Addressing sensitive skin and the microbiome

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The current global health crisis has impacted all sectors and cosmetics is no exception. The COVID-19 pandemic has led to a change in trends and different consumption levels worldwide.

One of the practices that has come into force is the use of hand sanitisers as a protection against coronavirus. However, the constant use of this type of alcohol-based products may cause dryness and irritation of the skin.[1,2] They may potentially be harmful to our skin health, which is the main defence layer of our body. They could be harmful to our skin's natural hydration barrier, and especially to those who suffer from sensitive skin.

Vytrus Biotech propose a new skin treatment based on plant stem cells, with a great moisturising potential, which acts as a soother and protector of sensitive skin.

Plant stem cells for sensitive skin

The active ingredient Sensia Carota calms and protects sensitive skin through a 360 mechanism of action (Fig 1):

- Lipid replenishment
- Inhibition of Neurogenic Inflammation
- Inhibition of inflammation caused by unbalanced microbiota
- Antioxidant activity
- Restoring the well-being of epidermal cells

The active ingredient shows a variety of statements that prove its composition and safe and respectful application:

- 100% natural origin, according to ISO 16128
- COSMOS-approved
- Preservative-free
- Microbiome compatible

Based on *Daucus carota* plant stem cells, mainly known as carrot, Sensia Carota targets the silent inflammation by calming the irritated skin. The unique composition of the active ingredient efficiently increases the tolerance of sensitive skin against chemical aggressions, in a natural and safe way, at two levels:

- Acts on secondary mediators to skin hypersensitivity thanks to its high concentration in plant cell factors
- Strengthens the primary skin natural protection due to its composition rich in essential fatty acids

In vitro efficacy

In vitro 1: Anti-inflammatory effect: reduction of TNF-α y IL-8

In the first assay, there was a significant reduction of up to 29% and 65% of TNF-α and IL-8 on the cell culture induced by LPS (bacterial insult). The active ingredient showed a great capacity to reduce the response of these two significant pro-inflammatory markers, demonstrating the ability to reduce an excessive inflammatory response.

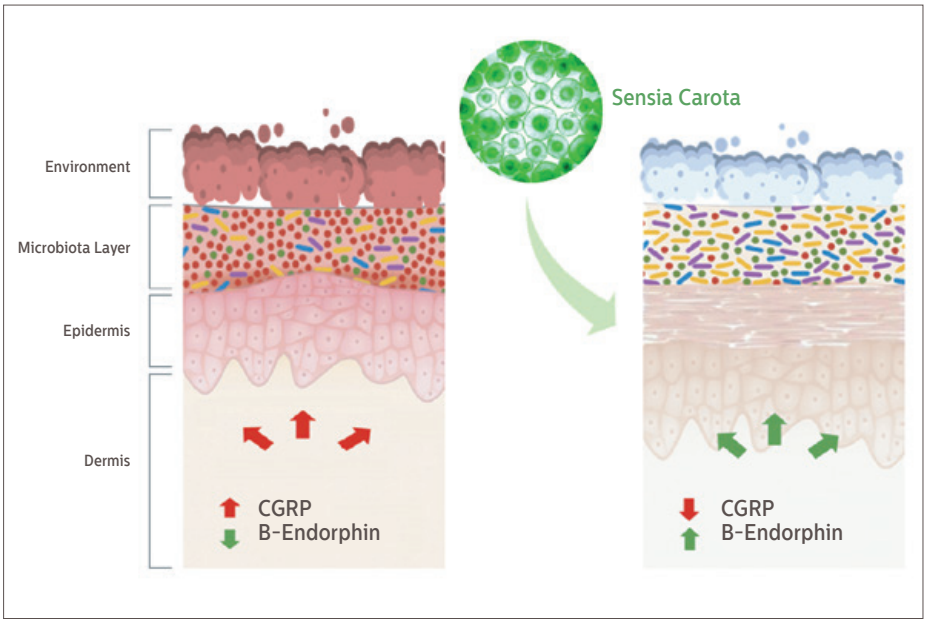

Figure 1: Mechanism of action of Sensia Carota.

In vitro 2: inhibition of neurogenic inflammation

The results of this second test at cellular level showed up to a 39% reduction in the release of the neuropeptide CGRP (a peptide related to calcitonin gene) in a sensory neuron culture after 24h pre-treatment, even higher than Capsazepine (-30%).

The release of CGRP is linked to the activation of an inflammatory activity and linked to activations of bacterial virulence. The active ingredient can modulate the release of CGRP in sensory neurons, avoiding the activation of pro-inflammatory pathways and the imbalance of the microbiota.

