

# Formulator Report:

## Skin Care Benefits of Floraesters K-20W<sup>®</sup> Jojoba



**Floraesters K-20W Jojoba** [INCI: Hydrolyzed Jojoba Esters (and) Water] is a multifunctional ingredient that has been clinically tested and utilized in a variety of cosmetic and personal care formulations such as creams/lotions, hand sanitizers, nonwoven wipes, sunscreens, sunless tanners, toners/astringents, and face washes.<sup>1</sup> Its film-forming properties make it ideal for rinse-off products and products that require water resistance or to extend the period of residence time on the skin.

The botanically-derived Floraesters K-20W Jojoba is Ecocert certified, and EU and China REACH compliant.

### Theoretical Mechanisms of Action:

Gene-expression testing of Floraesters K-20W Jojoba was conducted by Genemarkers, LLC (Kalamazoo, MI).<sup>2</sup> The data indicates statistically significant change over the vehicle in gene expression for genes related to the following biological functions (↑ indicates up regulation and ↓ indicates down regulation):

- Hydration (↑ AQP3 / ↑ AQP5 suggests an increase in hydration)
- Inflammatory Response (↓ TNF suggests a reduction in the inflammatory response)
- Desquamation (↑ KLK5 / ↑ KLK6 / ↑ KLK7 suggests an increase in stratum corneum shedding and keratinocyte turnover)
- Antioxidant Response (↑ TXN / ↑ TXNRD1 / ↑ CAT suggests an increase in antioxidant response)
- Proliferation (↓ MKI67 is in agreement with anti-aging literature)
- Pigmentation / Brightening (↓ EDN1 suggests a reduction in pigmentation / brightening effect)

### Clinical Study Facts<sup>3</sup>:

The substantivity of Floraesters K-20W Jojoba makes it well-suited to entrap molecules at the skin surface. In double-blind clinical studies, Floraesters K-20W Jojoba produced the following benefits over the vehicle control:

- In combination with glycerin or butylene glycol, Floraesters K-20W Jojoba enhances skin hydration<sup>4</sup>
  - Increased skin hydration up to 67% in a sunscreen formulation (**Figure 1**)
  - Increased skin hydration at least 100% in a toner formulation (**Figure 2**)
- Effective at reducing the appearance of irritation-associated erythema, as well as affecting skin barrier function and restoration<sup>5</sup>
  - Decreased the appearance of erythema in a baby wipe formulation (**Figure 3**)
  - Increased barrier function in a baby wipe formulation (**Figure 4**)
- Sunscreen actives in combination with Floraesters K-20W Jojoba are retained on the skin after water immersion<sup>6</sup>
- Many fragrances are retained on the skin longer in the presence of Floraesters K-20W Jojoba<sup>7</sup>

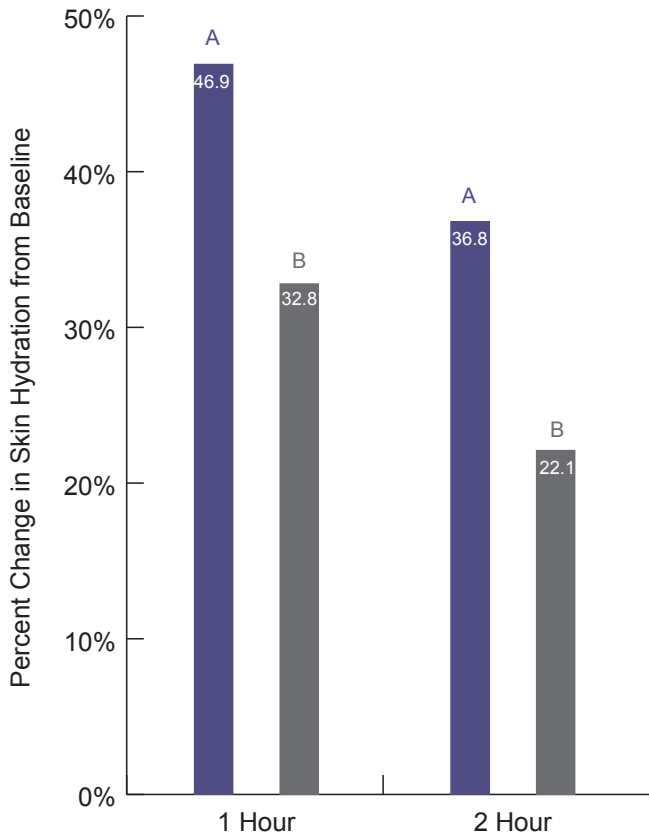
### Formulation Benefits:

- Emolliency remains after rinse-off
- Rich emolliency on skin
- Substantivity
- Water resistant
- Soluble in most alcohols and glycols
- Botanically derived
- Readily biodegradable<sup>8</sup>

1. Cargill has not tested Floraesters K-20W Jojoba in final drug formulations. Compliance with FDA regulations is the responsibility of the customer.  
 2. Study was conducted on a 5% Floraesters K-20W Jojoba solution in glycerin. Final Report available upon request.  
 3. Final Reports available upon request. Figures can be found on the next two pages of this document.  
 4. See Claim Sheets 09-013, 09-014, 10-017, 10-024, 13-052, 15-070, and 15-071 for more information.  
 5. See Claim Sheets 11-035 and 11-036 for more information.  
 6. See Claim Sheet 10-018 and 15-066 for more information.  
 7. M. Cummings. Built to last. *Soap, Perfumery & Cosmetics*. November 2001.  
 8. Biodegradable according to OECD 301B.

Figures<sup>9</sup>:

### Floraesters K-20W Jojoba Increased Skin Hydration



**Figure 1:** The sunscreen containing 5% Floraesters K-20W Jojoba statistically significantly ( $p < 0.05$ ) increased skin hydration compared to the vehicle sunscreen, one and two hours post application (43% and 67%, respectively). (See Claim Sheet 15-070.)

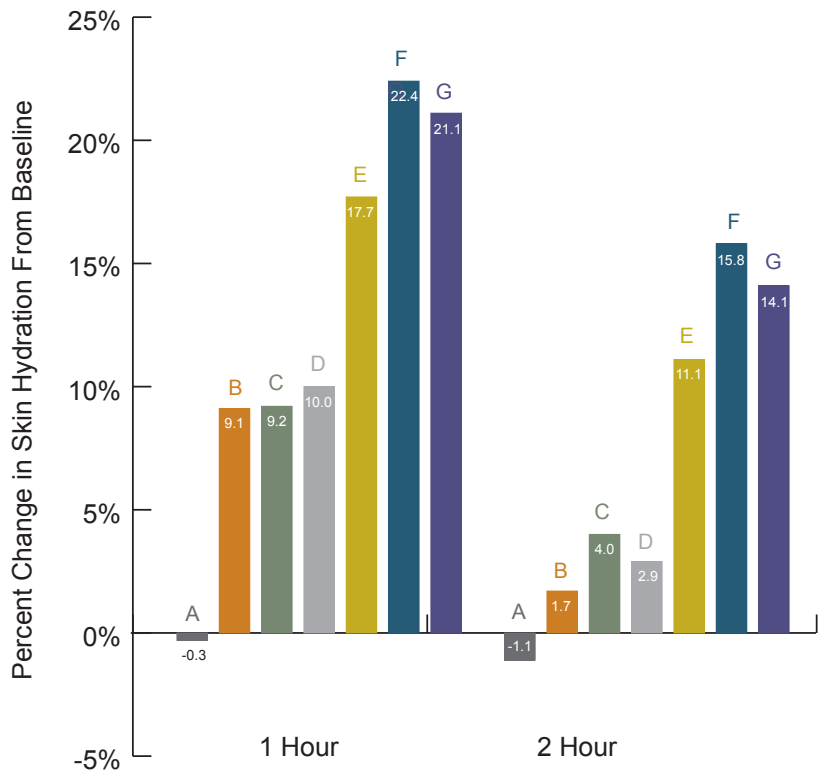
■ A - Vehicle + 5% Floraesters K-20W Jojoba  
 ■ B - Vehicle

Vehicle Sunscreen (%wt/wt): Water (q.s.), C12-15 Alkyl Benzoate (8.0%), Titanium Dioxide (and) Dimethicone (7.5%), Ethyl Macadamiate (5.0%), Potassium Cetyl Phosphate (3.0%), Sunflower Seed Oil Sorbitol Esters (2.0%), Polyhydroxystearic Acid (1.0%), Cetearyl Alcohol (1.0%), Glycerin (1.0%), Phenoxyethanol (and) Methylparaben (and) Ethylparaben (and) Butylparaben (and) Propylparaben (and) Isobutylparaben (0.8%), Triethanolamine (0.2%), and Acrylates/C10-30 Alkyl Acrylate Crosspolymer (0.1%).

