Nonwoven Wipes:
Skin Barrier Improvement using Natural Jojoba Esters

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and Robert A. Harper, Ph.D.

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Nonwoven Wipes: Skin Barrier Improvement Using Natural Jojoba Esters

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Introduction

Jojoba (Simmondsia chinensis) is a perennial shrub native to Arizona, California, and Northwestern Mexico.\(^4\) (Figures 1 and 2) The oil from this plant, jojoba seed oil, is a wax ester that has been used in the past as a folk remedy for renal colic, sunburn, chapped skin, hair loss, headache, wounds, sore throats, psoriasis, and acne (e.g., sulfurized jojoba).\(^5,6\) The ester is composed of long-chain linear fatty alcohols, 20 to 24 carbons in length and long-chain linear fatty acids, 18 to 22 carbons in length. Nearly all of the acid and alcohol moieties are \(\omega-9\) monounsaturated.\(^7\) More recently, Floratech has hydrotized this wax ester for use in various commercial cosmetic and personal care formulations such as lotions, body washes, hand sanitizers, toners, and nonwoven wipes for make up removal and facial cleansing.

Small, vehicle controlled, clinical studies were carried out to explore the benefits associated with incorporating Floraesters® K-100 Jojoba [INCI: hydrolized jojoba esters (and) jojoba esters (and) water (aqua)] and Floraesters K-20W Jojoba [INCI: hydrolized jojoba esters (and) water (aqua)] into various nonwoven wipe solutions. These solutions included hydro-alcoholic systems, non-alcohol based antimicrobial systems, and baby wipe systems. Incorporation of Floraesters K-100 Jojoba and Floraesters K-20W Jojoba resulted in increased skin hydration, increased consumer preference, and anti-irritation properties which include decreased erythema and increased skin barrier function (as compared to the known anti-irritant bisabolol\(^E\)). These studies demonstrate how Floraesters K-100 Jojoba and Floraesters K-20W Jojoba can provide added functionality to multiple categories of nonwoven wipes.

Objective: Determine the skin hydration potential of Floraesters K-20W Jojoba and Floraesters K-100 Jojoba in conjunction with glycerin, when added to a non-alcohol based solution.

Design: Nonwoven wipes (45g/m² spunlace) were soaked in the test solutions for 24 hours. One application of each experimental wipe was applied to dry lower legs of twelve healthy female subjects.

End Point: Increased skin hydration as measured by the Corneometer® CM 825 over four hours (Figure 3).

Increased Skin Hydration: Non-Alcohol Based Wipes

<table>
<thead>
<tr>
<th>Time (hours)</th>
<th>Vehicle</th>
<th>Vehicle + 1% Floraesters K-20W</th>
<th>Vehicle + 1% glycerin + 0.1% K-100</th>
<th>Vehicle + 1% glycerin</th>
<th>Vehicle + 1% glycerin + 0.5% K-20W</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5</td>
<td>-10%</td>
<td>30%</td>
<td>40%</td>
<td>0%</td>
<td>-40%</td>
</tr>
<tr>
<td>1.5</td>
<td>0%</td>
<td>20%</td>
<td>30%</td>
<td>-10%</td>
<td>-30%</td>
</tr>
<tr>
<td>2.5</td>
<td>0%</td>
<td>20%</td>
<td>30%</td>
<td>-10%</td>
<td>-30%</td>
</tr>
<tr>
<td>3.5</td>
<td>0%</td>
<td>20%</td>
<td>30%</td>
<td>-10%</td>
<td>-30%</td>
</tr>
<tr>
<td>4</td>
<td>0%</td>
<td>20%</td>
<td>30%</td>
<td>-10%</td>
<td>-30%</td>
</tr>
</tbody>
</table>

Increased Skin Hydration: Hydro-Alcoholic Wipes

Objective: Determine the skin hydration potential of Floraesters K-20W Jojoba and Floraesters K-100 Jojoba in conjunction with glycerin, when added to a hydro-alcoholic solution.

Design: All solutions contained 65% ethanol, 1% glycerin, and water. Nonwoven wipes (45g/m² spunlace) were soaked in the 2.5g of test solution for 72 hours. One application of each experimental wipe was applied to dry lower legs of twelve healthy female subjects.

End Point: Increased skin hydration as measured by the Corneometer CM 825 over two hours (Figure 4).

References / Footnotes


G. Corneometer is a registered trademark of Courage + Khazaka Electronic GmbH (Koln, Germany).

H. Germ-X® Antibacterial Soft Wipes Singles were utilized. Germ-X is a registered trademark of Vi-Jon Laboratories (St. Louis, MO).

I. Wal-Mart® Equate® Antibacterial Wipes were utilized. Equate is a registered trademark of Wal-Mart Stores, Inc. (Rockline Industries, Sheboygan, WI).