In vitro 3: Restoring epidermal cells wellbeing

This third test was carried out in epidermal progenitor cells and demonstrated the ability of the active ingredient to increase the generation of β-Endorphins, closely linked to cellular wellbeing and skin homeostasis.

In the assay, it was demonstrated up to 101% β-Endorphin release after induction of inflammation with IL-1α at even higher level than the control Capsazepine (63%).

In vitro 4: Skin microbiota compatibility

This new test evaluates the compatibility of an active ingredient with the skin microbiota. A bacterial co-culture was studied both in the presence and the absence of the active ingredient. In order to verify that the viability and diversity of the microbial community were both maintained, a series of microorganisms were analysed: *S. aureus, C. acnes, S. mitis, S. capitis, S. epidermidis, Corynebacterium sp., Streptococcus sp., and M. pachydermatis*. The plant-based active ingredient was shown to fulfil two main functions: maintaining the viability and microbial diversity of the skin and providing protection against pathogens such as *Staphylococcus aureus*, reaching the maximum score of 1 in skin microbiota compatibility test (Fig. 5). This result related to *Staphylococcus aureus* is of a high importance, as this bacteria is especially harmful for the sensitive skin.

In vivo efficacy

In vivo 1: Evaluation of erythema prevention

The 15-volunteer panel test at 1% dosage

demonstrated the ability of the active ingredient to increase the tolerance of sensitive skin with a pre-treatment of three weeks.

The active strengthens the sensitive skin by reducing the exaggerated response to external aggressions as shown in the trial. There was a reduction of increase in redness by 25% compared to placebo after applying an irritating patch. During the pre-treatment of just three weeks, the sensitive skin demonstrates a greater tolerance and a significant reduction in redness formation (Fig 2).

In vivo 2: Evaluation of erythema reduction and hydration

Unlike *in vivo* 1, where a pre-treatment was used, the *in vivo* 2 analyses the post-treatment and immediate effect of Sensia Carota on sensitive skin that has been irritated with the application of a patch.

The active ingredient demonstrated the ability to effectively reduce the generation of redness (Fig 3) with an erythema reduction by 18% and 19% after 1 and 24h from T1 where there was an induced irritation (1h after patch removal) compared to placebo. Also, a decrease of dehydration of sensitive skin with a TEWL reduction by 28% and 32% after 1 and 24h from T1 (1h after patch removal), compared to placebo was shown (Fig 4).

Those values in both cases showed a statistically significant difference with placebo, demonstrating the high activity of the active ingredient at only 1% concentration.

Conclusion

The active ingredient Sensia Carota calms and protects sensitive skin, balancing inflammatory processes in the deepest skin layers and achieving a high moisturising effect.

Through its mechanism of action, especially tested on delicate and irritated skin, the active naturally rebalances the skin microbiota, keeps it in homeostasis, and produces a calming effect through the skin pleasure molecules.

The cosmetic market presents a wide variety of formulas in which the active ingredient has a direct application: refreshing lotions and gels, treatments that respect the skin microbiota, skin repairing and protective formulations, as well as natural and clean cosmetic products.

This new raw material based on carrot stem cells represents a new approach in the treatment of sensitive skin, in a way that respects the skin microbiota. A hopeful treatment in the middle of a global pandemic that impacts everyone, where the cosmetic science may play a key role. **PC**

References

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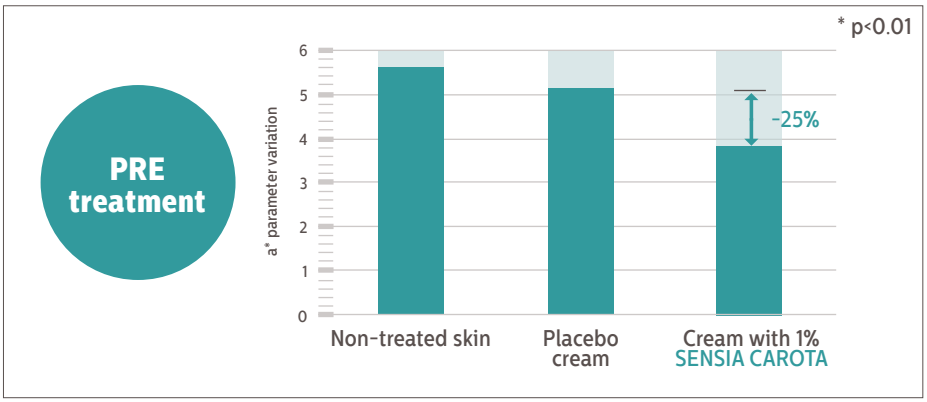

Figure 2: Clinical evaluation of erythema prevention.

