Poster ID – **P1087**

Comprehensive Oat Benefits for Skin Health: Synergistic Effects of Oat Flour and Oat Beta Glucan on Hyaluronic Acid Production and Barrier Function Through Upregulation of Filaggrin and Loricrin

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Introduction & Objectives

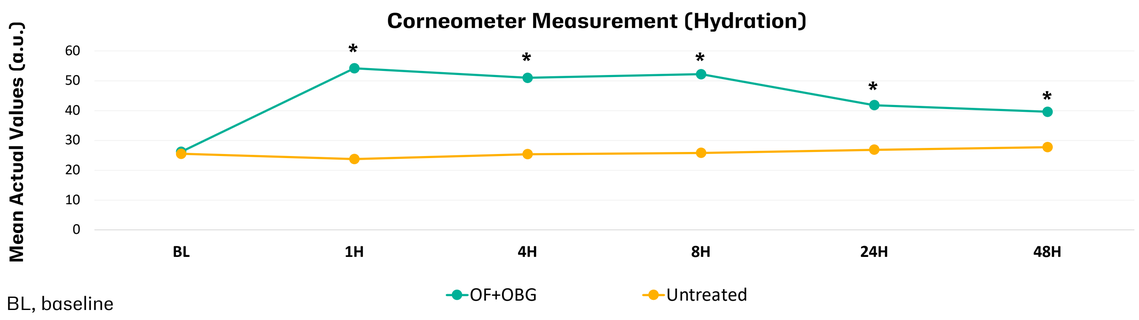
- Oats *(Avena sativa)* have been used for centuries to treat various skin conditions.
- This study investigated the synergy between oat and its beta glucan (OBG) components in strengthening the skin barrier through upregulation of key barrier proteins (filaggrin and loricrin) and stimulation of hyaluronic acid (HA) production, particularly under stress conditions.[1]
- A clinical study confirmed moisture and barrier benefits.

Methods

- **Study 1:** An *in vivo* clinical study of an oat flour (OF) + OBG cream evaluating moisturization (Corneometer®) and skin barrier efficacy (transepidermal water loss [TEWL]) was conducted on 35 participants after a single application to volar forearm over the course of 48 h vs untreated control.
- **Study 2:** An *in vitro* study. Human dermal fibroblasts were treated with OBG and oat flour under normal and cortisol-stressed conditions to evaluate HA productiGon.
- **Study 3:** An *ex vivo* study. Human skin explants were subjected to UV radiation to assess protective effects of oat components against UV-induced HA, filaggrin, and loricrin degradations.
  - Treatments were compared to a Vit C + Vit E combination (positive control), untreated skin explants or phosphate buffered saline (PBS) (negative control).

Study 1: *In Vivo* Study Results

Figure 1. OF + OBG Cream Increased Skin Moisturization Over 48 H After a Single Application



BL, baseline

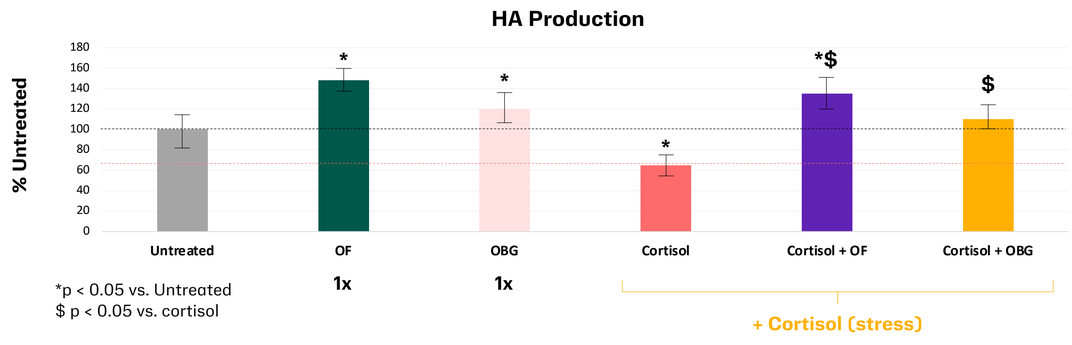
- OF + OBG cream increased moisturization at 1 h, which continued through 48 h (* $p<0.05$; **Figure 1**).
- OF + OBG cream decreased TEWL at 1 h, which continued through 8 h ($p<0.05$) (data not shown.)