J. Tewameter is a product of Courage + Khazaka Electronic GmbH, (Koln, Germany).


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Consumer Preference: Non-Alcohol Based Wipes

Objective: Determine the consumer preference between a non-alcohol based wipe with and without Floraesters K-20W Jojoba.
Design: Nonwoven wipes (45 g/m² spunlace) were soaked in the 5 g of test solution for 24 hours. One application of each experimental wipe was applied to the entire left or right hand of thirty-one healthy female subjects.
End Point: Consumer preference survey immediately following application (Figure 5).

Figure 5: Increased Consumer Preference

<table>
<thead>
<tr>
<th>Overall Preference</th>
<th>Vehicle + 0.5% K-20W</th>
<th>Vehicle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clean-Feel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moistness</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smoothness / Softness</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No Tackiness</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No Residue</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dry-Down</td>
<td></td>
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</tr>
</tbody>
</table>

Figure 5. The test article containing Floraesters K-20W Jojoba was preferred in all cases.

Barrier Function: Baby Wipes

Objective: Determine the anti-irritation potential of Floraesters K-20W Jojoba and Floraesters K-100 Jojoba, when added to a baby wipe solution.
Design: Nonwoven wipes (45 g/m² spunlace) were soaked in the 2.5 g of test solution for 24 hours. The forearms of fourteen healthy subjects were dry shaved to create skin irritation. Measurements were made at baseline (pre-shave, no treatment), post-shave (pre-test article treatment), and 4, 24, 48, and 72 hours post initial test article application. Test article applications were made following post-shave, 4, 24, and 48 hour measurements.
End Point: Increased barrier function as measured by the Tewameter™ 300 (Figure 6).

Figure 6: Increased Barrier Recovery

<table>
<thead>
<tr>
<th>Percent Barrier Recovery (TEWL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 hours</td>
</tr>
<tr>
<td>Vehicle</td>
</tr>
<tr>
<td>Vehicle + 0.2% K-100</td>
</tr>
<tr>
<td>Vehicle + 1% K-20W</td>
</tr>
<tr>
<td>Vehicle + 0.5% bisabolol</td>
</tr>
</tbody>
</table>

Figure 6. The addition of 1% Floraesters K-20W Jojoba or 0.2% Floraesters K-100 Jojoba produced statistically significant increases (p<0.01) in barrier recovery over the vehicle and untreated skin at all time points. The Floraesters K-20W Jojoba products also performed statistically significantly (p<0.05) better than 0.5% bisabolol at the 4 and 24 hour time points.

Anti-Irritation: Baby Wipes

Objective: Determine the anti-irritation potential of Floraesters K-20W Jojoba and Floraesters K-100 Jojoba, when added to a baby wipe solution.
Design: Nonwoven wipes (45 g/m² spunlace) were soaked in the 2.5 g of test solution for 24 hours. The forearms of fourteen healthy subjects were dry shaved to create skin irritation. Measurements were made at baseline (pre-shave, no treatment), post-shave (pre-test article treatment), and 4, 24, 48, and 72 hours post initial test article application. Test article applications were made following post-shave, 4, 24, and 48 hour measurements.
End Point: Decreased erythema (from 4 hours to each time point) as measured by the Mexameter MX 18™ (Figure 7).

Figure 7: Decreased Erythema

<table>
<thead>
<tr>
<th>Percent Decrease in Erythema (Mexameter)</th>
</tr>
</thead>
<tbody>
<tr>
<td>24 hours</td>
</tr>
<tr>
<td>48 hours</td>
</tr>
<tr>
<td>72 hours</td>
</tr>
</tbody>
</table>

Figure 7. The addition of 1% Floraesters K-20W Jojoba, 0.2% Floraesters K-100 Jojoba, or 0.5% bisabolol produced statistically significant decreases (p<0.01) in erythema over the vehicle, untreated skin, and baseline at all time points. The Floraesters K-20W Jojoba and Floraesters K-100 Jojoba products performed statistically equivalent to 0.5% bisabolol.

Conclusions

- Floraesters K-20W and K-100 Jojoba increased skin hydration when incorporated, in combination with glycerin, into non-alcoholic nonwoven wipes and hydro-alcoholic nonwoven wipes.
- Floraesters K-20W increased consumer perception when incorporated into non-alcoholic nonwoven wipes.
- Floraesters K-20W and K-100 Jojoba increased barrier function in irritated skin when incorporated into a baby wipe.
- Floraesters K-20W and K-100 Jojoba decreased erythema in irritated skin when incorporated into a baby wipe.
LOT SPECIFIC RAW MATERIAL INFO 24/7?

NOW THAT’S GENIUS!

CofA, TDS, SDS, Efficacy Data, Formulas, etc...

No Registration or Passwords!

Scan the QR Code on your product or sample

...or go to floratech.com/info for lot specific information 24/7!