# Gelling pearl improves oil-phase viscosity

Inspired by nature and designed from its environment-friendly philosophy, Brasca introduces Olifeel Pearls, a patented innovative non-hydrogenated natural oil-phase gelling agent that demonstrates stabilising properties for any oil-containing formula. The present study submits a summary of performed tests analysing the affinity of this ingredient for different lipophilic raw materials and assessing its gelling and stabilising properties when formulated.

## Pure olive components

Olive has always been more than mere food to the Mediterranean people. It has been a medicinal and magical device, a symbol of peace, honour and immortality. Olive and its derivatives have always been a successful ingredient in several fields of application. It was, for instance, used for religious rituals, but also in medicines, and in antiquity, for soap-making or skin care applications. Homer even called olive oil the 'liquid gold'.

The origin of the olive tree is lost in time, coinciding and mingling with the expansion of the Mediterranean civilisations, which for centuries left their imprint on Western culture. Its existence dates back to the twelfth millennium BC. The old wild olive tree originated in Asia Minor where it is extremely abundant and grows in thick forests. It appears to have spread from Syria to Greece via Anatolia. In the 16th century BC the Phoenicians started disseminating the olive throughout Greek islands. From the 6th century BC onwards the olive spread throughout the Mediterranean region reaching Tunisia and from there the island of Sicily and Southern Italy. The Romans continued the expansion of the olive tree to countries bordering the Mediterranean Sea. With the discovery of America, olive farming spread beyond its Mediterranean confines, and by 1560 olive groves were being cultivated in Mexico, Peru, California and Argentina.

Nature has always been the major source of inspiration for the cosmetic world, and this remains especially true for the olive tree, well-known since ancient times for its wide range of safe components, particularly suited for skin and body care. Olive oil components still today show important features for the cosmetic formulator, through its best known principles: phytosterols and their esters, waxes, triterpene alcohols, squalene, α-tocopherol or vitamin E, β-carotene and chlorophyll, polyphenols (including hydroxytyrosol and tyrosol) as well as long chain fatty acids and alcohols, mono-, di- and tri-glycerides. For example, squalene and fatty acid triglycerides modulate skin surface hydration, by helping to restore its natural protective hydrolipidic film. Antioxidants such as tocopherols and other polyphenols (hydroxytyrosol, oleouropein, tyrosol) help to prevent skin damage by free radicals.

However, often the formulator might not use *Olea Europaea* because safety and efficacy are not proven, or because its ingredients have a strong odour, they are coloured, and/or they are difficult to handle and formulate.

Brasca's olive-derived ingredients pursue a simple philosophy: maximise formulator benefit by providing pure isolated fractions or even just single components from olive oil, consequently allowing a new versatility of functional or biological applications. It applies here to Olifeel Pearls: a colourless performance ingredient formulated in a practical pearl form (with a very regular shape), and consisting of vegetable saturated $C_{16\text{-}18}$ triglycerides, with traces of unsaponifiables from olive oil (Fig. 1).

Triglycerides are among the most used ingredients in cosmetic formulas (content in skin care 64% and make-up, 29% – source GNPD Mintel). They generally appear as an emollient, coloured paste with a melting point not much above ambient room temperature. Brasca's patented ingredient is different: it is solid, white, odourless, and shows a higher melting point (not melting in contact with body heat). Its original INCI name is different too: Palmitic/Stearic Triglyceride. It is a potent and versatile rheology modifier/gelling agent, able to thicken any anhydrous oily system at different percentages. Its olive unsaponifiable content can also help antioxidation and emollience for a dual 'function and care' nature.

This compound is sustainably derived on site in Italy from non-edible parts of olive fruits (*Olea Europaea*, a plant of the Mediterranean basin). It is 100% natural in origin, and is not obtained by a chemical

process, but through a mechanical process that does not affect the natural components, maintaining the natural advantages of olive oil for nutrition and its antioxidation properties. The raw materials are used after they exited the agro-food chain (e.g. surpluses, non-edible fractions, etc.), so they do not subtract food or land to people. The result is a high purity ingredient.

