

NV CAFFEINE ECO

BODY &
FACE

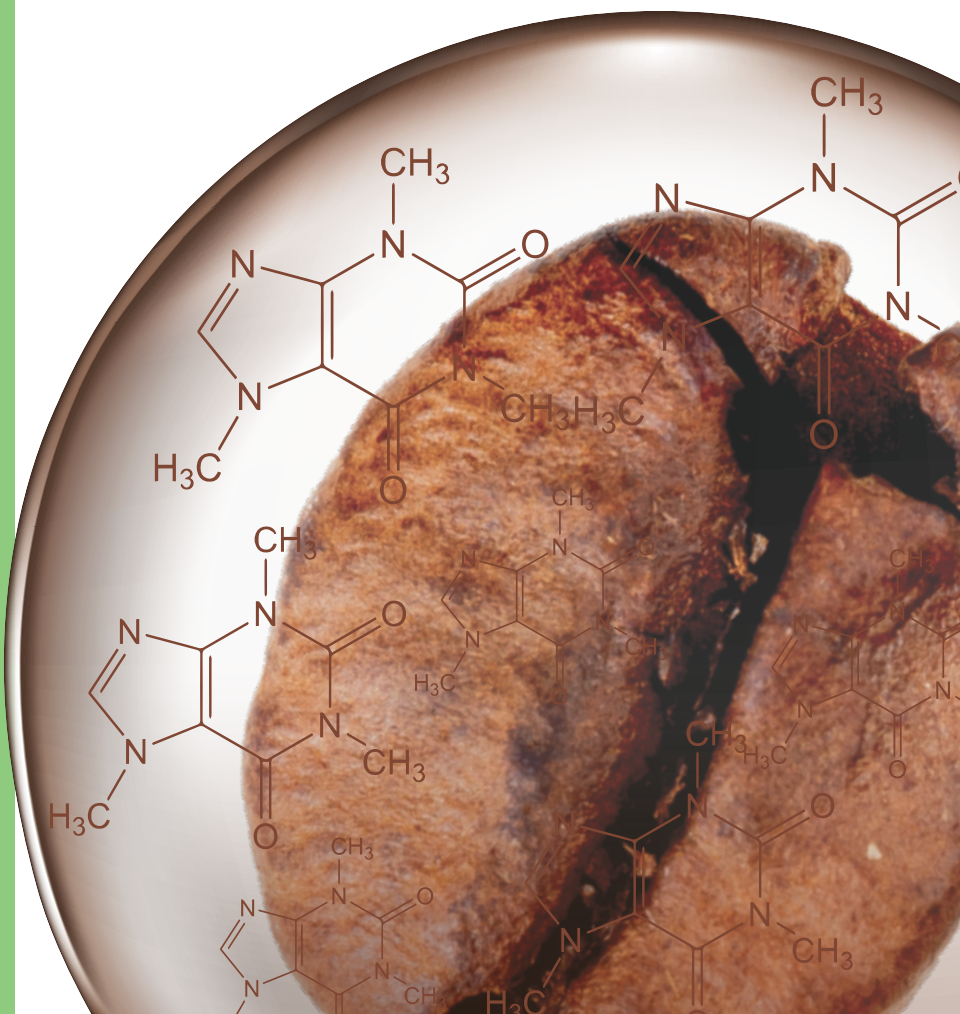
Active Ingredient: Caffeine

Benefits

- Improves skin appearance and firmness;
- Improves microcirculation;
- Reduces body measurements;
- Lypolitic action;
- Helps in reducing dark circles;
- Protects the skin from photoaging.

Application

Moisturizers, emulsions, serums
and sprays.



DESCRIPTION

NV Caffeine ECO is an active ingredient encapsulated in biopolymer particles with a diameter greater than 200nm. Because it is a hydrophilic substance, caffeine tends to precipitate depending on its vehicle and may form non redispersible agglomerates. Nanovetores' encapsulation technology allows the stabilization of sensitive components from being formulated on their free form, improving their incorporation into cosmetics, making them more effective. The continuous application of **NV Caffeine ECO** provides the activation of lipolysis with significant microcirculation and cellulite aspect improvement, and also improvement of hyperpigmentation and periorbital swelling (dark circles). Therefore, **NV Caffeine ECO** application versatility is an innovative tool for cosmetic formulations.

