

Active Beauty

Koffee'Up™

The upcycled coffee oil for well-ageing

Active Botanical Oil



Focus on the product

Coffee, a friend for your health and your skin

Known for centuries for its taste and stimulating qualities, the coffee has many beneficial properties for health: improved memory, concentration and mood. Energising and stimulating, coffee also contains antioxidants, which are good for the health and for the skin.

The antioxidants mainly found in coffee, the polyphenols, are very powerful and have the advantage of being very well assimilated by the body. They thus protect us from skin ageing (wrinkles, dryness, loss of firmness, appearance of spots, irritations, gray mine ...).*

In cosmetics, coffee extract is mainly used in body cares for its slimming properties, whereas the coffee ground is used for face scrubs. More famous for its flavor properties, coffee oil is the perfect ally for the skin as well! Its high concentration of palmitic and linoleic acids helps to quickly penetrate the skin layers. It supports the skin in its hydration role and strengthens the skin barrier against external aggressions. Rich in tocopherols as well, coffee oil is a great anti-ageing product!



Coffee oil: from coffee trash to upcycled beauty innovation

Consumers are more and more concerned about the planet and environment, and clean beauty is one of the biggest trend. But how brands can conciliate the increasing demand of natural products and natural resources protection? Using wasted products to create new ones is clearly one of the option. Thanks to a partnership with Kaffe Bueno, Givaudan Active Beauty shows its engagement in the safety of our planet, with a new beauty innovation: an active oil made by 100% of spent coffee ground!

Why coffee?

The spent coffee ground is one of the major by-product in the world, reaching 9 billion kilos per year! Considering as 99% as waste, and valueless, the spent coffee ground could even endanger the environment with the release of methane during the composting processes.

With such a potential, Givaudan Active Beauty featuring Kaffe Bueno has settle a process to use spent coffee ground, creating Koffee'Up™, a wonderful cosmetic product with many benefits for the skin!



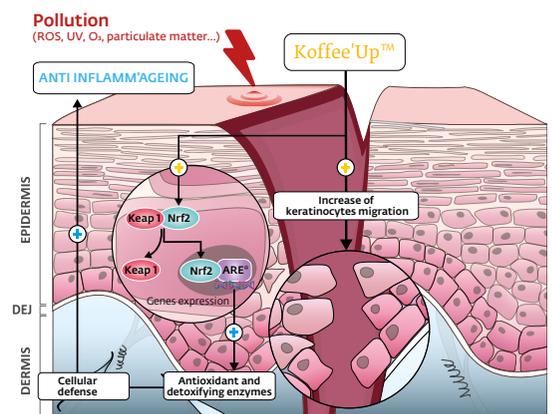
Koffee'Up™ is 100% natural, safe and friendly for the environment, using a supercritical CO₂ extraction process (no solvent), and low extraction temperatures to ensure the preservation of the whole spectrum of beneficial molecules. Koffee'Up™ is originating from 100% Arabica coffee grounds, fully traced back until farms it was grown.

Koffee'Up™, the new trendy ally for well-ageing

Koffee'Up™ is a unique combination of fatty acids with high levels of Palmitic and Linoleic Acid. This balance between saturated and unsaturated fatty acids helps the oil to quickly penetrate the skin layers.

It supports the skin in its hydration role and strengthens the skin barrier against external aggressions. It also contains Tocopherols, a natural antioxidants.

Koffee'Up™ is the first coffee oil with demonstrated results on skin repair, improvement of antioxidant defense by induction of Nrf2 and reduction of free radicals production.



*<https://www.sciencedirect.com/science/article/abs/pii/S0308814618319915>

Biological activity

Skin repair

The impact of Koffee'Up™ on keratinocytes migration using the skin repair method has been analysed.

Keratinocytes (25×10^3 cells/well) were seeded in a 96-well Essen ImageLock plate (Essen BioScience) and grown to confluence at 37°C in a humidified atmosphere of 5% CO₂.

After 24 h, a scratch was made using a 96-pin WoundMaker (Essen BioScience).

