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## Specially formulated pre and probiotic blends can decrease acne-severity

**Abstract:** Live-strain probiotics, soil-based probiotics and prebiotic-rich konjac root were combined to create a blend for skin and gut health. The effect of the orally administered pre and probiotic blend on the skin was studied in 27 women who consumed 400 mg daily of the proprietary blend as capsules for 60 days. Outcome was measured by IGA skin assessment from a dermatologist. The criterion for efficacy was the investigator's global improvement rating on a five-point scale. Additional measurements included self-reported skin assessment, moist sense measure, a medical symptom questionnaire (MSQ) and stool test for gut diversity. Over the course of the pre and probiotic intervention, there was a significant ( $p < 0.05$ ) reduction in acne severity. Participants also reported an improvement in Gastrointestinal related symptoms.

### Background:

Human skin, the largest organ of the body, is the first defense barrier against the physical, chemical, bacterial, and fungal challenges of the environment. Skin and mucosal surfaces of mammals are populated by millions of bacteria and are used to maintain the integrity and health of the skin.

Probiotics are live microorganisms (bacteria), which upon ingestion in sufficient concentrations can exert health benefits to the host<sup>1</sup>. Prebiotics are the food (or fuel) for probiotics to help them grow and thrive. Hundreds of different probiotic species are the natural and predominant constituents of intestinal microbiota and not only regulate digestive health, but can also impact the skin. When the integrity of the gut and probiotic balance gets disturbed, the skin can be impacted<sup>2</sup>. Balancing probiotics in the microbiome is one way to help restore healthy skin.

Mechanistically, the bacteria and their metabolites interact with immunological, metabolic and neuroendocrine pathways that modify stress-related responses in the skin through the gut-skin axis. The gut-skin axis is a way for the gut microbiome and the skin to communicate. The bacteria or probiotics in the gut can impact keratinization, regulation of the expression of MMP-1 enzyme, skin cell turnover, and different skin conditions<sup>2</sup>.

As a result, modifying the host microbiota by using dietary prebiotic supplements or probiotic organisms is now an emerging therapeutic and overall health-promoting modality. Recent studies have found dramatically improved skin and mucosal health in animal models consuming a probiotic-containing yogurt<sup>3</sup>. With these preliminary findings and an understanding of the gut-skin axis, clinically researched strains of pre and probiotics were formulated in a proprietary blend and tested to see the impact they would have on the skin of acne-prone women.

**Purpose:**

The aim was to create a blend of strains of bacteria that balance the gut-skin axis. The selected strains were studied for their impact on acne, eczema, dermatitis, and digestive health. A prebiotic was added to ensure the probiotic strains in the formula and native strains in the gut had adequate food to grow and thrive. The goal of the study was to measure the impact of the pre and probiotic proprietary blend.

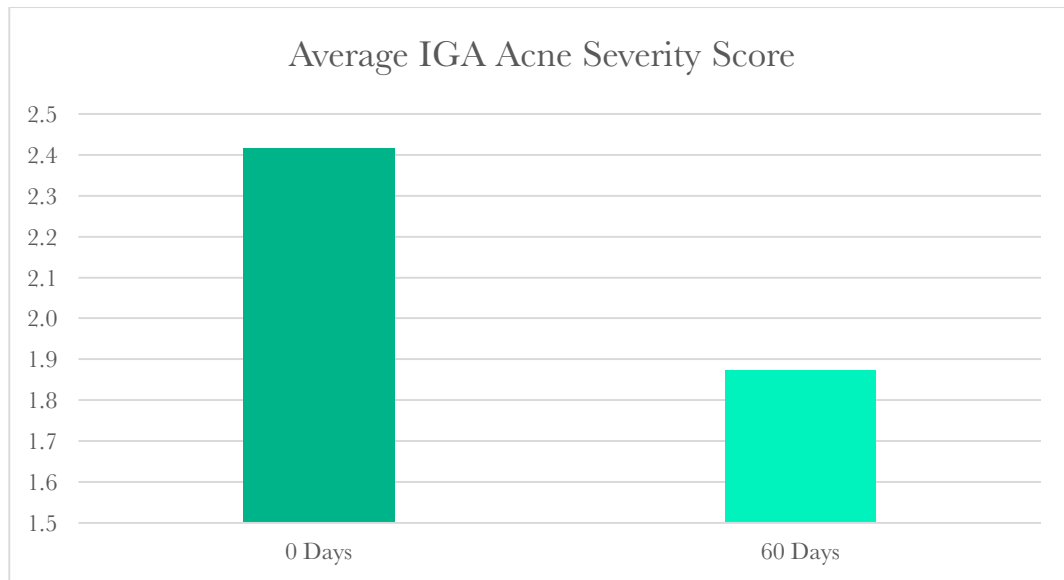
Two types of bacterial strains were used: soil-based and live-strain. The soil-based strains included patented subtilis DE111 and bacillus coagulans. Subtilis DE111 is clinically shown to increase healthy amounts of bacteria in the gut, specifically bifidobacterium and decrease E. coli strains in the gut <sup>4</sup>. Bacillus Coagulans improved digestive health and immune function <sup>5</sup>. One of the beneficial aspects of soil-based organisms is that they can withstand environmental changes without losing their potency, in turn making them shelf-stable.

