A Multi-Mechanism Skin Brightening Regimen Delivers Pigment Evening Benefits in an Ethnically Diverse Population

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Introduction

Pigmentation irregularities are a major concern for many ethnic skin populations spanning the globe. 1,2 Safe, effective, and aesthetically pleasing formulations that can even skin color, brighten skin tone, and reduce dark spots are requested by dermatology patients around the world. 3 A new brightening skincare regimen was developed to improve the complexity of facial skin by targeting multiple steps and pathways that affect pigmentation. The regimen consists of a facial cleanser, serum, and lotion, which contain N-Acetylglucosamine® plus a variety of other benefit ingredients to collectively whiten pigmented areas, reduce tyrosinase activity and melanin production, and deliver an overall pigment evening effect.

Objective

to evaluate the tolerability and lightening / brightening benefits of a high-strength twice-daily skincare regimen in normally pigmented and hypopigmented skin in an ethnically diverse population of women with uneven facial pigmentation.

Study Methodology

Study Design

Single-group, prospective skincare regimen use study with direct comparisons to baseline

Population / Inclusion Criteria

Women, 20-65 years old

Skin types 8-4 at enrollment, with areas of interest to be treated free of active inflammatory conditions, topical therapies (including retinoids and hydroquinone) for at least 4 weeks prior to study entry

Exclusion Criteria

Subjects with photosensitivity

Study Duration

16 weeks

Study Regimen

Three times a day for 16 weeks, twice on the forehead and lower face, and once on the remainder of the face

Evaluation Sites

Weeks 0, 4, 8, and 16

Enrollment Track

Subjects will be enrolled on the following schedule:

- New enrollees will be enrolled on a first-come, first-served basis
- Subjects will be enrolled at a rate of 4 to 6 per week until the study is closed

Study Products

ClearStart® Enlighten Ultra Brightening Cleanser

- 1% N-Acetylglucosamine (NeoGlucosamine®)
- Swiss apple plant extracts (GlyNet®)

ClearStart® Enlighten Illuminating Serum

- 1% N-Acetylglucosamine (NeoGlucosamine®)
- Swiss apple plant extracts (GlyNet®)
- Glyciphage®

(Whitefish)®
- Tetrahexyldecyl Ascorbate (Vitamin C)
- Licorice Extract®

Swiss apple plant extracts (GlyNet®)
- Salicylic Acid

ClearStart® Enlighten Brightening Serum

- 1% N-Acetylglucosamine (NeoGlucosamine®)
- Swiss apple plant extracts (GlyNet®)

Melanin Reducer

- 0.1% Retinol
- Swiss alpine plant extracts (GigaWhite)

Study sponsored by NeoStrata Company, Inc., Princeton, NJ, USA

Poster presented at the 21st Congress of the European Academy of Dermatology and Venous Disorders, Paris, France, 2011

References

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21st Congress of the European Academy of Dermatology & Venereology
Prague, Czech Republic, 27-30 September, 2012
Introduction

Pigmentation irregularities are a major concern for many ethnic skin populations spanning the globe. Safe, effective, and aesthetically pleasing formulations that can even skin color, brighten skin tone, and reduce dark spots are requested by dermatology patients around the world. A new brightening skincare regimen was developed to improve the complexion of facial skin by targeting multiple steps and pathways that affect pigmentation. The regimen consists of a facial cleanser, serum, and lotion, which contain N-Acetylglucosamine plus a variety of other benefit ingredients to collectively exfoliate pigmented areas, reduce tyrosinase activity and melanin production, and deliver an overall pigment evening effect.

Objective

To evaluate the tolerability and lightening / brightening benefits of a high-strength twice-daily skincare regimen in normally pigmented and hyperpigmented skin in an ethnically diverse population of women with uneven facial pigmentation.

