Floraesters K-20W Jojoba and Floraesters K-100 Jojoba: *condition* and *protect*

In rinse-out hair care applications Floraesters K-20W Jojoba and Floraesters K-100 Jojoba have been proven to reduce wet comb force, provide hair dye color protection, and improve perception of hair quality (*e.g.* smoothness, frizz, and shine) by consumers.

Floraesters K-20W Jojoba [INCI: Hydrolyzed Jojoba Esters (and) Water] and Floraesters K-100 Jojoba [INCI: Hydrolyzed Jojoba Esters (and) Jojoba Esters (and) Water] are multifunctional ingredients that have been utilized and/or tested in a variety of cosmetic and personal care formulations such as creams/lotions, hand sanitizers, nonwoven wipes, sunscreens, sunless tanners, shampoos/conditioners, toners/astringents, face washes, and oil-free formulations. The film-forming properties of these Floraesters make them ideal for rinse-off products, products that require water resistance, or to extend the period of residence time of a product on the hair or skin.

The botanically-derived Floraesters K-20W Jojoba and Floraesters K-100 Jojoba are Ecocert certified, sustainable, and EU and China REACh compliant.

The substantivity of Floraesters K-20W Jojoba and Floraesters K-100 Jojoba make them well-suited to deposit on hair fibers, maintaining lasting conditioning benefits to the hair shaft.

**Study Facts**:1

Floraesters K-20W Jojoba in a shampoo:
- Reduced wet comb force 60% more than the vehicle shampoo (*Figure 1*)
- Caused 10% less red hair dye color loss than the vehicle shampoo (*Figure 3*)
- Caused 35% less brown hair dye color loss than the vehicle shampoo (*Figure 3*)

Floraesters K-100 Jojoba in a conditioner:
- Reduced wet comb force 1.5 times more than the vehicle conditioner (*Figure 1*)
- Resulted in 30% less frizz than the vehicle conditioner (*Figure 2*)
- Caused 13% less red hair dye color loss than the vehicle conditioner (*Figure 4*)
- Caused 22% less brown hair dye color loss than the vehicle conditioner (*Figure 4*)
- Significantly improved consumer perception of hair qualities for multiple categories (*Figure 5*)

**Formulation Benefits:**
- Emolliency remains after rinse-off
- Substantivity
- Allows for oil-free claims
- Readily biodegradable
- Water resistant
- Soluble in most alcohols and glycols
- Botanically-derived

1. Final Reports available upon request. Figures can be found on the next two pages of this document.
2. All studies were conducted double-blind, vehicle-controlled, and randomized (when applicable).

3. Naturally curly, dark brown hair tresses were damaged by double-bleaching and cleansed with a 10% sodium lauryl sulfate solution prior to use in the study.

4. Naturally curly, dark brown hair tresses were cleansed with a 10% sodium lauryl sulfate solution prior to use in the study.

**Figure 1:** The shampoo containing 2.5% Floraesters K-20W Jojoba reduced wet comb force 60% more than the vehicle shampoo (p<0.10); and the rinse-out conditioner containing 1% Floraesters K-100 Jojoba reduced wet comb force 1.5 times more than the vehicle conditioner (p<0.05). (See Claim Sheets 15-067 and 15-068.)

**Figure 2:** Hair tresses treated with the conditioner containing 1% Floraesters K-100 Jojoba produced 30% less frizz than hair tresses treated with the vehicle conditioner. (See Claim Sheet 16-078.)
**Protect Hair: Improved Color Retention of Hair Dyes with Floraesters K-20W Jojoba**

Figure 3: Wool swatches dyed with commercial red or brown permanent hair dyes retained up to 35% more color when a shampoo containing 2.5% Floraesters K-20W Jojoba was compared to a shampoo without. Statistical (*) significance between test articles was apparent where indicated (p<0.05). (See Claim Sheet 15-074.)

![Graph showing color retention vs. wash cycles for different shampoos](image)

- A - vehicle shampoo (red)
- B - vehicle shampoo + 2.5% K-20W (red)
- C - vehicle shampoo (brown)
- D - vehicle shampoo + 2.5% K-20W (brown)

The images above show the wool swatches after 8 wash / rinse treatment cycles for each shampoo. The shampoos with Floraesters K-20W Jojoba resulted in less color fading.

