

• SAFFRON •

COSMETICS

**NATRISSE
EXOSOME**

•

**NEXT
BEAUTY
EXPERIENCE**

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EXOSOMES IN COSMETICS

Intercellular communication is the future of advanced cosmetics for the beauty and well-being of the skin.

In this system of communication, exosomes perform a fundamental carrier function: **they transport and exchange information and bioactive molecules between the cells** of our body. They store the contents they carry to their destination and are able to penetrate even the deepest layers of the skin.

Valued for their antioxidant, anti-inflammatory and cell regeneration properties, they are mainly used in cosmetic treatments to attenuate and delay the processes of skin ageing.

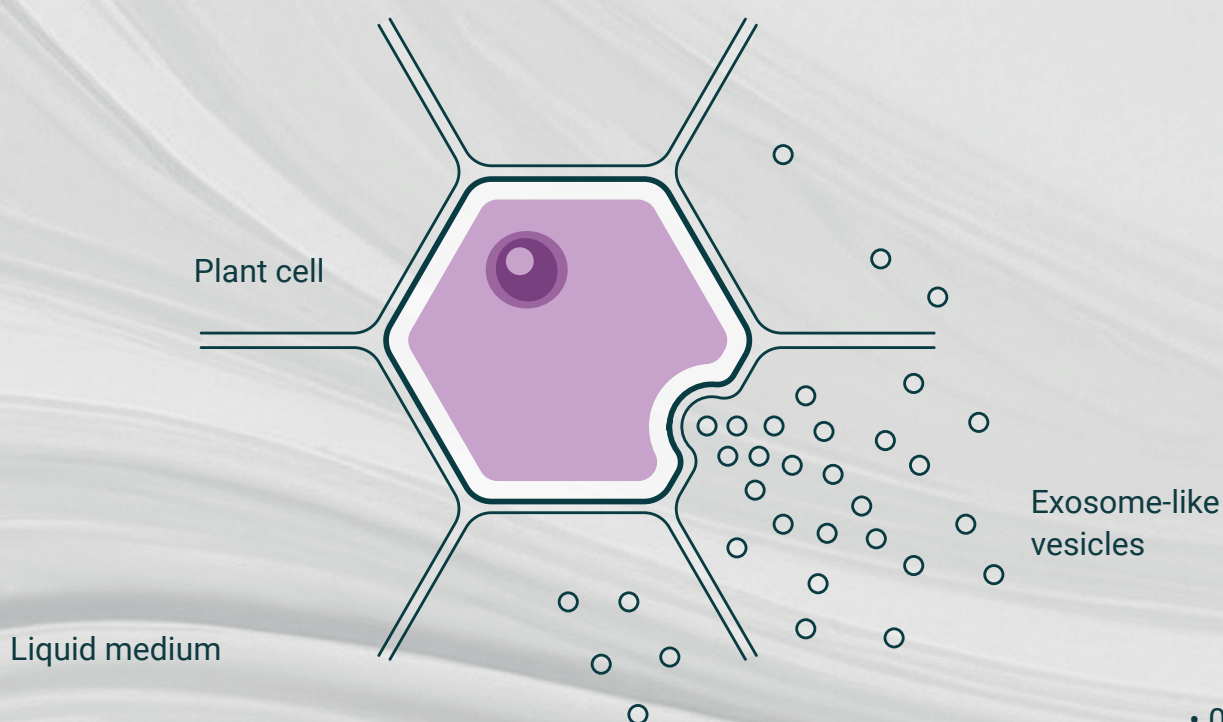
PLANT EXOSOMES FROM PLANT CELL SUSPENSION CULTURES

At ABResearch, we produce *exosome-like* plant extracellular vesicles (Plant Evs) for the cosmetics market, more commonly known as **plant exosomes, from plant cell suspension cultures**.

We use our **Natrise Exosome biotechnology, a production platform that preserves the integrity of plant exosomes**.

Natrise Exosome plant exosomes are the result of physiological processes occurring in the plant cells that we cultivate in liquid medium and which are released by the plant cells themselves in a completely natural way, with no external intervention.

We use neither animal products nor GMOs in our production process.



