

# No more skin dryness after cleansing

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## ABSTRACT

As the responses to one of our recent global consumer surveys made clear, there is still a need for effective skin cleansers that also provide instant and long-lasting moisturisation after use. To address this unmet need, DSM has carried out some new studies with its hero ingredient Pentavitin®, a 100% natural, sustainably produced, moisturiser renowned for its moisture-magnet properties. Our findings from these studies show that common skin cleansing formulations containing Pentavitin immediately increase skin hydration for 24 hours, meaning an end to skin dryness post-cleansing or showering. We also found that even with frequent showering, Pentavitin helps reinforce the skin's barrier while protecting against dryness.

Dry skin, as a result of washing and cleansing is one of the most significant unmet consumer needs today. Around the globe, the preference for different types of cleansing product – bar soap, shower gel or body wash – may vary from region to region,<sup>1</sup> but wherever people are in the world, our research shows that the concerns are the same. Sensations of “pulling”, itchiness, dry feeling skin, and stinging after showering and facial cleansing are all common complaints.<sup>2</sup>

The ‘Wash, Rinse, Repeat’ routine, which has become the norm for so many people in the wake of the COVID-19 global pandemic, has magnified dry skin concerns further. Because while frequent washing is essential in helping to control the spread of infections, it can also impair skin barrier function, resulting in dry, cracked and sore skin. According to Google Trends, in March 2020, there was a 5000% increase in Internet searches relating to “dry, cracked hands”, “red and dry hands” and “dry hands from over washing”.<sup>3</sup> More than ever, consumers are looking for effective skin

cleansers that can also deliver instant and long-lasting moisturisation after use. However, they currently cannot find such products on the market so there is a clear opportunity here for the personal care industry. A recent Mintel report reveals that when it comes to shower products, women especially are more likely to prioritise additional care benefits over functional benefits only. Indeed, at least 59% of people in China who buy shower gel (the most used cleansing product type in this country) would be willing to pay more for products that smooth and hydrate the skin. Reflecting a broader global interest in sustainable and environmentally-friendly products, 90% of these consumers also said they would prioritise natural ingredients.<sup>1</sup>

## About NMF – the key to sustaining skin hydration

The balance of moisture in the skin is carefully regulated by the epidermis – notably by the stratum corneum, its upper-most layer. One of the key factors that influences the stratum corneum's ability to absorb water and maintain hydration is skin's natural moisturising factor, or NMF. Natural moisturising factor is a highly effective humectant, but it is greatly reduced by frequent daily washing. And without sufficient NMF the skin is prone to developing typical signs of dryness such as rough and flaky skin, stinging, or itchiness, tightness and redness.

To boost skin hydration and address dry skin issues, DSM developed a unique skin identical carbohydrate complex, similar in composition to the endogenous carbohydrate complex in NMF. Pentavitin® (INCI: Saccharide Isomerate) mimics the skin's natural ability to lock in moisture by binding to it like a magnet and boosting filaggrin<sup>4</sup> (an essential building block in the skin barrier). Additionally, it is 100% natural and has one of lowest carbon footprints in the industry for a moisturising agent. Our ingredient's hydration boosting benefits are already proven to last for 72 hours after use in leave-on applications.<sup>4</sup> So in view of a clear demand for cleansing products that also moisturise, we recently carried out new studies to look at its performance in rinse-off applications.