NV Caffeine ECO contains caffeine active (**Figure 1**), a potent measurements-reducing

agent. Which in addition to is lipolytic activity, it stands out for its ability to combat ultraviolet(UV) damage, and thus protects the skin from photoaging, improving strength, resilience and skin elasticity¹. With astringent action, caffeine promotes skin balance and improves blood microcirculation^{2,3}.

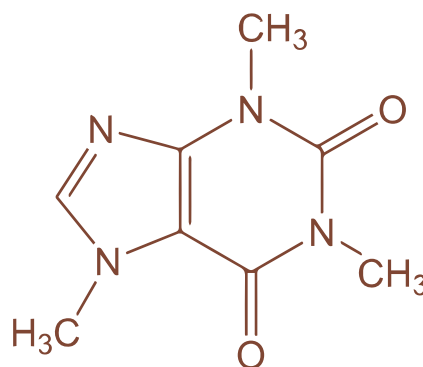
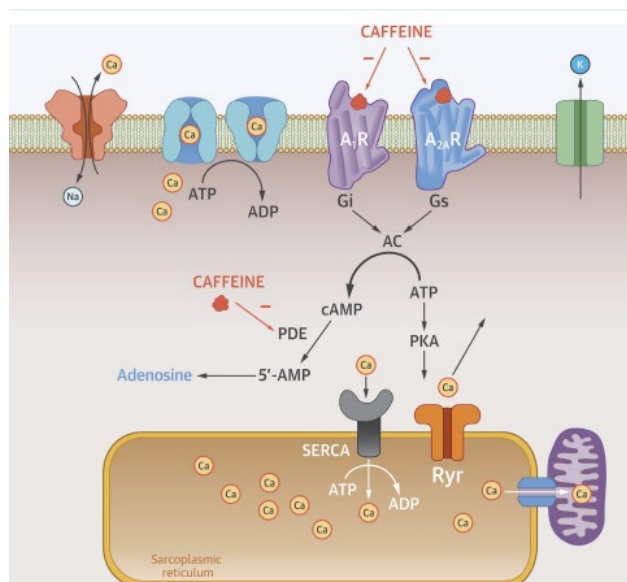
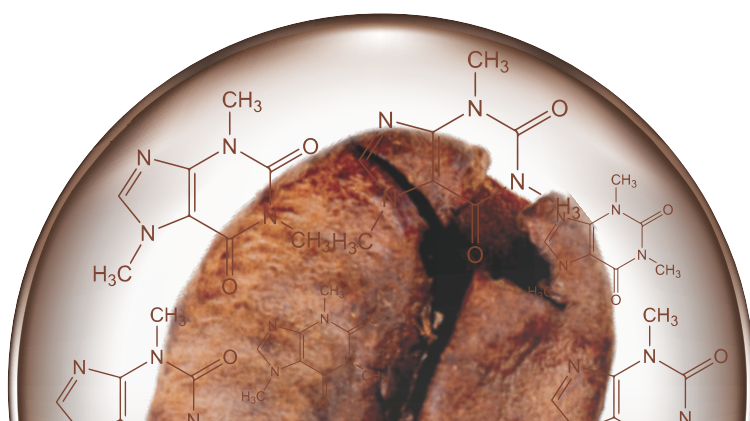


Figure 1: Caffeine chemical structure.
CAS: 58-08-2.

CAFFEINE

Caffeine, an alkaloid from the methylxanthines group, which occurs naturally in coffee, tea and chocolate, with relevant effects on various cellular biochemical processes (**Figure 2**). Some of these effects include: inhibition of phosphodiesterase and cAMP accumulation; reduction of the mutagenic effect of that induced by UV; antioxidant effects and influence on DNA repair. Studies also show the caffeine's protective booster effect in sunscreens, with spectral range between 244 and 295 nm, and increased chemical stability of the formula components⁴, being these mechanisms responsible for its skin protection against photoaging caused by UV induction⁵.