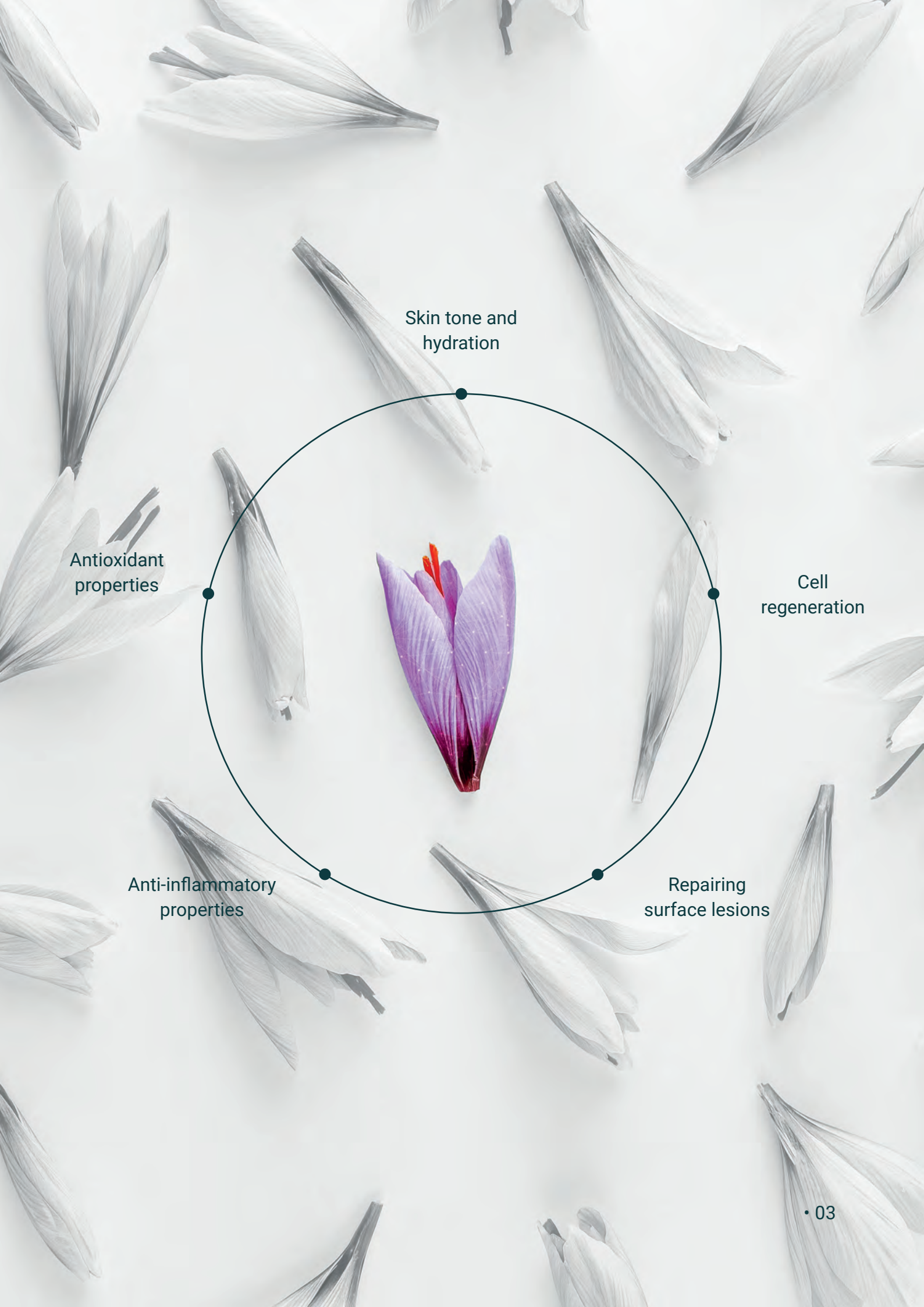
SAFFRON • *CROCUS SATIVUS*

The saffron plant is known in cosmetics as a natural **antioxidant**.

An ally of all skin types, even the most delicate, saffron is used in cosmetics - creams, serums and masks - formulated to improve the appearance of the skin and combat ageing.



- **It protects the skin against free radicals and oxidative stress** caused both by endogenous conditions, such as physiological ageing and psychophysical stress, and by environmental factors, such as pollution and UV damage.
- It promotes **firm and toned skin**.
- **It supports cell regeneration** and the natural skin barrier.
- It helps keep the **skin moisturised**.
- It has **anti-inflammatory properties**, helping to alleviate the irritation typical of inflamed skin.
- It accelerates the **repair processes of surface lesions**.