The triglycerides are fully saturated, without double bonds. Its $C_{16\text{-}18}$ specific fatty acids (palmitic acid and stearic acid) composition imparts from 5˚C up to 10˚C higher melting temperature than other aliphatic $C_{16\text{-}18}$ saturated fatty acids. Indeed, they show a peculiar configuration, inferring a precise and repeatable conformation at the molecular level, promoting molecular interactions by hydrogen bridge bonds (i.e. especially strong dipole-dipole attraction). With its consequently higher melting point, Olifeel Pearls are suitable as an additive and gelling agent in cosmetic formulations, at different dosages.

## Affinity for lipophilic ingredients

Palmitic/Stearic Triglyceride shows compatibility with the majority of cosmetic lipophilic ingredients, even from diverse origins (natural, mineral or synthetic). Figure 1 thus demonstrates the compatibility and affinity towards major ingredients. This simple test consists of adding scalar percentages of Palmitic/Stearic Triglyceride to varied oils (vegetable oils, mineral oils, esters, and silicones), and measuring the viscosity value of the stable system obtained.

Components are heated at 70˚C-75˚C under stirring until melted, and the temperature is then cooled to 25˚C-30˚C. The final aspect is a pasty form analysed for viscosity. Increasing viscosity is observed for higher percentages of pearls (creating a more solid structure) but is also linked to the freezing point of combined oils. As a matter of fact, the higher the freezing point of the combined oil, the higher the viscosity, the more structure and affinity for Palmitic/Stearic Triglyceride.

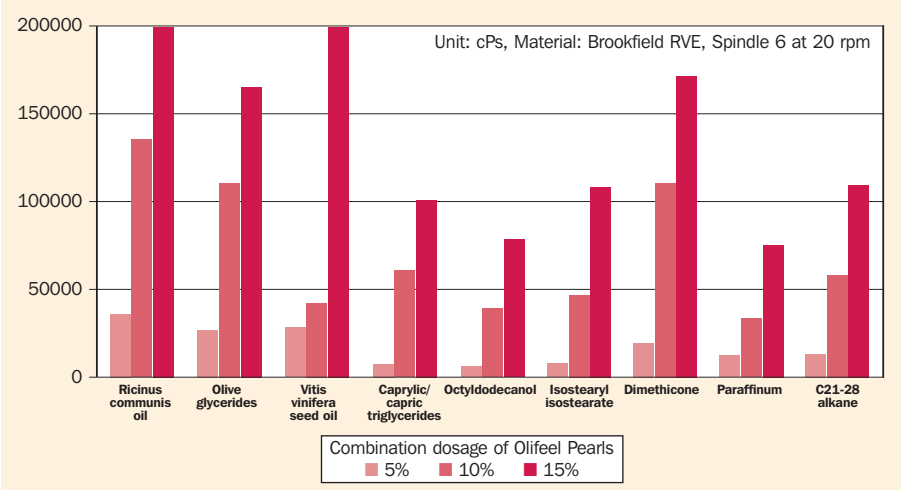


**Figure 1:** *Affinity/gelling effect of Olifeel pearls with various oils.*

A greater affinity (and viscosity) towards natural vegetable oils can be observed too. This is particularly helpful in natural formulas to improve the stability and reduces the risk of syneresis. This performance is not exclusive though, and it is interesting to note that the affinity is also very good for silicones, esters and other hydrophobic substances. With mineral oils, the affinity seems to depend more on the length of the carbon chain. The longer the chain, the higher the viscosity, the better the affinity.

## Dose-dependent viscosity

Palmitic/Stearic Triglyceride helps to stabilise finished products once cooled as shown in Figure 2. The test relates the measure of viscosity for a simple emulsion (15.0% of auto-emulsifier base Dermafeel AE 103, 0.1% of preservative BiosControl Synergy MMM, progressive dosage from 0.0% up to 10.0% of Olifeel Pearls, and remaining quantity of water). The triglycerides and water were heated up separately at 75˚C-80˚C. After adding the two phases together, the oily/emulsifying phase was in turn added under turbomix (Silverson). After cooling, viscosity value was measured, and completed with a second analysis 24 hours later.

Viscosity significantly increases in a dose-dependent manner starting from just 0.5% of Palmitic/Stearic Triglyceride. This ingredient proved to help the stability of the formula, increasing the viscosity during the test period both at ambient temperature as well as in a warm room (40˚C).

