

Clinical Evaluation of Next-Generation, Multi-Weight Hyaluronic Acid Plus Antioxidant Complex-Based Topical Formulations with Targeted Delivery to Enhance Skin Rejuvenation

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Abstract

Introduction: Hyaluronic acid (HA) has become a commonly used ingredient in many topical moisturizing products due to its strong humectant properties and essential role in skin hydration; however, limitations of delivery of HA to only the surface of skin has hindered leveraging the full capacity of HA biology necessary for skin rejuvenation. Here we describe the clinical efficacy data of a set of novel next-generation, multi-weight HA plus antioxidant complex-based topical formulations with targeted skin delivery to enhance skin rejuvenation, giving a youthful, healthy appearance.

Methods: Four multi-weight HA plus antioxidant complex-based formulations: 1) Multi-Weight HA plus Antioxidant Complex Lotion with SPF 30 (Day Lotion); 2) Multi-Weight HA plus Antioxidant Complex Cream (Night Cream); 3) Multi-Weight HA plus Antioxidant Complex Gel Cream; and 4) Multi-Weight HA plus Antioxidant Complex Boost Serum were clinically evaluated for key attributes including moisturization via corneometer, with clinical grading of: dryness, roughness, fine lines and wrinkles, and following daily use of the individual products for up to 8 weeks.

Results: Daily use of the multi-weight HA plus antioxidant complex-based formulations demonstrated significant improvements in all parameters evaluated compared to baselines, with changes in moisturization observed within 30 minutes of application, and changes in clinical grading parameters of dryness, roughness, fine lines and wrinkles observed as early as 2 weeks.

Conclusions: These data demonstrate the clinical benefits of daily use of multi-weight HA plus antioxidant complex-based moisturizers for overall improvement in skin health and appearance.

Materials and Methods

Multi-weight HA plus Antioxidant Complex-based Formulations:

- Multi-weight HA plus Antioxidant Complex Lotion with SPF 30 (Day Lotion; Eucerin Face Immersive Hydration Daily Lotion SPF 30)
- Multi-weight HA plus Antioxidant Complex Cream (Night Cream; Eucerin Face Immersive Hydration Night Cream)
- Multi-weight HA plus Antioxidant Complex Gel Cream (Eucerin Face Immersive Hydration Gel Cream)
- Multi-weight HA plus Antioxidant Complex Boost Serum (Eucerin Face Immersive Hydration Moisture Boost Serum)

Study Design: Multi-weight HA plus Antioxidant Complex Lotion with SPF 30 (Day Lotion) and Multi-weight HA plus Antioxidant Complex Gel Cream

A double-blind comparative study was conducted on 70 female subjects (n=35, multi-weight HA plus antioxidant complex lotion with SPF 30; n=35, multi-weight HA plus antioxidant complex gel cream) ages 25 to 65 years with mild to moderate facial dryness and visible fine lines and wrinkles, including subjects with Fitzpatrick Skin Types I-VI, with 20% having Fitzpatrick Skin Types V-VI. Clinical grading of the face including dryness, roughness, fine lines, and wrinkles were assessed at baseline, 2 weeks, 4 weeks, and 8 weeks after once daily application in the morning. Digital photography with image grading was conducted at baseline and Week 4.

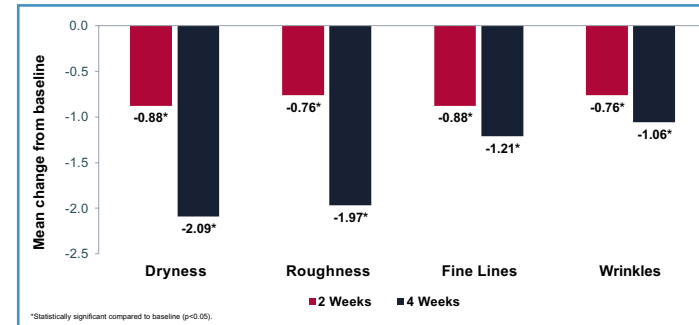
Study Design: Multi-weight HA plus Antioxidant Complex Cream (Night Cream) - Moisturization
A test-sample blind study was conducted on 32 female subjects ages 35 to 65 years with sensitive and/or dry skin. Product was applied on the inner forearm twice daily for 2 weeks. Skin moisturization was assessed by Corneometer CM 825 measurements at baseline, 24 hours, and 2 weeks.