Skin tone and
hydration

Cell
regeneration

Repairing
surface lesions

Anti-inflammatory
properties

Antioxidant
properties

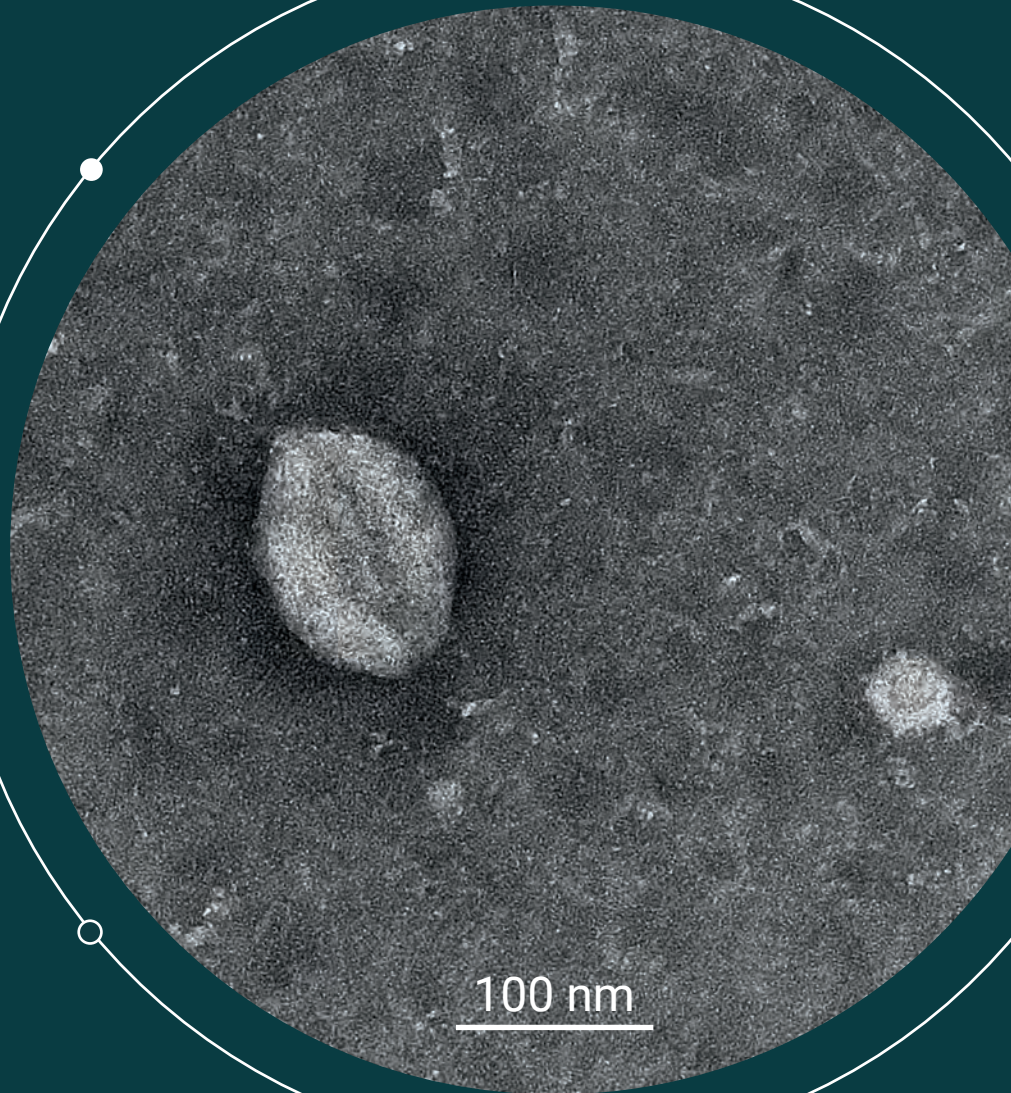
SAFFRON PLANT EXOSOMES FROM PLANT CELL SUSPENSION CULTURES

At ABResearch, we use our Natrise Exosome biotechnology to produce **plant exosomes from saffron suspension plant cell cultures**. Our saffron plant exosomes have **concentration standards of 1.50×10^{11} exosomes/litre and a size of between 50 and 160 nanometres**.