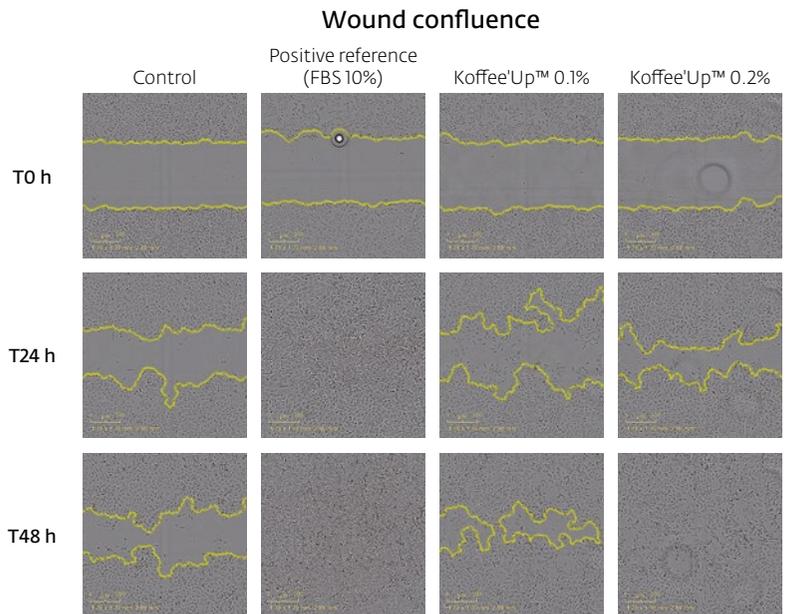
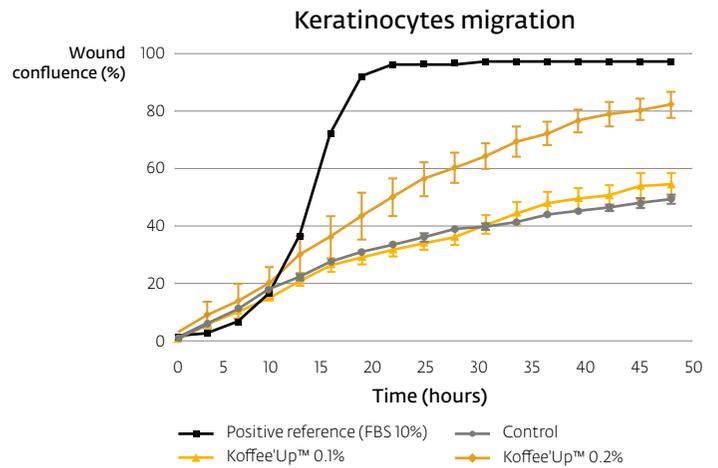
Wound images were taken every 3 h for 48 h and the data analysed by the integrated metric Relative Wound Density expressed in percentage.

Cells were treated with Koffee'Up™ at 0.1%, 0.2%, whereas the positive control was at 10% (FBS).

Illustrative pictures showing the level of wound confluence after T0h, T24h and T48h of incubation with Koffee'Up™.

Results: Koffee'Up™ at 0.2% demonstrated an activation of cell migration to reach 100% of wound confluence after 48h at 0.2%.

Koffee'Up™ induced an **increase of cell migration** as observed by the **reduction of wound confluence**, demonstrating **skin repair properties**.



Biological activity

Improvement of antioxidant defense by induction of Nrf2

The ability of Koffee'Up™ to activate the Nrf2 pathway (well-known to be responsible for the antioxidant cellular response), has been studied. A keratinocyte cell line containing the luciferase reporter gene under the control of the ARE promoter were used as a model. These keratinocytes express luciferase when Nrf2 is activated, enabling to detect ingredients triggering this detox/antioxidant pathway.

The cells were cultivated in 96-well plates at the concentration of 2×10^4 cells/well in a CO₂ incubator at 37°C. For induction of Nrf2 activation the cells were treated with increasing concentrations of the test substances for 6 h directly diluted in the culture medium.

As a positive control the cells were treated with the antioxidant Tert-butyl-hydroquinone (TBHQ). Then the cells were washed and lysed; and luciferase activity was measured.

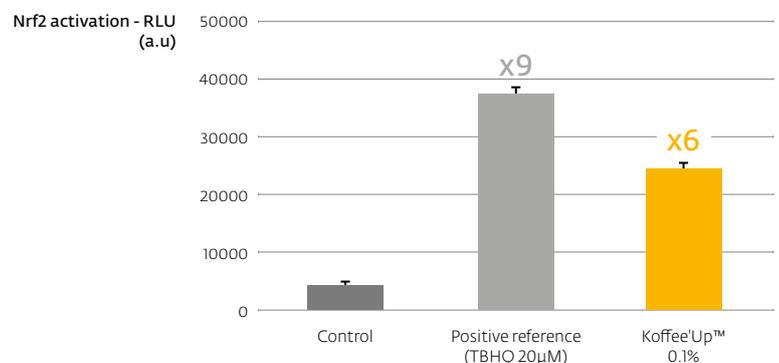
The experiments for each concentration of the test items were done in triplicate wells and data were normalised according to untreated control at 1.

Using this innovative model based on over-expression of reporter Nrf2 gene coupled to luciferase detection, we could correlate to a level of Nrf2 activation to a measurement of luciferase activity in RLU.

We observed that the incubated with TBHQ induced a drastic increase of Luciferase activity demonstrating the intense activation of Nrf2 pathway by 9 times in compared with untreated control.

