

Pharmaceutical & Cosmetic review

OCTOBER 2022
Volume 49 | Number 10

49
years
★

www.pharmacos.co.za

**Connected
and customised
health & wellness**

**Exposome
protection for
lasting beauty**

**Process
automation
simplified**



Vitamin D skin care

A new reality!

Is vitamin D-skin care a new reality?

Vitamin D deficiency is an inherent challenge for today's world. Lifestyles and consumer behaviour are constantly evolving, with important outcomes for skin care.

Harald van der Hoeven, CLR Berlin's director of product design and development, explores whether skin care products can help address vitamin D deficiency.

Urbanisation and the COVID-19 pandemic have led to a significant increase in the number of people working and living indoors. Significantly more consumers now use high SPF sun protective products than a few decades ago. Our skin is also increasingly exposed to influences that promote skin dryness with less and less exposure to sunlight.

Sunlight provides skin with the ability to produce vitamin D and decreased exposure to UV light leads to a deficiency in vitamin D in the human body. The prevalence of vitamin D deficiency is now indicated as a major global health problem. Vitamin D is important for many biological processes in our body, including healthy skin. We need vitamin D for good quality skin and hydration. Can skin care products help? Yes, but how though?

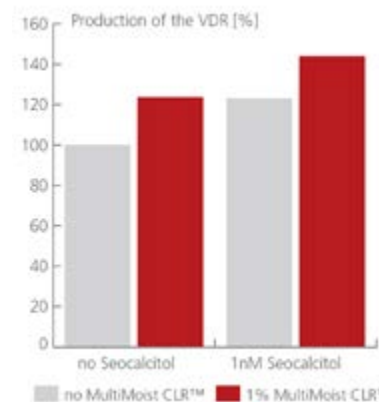


Figure 1: Influence on VDR expression after 72 hours of incubation of normal human epidermal keratinocytes with and without the presence of seocalcitol and MultiMoist CLR

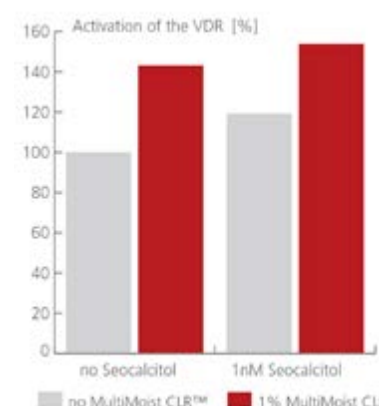


Figure 2: Influence on VDR activation (VDR-SerP) after 72 hours of incubation of normal human epidermal keratinocytes with and without the presence of seocalcitol and MultiMoist CLR

VITAMIN D AND SKIN HYDRATION

In skin care, vitamin D is an important initiator of filaggrin production. Filaggrin is the key raw material for NMF production and the skin's ability to stay moisturised. In more detail, the vitamin D receptor (VDR) is essential for epidermal differentiation. VDR is a nuclear receptor to which vitamin D binds to elicit its biological effects. An increase in VDR expression leads to an improvement of epidermal differentiation and more moisturised skin.

"An intelligent combination of *in vivo* methodologies showed that MultiMoist CLR has significant and relevant moisturising properties"

Considering vitamin D deficiency is a worldwide concern, increasing the production and activation of VDR will lead to a higher probability for vitamin D to elicit its beneficial effects on the skin. CLR Berlin developed MultiMoist CLR™ (INCI: Fructooligosaccharides, Beta Vulgaris (Beet) Root Extract, Water). *In vitro* and *in vivo* studies were performed on MultiMoist CLR with the purpose to prove its beneficial effects on the production and activation of the VDR and its properties as a moisturising active ingredient.

INFLUENCE ON VDR EXPRESSION AND ACTIVATION

It was assessed *in vitro* whether MultiMoist CLR was able to potentiate vitamin D-induced effects on VDR expression and its activation. Normal human epidermal keratinocytes were incubated for 72 hours with and without the presence of seocalcitol (a calcitriol analogue; calcitriol is the biologically active form of vitamin D) and MultiMoist CLR.

Results obtained on VDR expression are presented in figure 1. VDR expression without the presence of seocalcitol or MultiMoist CLR is set at 100%. Corresponding results relevant to the activation of the VDR (VDR-SerP) are presented in figure 2.

Treatment with MultiMoist CLR led to pronounced results when compared to the treatment with seocalcitol alone. The addition of MultiMoist CLR to seocalcitol clearly showed the potentiating effects of the active ingredient. This leads to the conclusion that MultiMoist CLR can amplify the effects of vitamin D.

