

NANOVETORES

# NV GRAYLESS

Actives:

**Glycerin, hydrolyzed pea protein, Camellia sinensis leaf extract, Larix europaea wood extract, glycine, N-Acetyl Tyrosine and zinc.**

## Benefits:

- Anti-aging hair care;
- Natural repigmentation of hair strands;
- Prevents gray hair;
- Stimulates hair growth.

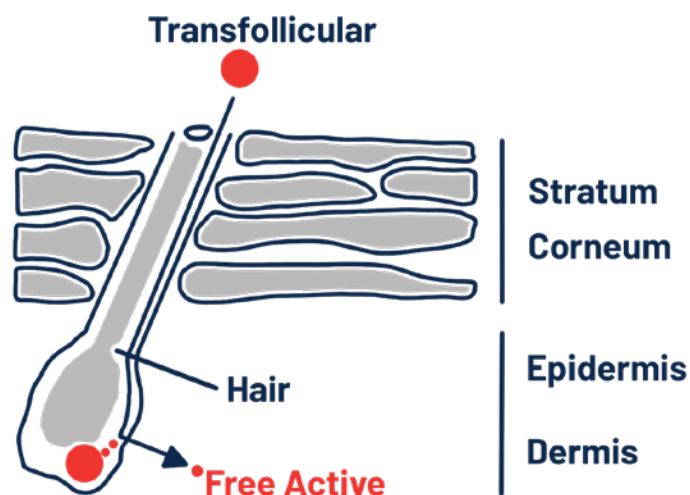
## Applications:

- Emulsions in general, shampoos and serums.



## DESCRIPTION

NV Grayless is a nanoparticle system composed of a blend of active ingredients that act in the production of hair follicle stem cells and melanin. The size of the biopolymer particles, around 300 nm, was carefully selected so that the permeation would effectively reach the targets of action (Figure 1). This active ingredient can be incorporated into cosmetic formulations with the purpose of reversing gray hair and preserving its natural color.



**Figure 1:** Nanoparticle permeation mechanism in the hair bulb. Adapted from DRAGICEVIC and MAIBACH (2015).<sup>1</sup>

## BLEND OF ACTIVE INGREDIENTS

### Glycerin

Glycerin is a triolcohol that can be found in vegetable oils of coconut, palm, soy and olive. The uses and benefits of glycerin are focused on moisturizing and emollient, lubricating properties.<sup>2</sup>

### Hydrolyzed pea protein

Pea protein, derived from the *Pisum sativum* plant, has an extraordinary amino acid profile, especially rich in lysine, a key amino acid in the synthesis of collagen and carnitine. Recently, several peptides and proteins have been developed to accelerate and facilitate the delivery of bioactive molecules to the skin, as hydrolyzed proteins rich in arginine have remarkable effects on permeation. Natural bioactive peptides when applied topically can contribute to reversing signs of aging and photodamage to the skin and hair. They play a significant role in anti-aging cosmetics, with remarkable skin redensification, increased synthesis of collagen and elastin, glycosaminoglycans, proteoglycan and fibronectin, noticeably improving healing processes.<sup>3,4,5</sup>

### *Larix europaea* wood extract

*Larix europaea* is a coniferous tree that grows to about 25-45 m in height and its trunk can reach up to 1 m in diameter. The species requires light and drier environments for its growth<sup>6</sup>. The benefits of this plant for cosmetics are quite relevant. European larch wood extract activates the division of hair follicle stem cells, which have an important function in initiating the anagen phase of hair growth. The extract also has in its composition dihydroquercetin-glucoside (DHQG), which acts by inducing the viability, proliferation and genetic expression of the fibroblasts located in the dermal papilla, which is an essential active ingredient for hair growth<sup>7,8</sup>.