SIZE
50 - 160 nm

CONCENTRATION
 1.50×10^{11}

Viewing with a transmission
electron microscope



100 nm

RECOMMENDED USE

Our plant-derived saffron exosomes are valuable ingredients in cosmetic formulations that aim to support skin well-being by:

- providing **antioxidant action** against free radicals, oxidative stress, and physiological aging;
- supporting natural **cell regeneration**.

FUNCTIONAL TESTS

- Antioxidant power

- Protection against oxidative stress

- Cell regeneration

- Anti-inflammatory capacity

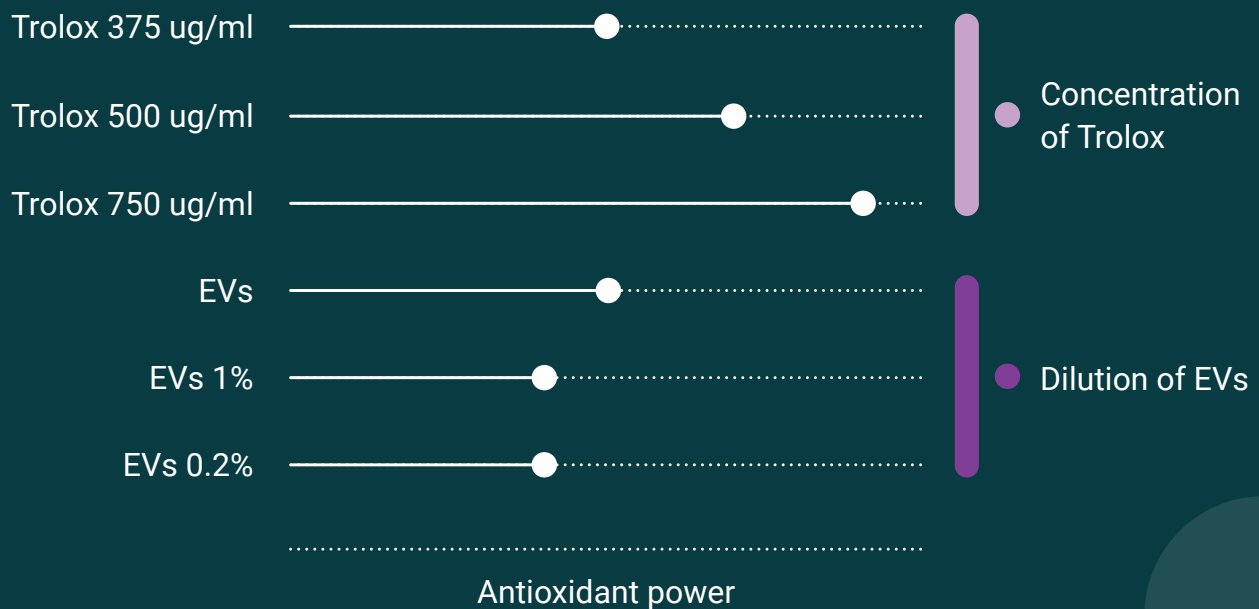
- Toxicity

ANTIOXIDANT POWER

We carried out *in-vitro* tests to assess the effective antioxidant power of our plant-derived saffron exosomes.