5'-AMP ¼ 5'-adenosine monophosphate; AC ¼ adenylyl cyclase; ADP ¼ adenosine diphosphate; AR ¼ adenosine receptor; ATP ¼ adenosine triphosphate; Ca²⁺ ¼ calcium; cAMP ¼ cyclic adenosine monophosphate; Gi ¼ inhibitory regulatory G-protein; Gs ¼ stimulative regulatory G-protein; PDE ¼ cyclic nucleotide phosphodiesterase; PKA ¼ protein kinase A; RyR ¼ Ryanodine receptor; SERCA ¼ sarcoendoplasmic reticulum calcium transport ATPase.

Figure 2: Caffeine effects at cellular level⁶.

Caffeine also stands out among the substances that are characterized for being agents that reduce lipogenesis and promote lipolysis. Gynoid lipodystrophy, commonly known as cellulite, is a multifactorial fatty tissue alteration perceived by the appearance of deformations in the skin similar to the "orange peel" aspect. This skin disfunction can occur in any body region, however, it is more frequent in the glutes, thighs and abdomens regions, affecting mainly the female population after puberty. Fibroblasts alteration, mainly caused by estrogen, creates structural modifications in the dermis glycosaminoglycans and in the perivascular connective tissue. This process causes water retention (edema), increases the interstitial matrix viscosity, produces cellular changes, and, consequently, compresses the vessels. Poor blood circulation leads to an alteration in glucose metabolism, which activates proline, increasing collagen production, resulting in tissue fibrosis^{8,9}.

Besides this, this process influences in the tissue's microcirculatory capacity by increasing capillary pressure, with blood flow reduction. As a consequence, the accumulation of toxins, microhemorrhages and edema is observed, which are classic characteristics observed in regions with cellulite⁷. Caffeine's lipolytic action is due to the mobilization of free fatty acids from tissues and intramuscular stores. It acts inhibiting the phosphodiesterase enzyme, in addition to antagonizing adenosine receptors, thus increasing levels of cyclic adenosine monophosphate. (cAMP), promoting lipolysis and, consequently, reducing measurements. Synergistically, the blood microcirculation activation reduces local swelling, and promotes toxins elimination^{8,9,10}. As a result, it is observed skin texture improvement, reducing the visible ripples of cellulite.

In the eyes region, the eyelids skin is very thin, and it is a region abundantly irrigated by blood vessels. Being the dark and swollen appearance of the periorbital region a common complaint among people, which is triggered by several factors, such as: caused by excess deposition of melanin and toxins, shadow effects, increase in vascularity and structural change related to age and hereditary characteristics. Caffeine has a vasoconstrictor action and is rich in antioxidants which help combat inflammation and remove toxins. These activities promote the appearance

reduction of bags and whitening of the eyes region¹¹. Another beneficial caffeine activity is the fibroblasts stimulation by the increase in collagen synthesis and other components of the extracellular matrix, causing skin firmness increase¹.

This way, NV Caffeine ECO is a versatile and high-performance option, with greater stability and more effective permeation, and acts in the aging process by stimulating cell regeneration, activates blood circulation, reduces swelling, improves dark circles appearance and has a potent action in combating cellulite and localized fat.



NV CAFFEINE ECO

Regulatory Information

INCI Name	Cas Number	EINCS Number
AQUA	7732-18-5	231-791-2
CAFFEINE	58-08-2	200-362-1
SODIUM BENZOATE	532-32-1	208-534-8
ALGIN	9005-38-3	-
POTASSIUM SORBATE	24634-61-5	246-376-1
CITRIC ACID	77-92-9	201-069-1
CALCIUM CITRATE	813-94-5/5785-44-4	212-391-7

Physical-Chemical Information

Aspect	Clear liquid
Color	Colorless to light yellow
Odor	Characteristic
Dispersibility	Dispersion of encapsulated actives in water
Relative Density	0,9 to 1,1 g/mL
pH	4,0 to 7,0

Usage mode

Agitate before using, add to the formulation bellow 40°C.