## Camellia sinensis leaf extract

Camellia sinensis leaf extract is a source of bioactive flavonoids with potent antioxidant activity. It fights free radicals responsible for aging and protects against damage caused by exposure to UV radiation. It also has anti-inflammatory action, significantly improving skin microcirculation. It acts as an astringent, promoting cleanliness and balance for oily hair<sup>9,10</sup>. In addition, the extract contains epigallocatechin-3-gallate (EGCG), an important polyphenol that stimulates hair growth and reduces follicular cell death, acting on the dermal papilla cells that are the source to hair follicles.<sup>10,1</sup>



## Glycine

Glycine has great relevance for the cosmetics industry, due to its ability to help hair growth and the functioning of the nervous system, protecting the body from nervous disorders and promoting an anti-hair loss effect.<sup>12</sup>



## N-Acetyl Tyrosine

The compound N-Acetyl Tyrosine is a modified form of the amino acid tyrosine, in which an acetyl group is attached to the amino acid molecule, a modification that increases the solubility and stability of tyrosine, making it more bioavailable and easily absorbed by the body<sup>13</sup>. The compound acts as a precursor of tyrosine in the body, which plays a crucial role in the process of melanogenesis, which is the production of melanin, the pigment responsible for hair, skin and eye color.<sup>14, 15</sup>

## Zinc

Zinc is an essential mineral for the development and proper functioning of the body. This mineral participates in the cell renewal process, metabolizing vitamins and proteins that are essential for the health of the hair follicle, favoring the production of enzymes linked to growth of hair strands. In addition to these benefits, Zinc has anti-inflammatory action and influences the balance of sebum production in the sebaceous glands, providing health to the scalp and contributing to the prevention of hair diseases such as dandruff<sup>16</sup>.



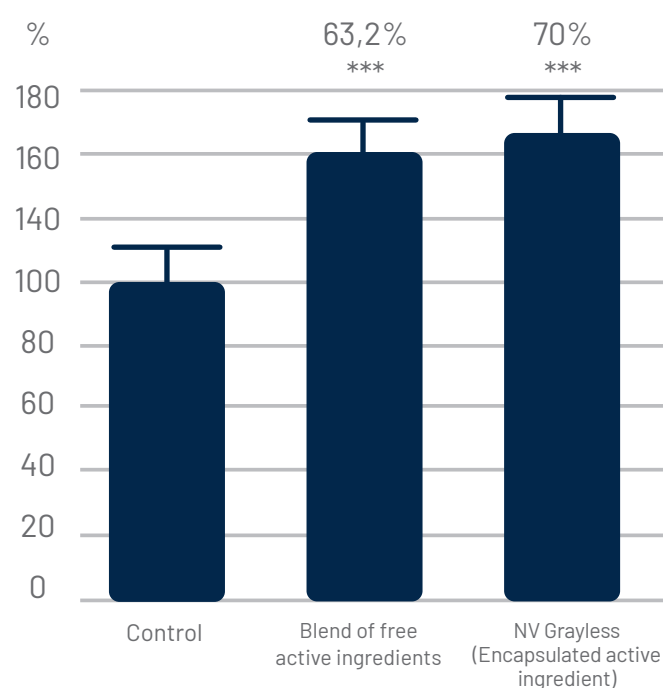


## In Vitro Study

# MELANIN PRODUCTION COMPARISON

The objective of the test was to evaluate the production of melanin granules by melanocyte cells, after exposing the samples with NV Grayless, blend of free active ingredients and positive control with melanocyte stimulating hormone. For this study, analyzes were performed at non-cytotoxic concentrations. For sample analysis, the control group was normalized to 100%. The sample of the blend of free active ingredients showed an increase of 63.2% while NV Grayless had an increase of 70.0% when compared to the control group. These results can be seen in Figure 2. Thus, it was possible to verify the increase in the production of melanin granules caused by NV Grayless, compared to the blend of free active ingredients, with an increase of 6.8% in melanin granules. Additionally, the samples were subjected to staining of the treated cells with the respective non-cytotoxic concentrations. Fontana-Masson staining highlights melanin granules within the cell. As shown in Figure 3, it is possible to observe that there was a significant increase in melanin granules when comparing the NV Grayless sample and the control group.