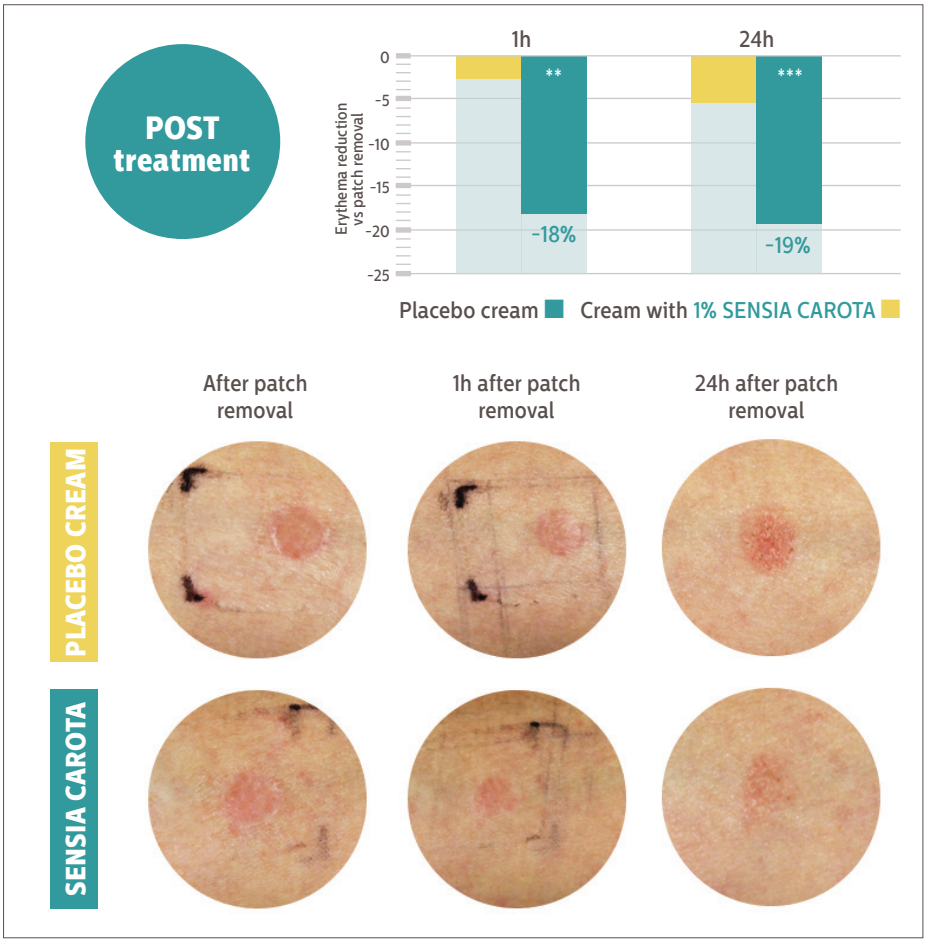

Figure 3: Clinical evaluation of erythema reduction.

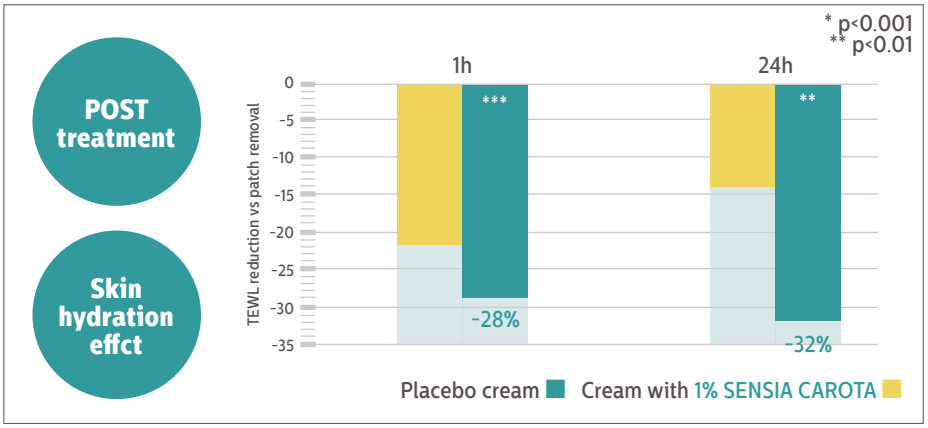

Figure 4: Clinical evaluation of high skin hydration effect of the active.