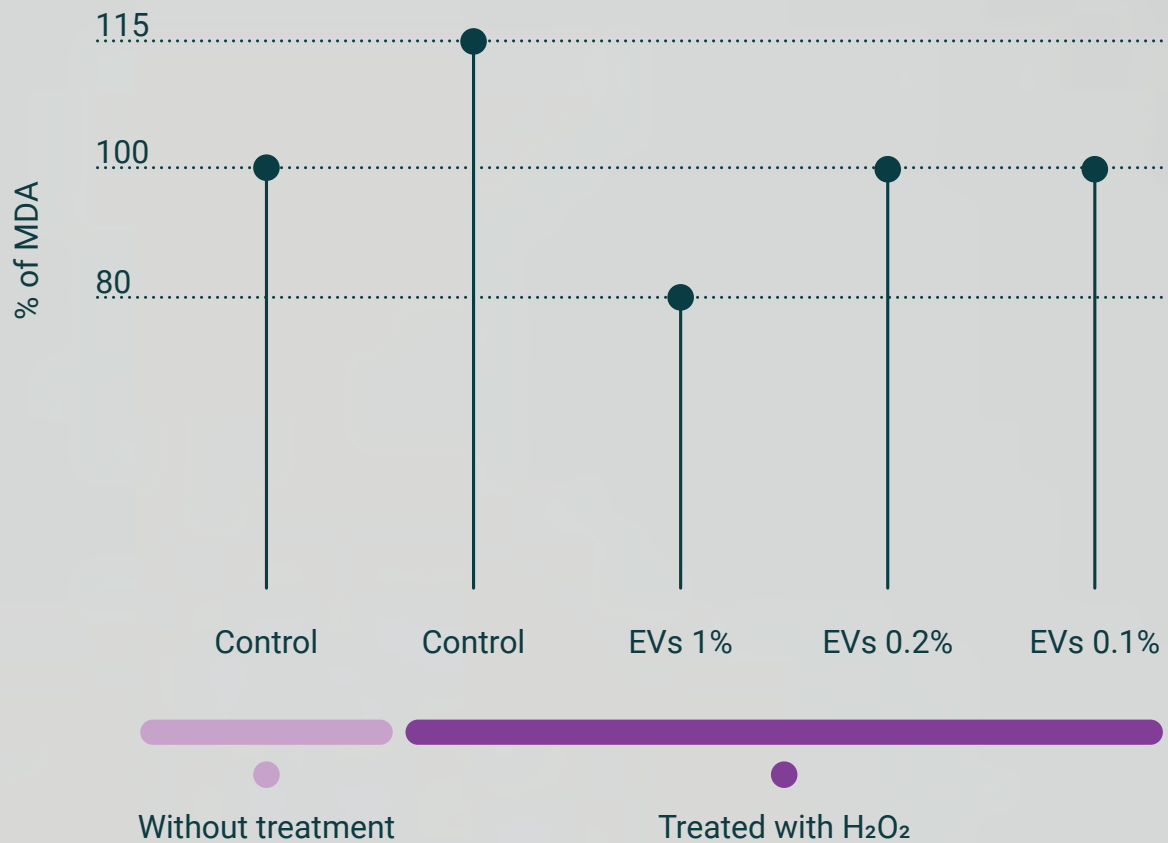
DPPH test

The comparison test with Trolox (Vitamin E) showed that **our plant-derived saffron exosomes exhibit a high antioxidant capacity** even when diluted to the final concentration of 1% or 0.2%.



MDA test

The test to assess the degree of lipid peroxidation was based on the measurement of malondialdehyde, the marker of oxidative stress in lipids. To induce oxidative stress, hydrogen peroxide was used. This test also confirmed that **our plant-derived saffron exosomes are able to protect cells from the action of free radicals.**