With the results obtained, it can be stated that the sample of NV Grayless presented better results compared to the sample of the blend of free active ingredients, in the increase of melanin granules, which is associated with the pigmentation potential of hair strands.



**Figure 2:** Quantitative chart of the results observed in the study, with the control group normalized to 100% for the respective non-cytotoxic concentrations of the evaluated samples (\*\*p<0.001).



**Figure 3:** Representative images of the indicated groups with Fontana-Masson staining to highlight the melanin granules.



## Clinical Study

# ASSESSMENT OF COSMETIC APPRECIABILITY AND DERMATOLOGICAL ACCEPTABILITY

**Objective:** Evaluate the dermatological safety of the Serum NV Grayless 5%, under normal conditions of use, by assessing dermatological skin acceptability; and evaluate the efficacy perceived by research participants (cosmetic appreciability).

**How to use:** Use the product twice a day, applying it directly to the scalp, in the gray area of the hair. Massage gently for better absorption. Do not rinse after using the product.

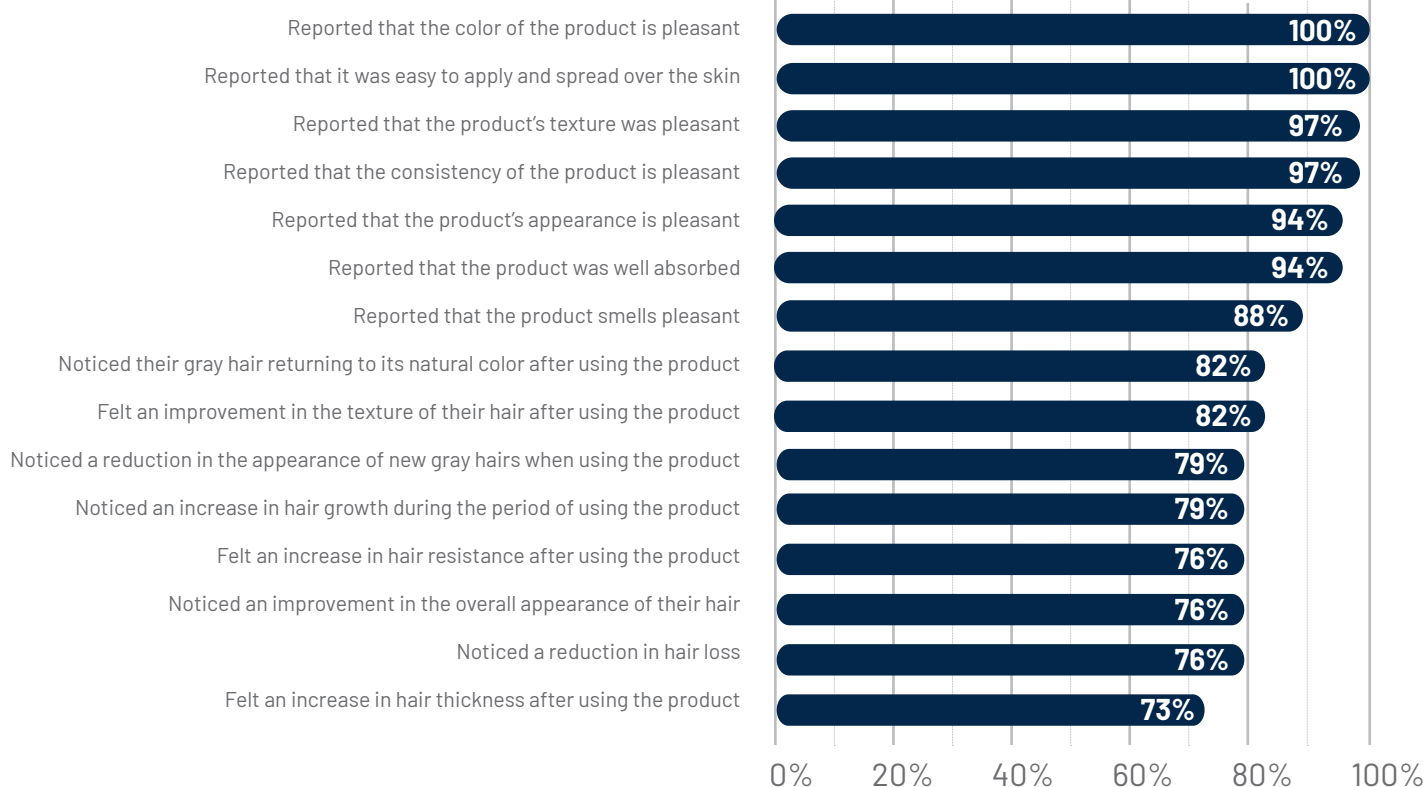
**Number of participants:** 33

**Methodology:** The investigational product was delivered to participants on the first day of the research to be used at home for  $60 \pm 2$  days according to the method of use informed by the Sponsor.

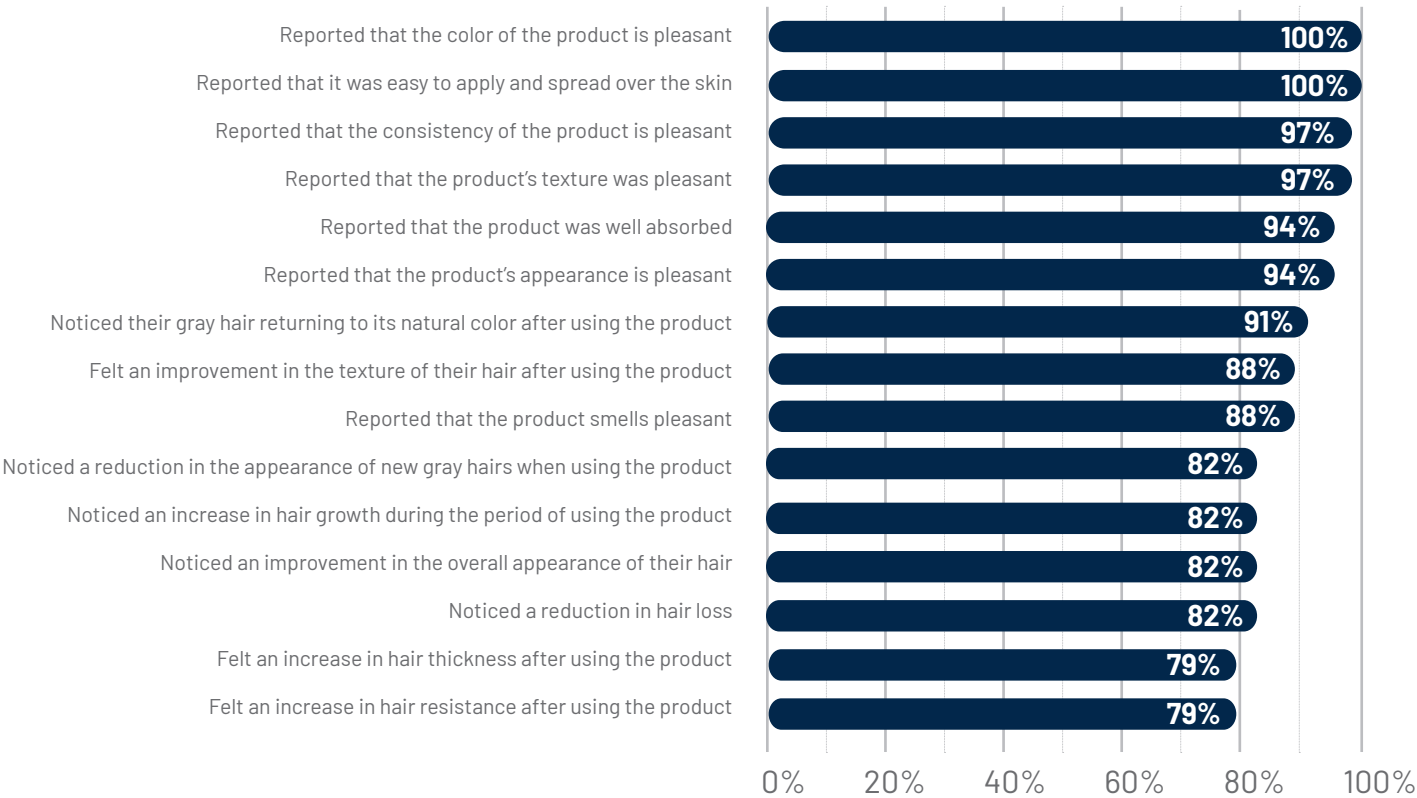
Participants were instructed to answer a questionnaire on D30 and D60 containing the questions and possible answers listed.