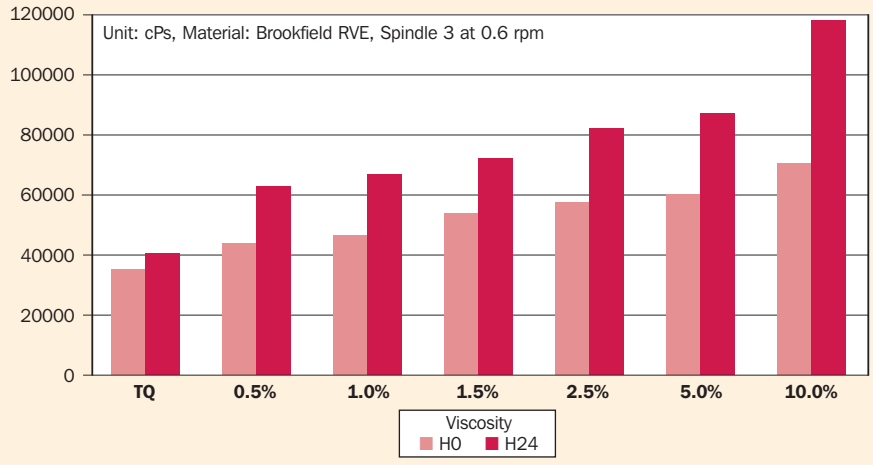


**Figure 2:** *Viscosity of Olifeel Pearls in a simple emulsion.*

## Benefits for formulas

Another practical example is conveyed by the following demonstration in which three simple formulas (face cream, hand cream and body cream) with different viscosities and containing each 2.5% of Palmitic/Stearic Triglyceride were compared to their 'placebo' version (without pearls). The measured results confirm an important viscosity increase in every type of finished product: face cream in Figure 3, hand cream in Figure 4, and body cream in Figure 5, confirming a more compact and homogenous structure helping to create a more stable formulation.

We also note that Palmitic/Stearic Triglyceride offers another important cosmetic benefit by giving to the final formulation a nicer appearance, together with triglyceride emollient and a creamy, comfortable non-greasy touch with a soft nourishing skin-feel.

Moreover, Palmitic/Stearic Triglyceride is available in an easy-to-manipulate colourless pearl form with a regular shape, optimising a safe manipulation by operators and minimising the risk of environmental contamination, hence reaching the company criteria of sustainability ('No Impact in Progress' philosophy).

