

## Squalane Derived from Sugar Cane Research Paper

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The Squalane that Three Ships uses in products like the [Radiance Day Cream](#) is plant-based and derived from sugarcane. While Squalane provides moisturizing benefits, it is also a physically and chemically stable compound that makes it desirable for manufacturers to work with. It's readily emulsifiable, disperses well, and is compatible with other ingredients. While Squalane is an oil, it is also non-comedogenic so it will not clog the pores, and is suitable for people with acne-prone skin.

### SQUALANE IS AN OIL, IT IS ALSO NON-COMEDOGENIC SO IT WILL NOT CLOG THE PORES

Squalane is a saturated hydrocarbon manufactured by the fermentation of sugarcane. Its inert properties suggest low toxicity piqued the interest of researchers, especially in cosmeceuticals.

An emollient works to moisturize and soften skin texture by supporting the natural skin barrier and as an emollient with substantial moisturizing capabilities, Squalane has made its way into the protective nutraceuticals and cosmeceutical arena. It is more stable in nature and therefore highly preferable in cosmeceutical and nutraceutical applications, while also having the same properties, compared to its more native counterpart, Squalene.



The Squalane used in the Radiance Day Cream is derived from sugar cane. It is made from fermentable sugar sourced from sugarcane. The natural biosynthetic precursor, Squalene, is produced on an industrial scale by fermentation using *Saccharomyces Cerevisiae*, a common non-pathogenic yeast. The yeast is then completely removed, followed by a simple chemical coupling that mimics natural processes. This avoids the need for isolating lipophilic and oxidatively unstable Squalene from the fermentation biomass. Once the crude Squalane is formed, the solvent goes through a purification process. The exact process of extraction method for the Squalane that Three Ships sources is proprietary information.

## VITAMIN C CAN ALSO BOOST COLLAGEN PRODUCTION

Synthetic Squalane is manufactured by the catalytic hydrogenation of Squalene. It is obtained by converting the double bonds in Squalene into single bonds through saturation. Squalene is sensitive to oxidation, which means its molecular structure will break down in the presence of oxygen. To mitigate its oxygen sensitivity, the double bonds pass to the stable form by chain reactions, where the former double bonds link to new ions, producing a saturated form - Squalane. Some other products are generated through self-hydrolytic processes, such as peroxides, but the Squalene is not susceptible to peroxidation; in fact, it has an antioxidant protective effect by trapping oxygen singlets during the reaction processes.

Depending on the configuration of Squalene, it is typically organized in a spiral or extended conformation, oriented parallel to the phospholipid chains between the cell membrane. When Squalene configures into a hexagonal form, it increases the rigidity and the size of the cell membrane. Other components such as saponins, in interaction with phytosterols and Squalene, form insoluble complexes which fix the architecture of the lipid bilayer and generate pores that participate in the permeability of cell membranes.

Skin is constantly exposed to environmental factors such as UV radiation that create free radicals and cause damage to the skin. The skin is also home, to small sebaceous glands which secrete sebum that protects our skin and replenishes our skin's natural lipid barrier. The lipid barrier prevents trans-epidermal water loss and acts as protection against high sun exposure. It is speculated that the native Squalane and Squalene are responsible for the protection against UV radiation-induced oxidative stress, however, more investigation will have to be done to verify this claim.

## SCIENTIFIC STUDY

### In Vivo Study of the Effects of Squalane and Vitamin C

One study done with a panel of 40 women from the ages of 37 - 60 used a mixture of Squalane and vitamin C. The oil was used twice a day for 28 days. The results from this study showed that the oil had a firming effect characterized by a decrease in the surface, the volume and the depth of the skin deformation observed during the blow air impact using a Dynaskin.

The skin was overall more resistant and less deformed. The results also showed that transepidermal water loss was reduced by 18% over the 40 women, and the skin-lipid barrier was enhanced. It is speculative to conclude that those results were solely attributable to just the Squalane and in no part did the vitamin C have an effect, however, Squalane is a proven emollient and does provide support for the native lipids in the skin barrier, based on its chemical structure and properties.

Squalane used to be derived from shark liver due to its high concentrations in oils. Since then, there has been much pressure to find a new way to source Squalane that is sustainable and plant-based. Through novel modern technologies, high quality and purity Squalane can be derived from sugarcane through industrial-scale fermentation and distillation. Overall, Squalane is a non-comedogenic emollient used in moisturizers and creams as an ingredient to prevent transepidermal water loss.