**Results:** None of the participants reported feelings of discomfort and clinical signs were not detected after  $60 \pm 2$  days of using the product.

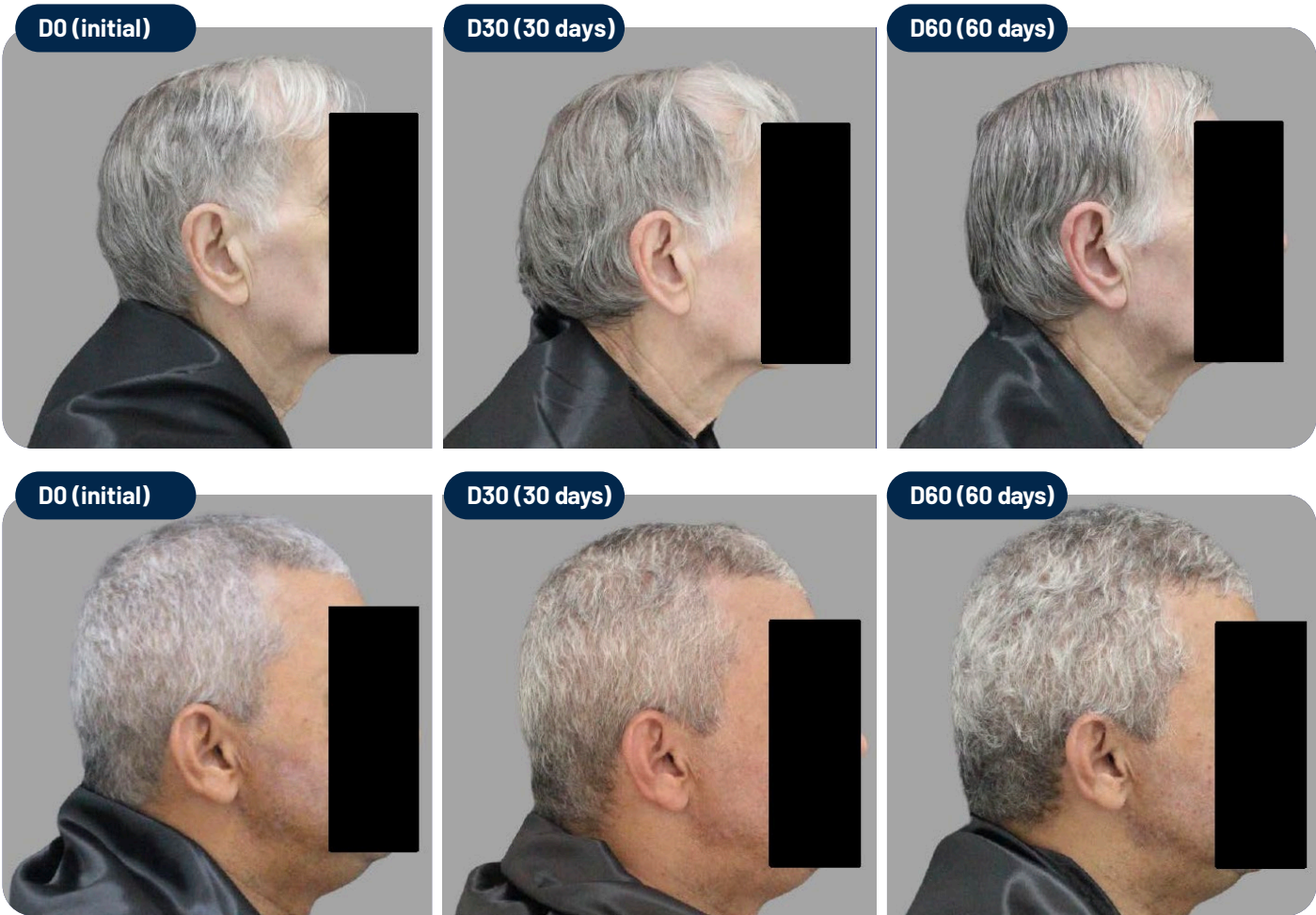
## Results after 30 days:

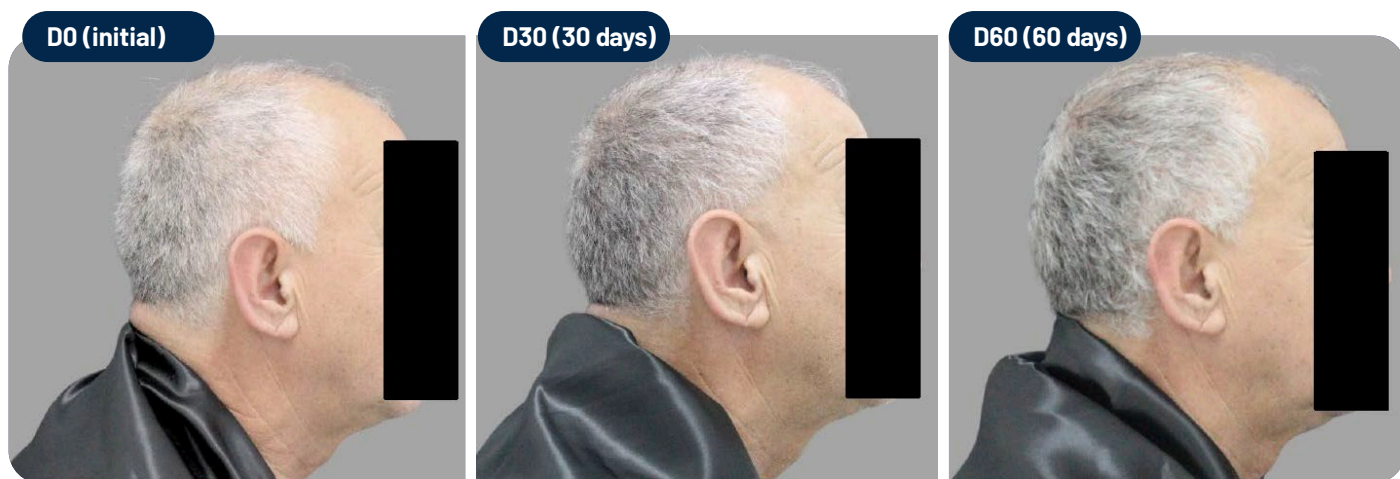


# Results after 60 days:



## IMAGES OBTAINED IN THE CLINICAL EFFICACY STUDY WITH PHOTOGRAPHIC EVALUATION





## REGULATORY INFORMATION

INCI Name	CAS Number	EINECS Number
AQUA	7732-18-5	231-791-2
GLYCERIN	56-81-5	200-289-5
PROPANEDIOL	504-63-2	207-997-3
ACETYL TYROSINE	537-55-3	208-671-3
POTASSIUM SORBATE	24634-61-5	246-376-1
SODIUM BENZOATE	532-32-1	208-534-8
HYDROLYZED PEA PROTEIN	222400-29-5	-
ALGIN	9005-38-3	-
LARIX EUROPAEA WOOD EXTRACT	91722-66-6	294-466-4
GLYCINE	56-40-6	200-272-2
SODIUM METABISULFITE	7681-57-4	231-673-0
CAMELLIA SINENSIS LEAF EXTRACT	84650-60-2	283-519-7
ZINC CHLORIDE	7646-85-7	231-592-0

<b>Appearance</b>	Slightly viscous liquid
<b>Color</b>	Light yellow to amber
<b>Odor</b>	Characteristic
<b>pH</b>	4.0 to 6.0
<b>Density 25°C (g/ml)</b>	0.9 to 1.1

**HOW TO USE:** Shake before use and add to formulation below 40°C

**USAGE CONCENTRATION:** 0.2% to 10%.

**COMPATIBILITIES:** Emulsions in general, shampoos and serums

**INCOMPATIBILITY:** Ethanol and other organic solvents

**pH DE STABILITY:** 4.0 – 8.0





Our production process is based on Green Chemistry, being water-based and free of organic solvents, totally sustainable. We do not generate waste that could be harmful to users or the environment



We do not test on animals. All tests are conducted in trustworthy laboratories with human volunteers.



