles tend to appear following the changes in the capillary walls, densification of the vascular network and the loss of elastic properties in the thin skin around the eye contour. The quinoa extract was studied on *in vitro* models to highlight its three targeted actions that help reduce the appearance and intensification of dark circles.

Vascular-protective effect

The eye contour area is sensitive to the free radicals generated by external aggressions, stress and fatigue. When confronted with oxidative stress, endothelial cells become fragile: mitochondrial activity slows down. The capillaries formed by these cells become permeable, particularly to red blood cells that migrate to the dermis, which leads to the formation of dark circles.

The effects of daily aggressions (fatigue, overworking, UV exposure, pollution) were modelled by applying oxidative stress (H_2O_2) to endothelial cells. The vascular-protective effect was evaluated using luminometric measurements taken of the ATP content in cells. Subject to H_2O_2, the HUVEC or endothelial cells showed a 70% decrease in intracellular ATP in stress conditions (Fig. 3). In the presence of these same stressed cells, the quinoa extract is capable of preserving 23% of the cells' energetic potential. This increase in intracellular ATP content reflects an improved level of activity in the mitochondria of these cells and, consequently, higher quality blood vessels.[1,2]

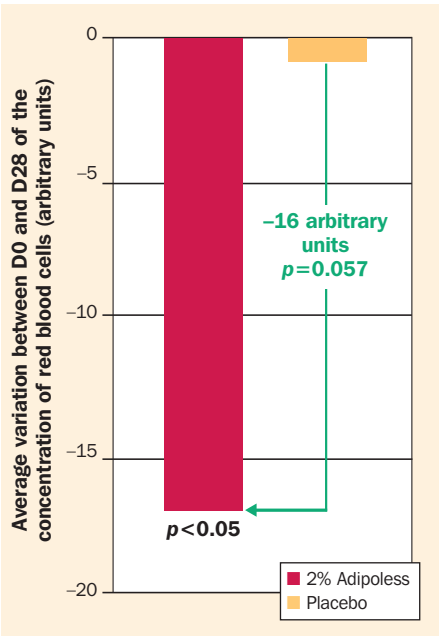

Figure 2: *Determination of the concentration of red blood cells in the hollows under the eyes after 1 month of treatment.*

More resistant to distending and therefore less subject to permeability, the capillaries are more likely to counter any slowdown in microcirculation. The red blood cells are less inclined to stagnate in the blood network and leak into the dermis. Due to this preventive action, environmental irritations, stress and fatigue have a lower impact on the formation of dark circles.

Controlled neovascularisation

Altered by the daily aggression of free radicals on the eye contour area, the capillaries lose their capacity to regulate deficient microcirculation. The lack of oxygen in the blood (hypoxia) is a factor that triggers the synthesis of pro-angiogenic mediators to compensate for the poor functioning of the existing vessels. As a result, the number of capillaries increases to form a more visible network in the hollowed area underneath the eyes and therefore must be limited.

The effectiveness of the quinoa extract on limiting neovascularisation was evaluated on HUVEC endothelial cells cultured on a biological matrix (Matrigel). Following microscopic observation, the formation of new tubular structures derived from a 3D culture model of capillary cells was quantified.

At 0.01%, the quinoa extract reduces

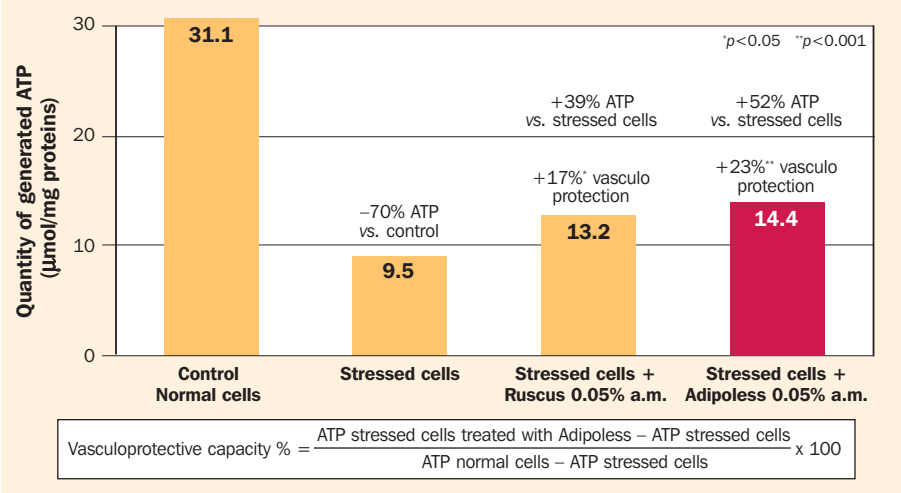

Figure 3: *Evaluation of vasculoprotective effect by measuring the ATP content of endothelial cells subjected to oxidative stress (H_2O_2) – stress modelling.*