## Study 1: Hydration and skin barrier boost for Caucasian skin in a shower gel formulation

### Study design

Our first new clinical study investigated the skin

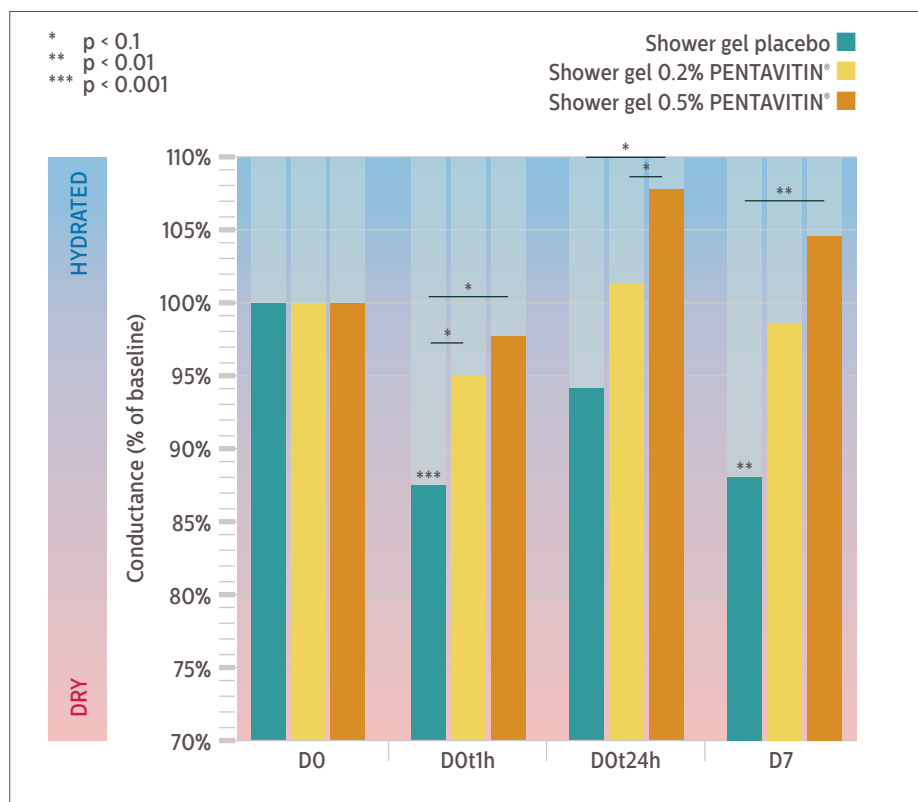


Figure 1: Evaluation of skin hydration after 7 days with shower gel (soap-free, pH 5) formulations.

hydration and skin barrier improvement properties of Pentavitin (now referred to as 'Saccharide Isomerate') in a standard shower gel formulation.

The randomised and placebo controlled study was carried out on a total of 50 Caucasian women aged between 25 and 45 and with dry skin. Two shower gels containing different concentrations of Saccharide Isomerate (0.2% and 0.5%) were tested and compared against placebo (base formula without Saccharide Isomerate). All three formulations were soap-free (pH ~5)

During the study, 25 volunteers were tested with the shower gels with 0.2% Saccharide Isomerate and 0.5% Saccharide Isomerate and 25 volunteers were tested with the shower gel placebo. The test products were applied on the volar forearm once on Day 0 and twice daily from Day 1 to Day 6 with the last application taking place in the evening, at least 12 hours before an evaluation on Day 7. Biophysical measurements were taken using the DermaLab device to assess skin hydration (conductance) and the Tewameter device to assess transepidermal water loss at the baseline and after one hour, 24 hours and seven days. Volunteers also completed a self-evaluation questionnaire.

#### Findings

The skin hydration results are reported in Figure 1 and are shown as percentages compared to the baseline. The use of the shower gel placebo led to a significant decrease in skin hydration immediately after showering and after 7 days this was still not recovered. In contrast, after just one use, the shower gel formulations with Saccharide Isomerate (0.2%, 0.5%) were shown to preserve and even boost skin hydration for 24 hours and even after one week these formulations were still hydrating the skin and preventing skin dryness (Fig 1).

Additionally, the evaluations of transepidermal water loss over 7 days showed that the formulations containing Saccharide Isomerate (0.2%, 0.5%) helped to reinforce the skin barrier just one hour after showering and even after one week of frequent showering.

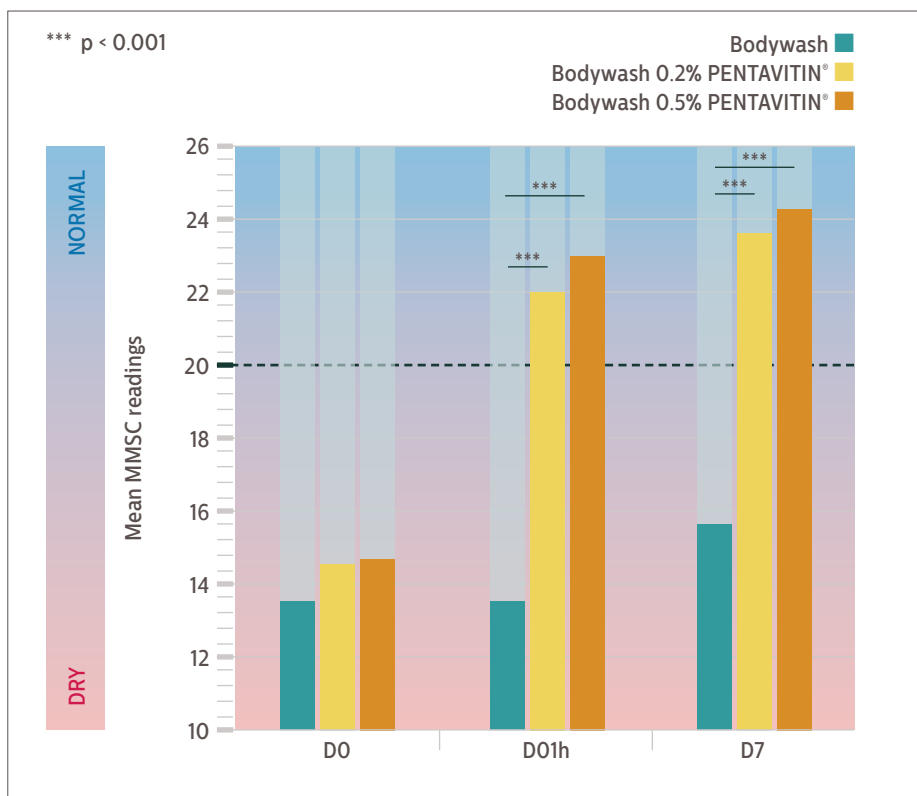
The self-evaluation questionnaire supported these findings, with 75% of respondents reporting that their skin felt softer and less tight after seven days of using the shower gels with Saccharide Isomerate, and 71% that their skin felt more moisturised.