Study Methodology

Study Design
Single-group, prospective skincare regimen use study with direct comparisons to baseline

Population / Inclusion Criteria
Women, 30–60 years old, Fitzpatrick skin types I–IV, all ethnicities, with areas of mild to moderate facial hyperpigmentation (3–7 on a 10 cm visual analog scale), epidermal in nature (confirmed by Wood's Lamp), willing to limit sun exposure and not change hormonal medications

Exclusion Criteria
Allergies to skincare product ingredients; use of hydroxyacids, retinol, hydroquinone, kojic acid and other antiaging or lightening/brightening cosmetics within last 2 months; cosmetic procedures or routine use of antiaging or skin brightening topical medications, including prescription retinoids, within last 6 months; planned or current pregnancy/breast-feeding

Study Duration
16 weeks

Study Regimen
Twice a day use of the cleanser, serum, and lotion on the entire face (standard facial sunscreen provided for as needed use)

Evaluation Visits
Weeks 0, 4, 8, and 16

Evaluation Tools
• Objective
  – Visual grading by a trained clinical grader using a 10 cm visual analog scale from extremely uneven skin tone (0) to even skin tone (10)
  – Chromameter measurements of brightness (L*) and sallowness (yellow hue, b*) of normally pigmented and hyperpigmented areas (weeks 0, 8, and 16 only)
  – Digital clinical photographs of the face
• Subjective
  – Subject self-assessment questionnaires

Statistics
• Before and after treatment comparisons of visual grading scores and chromameter measurements using ANOVA followed by a Dunnett's test at P<0.05
• Chromameter change from baseline comparisons for hyperpigmented vs normally pigmented skin using paired t-tests at P<0.05
• Tabulation of subject self-assessment scores

Safety
Observed and reported adverse events

Study Products

Product
Cleanser (NeoStrata® Enlighten Ultra Brightening Cleanser)
Serum (NeoStrata® Enlighten Illuminating Serum)
Lotion (NeoStrata® Enlighten Pigment Controller)

Key Benefit Ingredients
• 4% N-Acetylglucosamine (NeoGlucosamine)a,b,c
• Swiss alpine plant extracts (GigaWhite)b,c
• 4% N-Acetylglucosamine (NeoGlucosamine)a,b,c
• Swiss alpine plant extracts (GigaWhite)b,c
• Oligopeptide-34d,e
• Tetrahexyldecyl Ascorbate (Vitamin C)b,c
• Eucommia Ulmoides Leaf Extract (source of chlorogenic acid)f
• Licorice Extractg
• 6% N-Acetylglucosamine (NeoGlucosamine)g,h,i
• Swiss alpine plant extracts (GigaWhite)b,c
• 0.1% Retinolf,h,i
• Ascorbyl Glucoside (Vitamin C)b,c
• Tetrahydrodiferuloylmethane (curcumin analogue found naturally in turmeric, SabiWhite)b,c

aExfoliant; bTyrosinase Inhibitor; cMelanin Reducer

References
2. Self-assessment questionnaires confirmed that subjects noticed brighter skin tone, increased clarity / radiance, and reduced appearance of brown spots after regimen use.
4. Subject photographs (Figs. 3, 4, and 5) show lighter and more even skin color, a brighter overall skin tone, and less apparent brown spots after regimen use.
5. Figure 1. Improvement in Brightness and Sallowness of Normally Pigmented and Hyperpigmented Skin
6. Brighter overall skin tone
7. Brown spots improved in sallowness faster and to a greater degree than normally pigmented skin using paired t-tests at P<0.01.
8. Figure 4. Lighter and less apparent brown spots
9. Figure 5. Evenly colored
13. Hyperpigmented Skin
14. Normally Pigmented Skin
Results

Subject Demographics

<table>
<thead>
<tr>
<th>Subjects (n)</th>
<th>30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Female</td>
</tr>
<tr>
<td>Age, mean (range)</td>
<td>50 (37–60)</td>
</tr>
<tr>
<td>Race/Ethnicity, n (%)</td>
<td></td>
</tr>
<tr>
<td>Latin American</td>
<td>14 (47%)</td>
</tr>
<tr>
<td>Caucasian</td>
<td>10 (33%)</td>
</tr>
<tr>
<td>Pacific Rim Asian</td>
<td>3 (10%)</td>
</tr>
<tr>
<td>African American</td>
<td>2 (7%)</td>
</tr>
<tr>
<td>Indian</td>
<td>1 (3%)</td>
</tr>
</tbody>
</table>