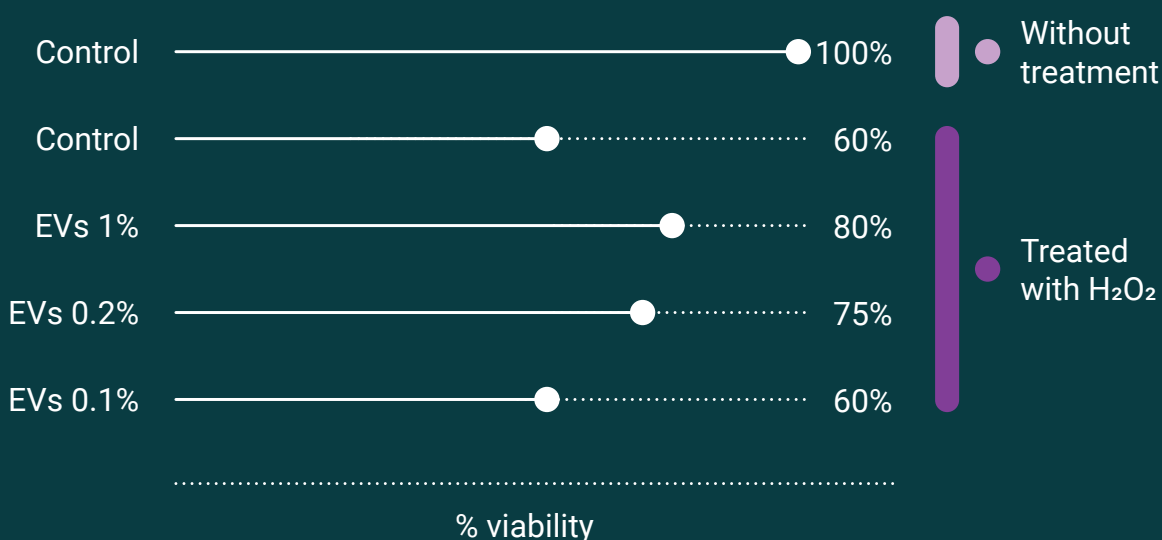


PROTECTION AGAINST OXIDATIVE STRESS

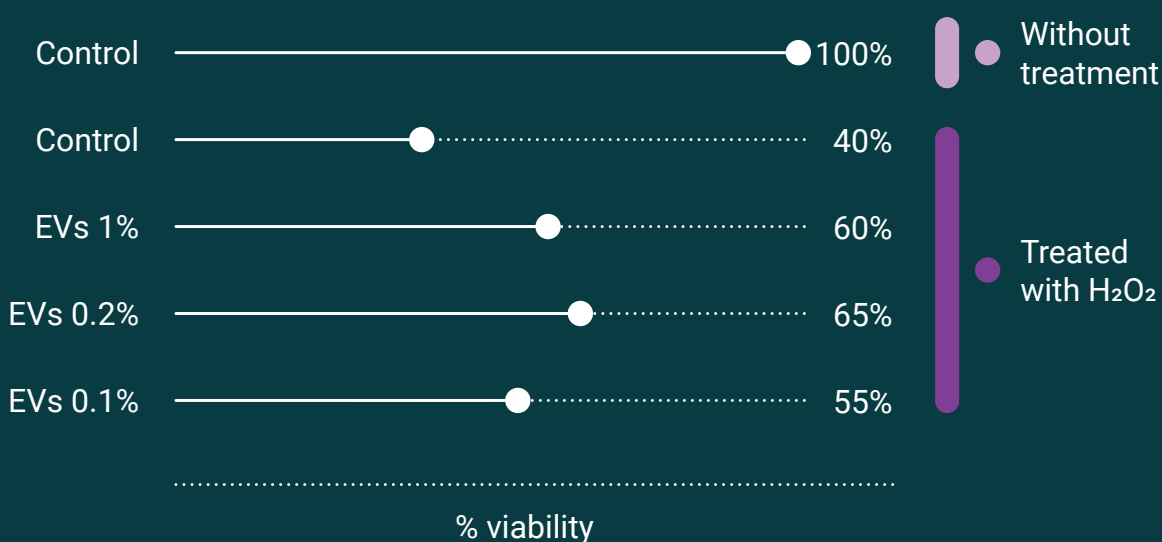
In-vitro tests on the survival of cells subjected to more or less intense and long-lasting oxidative stress were conducted to assess the ability of plant-derived saffron exosomes to protect cells. Also in this test, hydrogen peroxide was used to induce a condition of oxidative stress on the cells.

The result is that **our plant-derived saffron exosomes, both under acute oxidative stress (2-hour treatment) and prolonged stress (24-hour treatment), maintain high cell viability.**

MTT test (2 hours)



MTT test (24 hours)



CELL REGENERATION

Using the scratch test technique, we evaluated the ability of our plant-derived saffron exosomes to promote cell regeneration.

The test showed that our **plant-derived saffron exosomes enhance natural skin regeneration**. After 48 hours, the repopulated surface area was greater in the samples containing cells and exosomes than in the cell-only sample.

