

NovoRetin™: the natural retinol alternative

Retinol and structurally related molecules of the group of retinoids are well-known for their strong anti-aging effects and their use in the treatment of acne. However, most retinoids are not stable in formulations and the treatment with retinoids can lead to side effects, such as dry skin, photosensitivity, and redness, limiting the chronic therapeutic application and largely preventing the use in cosmetics. NovoRetin™ is a plant-based active ingredient that can increase naturally occurring retinoic acid in the skin and thereby induce retinol-like effects without the need to apply retinoids topically on the skin.

Boosting naturally occurring retinoic acid in the skin

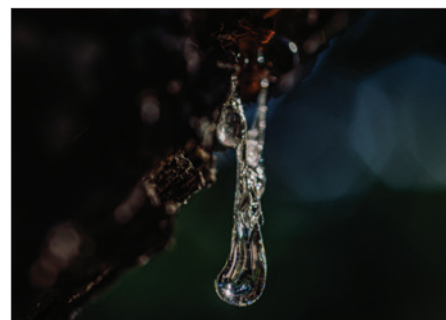
Retinoic acid is the most active metabolite of retinol and is therefore responsible for the effects of retinol on the skin. As retinoic acid plays an important role in the maintenance of the skin, it also occurs naturally in skin cells, where it is degraded by cytochrome P450 family 26 (CYP26) enzymes. By inhibiting CYP26 enzymes, it is possible to increase the levels of endogenous retinoic acid and achieve retinol-like effects. CYP26 inhibitors, such as talarozole, are therefore under pharmaceutical investigation as potential anti-acne drugs. NovoRetin™ serves as a plant-based CYP26 inhibitor. As demonstrated in *in vitro* studies, it significantly decreases the activity and gene expression of CYP26A1, a CYP26 isoform present in the skin. Tested in a 3D epidermis model, NovoRetin™ increased the expression of involucrin, a marker of retinoic acid activity, to a similar extent as the CYP26 inhibitor talarozole. Thus, by preventing the degradation of retinoic acid in the skin, NovoRetin™ leads to beneficial effects similar to the ones known from retinol applications.

Strong anti-aging effects and benefits for impure skin

NovoRetin™, on the one hand, demonstrates



strong anti-aging effects, as shown in a placebo-controlled clinical study on a cohort of 18 women (aged 42 to 70 years) with wrinkles in the crow's feet area and signs of photoageing. After 28 days of treatment with a cream containing 2% NovoRetin™ twice daily or the corresponding placebo cream on the different sides of the face and on different areas on the forearms, facial skin elasticity and skin density on the forearm improved by 20.4% and 13.8%, respectively. An additional benefit of NovoRetin™ and an advantage compared to retinol is its ability to immediately reduce wrinkles and skin roughness after only a single application. By enhancing retinoic acid in the skin, NovoRetin™ also provides beneficial effects for acne-prone skin. Several clinical studies have demonstrated its anti-comedogenic effect and its ability to reduce



shininess, pore size, and skin imperfections. Pore refinement is a great benefit not only for impure skin but also for aged skin where pores often appear enlarged. In contrast to classic retinol treatments, NovoRetin™ does not dry out the skin but even increases skin hydration.

A plant-based, stable, and safe retinol alternative

NovoRetin™ (INCI: Pistacia Lentiscus Gum/ Pistacia Lentiscus (Mastic) Gum (and) Lecithin (and) Pentylene Glycol (and) Glyceryl Caprylate/Caprinate (and) Caprylic/Capric Triglyceride (and) Aqua/Water) is based on mastic, a resin from the Pistacia lentiscus trees that grow on the Greek island of Chios. Mastic was the first natural chewing gum in the ancient world and has been consistently used in medicinal applications and skin care formulations for hundreds of years. The application of mastic in modern cosmetics, however, has been limited due to its insolubility in water. This is no longer an issue as Mibelle Biochemistry has developed a unique delivery system to make mastic bioavailable for the skin. The resulting active ingredient NovoRetin™ can be incorporated into most water-based formulations and offers an innovative alternative to retinol, because it enhances the levels of naturally occurring retinoic acid in the skin and therefore leads to retinol-like effects without the risk of the side effects known from retinoid applications.

Therefore, NovoRetin™ serves as an ideal plant-based retinol alternative in cosmetics, providing both strong anti-aging effects and exceptional benefits for impure skin.

PC

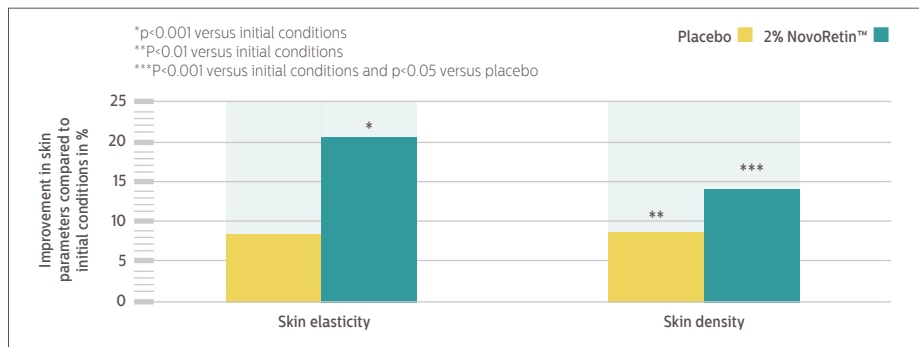


Figure 1: Improved skin elasticity and skin density after application of 2% NovoRetin™ for 28 days