OF and OBG Synergistically Upregulated Production of HA in Human Fibroblasts

Study 2: *In Vitro* Study Results

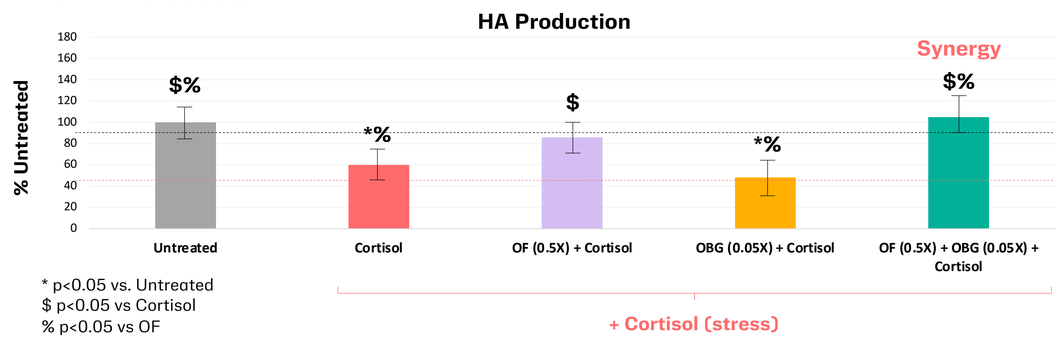
- When human fibroblasts were grown in the presence of cortisol (eg, stress), there was a significant reduction in HA production **(Figure 2).**
- OF and OBG mitigated cortisol-induced reductions in HA **(Figure 2).**
- OBG, at a 20x lower concentration, did not mitigate the effect of cortisol **(Figure 3).**
- However, OBG at a 20x lower concentration synergistically boosted the effect of OF, leading to an increased production of HA despite the presence of cortisol **(Figure 3).**

Figure 2. OF and OBG Upregulated Production of HA in Human Fibroblasts



*p < 0.05 vs. Untreated
$ p < 0.05 vs. cortisol

Figure 3. Synergy between OF and OBG (at reduced concentrations) in the Upregulation of HA in Human Fibroblasts

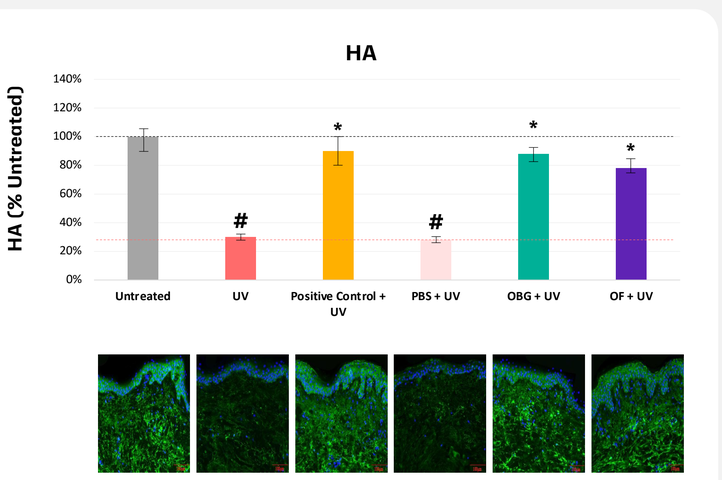


* p<0.05 vs. Untreated
$ p<0.05 vs Cortisol
% p<0.05 vs OF

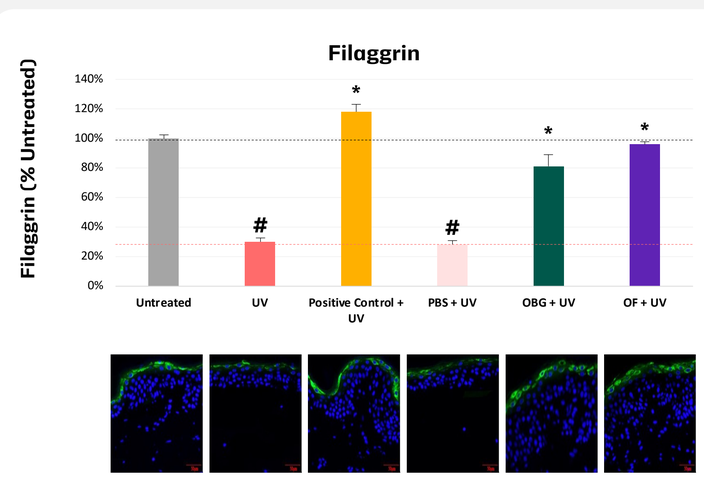
OF and OBG Protect Against UV Induced Degradation of HA, Filaggrin, and Loricrin in Skin Explants