### Study 2: Lasting hydration for Asian skin in a body wash formulation

In our second new clinical study, we investigated the skin hydration efficacy of Saccharide Isomerate in a body wash formulation.

This time, 33 Asian women aged between 21 and 65 and with dry skin were enrolled. Two body washes containing different concentrations of Saccharide Isomerate (0.2% and 0.5%) were tested and compared against placebo (base formula without Saccharide Isomerate). All three formulations were soap-based (pH ~9).

During the study, the volunteers applied test products on the volar forearm once on Day 0 and twice daily from Day 1 to Day 6 with the last application taking place in the evening, at



**Figure 2:** Evaluation of skin hydration (MMSC) over 7 days with body wash (soap based pH 9) formulations

least 12 hours before the evaluation on Day 7. Measurements were taken using a capacitance MoistureMeter SC at the baseline, after one hour and after seven days.

#### Findings

MoistureMeter SC readings for the placebo and both Saccharide Isomerate body wash formulations, taken at the baseline, one hour and seven days, are plotted in Figure 2. The formulations containing Saccharide Isomerate (0.2%, 0.5%) led to a significant increase in hydration compared to the placebo. Specifically, within one hour of application, skin exposed to the body wash formulations enriched with Saccharide Isomerate had moved from a dry status into a normal status and optimum skin hydration could still be maintained after seven days.

### Boosting foam volume in soap-based products

Saccharide Isomerate is soluble in water at all ratios and easy to incorporate into rinse-off formulations. We have also measured its foam volume boosting properties. For this test, a soap-based cream cleanser containing 0.5% Saccharide Isomerate and the placebo formula were dissolved into water and foam volume was assessed with a SITA foam tester R-2000. Under these conditions, the cream cleanser with 0.5% Saccharide Isomerate was shown to boost foam volume by up to 43% more than the placebo.

#### Conclusion

Pentavitin is a 100% natural bioactive, sustainably produced using sugar isomerization technology. By mimicking essential molecules found in skin's NMF, this bioactive binds to

the skin, locks in moisture, and is not washed off. Pentavitin, as supplied by DSM, does not contain preservatives, is Halal-certified and its ingredients are China-listed. It has one of the lowest carbon footprints in the industry for a moisturizing ingredient and is also NATRUE-certified and approved by ECOCERT and COSMOS.

The hydration benefits of Pentavitin have already been proven to last for 72 hours after application in leave-on products. Our new studies further demonstrate its benefits also in rinse-off applications such as shower gels and body washes. Notably, body wash formulations with Pentavitin have been shown to deliver optimum skin hydration for seven days, while shower gel formulations with Pentavitin have been shown to prevent skin cleansing associated dryness and significantly boost hydration for 24 hours and longer, and to strengthen the skin barrier.

Pentavitin can be used in multiple applications and is an ideal candidate for rinse-off formulations that both cleanse and hydrate the skin – a still unmet consumer need. DSM's own line-up of ready-to-use formulations includes shampoos, shower gels and washes, and also newer products that are growing in popularity such as micellar water and mousse cleansers.

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#### References

- 1 Mintel - Soap, Bath and Shower Products 2019
- 2 DSM Consumer Insights hub
- 3 Google Trends, consumer searches for "Dry Hands", 24 March 2020
- 4 *Cosmetics & Toiletries* 2012; 127(9): 636-643