Study Design: Multi-weight HA plus Antioxidant Complex Cream (Night Cream) - FOITS_{HD} Technique
A test-sample blind study was conducted on 42 female subjects ages 36 to 62 years with moderate to distinct (deep) lines and wrinkles in the eye area including subjects with Fitzpatrick Skin Types I-IV. Product was applied to the face twice daily. FOITS_{HD} (Fast Optical *In-vivo* Topometry of Human Skin in High Definition) was assessed at baseline and Week 4. The basis parameters in order to describe the periorbital regions are the averaged depth of roughness (Rz) and the arithmetic mean roughness (Ra).

Study Design: Multi-weight HA plus Antioxidant Complex Boost Serum - Moisturization
A test-sample blind study was conducted on 33 female subjects ages 25 to 55 years. Product was applied on the inner forearm twice daily for 4 weeks. Skin moisturization was assessed by Corneometer CM 825 measurements at baseline, 2 hours, 24 hours, 48 hours, 2 weeks, and 4 weeks.

Study Design: Multi-weight HA plus Antioxidant Complex Boost Serum - FOITS_{HD} Technique
A test-sample blind study was conducted on 31 female subjects ages 27 to 55 years with self-assessed deep lines and wrinkles in the eye areas. Product was applied to the periorbital region (right or left) twice daily for 4 weeks. Anti-wrinkle effects were determined by FOITS_{HD} (Fast Optical *In-vivo* Topometry of Human Skin in High Definition) at baseline and Week 4 in comparison to an untreated control. The basis parameters in order to describe the periorbital regions are the averaged depth of roughness (Rz) and the arithmetic mean roughness (Ra).

FIGURE 1. Multi-weight HA plus Antioxidant Complex Lotion with SPF 30; Clinical Grading (Dryness, Roughness, Fine Lines, Wrinkles)

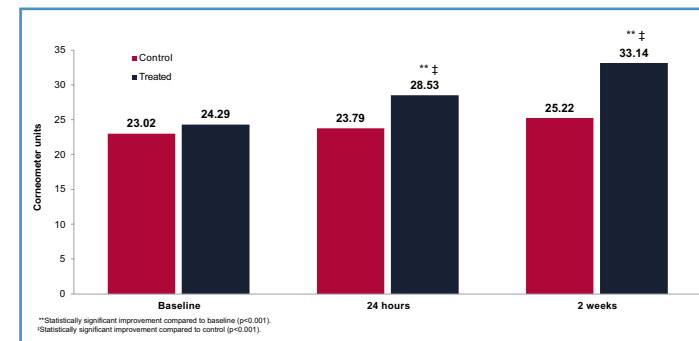


Study Design: A double-blind study was conducted on 35 female subjects ages 25 to 65 years with mild to moderate facial dryness and visible fine lines and wrinkles, including subjects with Fitzpatrick Skin Types I-VI, with 20% having Fitzpatrick Skin Types V-VI. Clinical grading of the face including dryness, roughness, fine lines, and wrinkles were assessed at baseline, 2 weeks, 4 weeks, and 8 weeks after once daily application in the morning.

FIGURE 2. Multi-weight HA plus Antioxidant Complex Lotion with SPF 30; Clinical Grading (Fine Lines)

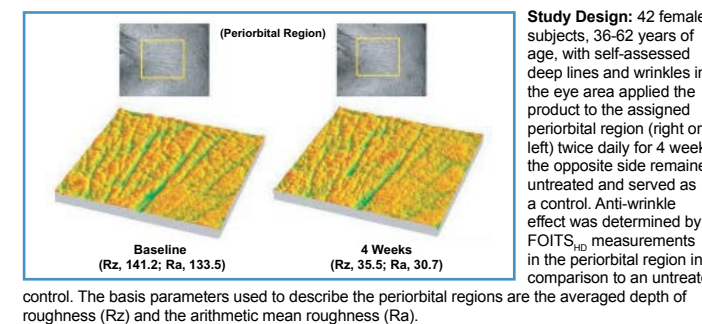


FIGURE 3. Multi-weight HA plus Antioxidant Complex Cream; Clinical Grading (Moisturization)



Study Design: A test-sample blind study was conducted on 32 female subjects ages 35 to 65 years with sensitive and/or dry skin. Product was applied on the inner forearm twice daily for 2 weeks. Skin moisturization was assessed by Corneometer CM 825 measurements at baseline, 24 hours, and 2 weeks.

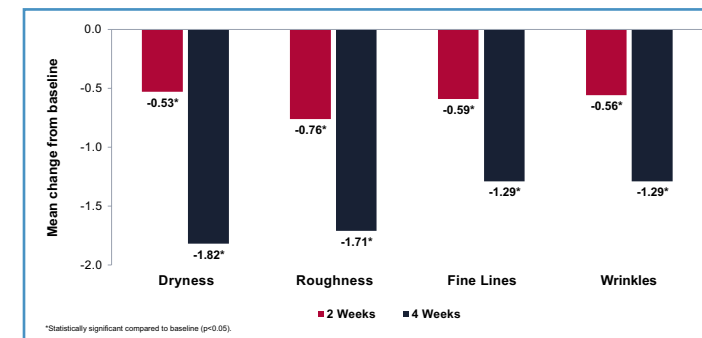
FIGURE 4. Multi-weight HA plus Antioxidant Complex Cream; Clinical Grading (Topometry)



control. The basis parameters used to describe the periorbital regions are the averaged depth of roughness (Rz) and the arithmetic mean roughness (Ra).

