



TINS

We Believe in Green Chemistry

**NATURAL CAPSULES TO ENCAPSULATE
FRAGRANCES, NUTRIENTS AND BACTERIA**

WHY ENCAPSULATE ACTIVES?

Fragrances and essential oils are volatile compounds with characteristic scent and relevant properties that leave a mark wherever they are applied. **However, these actives are sensitive to UV radiation and high temperatures,** for example. Thus, to ensure the effectiveness of fragrances and essential oils, TNS offers capsules that protect these active compounds.

WHY ENCAPSULATE ACTIVES?

When it comes to the protection of actives that are essential to the formulation of premium cosmetics, we are also aligned with the **nutricosmetics** trend. Most actives, such as vitamins, methylxanthines, and other supplements are unstable in the presence of UV radiation, heat, wide pH range, or insoluble in their final matrix. So, **protecting them from these physical and chemical factors by using TNS capsules is an excellent option to extend the useful life of actives**, offering protection in terms of storage, extended release, and efficacy and producing better results for consumers.



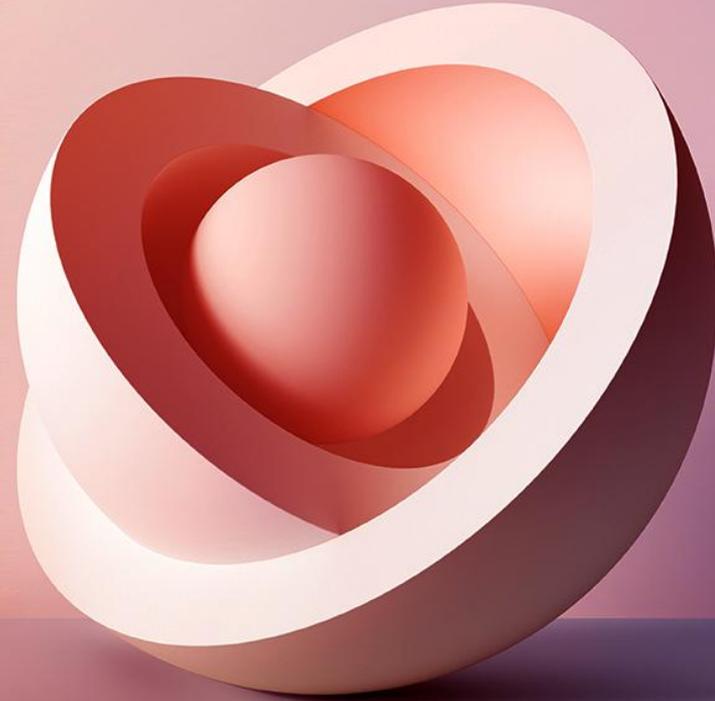
And last but not least, there is a new and challenging trend in the market, which is **the use of bacteria (stable and viable) in the formulation of biocosmetics.**

Bacteria are known to have **beneficial effects** on our daily lives and can already be found on food technology applications (probiotics, for example).

Like some nutrients and essential oils, **bacteria are susceptible to the effects of UV radiation, wide temperature and pH ranges, and potential interactions with other components of the formula.**

Given its wide range of applications in products, TNS capsules are an attractive option. This technology protects bacteria, and its addition to formulations is a strategy to ensure the stability and quality of bacteria and also the use of specific triggers necessary for the final application.

This way, the encapsulation process **protects the compound against external environmental factors, while promoting the extended release of the material,** prolonging consumer well-being.



WHAT ARE THE BENEFITS OF THE ENCAPSULATION OF ACTIVES?



1. Insertion of oily materials in aqueous medium

The encapsulation of oily substances, such as fragrances or essential oils, and even some nutrients, in hydrophilic matrices enables the application of these actives in aqueous formulations, **ensuring their chemical stability.**