### Floraesters K-20W Jojoba Increased Skin Hydration

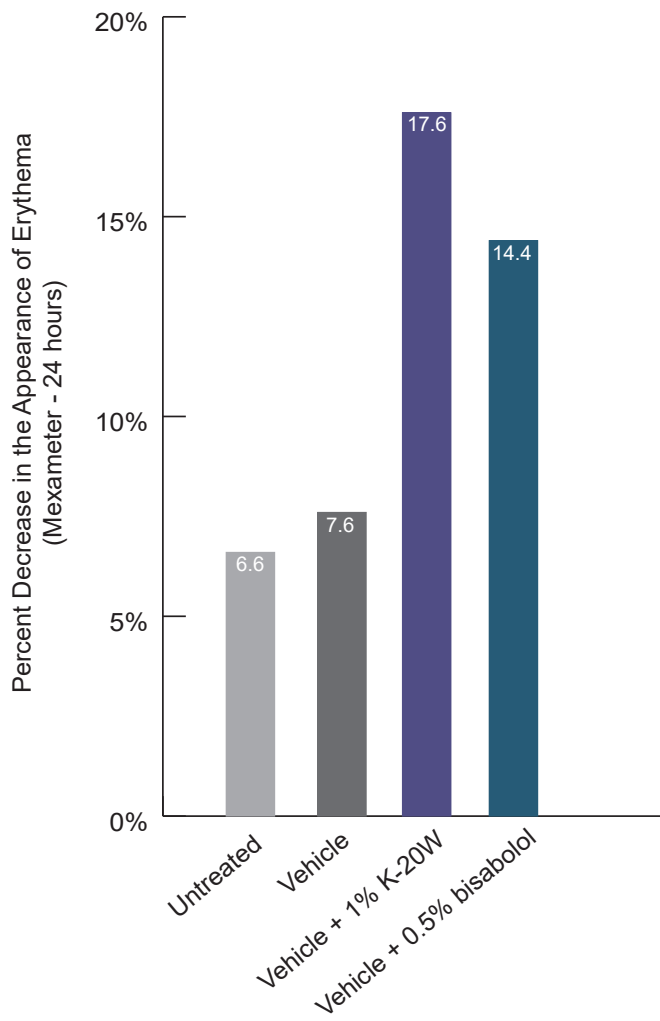
**Figure 2:** Floraesters K-20W Jojoba added to clear, alcohol-free, and PEG-free toners, in conjunction with either glycerin or butylene glycol, increased skin hydration at least 100% compared to the test articles without Floraesters K-20W Jojoba. (See Claim Sheet 15-071.)

■ A - 0.3% glycerin  
 ■ B - 2% butylene glycol  
 ■ C - 0.5% Floraesters K-20W Jojoba  
 ■ D - 2% butylene glycol + 0.3% glycerin  
 ■ E - 0.3% glycerin + 0.5% Floraesters K-20W Jojoba  
 ■ F - 2% butylene glycol + 0.5% Floraesters K-20W Jojoba  
 ■ G - 2% butylene glycol + 0.3% glycerin + 0.5% Floraesters K-20W Jojoba



<sup>9</sup>. All studies were conducted double-blind, vehicle-controlled, and randomized.

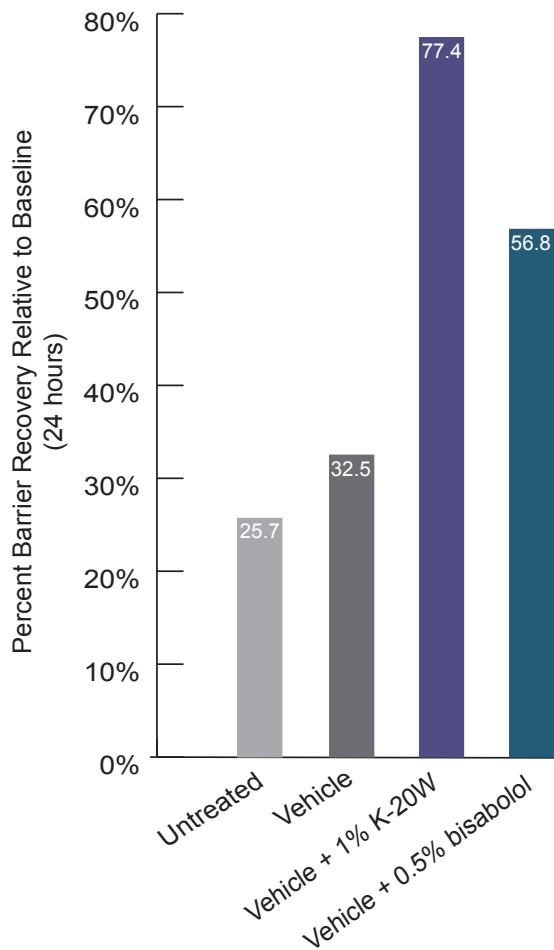
## Floraesters K-20W Jojoba Reduced the Appearance of Erythema



**Figure 3:** A baby wipe containing 1% Floraesters K-20W Jojoba decreased the appearance of erythema (redness) better than the vehicle baby wipe ( $p < 0.05$ ) and better than the baby wipe containing 0.5% of the known anti-irritant bisabolol.<sup>10</sup>

Irritation was induced by dry shaving the forearms. (See Claim Sheet 11-036.)