Study 3: *Ex Vivo* Study Results

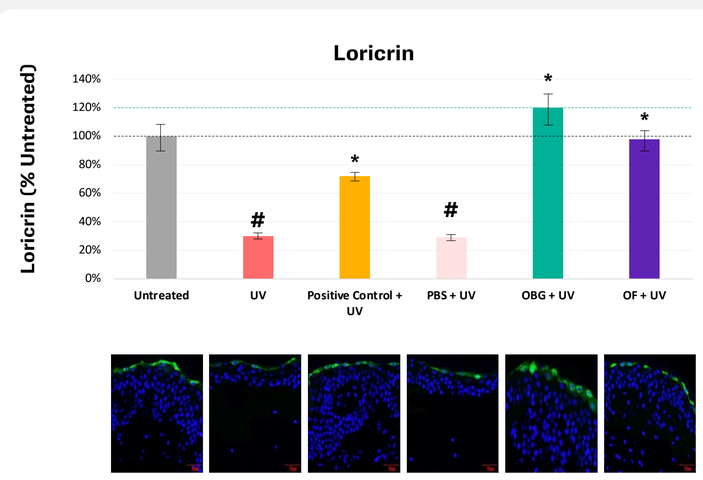
Figure 4. Formulations Containing OF and OBG Protected Against UV-Induced Degradation of HA, Filaggrin, and Loricrin in Human Skin Explants



Immunohistochemistry images:
Brighter green indicates more HA



Immunohistochemistry images:
Brighter green indicates more filaggrin



Immunohistochemistry images:
Brighter green indicates more loricrin

# p<0.05 vs Untreated; * p<0.05 vs UV
Positive control: Vit C + Vit E. Negative control: PBS.
OBG, oat beta glucan; OF, oat flour; PBS, phosphate-buffered saline

Conclusions

Combination of OF and OBG Showed:

Synergistic Production of HA

- The combination of OF and OBG synergistically upregulated production of HA in human fibroblasts in the presence of cortisol (stress) vs the ingredients individually.

Protection Against UV-Induced Degradation of HA and Skin Barrier Proteins

- OBG and OF treatments significantly ($p<0.05$) protected human explants against UV-induced degradation of HA and key barrier proteins filaggrin and loricrin vs UV-treated skin explants.
- Prior work showed oat flour on its own significantly increased filaggrin and loricrin expression in reconstructed human epithelium to strengthen barrier proteins.[2]

Clinical Efficacy in Boosting Hydration and Preserving Barrier to Corroborate the *In Vitro* and *Ex Vivo* Findings

- OF and OBG cream showed statistically significant hydration benefits ($p<0.05$) 1–48 h, and statistically significant barrier benefits ($p<0.05$) 1–8 h after a single use vs untreated control.
  - Boosts and protects skin's HA levels for longer lasting hydration.
  - Strengthens the skin barrier through upregulation and protection of crucial skin barrier proteins and locks in hydration.

References

1. Thomas J, et al. 42923 Oat components provide holistic skin protection against both internal and external exposomal stressor-induced damages, increase ceramide production and balance skin pH *in vitro*. J Am Acad Dermatol. 2023; 89(3):AB201. **2. Edison BL et al.** Pre-clinical and clinical efficacy of an oat-containing lotion demonstrated increased protein, ceramide, skin resiliency and speed of healing the skin barrier. AAD 2026 Poster #75074.

Disclosures: *This work was sponsored by Kenvue Brands LLC*
Author Disclosures: *All authors were employees of Kenvue Brands, LLCat the time of the research*

This data was already presented at the American Academy of Dermatology (AAD), March 27–31, 2026, Denver, CO, USA
European Academy of Dermatology and Venerology (EADV), September 30– October 3, 2026, Vienna, Austria