Visual Grading

- 93% of users achieved a more even skin tone after the first 4 weeks
- Significant improvement in evenness of skin tone was observed at every post-baseline visit (weeks 4, 8, and 16, \( P<0.0001 \))

Chromameter Measurements

- Normally pigmented skin and hyperpigmented skin (brown spots) showed significantly increased brightness and decreased sallowness (Fig. 1):
  - Brightness (L*):
    - Normally pigmented skin achieved fast improvement in brightness (week 8, 16), \( P<0.01 \)
    - Hyperpigmented skin achieved strong improvement in brightness by week 16, \( P<0.01 \)
    - Normally pigmented skin and hyperpigmented skin achieved comparable increases in brightness by week 16
  - Sallowness (b*)
    - Normally pigmented skin was significantly less sallow at week 16, \( P<0.01 \)
    - Hyperpigmented skin was significantly less sallow at weeks 8 and 16, \( P<0.01 \)
    - Hyperpigmented skin achieved a significantly greater reduction in sallowness than normally pigmented skin at week 8, \( P<0.05 \)

Figure 1. Improvement in Brightness and Sallowness of Normally Pigmented and Hyperpigmented Skin

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<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>Week 0</td>
</tr>
<tr>
<td>Normally Pigmented Skin</td>
</tr>
<tr>
<td>Hyperpigmented Skin</td>
</tr>
<tr>
<td>Decreased Sallowness</td>
</tr>
</tbody>
</table>

Subject Self-Assessment

- Subjects reported brighter overall skin tone during regimen use:
  - 60% of subjects noticed an improvement as early as 2 weeks
  - 90% of subjects rated excellent, very good or good improvement after 16 weeks
- Subjects reported more even pigmentation, less obvious brown spots, and improved clarity and radiance at each post-baseline visit (Fig. 2)
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Introduction

Pigmentation irregularities are a major concern for many ethnic skin populations spanning around the world. A new brightening skincare regimen was developed to improve around the globe. Safe, effective, and aesthetically pleasing formulations that can even skin pigment evening effect.

Clinical Photographs

Subject photographs (Figs. 3, 4, and 5) show lighter and more even skin color, a brighter overall skin tone, and less apparent brown spots after regimen use.

Figure 2. Subject Self-Assessment of Improvement in Skin Pigmentation

Tolerability

The high-strength regimen was well-tolerated. Adverse reactions were mild (n=3) to moderate (n=3) localized skin irritation, mostly within the first 2 weeks of use, and may have been due to twice-daily use of retinol without an acclimation phase. Reactions were distributed across ethnicities.

Clinical Photography

Subject photographs (Figs. 3, 4, and 5) show lighter and more even skin color, a brighter overall skin tone, and less apparent brown spots after regimen use.

Figure 3.

Figure 4.
A new multi-ingredient brightening skincare regimen was tested in an ethnically diverse sample of women with uneven facial pigmentation. Women applied the regimen to the entire face twice a day for 16 weeks.

**Visual grading and clinical photographs** showed:
- Lighter and more even skin color
- Brighter overall skin tone
- Reduced overall sallowness
- Lighter and less apparent brown spots
- Effects were observed in all ethnic groups

**Chromameter analyses of normally pigmented areas and brown spots** showed that:
- Both normally pigmented areas and brown spots became brighter and less sallow
- Normally pigmented areas brightened faster than brown spots
- Brown spots improved in sallowness faster and to a greater degree than normally pigmented areas

**Self-assessment questionnaires** confirmed that subjects noticed brighter skin tone, more even pigmentation, and less apparent brown spots.

**References**

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