## Floraesters K-20W Jojoba Enhanced Barrier Recovery



**Figure 4:** A baby wipe containing 1% Floraesters K-20W Jojoba increased barrier recovery as measured by Tewameter (TEWL) better than the vehicle baby wipe ( $p < 0.05$ ) and better than the baby wipe containing 0.5% of the known anti-irritant bisabolol ( $p < 0.05$ ).<sup>10</sup>

Irritation was induced by dry shaving the forearms. (See Claim Sheet 11-035.)

Vehicle (%wt./wt.): water (q.s.), propylene glycol (2.00%), PEG-40 hydrogenated castor oil (1.25%), PPG-26 Buteth-26 (and) PEG-40 hydrogenated castor oil (1.00%), decyl glucoside (0.30%), methylisothiazolinone (0.10%), disodium EDTA (0.05%), and citric acid (q.s.)

10. Stanzyk K, Volhardt J. The Case of Alpha-bisabolol. Handbook of Cosmetic Science and Technology. Ed. Ao Barel, M Payne, and HI Maibach. New York, NY: Marcel Dekker, 2001: 277-84. Print.

## Formula: PEG-Free Clear Hydrating Toner<sup>11</sup>

This crystal clear, alcohol and PEG-free toner revitalizes and balances the skin. Floraesters K-20W Jojoba hydrates and firms the skin, leaving the face feeling clean, refreshed, and moisturized.

Phase	Trade/Common Name	INCI Name	Manufacturer	% wt./wt.
A	Deionized Water	Water	-----	q.s.
	Versene® Na2 Crystals	Disodium EDTA	The Dow Chemical Co.	0.10
B	Glycerine 99.7% USP Kosher	Glycerin	Acme-Hardesty Co.	0.30
	1,3-BG	Butylene Glycol	Nexeo Solutions	2.00
	<b>Floraesters K-20W Jojoba</b>	<b>Hydrolyzed Jojoba Esters (and) Water (Aqua)</b>	<b>Floratech</b>	<b>0.50</b>
	Fragrance <sup>12</sup>	-----	-----	q.s.
C	Plantaren® 810UP	Caprylyl/Capryl Glucoside	BASF Corporation	3.00
	Preservative <sup>13</sup>	-----	-----	q.s.
	Witch Hazel Distillate preserved with Phenoxyethanol	Hamamelis Virginiana (Witch Hazel) Water	American Distilling, Inc.	3.50
D	Trehalose 100	Trehalose	Hayashibara Co., Ltd.	0.10
	Sodium Hyaluronate Powder (1% Solution)	Sodium Hyaluronate (and) Water	Tri-K Industries Inc.	0.10
	Purac® Hipure 90 (15% Solution)	Lactic Acid (and) Water	Corbion	q.s.
			<b>Total</b>	<b>100.00</b>

### Procedure:

1. At room temperature, add the Versene Na2 Crystals to the deionized water of Phase A with moderate propeller agitation and mix until completely dissolved.
2. Weigh the Floraesters K-20W Jojoba in a separate container. Add the other ingredients of Phase B to the Floraesters K-20W Jojoba, in the order listed. Begin mixing at room temperature with low to moderate propeller agitation. Make sure the Floraesters K-20W Jojoba is completely dissolved.
3. Add Phase B to Phase A with moderate to rapid propeller agitation.
4. Add Phase C to Phase AB, one ingredient at a time in the order listed, at room temperature with moderate to rapid propeller agitation. Make sure each ingredient is uniformly mixed in the solution before the next ingredient is added.
5. Add Phase D with moderate to rapid propeller agitation to achieve pH 5.5.

### Formula Properties:

Property	Result
pH	5-6
Clarity	96-100% Transmittance



Floraesters K-20W Jojoba

## Ingredient Information 24/7 Online

**iLabel**®  
www.floratech.com/info

<sup>11</sup>. INCI/Trade names must be verified with each manufacturer.

<sup>12</sup>. Fragrance: Citrus Herbal ORC0801108 supplied by Orchidia.

<sup>13</sup>. Preservative: Botanistat® PF-64 [INCI: Phenoxyethanol (and) Caprylyl Glycol (and) Ethylhexylglycerin (and) Hexylene Glycol] supplied by Botanigenics, Inc.