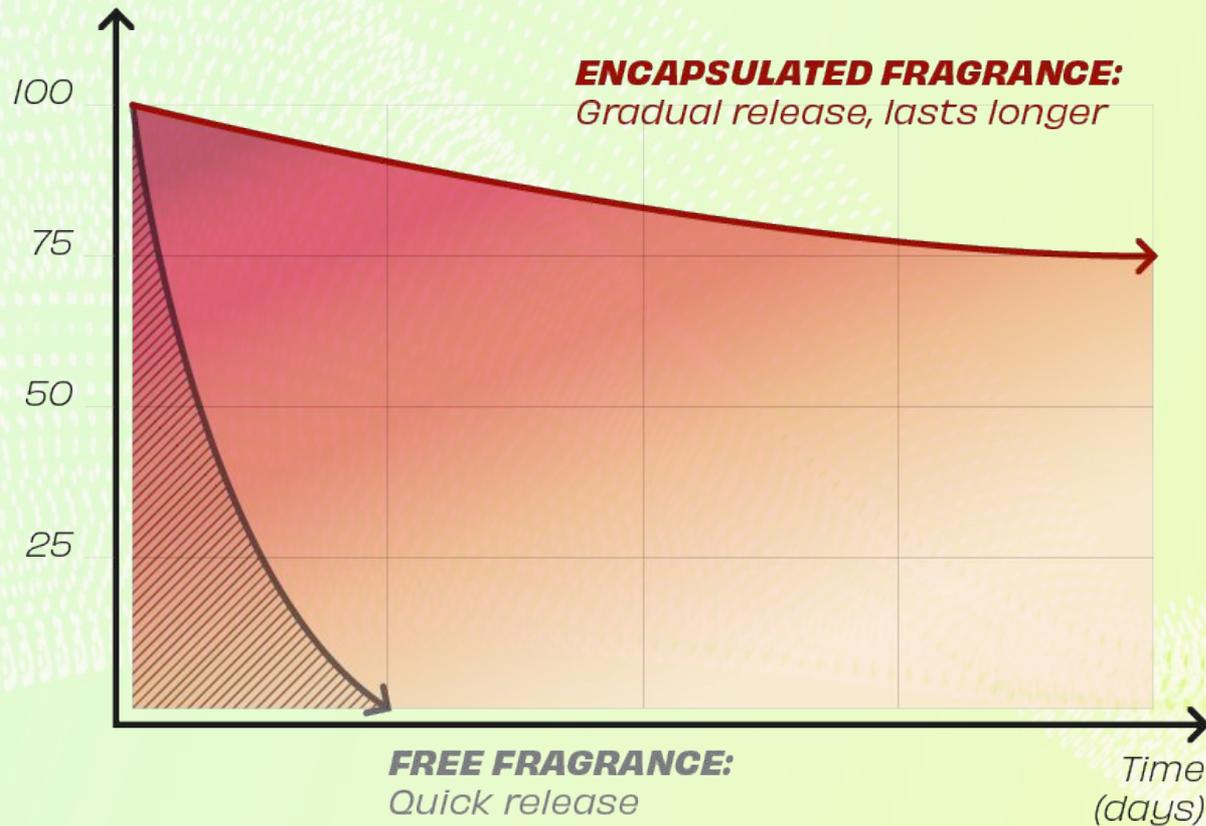
WHAT ARE THE BENEFITS OF THE ENCAPSULATION OF ACTIVES?

2. Long-lasting

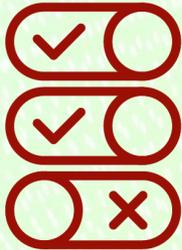


Once volatile compounds, nutrients or sensitive bacteria are protected, **their duration of action in the final formulation is also prolonged**, when compared to free actives. The graph below illustrates the extended release of a fragrance protected by TNS capsules compared to the same free fragrance. In this quantitative test performed in aqueous medium, it was observed that the action of the encapsulated fragrance was maintained for 4 times longer than the free fragrance.

This example indicates that TNS capsules promote a **long-lasting effect**, enabling a slow and gradual release of actives, **avoiding degradation throughout their useful life**.



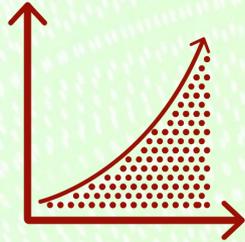
WHAT ARE THE BENEFITS OF THE ENCAPSULATION OF ACTIVES?



3. Release by specific triggers

The release of active agents is modulated according to specific triggers, as requested by TNS customers. For example, pH variation, temperature increase, presence of enzymes or even friction may be physical-chemical variables (triggers) chosen for the capsule to break.

WHAT ARE THE BENEFITS OF THE ENCAPSULATION OF ACTIVES?



4. Increased bioavailability of active agents in the final formulation

The practice of encapsulation, for the most part, allows the use of lesser amounts of additives due to the extended release and the protective effect offered by TNS capsules.

HOW DOES THIS PROCESS TAKE PLACE?

Focusing on sustainability and conscious consumerism, TNS capsules are made of natural polymers. Materials are formulated according to the clean slow beauty trend set by current consumers. They are free of formaldehyde and microplastics, and it is possible to add special features to different formulations.



CONTACT OUR EXPERTS

TNS invests in cutting-edge technology to offer quality materials that add value and distinctive features to our partners' products.

Together, we develop our best version!



TNS

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