Usage concentration

2 to 10%.

Stability pH

4,0 to 8,0.

Storage

Keep in a well-ventilated place, away from light and heat.

Incompatibility

Organic solvents.

Compatibility

Moisturizers, emulsions, serums and sprays.





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.

Bibliographic references

1. RODRIGUES; et. al. **Permeation of topically applied caffeine from a food by-product in cosmetic formulations: Is nanoscale in vitro approach an option?** International Journal of Pharmaceutics, 513, 496-503, 2016.
2. LUPI, O.; et al. **Evaluation of the effects of caffeine in the microcirculation and edema on thighs and buttocks using the orthogonal polarization spectral imaging and clinical parameters.** Journal of Cosmetic Dermatology, v. 6, n. 2, p. 102-107, 2007.
3. LUO, L.; et al. **Topical and transdermal delivery of caffeine.** International Journal of Pharmaceutics. 490, 155-16, 2015.
4. Rosado et al. **Another Reason for Using Caffeine in Dermocosmetics: Sunscreen Adjuvant.** Front. Physiol. 10, 519, 2019.
5. Huang, M.T., et al. **Effects of Tea, Decaffeinated Tea, and Caffeine on UVB Light-induced Complete Carcinogenesis in SKH-1 Mice: Demonstration of Caffeine as a Biologically Important Constituent of Tea.** Cancer Research. 57,2623-2629, July 1, 1997.
6. Voskoboinik, A. et al. **Caffeine and Arrhythmias Time to Grind the Data.** J Am Coll Cardiol EP. 2018;4(4):425-32.
7. Lupi, O. et al. **Evaluation of the effects of caffeine in the microcirculation and edema on thighs and buttocks using the orthogonal polarization spectral imaging and clinical parameters.** Journal of Cosmetic Dermatology, 6, 102-107, 2007.
8. RAWLINGS, A.V. **Cellulite and its treatment.** Int J Cosmet Sci; 28 (3): 175-190, 2006.
9. HEXSEL, D.; ORLANDI, C., ZECHMEISTER DO PRADO, D. **Botanical extracts used in the treatment of cellulite.** Dermatologic Surg; 31(7 Pt 2): 866-872, 2005.
10. TERRA, R. S.; MININ, M. M.; CHORILLI, M. **Desenvolvimento e avaliação da estabilidade físicoquímica de formulação anticelulítica acrescida de lipossomas contendo sinefrina e cafeína.** Rev Bras Farm., v. 90, n. 4, p. 303-308, 2009.
11. FRIEDMANN, et al. **Dark Circles Etiology and Management Options.** Clin Plastic Surg. 42, 33-50, 2015.

Nanovetores Encapsulation Technology



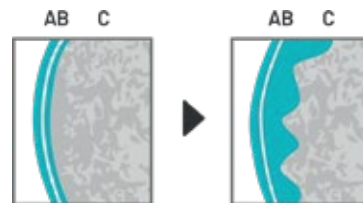
Active Ingredient Protection against oxidation resulted from interaction with external environment and other components of the cosmetic formulation.



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



Secure particles 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 Active Ingredients and Ensure:

- Stability Improvement
- Increased compability in the formulation
- Occlusion of odors
- Increased skin permeation
- Reduced dose
- Use of sensitive active ingredients (without refrigeration)
- Increased Solubility
- Prolonged release
- Increased effectiveness



Nanovetores Tecnologia S.A.

Sapiens Parque - InovaLab. Av. Luiz Boiteux Piazza, 1302
Cachoeira do Bom Jesus, Florianópolis - SC, 88056-000

Tel.: +55 (48) 3205-6262 | Cel.: +55 (48) 99664-0099
contato@nanovetores.com.br | nanovetores.com.br



Nanovetores.group



Nanovetores



Nanovetores



Nanovetores.group