Nonwoven Wipes: Skin Barrier Improvement Using Natural Jojoba Esters

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For the Society of Cosmetic Chemists
2012 Technology Showcase

December 6th – 7th, 2012
New York, NY

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Introduction

Small, environmentally controlled, double-blind, clinical studies were conducted to explore the benefits of incorporating small amounts of hydrolyzed jojoba esters into nonwoven wipes. In the first study, Floraesters K-20W Jojoba [INC: hydrolyzed jojoba esters (and) water (aqua)] or Floraesters K-100 Jojoba [INC: hydrolyzed jojoba esters (and) jojoba esters (and) water (aqua)] was incorporated into hydro-alcoholic wipes. After one application to the lower legs of normal subjects with dry skin, the wipes containing the hydrolyzed jojoba esters produced statistically greater skin hydration than the vehicle wipe (as measured by a Corneometer) with peak hydration increases of approximately 35% at the 30 minute time point. In a second study carried out in a similar fashion as the first study, hydrolyzed jojoba esters were incorporated into non-alcohol based antimicrobial wipes. These wipes were compared to a vehicle wipe as well as to currently marketed antibacterial wipes. After one application, the wipes which contained either of the hydrolyzed jojoba esters produced statistically greater skin hydration than all other wipes, with peak hydration increases of 40 to 47%. In the third study, skin irritation was induced by dry shaving the forearm of normal subjects. Hydrolyzed jojoba esters were incorporated into baby wipes and compared to a vehicle wipe and a wipe containing bisabolol. Multiple wipe applications were made after shaving over four days. Erythema and transepidermal water loss (TEWL) measurements were taken after each wipe application. The baby wipes which contained the hydrolyzed jojoba esters increased barrier recovery (as measured by TEWL) better than bisabolol and were as efficacious as bisabolol in reducing skin erythema. These studies indicate that hydrolyzed jojoba esters can be delivered to the skin in multiple nonwoven wipe formulas which all produce significant benefits to the skin barrier.

Increased Skin Hydration: Non-Alcohol Based Wipes

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

Design: Nonwoven wipes (45g/m² spunlace) were soaked in 5g of test solution 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 1).

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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 glycine when added to a hydro-alcoholic solution.

Design: All solutions contained 65% ethanol, 1% glycine, and water. Nonwoven wipes (45g/m² spunlace) were soaked in 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 2).

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References / Footnotes

A. Corneometer is a registered trademark of Courage + Khazaka Electronic GmbH (Köln, Germany).
B. Fresh Scent Wet Ones® Antibacterial Hand and Face Wipes Pocket Size Singles were utilized. Wet Ones is a registered trademark of Playtex Products Inc. (Dover, DE).
C. Germ-X® Antibacterial Soft Wipes Singles were utilized. Germ-X is a registered trademark of Vl-Jon Laboratories (St. Louis, MO).
D. Wal-Mart® Equate® Antibacterial Wipes were utilized. Equate is a registered trademark of Wal-Mart Stores, Inc. (Rockline Industries, Sheboygan, WI).
E. Tetramer is a product of Courage + Khazaka Electronic GmbH, (Köln, Germany).
G. Mexameter is a product of Courage + Khazaka Electronic GmbH, (Köln, 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 (45g/m² spunlace) were soaked in 5g 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 3).

![Overall Preference](chart.png)

Figure 3: The test article containing Floraesters K-20W Jojoba was preferred in all cases.

### 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 (45g/m² spunlace) were soaked in 2.5g 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\(^{95}\) (Figure 5).

![Percent Decrease in Erythema (Mexameter)](chart.png)

Figure 5: 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 Jojoba increased favorable 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.
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