The blend of live strain probiotics also helps boost the immune system, protect-the skin-gut axis improving skin barrier function. Additional strains included L. rhamnosus HN001, which was found to help prevent atopic dermatitis in high risk infants <sup>6</sup>. The blend also included lactobacillus acidophilus (La-14), lactobacillus paracasei (Lpc-37), bifidobacterium lactis HN019, bifidobacterium lactis (Bi-07), lactobacillus salivarius (Ls-33), bifidobacterium lactis (Bi-04).

The prebiotic konjac root was used due to its ability to feed beneficial bacteria in the gut. Konjac glucomannan hydrolysates have the potential to stimulate the growth of probiotic microorganisms including lactobacilli and decrease bacteroides-prevotella <sup>7</sup>. It is thought that the microorganisms prefer the mannose: glucose substrate (1.6:1), such as found in konjac hydrolysates, because of the nature of the sugars and the accessibility of these sugars as carbon sources <sup>8</sup>.

**Subjects and Methods:** 27 women ages 23-44 with acne-prone skin from the Los Angeles area were recruited to participate in a 60-day pilot study. The effect of HUM Nutrition's pre and probiotic blend (Skin Heroes), which was orally administered once daily at 400mg, was studied. Participants met with a dermatologist to assess their skin and were provided instructions by a dietitian on how to take Skin Heroes Pre+Probiotic daily. Data was collected at the baseline, 30 days and 60 days. Outcome was measured by IGA skin assessment from a dermatologist, self-reported skin assessment, moist sense measure, medical symptom questionnaire, and stool test for gut diversity.

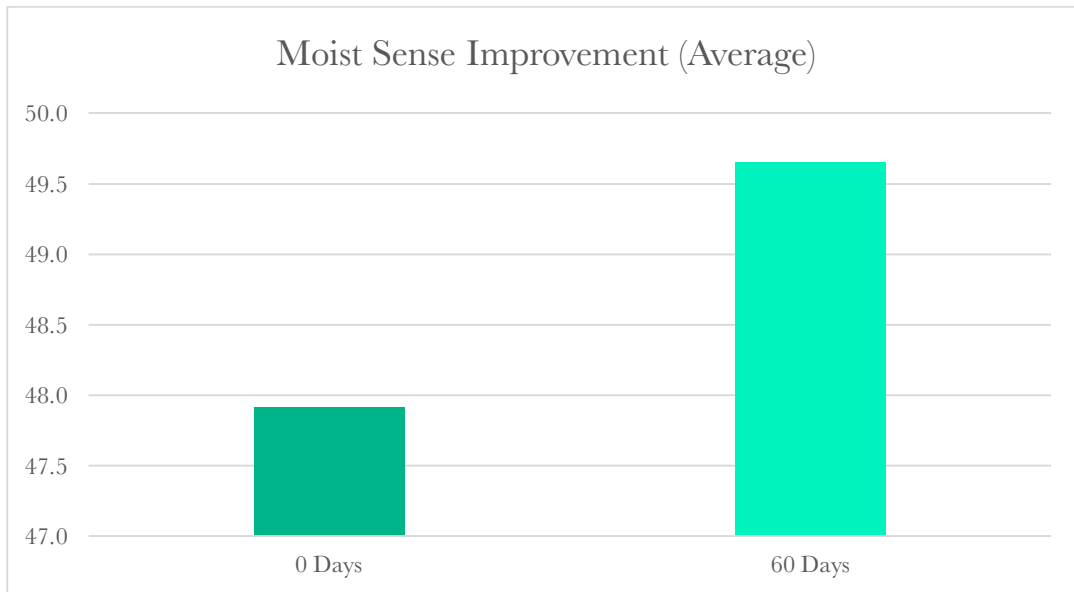
**Results:** Of the 27 women, 23 completed the study. After 60 days, the average improvement of acne severity for study participants were statistically significant with a 5% significance level ( $p=0.000014$ ). The average improvement from self-assessment of severity for study participants were statistically significant at a 5% significance level ( $p < 0.00001$ ). 88% of study participants reported a decrease in acne severity. For all study participants, the average IGA Acne Severity score decreased from 2.42 at the beginning of the study to 1.88 at the end of the study (Fig. 1).