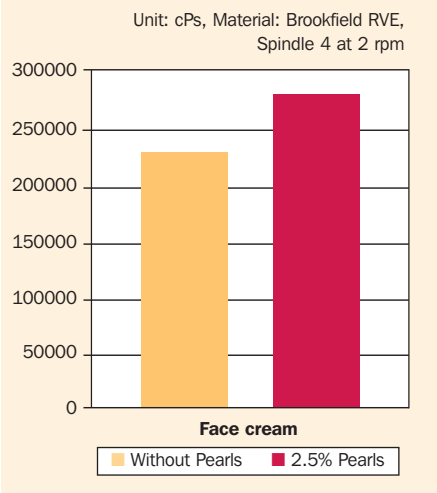


**Figure 3:** *Viscosity increase of face cream with 2.5% Olifeel Pearls versus placebo.*

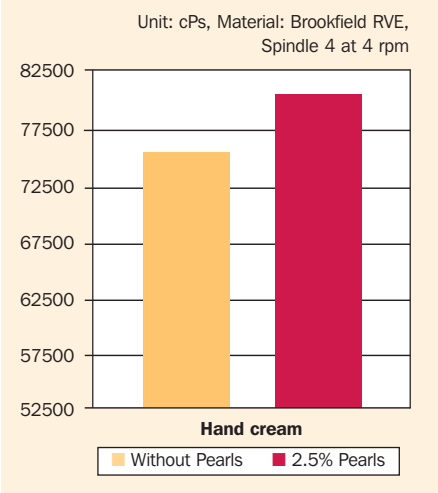


**Figure 4:** *Viscosity increase of hand cream with 2.5% Olifeel Pearls versus placebo.*

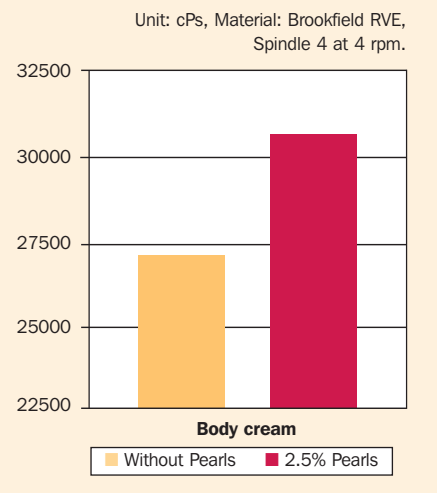


**Figure 5:** *Viscosity increase of body cream with 2.5% Olifeel Pearls versus placebo.*

## Touchable synergistic benefits

Palmitic/Stearic Triglycerides is a simple single ingredient that brings a higher viscosity and better stabilisation to the formula. This double attribute represents only one of the major features of this high performance compound. It can be involved in a synergistic system with other purified olive ingredients conferring several advantages in terms of touch given to the finished formula.

We already considered that Palmitic/Stearic Triglycerides helps to obtain a viscosity increase thanks to its extreme compatibility with most of the cosmetic ingredients typically used. The perfect synergy is demonstrated through the grid structure resulting in a dense, viscous, more stable system. This synergy is even stronger when the combined ingredient is characterised by a saturated composition (preventing the attacks of free radicals or chemical agents). Overall, this brings more stability to the finished formula versus oxidation, external aggressive agents, temperature and time.

Palmitic/Stearic Triglycerides also shows sensorial properties, that can be useful in combination with two other olive-derived ingredients. This combination improves the single characteristics of each compound, and creates an added-value to the skin feel of the finished formula, as shown in Figure 6. In this touch guide summary, Palmitic/Stearic Triglycerides was evaluated in relation to two products: Olifeel TD7525 (a vegetal oil, with the following INCI name: Olive Glycerides) and Olifeel Butter (a vegetal butter, with the following INCI name: Olive Glycerides, Palmitic/Stearic Triglycerides).

On one hand, the vegetal oil has a great affinity with both the formula and the skin. It is an excellent enhancer for emulsion penetration. On the other hand, the olive-derived butter is characterised by co-emulsifying properties bringing an unctuous and generous touch. We should not consider Palmitic/Stearic Triglycerides as solely a performing gelling agent; it shows also important features in terms of sensorial benefits.

The combined use of these three ingredients one-by-one or all together can be the basis of any cosmetic feel requested in natural but also classical formulation.

The use of Palmitic/Stearic Triglycerides in synergy with the first ingredient (the soft touch oil) gives moisture and structure thanks to the resulting fusion developing a paste unguent with a non-greasy touch.

The synergy with the second ingredient (the smooth butter) shows a better performance in make-up formulations, in particular sticks and balms. The obtained paste is characterised by creamy qualities but also structuring properties that support the final cosmetic product.


**Figure 6.**

Finally, the synergy between all three compounds brings to the finished formula more penetration enhancement with a consistent body and a rich touch.

Because of their high versatility and their extreme compatibility, these three cosmetic ingredients emphasise the single characteristics of each one and add major qualities to the finished formula. The biggest observed advantage of this combination is that a variation in the dose of each compound can modify the global sensorial result in a specific direction (Fig. 6).

## Conclusion

Olifeel Pearls is a non-hydrogenated natural innovative solution for all types of formulas. The isolation of its vegetable components confers a groundbreaking gelling effect compatible with all types of oil phases (from mineral, synthetic as well as natural origins). It is a dual 'functional and caring' ingredient, improving the stability of final products while bringing the characteristic emollience of a triglyceride.

This very versatile ingredient covered by a patent filed for international priority will enable formulators to better control the rheology of a formula, and can help replace synthetic and semi-synthetic gelling agents for lipophilic phases in all applications: skin care, body care, sun care and makeup.

This sustainable '3E' (Environment, Economics, Ethics) ingredient with unique INCI name (Palmitic/Stearic Triglyceride) is available in an easy-to-use form to ideally optimise time and costs during the production phase. PC