35%

Control

70%

EVs 1%

55%

EVs 0.2%

42%

EVs 0.1%

CUT

Microscope vision

**48 HOURS WITH
EXOSOMES 1%**

**48 HOURS
WITHOUT
EXOSOMES**

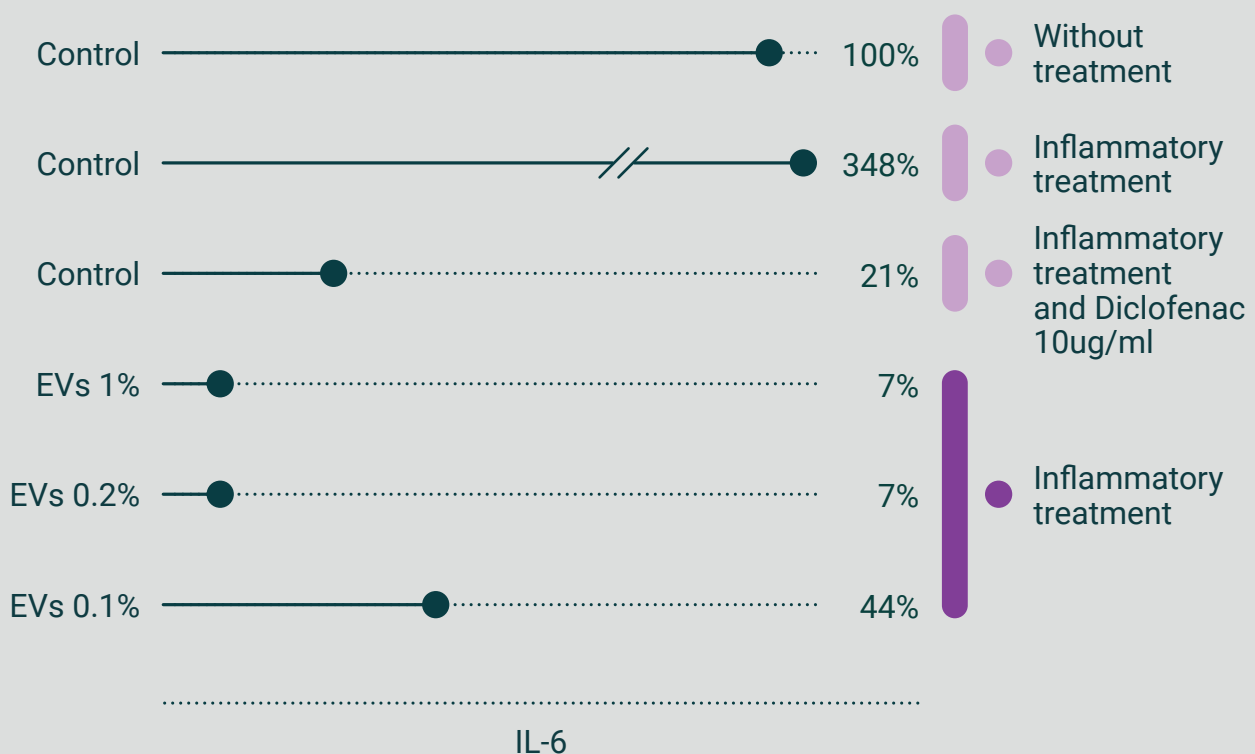
ABSENCE OF TOXICITY

We have conducted *in-vitro* tests that have confirmed that **our saffron plant exosomes are non-toxic**. The tests were carried out on a keratinocyte cell model and a fibroblast cell model. Our plant-derived saffron exosomes were considered at increasing dilutions of 1%, 0.2% and 0.1%.

ANTI-INFLAMMATORY CAPACITY

We have evaluated the anti-inflammatory capacity of our saffron plant exosomes using an *in vitro* assay that measures the concentration of the inflammatory cytokine interleukin-6 (IL-6). To induce inflammation, control cells and cells pre-treated with saffron exosomes were stimulated with an inflammatory cocktail.

The comparison test with Diclofenac highlighted the **high anti-inflammatory action of our saffron exosomes** diluted at 1% and 0.2%.



● Product

Plant-derived saffron exosomes (*Crocus sativus*)

● Product name

EVin CRO

● INCI name

Glycerol, with INCI name Glycerin; PBS, with INCI name phosphate buffered saline; Exosomes, with INCI name **Crocus Sativus Callus Extracellular Vesicles**

● Field of application

Ingredient for B2B cosmetic applications

● Suggested claims

Antioxidant action | Cell regeneration

● Size of exosomes

50 - 160 nanometres

● Concentration standards

1.50×10^{11} exosomes/litre

● Recommended usage level

0.2 - 1%

● Technology

NATRIS EXOSOME Platform (plant cell suspension cultures)



NATRISÉ[®] EXOSOME





ABResearch s.r.l.
Via dell'Impresa, 1
36040 Brendola (Vi), Italy
Tel. +39 0444 401569
info@abres.it
www.abres.it