Results: We observed an **activation of the Nrf2 pathway up to 6 times** with Koffee'Up™ at 0.1%.

Activation of the Nrf2 pathway



Biological activity

Reduction of ROS production

In order to demonstrate that the activation of the Nrf2 pathway is well correlated to an improvement of antioxidant defense, the intracellular reactive oxygen species production has been measured.

Tert-butyl-hydroperoxide has been used to induce oxidative stress as observed by the drastic increase of intracellular ROS accumulation with TBHP.

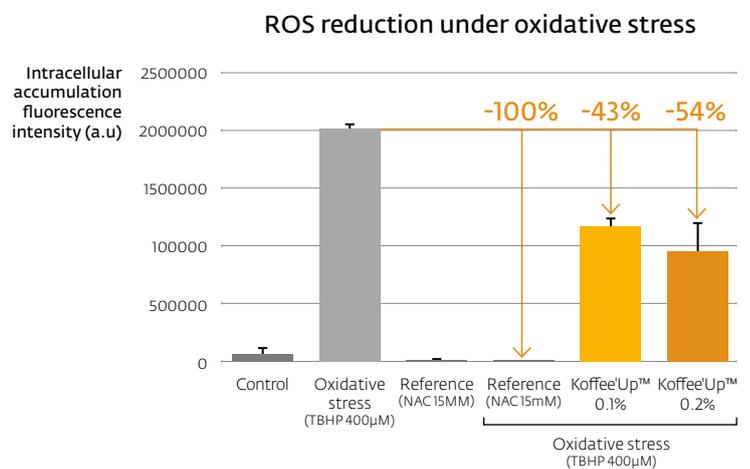
The intracellular accumulation of reactive oxygen species (ROS) is detected by fluorimetry using 2',7'-dihydrofluorescein-diacetate (DCFH-DA) probe. Keratinocytes (15×10^3 cells/well) were cultured in a 96-well black plate in DMEM supplemented with 10% serum; culture medium was renewed when the cells reached 80% confluence.

For inhibition, the cells were pre-incubated with the test substances diluted in culture medium for 30 min and oxidative stress is induced with Tert-butyl-hydroperoxide (TBHP). After 3 h the cells were incubated with $10 \mu\text{M}$ DCFH-DA in the culture medium at 37°C for 30 min. The acetate groups on DCFH-DA are removed by an intracellular esterase, trapping the probe inside the keratinocytes.

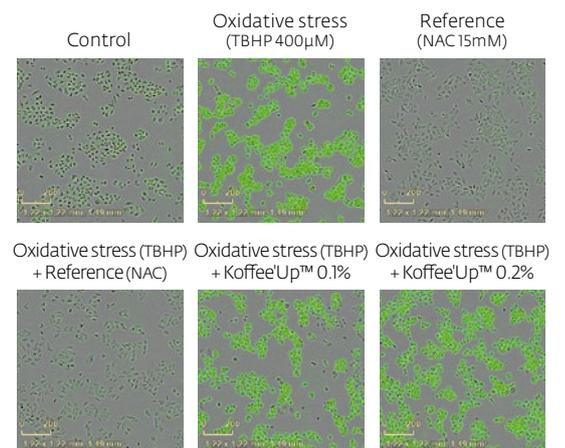
Cells were washed at 37°C and the production of ROS measured by changes in fluorescence due to the intracellular accumulation of DCF caused by the oxidation of DCFH.

Intracellular ROS, as indicated by DCF fluorescence was detected using the Incucyte FLR software; the data were analysed by the total green object integrated intensity (GCUx μm^2 xWell) of the imaging system IncuCyte HD (Essen BioScience). The data were expressed in percentage relative to untreated basal condition.

Results: Antioxidant property of Koffee'Up™ is observed by the reduction of intracellular ROS accumulation with a dose-dependent effect. Indeed, a relevant **reduction of ROS production** is observed by **-43%** and **-54%** with Koffee'Up™ at 0.1% and 0.2% respectively.



Illustrative pictures



Summary



Technical information

INCI:	Coffea Arabica (Coffee) Seed Oil
Origin:	CO ₂ extraction
Preservation:	Preservative free
Appearance:	Brown
Solubility:	Liposoluble
Dosage:	0.3%
Processing:	Temperature < 80°C <ul style="list-style-type: none">▶ Oily phase▶ Addition at the end of an emulsion▶ Stirring under high shear mixer or gentle stirring such as anchor

Claims

Claims: Antioxidant, moisturising, nourishing, premature ageing prevention, anti first-wrinkle, first wrinkle prevention, detox stimulation.

Applications: Skin care, body care, hair care, upcycled products, natural products, anti-ageing products.

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