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. It is a woody plant, seed oil, and wax, which has been used in the past as a folk remedy for renal colic, sunburn, chafed skin, hair loss, headache, wounds, sore throats, pneumonia, and acne (e.g., sulfated jojoba). The ester is composed of long-chain fatty alcohols, 20 to 24 carbons in length and long-chain fatty acids, 18 to 22 carbons in length. Nearly all of the acid and alcohol moieties are ω-3 monoenoic. More recently, Floratech has hydrolyzed 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 makeup removal and facial cleansing.

Small, vehicle controlled, clinical studies were carried out to explore the benefits associated with incorporating Florastore® K-100 Jojoba (INCI: hydrolyzed jojoba esters (and) jojoba esters (and) water (aqua)) and Florastore® K-20W Jojoba (INCI: hydrolyzed jojoba esters (and) water (aqua)) into various nonwoven wipe solutions. These solutions included hydro-alcoholic systems, non-alcohol based systems, and baby wipe systems. Incorporation of Florastore® K-100 Jojoba and Florastore® 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). These studies demonstrate how Florastore® K-100 Jojoba and Florastore® K-20W Jojoba can provide added functionality to multiple categories of nonwoven wipes.

Materials and Methods

Each of the studies described below utilized nonwoven wipes consisting of 100% polypropylene spunlace. These nonwoven wipes had a bursting strength of 155 lb/in², a thickness of approximately 0.005”, and a weight of 45 g/m². The nonwoven wipes were conditioned at 50% relative humidity and 23°C for 48 hours prior to testing.

Objective: To determine the skin hydration potential of Florastore® K-20W Jojoba and Florastore® K-100 Jojoba in conjunction with glycerin, when added to a hydro-alcoholic based solution.

Design: Nonwoven wipes (4Kg/m² spunlace) 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 Centometer® CM 825 over four hours (Figure 3).

Objective: To determine the consumer preference between a non-alcohol based wipe with and without Florastore® K-20W Jojoba.

Design: Nonwoven wipes (4Kg/m² spunlace) soaked in 2.5g 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 5).

Objective: To determine the skin hydration potential of Florastore® K-20W Jojoba and Florastore® K-100 Jojoba in conjunction with glycerin, when added to a hydro-alcoholic based solution.

Design: All solutions contained 65% ethanol, 1% glycerin, and water. Nonwoven wipes (60g/m² spunlace) 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 Centometer® CM 825 over two hours (Figure 4).

Objective: To determine the consumer preference between a non-alcohol based wipe with and without Florastore® K-20W Jojoba.

Design: Nonwoven wipes (4Kg/m² spunlace) soaked in the 2.5g 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 5).

Results and Discussion

Increased Skin Hydration: Non-Alcohol Based Wipes

Figure 1: Jojoba Seed

Figure 2: Jojoba Seed

Figure 3: Increased Skin Hydration

Increased Skin Hydration: Hydro-Alcoholic Wipes

Figure 4: Increased Skin Hydration

Consumer Preference: Non-Alcohol Based Wipes

Figure 5: Increased Consumer Preference

Increased Skin Hydration: Hydro-Alcoholic Wipes

Figure 6: Increased Barrier Recovery

Barrier Function: Baby Wipes

Figure 7: Increased Skin Hydration

Conclusions

- Florastore® K-20W and K-100 Jojoba increased skin hydration when incorporated, in combination with glycerin, into non-alcohol nonwoven wipes and hydro-alcoholic nonwoven wipes.
- Florastore® K-20W increased consumer perception when incorporated into non-alcohol nonwoven wipes.
- Florastore® K-20W and K-100 Jojoba increased barrier function in irritated skin when incorporated into a baby wipe.
- Florastore® K-20W and K-100 Jojoba decreased erythema in irritated skin when incorporated into a baby wipe.
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