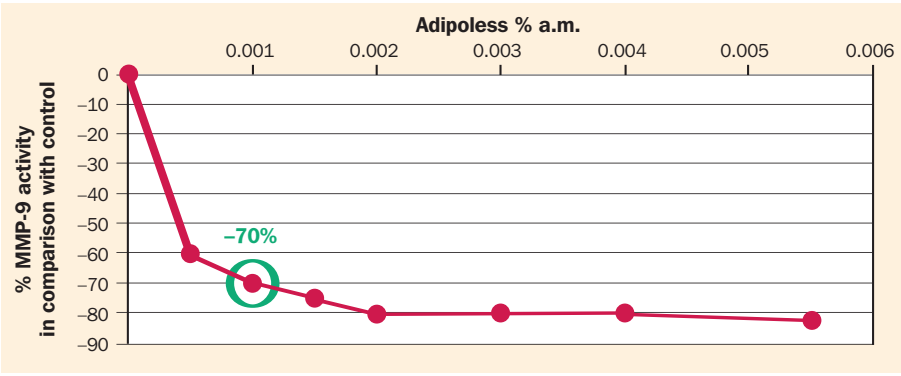

Figure 4: *Evaluation of the impact of Adipoless on the activity of metalloprotease-9.*

the formation of new blood vessels by 90%. This result is notably attributable to the reduction in the activity of metalloprotease-9 (enzyme involved in angiogenesis). A human MMP-9 was tested *in tubo* with a synthetic fluorescent substrate, in the presence or absence of the active ingredient, at concentrations of between 0.0005% and 0.0055%, at 37°C for 20 minutes. Starting at just 0.001% concentration of the quinoa extract, the activity of human MMP-9 decreases by 70% (Fig. 4).

By restricting neovascularisation, the density of the blood network is controlled: blood capillaries are less visible through the thin skin around the eye and the aggravation of dark circles is diminished.

Preservation of skin elasticity

With age, muscles and fatty tissue succumb to gravity and sag toward the bottom of the face. Skin loses its elasticity, stretches out and becomes thinner, particularly around the eye, which allows the underlying vascular network to show through. Furthermore, the dermis no longer fulfills its role of supporting the weakened capillary network, which accentuates the appearance of dark circles.

The capacity of the quinoa extract to protect dermal elastic fibres was evaluated on cryosections of human skin treated with elastase. The elastic fibres were coloured with a specific stain (Weigert) and then photographed through a microscope.

Starting at 0.05%, the quinoa extract limits the action of elastase and provides 79% protection of cutaneous elastic fibres.

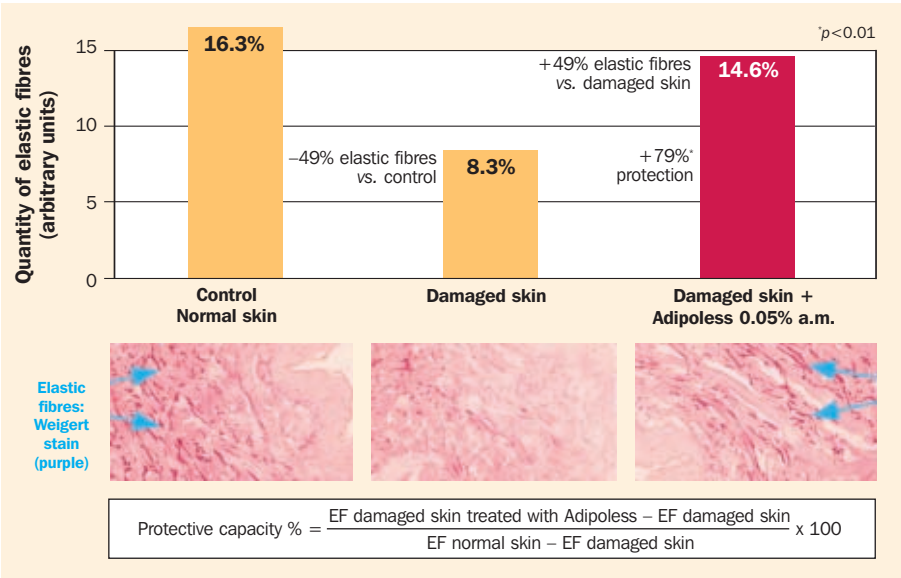

Figure 5: *Evaluation of the protective potential of Adipoless on cutaneous elastic fibres.*

Skin maintains its elastic potential and is less prone to distending, which limits the visibility of the dark circles (Fig. 5).

Conclusion

Organically grown quinoa extract, Adipoless works locally to effectively prevent and erase dark circles. In just 28 days at a dosage of 2%, this active ingredient visibly fades the dark areas, which affect the appearance of the eye contour.

A new mode of action provides a very precise explanation for the significant drop in the concentration of red blood cells observed *in vivo*. Adipoless protects capillaries in the eye contour area from stress, fatigue and environmental irritations by making them more resistant and less permeable to leak red blood cells. It limits the acceleration of the phenomenon by controlling the formation of new capillary structures in a way that reduces the intensity of their colour. Finally, it acts directly on the dermis to preserve its elasticity, which tends to decrease with age.

The application of a cosmetic product to the eye contour requires compliance with optimal safety standards, thus the dosage of the quinoa extract was verified. Easy to formulate, water soluble and colour free, Adipoless restores life to eyes that are troubled by dark circles. PC

References

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