Essential oils, Vitamins, Acids and Natural Extracts are highly oxidative substances that degrade quickly and react constantly with the medium and other cosmetic compounds (light, oxygen, packaging, preservatives, fragrances, surfactants, etc.). By encapsulating it, we guarantee the stability of the active ingredients and protect them from potential reactions with the formulation or the environment.

## References

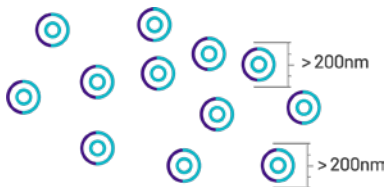
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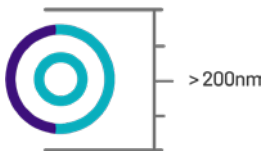
# Nanovetores Encapsulation Technology



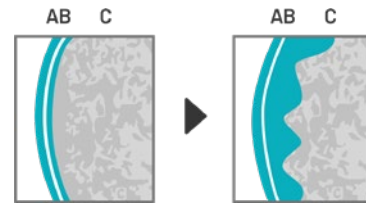
**Active Ingredient Protection** against oxidation resulted from interaction with external environment and other components of the cosmetic formulation.



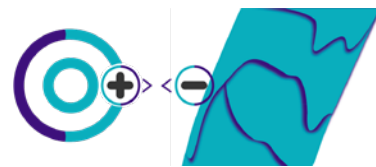
**Monodispersity**, that ensures control of the particle size, providing adequate permeation to its proposed action.



**Secure Particle** larger than 200nm, bio-compatible and biodegradable.



**Greater Permeation** on the contact surface due to the small size of the capsule.



**Surface Charge Control** of the particle, promoting greater affinity with the contact surface.



**Water Base**. Active ingredients are manufactured without the use of organic solvents, ensuring safety for users and the environment.

## Use Encapsulated Actives Ingredients and Ensure:

- Stability Improvement;
- Increased compability in the formulation;
- Occlusion of odors;
- Increased skin permeation;
- Reduced dose;
- Use of sensitive active ingredients (withou refrigeration);
- Increased Solubility;
- Prolonged release;
- Increased effectiveness.

# NANOVETORES

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