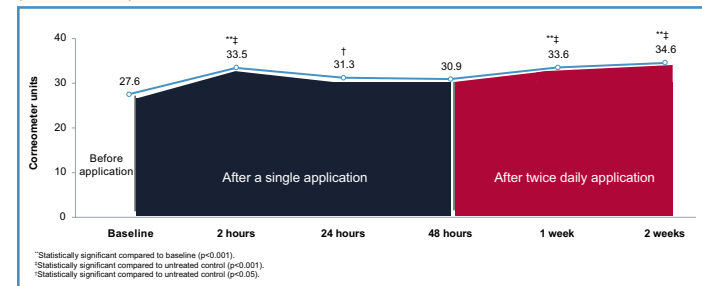
FOITS_{HD}: Fast Optical *In-vivo* Topometry of Human Skin in High Definition (allows for 3D mathematical analysis of skin surface).

FIGURE 5. Multi-weight HA plus Antioxidant Complex Gel Cream; Clinical Grading (Dryness, Roughness, Fine Lines, Wrinkles)



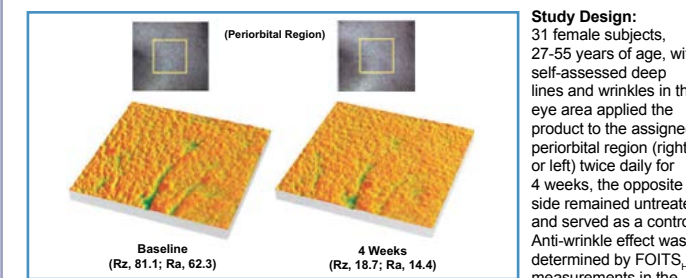
Study Design: A double-blind study was conducted on 35 female subjects ages 25 to 65 years with mild to moderate facial dryness and visible fine lines and wrinkles, including subjects with Fitzpatrick Skin Types I-VI, with 20% having Fitzpatrick Skin Types V-VI. Clinical grading of the face including dryness, roughness, fine lines, and wrinkles were assessed at baseline, 2 weeks, 4 weeks, and 8 weeks after once daily application in the morning.

FIGURE 6. Multi-weight HA plus Antioxidant Complex Boost Serum; Clinical Grading (Moisturization)



Study Design: A test-sample blind study was conducted on 33 female subjects ages 25 to 55 years. Product was applied on the inner forearm twice daily for 4 weeks. Skin moisturization was assessed by Corneometer CM 825 measurements at baseline, 2 hours, 24 hours, 48 hours, 2 weeks, and 4 weeks.

FIGURE 7. Multi-weight HA plus Antioxidant Complex Boost Serum; Clinical Grading (Topometry)



control. The basis parameters used to describe the periorbital regions are the averaged depth of roughness (Rz) and the arithmetic mean roughness (Ra).

FOITS_{HD}: Fast Optical *In-vivo* Topometry of Human Skin in High Definition (allows for 3D mathematical analysis of skin surface).

Summary and Conclusions

- HA plays an essential role as a humectant, capable of binding up to 1000 times its mass with water, leading to both skin moisturization and extracellular matrix rigidity
- Utilization of multi-weight HAs plus antioxidant complex-based topical formulations moisturize the skin surface and penetrate the upper surface layers of the skin, combined with the added benefits of key antioxidants, including glycine saponin and glycyrrhetic acid, which have been previously shown to induce endogenous HA synthesis and inhibit endogenous hyaluronidase activity *in vitro*, respectively
- Here we describe the clinical efficacy data of a set of novel next-generation, multi-weight HA plus antioxidant complex-based topical formulations with targeted skin delivery to enhance skin rejuvenation, giving a youthful, healthy appearance
- Daily use of the multi-weight HA plus antioxidant complex-based formulations demonstrated significant improvements in all parameters evaluated compared to baselines, with changes in moisturization observed within 30 minutes of application, and changes in clinical grading parameters of dryness, roughness, fine lines and wrinkles observed as early as 2 weeks
- These data demonstrate the clinical benefits of daily use of multi-weight HA plus antioxidant complex-based moisturizers for overall improvement in skin health and appearance

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