*Figure 1: Acne Severity Score*

*A significant ( $p < 0.05$ ) decrease in acne severity was observed after 60 days. This indicates an improvement in skin due to the oral intake of HUM Nutrition's Skin Heroes Pre+Probiotic.*

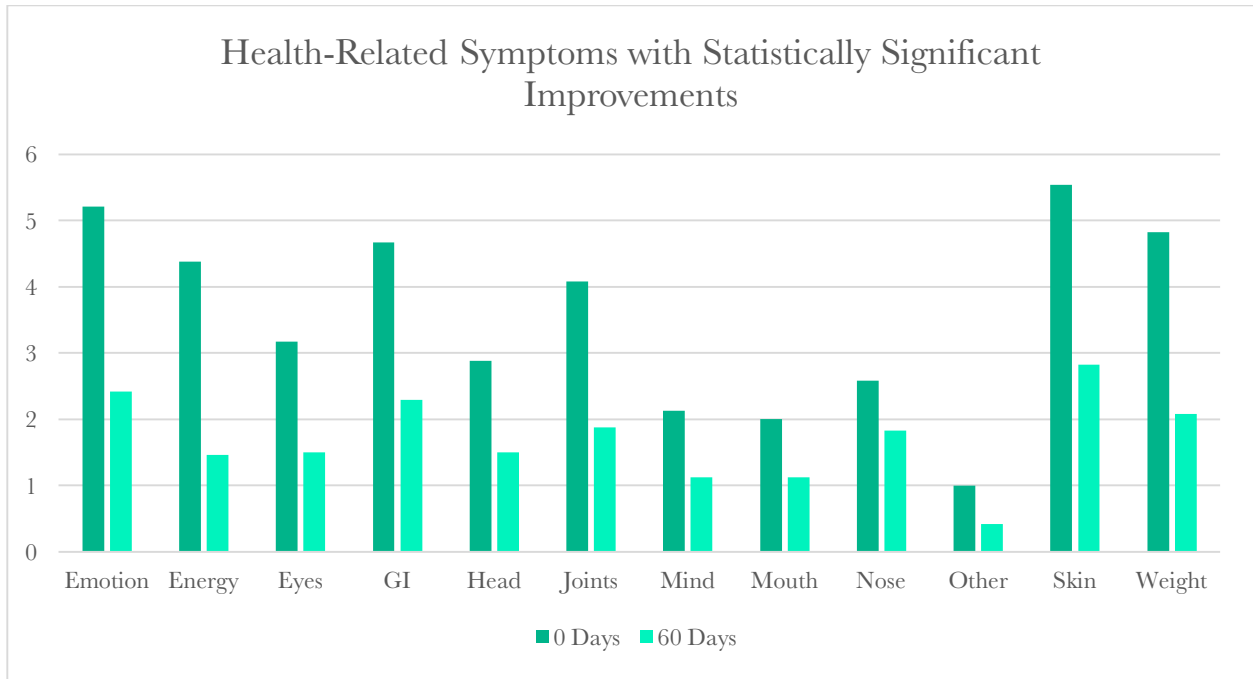
There was also improvement in skin hydration as measured by a Moist Sense Meter.



*Figure 2: An increase of skin moisture was observed after 60 days vs the average baseline of participants.*

**Other findings:** Based on the Medical Symptom Questionnaire: After 30 days, 88% of study participants reported an improvement in overall medical symptoms. After 60 days, 92% of study participants reported an improvement in skin-related symptoms. After 60 days, 81% of study participants reported an improvement in GI-related symptoms.

*\*Note those without GI-related symptoms at the beginning of the study were excluded. After 60 days, the study showed an average improvement for study participants across all fifteen health-related symptoms, 12 of the symptoms showing a statistically significant improvement at a 5% significance level ( $p \leq 0.01$ ).*



*Figure 3: Participants were also given an MSQ (Medical Symptoms Questionnaire). There are a total of 15 categories, which all improved. 12 out of 15 (listed in figure 3) showed a statistical significant ( $p < 0.05$ ) improvement.*

**Discussion:** This preliminary research highlights the impact the Skin Heroes Pre+Probiotic blend had on the gut-skin axis, and the connection between a balanced gut microbiome and improved skin outcomes. 88% of participants reported an improvement in acne severity, 81% reported in improvement in digestive symptoms, and there was a statistically significant difference in Medical Symptom Questionnaire responses in 12 out of the 15 categories. Participants also reported the positive impact the synbiotic blend had on their overall health and self-confidence.

More research needs to be conducted to find exact mechanisms for improvement and isolate the impact each strain may have on native populations in the gut and their metabolites. The microbiome is a complex system of bacteria and can be impacted by external forces such as stress, diet, movement, and environment. The gut-skin axis is an exciting field and will continue to be explored.

## References

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