IN VIVO APPROACHES AND RESULTS

Proving the real moisturising effects of a cosmetic is a complex endeavour. Most measuring techniques to quantify the hydration level in the skin are not perfect. This does not mean that they are inadequate, yet to be able to draw 'watertight' conclusions from the results obtained with these techniques, a combination of techniques needs to be used. Furthermore, the hydration level that is measured with these techniques do not necessarily correlate with consumer



CONSUMER STUDY

A consumer study was also performed, and the combined results of all the *in vivo* studies were clear.

Against the corresponding placebo formulation, 3% MultiMoist CLR showed clear moisturising benefits both on normal and dry skin. One-time applications of MultiMoist CLR showed remarkably fast moisturising effects, which were also long lasting. Long-term studies conducted over three weeks showed clear and relevant effects.

In these long-term studies, a comparison was made, not only with a placebo formulation, but also with the same formulation, containing a benchmark moisturising

active ingredient.

MultiMoist CLR clearly showed to be superior to the benchmark ingredient. The consumer study confirmed the results obtained instrumentally. Figure 3 shows examples of the results obtained using MoistureMap technology two hours after the application of the test products. On all parameters measured and determined, MultiMoist CLR showed to be an intense, quick and long-lasting moisturiser.

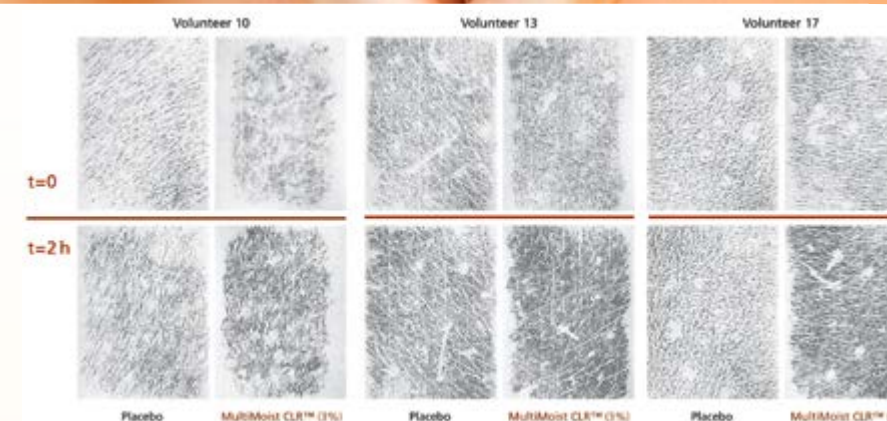


Figure 3: Individual results obtained using MoistureMap technology

perception of hydrated versus dry skin. Dry skin feels rough and looks dull to the consumer, so these parameters should also be quantified. Lastly, a consumer study should be performed in order to validate the results obtained with the instrumental methods.

Skin capacitance as a parameter of skin hydration was initially used in the study. Two types of the Corneometer were used (CM825 and MPA 5 CPU, Courage & Khazaka electronics), as well as MoistureMap technology. This is a 'capacitance imaging' technology giving graphical information on the near surface hydration distribution over a larger skin area.

Thereafter, a moisture accumulation test (MAT) was performed with a Novameter DPM 9003 (NOVA Technology Corp). The MAT gives information on the quantity of moisture the SC may accumulate during a given time. It is

well-described in literature that decreased NMF content (i.e. a decreased ability to bind water) correlates with lower water accumulation during the MAT.

Where the abovementioned technologies only give information on water in the stratum corneum, two other technologies were used to address the more subjective aspects of skin hydration. Squametry (skin dryness evaluation) was performed. By tape stripping the surface of the skin, the loosely adherent portion of the SC sticks to the adhesive. The scales can be automatically sized and counted to give a measurement of the degree of skin dryness, correlating to skin appearance.

Dry skin is also perceived as rough. Skin roughness was assessed using a Primos 5.7 high-res (GF Messtechnik). With this optical technology, the precise three-dimensional topography of skin can be determined reliably.

CONCLUSION

Vitamin D deficiency is a common problem that has significant impact on the quality of skin, especially its hydration level. MultiMoist CLR is able to induce the production and activation of the VDR. Mimicking the *in vivo* situation, where MultiMoist CLR was combined with a vitamin D analogue, it was shown that MultiMoist CLR could also potentiate the effect of vitamin D.

An intelligent combination of *in vivo* methodologies showed that MultiMoist CLR has significant and relevant moisturising properties, both in the short and long term. It even showed to outperform a benchmark moisturising active ingredient, which is extremely widely used in the cosmetics industry.

MultiMoist CLR is available locally from IMCD South Africa. ■

CLR Berlin – www.clr-berlin.com
IMCD South Africa – www.imcdgroup.com/en/worldwide/south-africa