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**Protect Hair: Improved Color Retention of Hair Dyes with Floraesters K-100 Jojoba**

Figure 4: Wool swatches dyed with commercial red or brown permanent hair dyes retained up to 22% more color when a conditioner containing 1% Floraesters K-100 Jojoba was compared to a conditioner without. Statistical (*) significance between test articles was apparent where indicated (p<0.05). (See Claim Sheet 15-075.)

![Graph showing color retention vs. wash cycles for different conditioners](image)

- A - vehicle conditioner (red)
- B - vehicle conditioner + 1% K-100 (red)
- C - vehicle conditioner (brown)
- D - vehicle conditioner + 1% K-100 (brown)

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5. Wool swatches were dyed with commercial hair dyes according to package instructions.
**Condition Hair: Increased Consumer Preference with Floraesters K-100 Jojoba**

This luxurious shampoo is oil-free and silicone-free. Floraesters K-20W Jojoba conditions the hair by reducing wet comb force, leaving the hair soft and manageable.

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**Formula: Silicone-Free, Ultra-Conditioning Shampoo with Floraesters K-20W Jojoba**

This luxurious shampoo is oil-free and silicone-free. Floraesters K-20W Jojoba conditions the hair by reducing wet comb force, leaving the hair soft and manageable.

### 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
 | Carbopol® Aqua SF-1 Polymer | Acrylates Copolymer | The Lubrizol Corporation | 5.50
B | Glucamate® CCO | Methyl Glucose Caprate/Caprylate Oleate (and) Propandiol | The Lubrizol Corporation | 2.00
 | Chemccinate® DLS Surfactant | Disodium Laureth Sulfosuccinate | The Lubrizol Corporation | 12.00
 | Plantaren® 2000 N UP | Decyl Glucoside | BASF Corporation | 8.00
 | Perlastan® L-30 | Sodium Lauroyl Sarcosinate | Schill & Seilacher | 8.00
 | Pureact l-78C | Sodium Cocoyl Isethionate | Innospec Performance Chemicals | 2.00
 | Rita EGDS | Glycol Distearate | Rita Corporation | 1.50
C | Deionized Water | Water | ----- | 5.00
 | Zema® Propanediol | Propanediol | DuPont Tate & Lyle BioProducts | 0.50
 | Floraesters K-20W Jojoba | Hydrolyzed Jojoba Esters (and) Water (Aqua) | Floratech | 2.50
D | Chembetaine® C Surfactant | Cocamidopropyl Betaine | The Lubrizol Corporation | 8.00
E | Aquacat® CGS18 | Guar Hydroxypropyltrimonium Chloride | Ashland, Inc. | 0.70
 | AMP-Ultra® PC2000, Neutralizing Amine | Aminomethyl Propanol | Angus Chemical Company | q.s.
F | Fragrance* | ----- | ----- | q.s.
 | Preservative*** | ----- | ----- | q.s.
| **Total** | | | **100.00** |

### 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. Add the Carbopol Aqua SF-1 Polymer and mix until uniform. Start heating to 70-75°C.
2. Add each ingredient of Phase B to Phase A at 70-75°C in the order listed with moderate propeller agitation and mix until uniform. Reduce the heat to 60-65°C.
3. In a separate vessel, mix the Floraesters K-20W Jojoba and the Zemea Propanediol of Phase C until the Floraesters K-20W Jojoba is well dispersed. Add the deionized water of Phase C and continue mixing until uniform. Add Phase C to Phase AB at 60-65°C with moderate propeller agitation and mix until uniform.
4. Add Phase D to Phase ABC with moderate propeller agitation and begin cooling.
5. At 50-55°C, add Phase E to Phase ABCD with moderate to low propeller agitation and continue cooling.
6. At 45-50°C, add Phase F to Phase ABCDE. Continue cooling the mixture to room temperature.

### Formula Properties:

<table>
<thead>
<tr>
<th>Property</th>
<th>Result</th>
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<tbody>
<tr>
<td>pH</td>
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<tr>
<td>Viscosity</td>
<td>4400 - 7900cP</td>
</tr>
</tbody>
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6. Naturally curly, dark brown hair tresses were damaged by double-bleaching and cleansed with a 10% sodium lauryl sulfate solution prior to use in the study.
7. The preference data does not include subjects that indicated no preference.
8. INCI/Trade names must be verified with each manufacturer.
9. Fragrance: Clean Ocean Fragrance ORC 0801665 supplied by Orchidia

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