Floraesters® K-20W Jojoba increases permanent and semi-permanent hair dye deposition and retention. Floraesters K-20W Jojoba [INCI: Hydrolyzed Jojoba Esters (and) Water (Aqua)] is a multifunctional ingredient that has been tested and utilized 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, primers, hair dyes, and oil-free formulations. Its film-forming properties make it ideal for rinse-off products, products that require water resistance, and products that require an extended period of residence time on the skin (i.e. long wear).

The substantivity of Floraesters K-20W Jojoba makes it well-suited to entrap molecules on the hair or at the skin surface. For example, in combination with glycerin, Floraesters K-20W Jojoba enhances skin moisturization.1 Additionally, Floraesters K-20W Jojoba increases sunscreen active retention on the skin after water immersion,2 and fragrances remain on the skin longer in the presence of Floraesters K-20W Jojoba.3 Clinical studies have also shown that Floraesters K-20W Jojoba is effective at reducing irritation-associated erythema, as well as improving skin barrier function and restoration;4 and ex vivo studies have shown that Floraesters K-20W Jojoba remains on hair after rinsing, and provides long lasting conditioning and protection benefits.5

The botanically-derived Floraesters K-20W Jojoba is COSMOS/Ecocert certified, sustainable, and EU and China REACh compliant.

Study Facts6:
Floraesters K-20W Jojoba in a permanent hair dye:
• Reduced hair dyeing time by almost 50% compared to the vehicle hair dye (Figure 1)
• Resulted in 10% less hair dye color loss than the vehicle hair dye (Figure 2)

Floraesters K-20W Jojoba in a semi permanent hair dye:
• Resulted in up to 21% greater hair dye color intensity than the vehicle hair dye (Figures 3 and 4)
• Resulted in up to 58% less hair dye color loss than the vehicle hair dye (Figures 3 and 5)
• Significantly improved consumer perception of gray coverage and richness of hair dye color (Figure 6)

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
Permanent Hair Dye: Increased Deposition and Enhanced Color Retention

**Figure 1:** Wool swatches dyed with the permanent hair dye containing 2% Floraesters K-20W Jojoba achieved the same color intensity with just over 10 minutes of residence time as the vehicle hair dye with 20 minutes of residence time (p<0.05). (See Claim Sheet 16-080.)

**Figure 2:** Wool swatches dyed with the permanent hair dye containing 2% Floraesters K-20W Jojoba retained more color (i.e. slower rate of color loss) when compared to the vehicle hair dye (p<0.05). (See Claim Sheet 16-081.)

Semi-Permanent Hair Dye: Increased Deposition and Enhanced Color Retention

**Figure 3:** Hair tresses dyed with the semi-permanent hair dye containing 2% Floraesters K-20W Jojoba achieved 21% greater color intensity in 20 minutes (p<0.05), and subsequently resulted in up to 58% less color loss after 6 wash cycles (p<0.01). (See Claim Sheet 16-088.)

Study Design: Brown permanent hair dyes with and without 2% Floraesters K-20W Jojoba were applied to wool swatches, and change in color (ΔE) from pre-dye was measured after 5, 10, 15, and 20 minutes of residence time. Additionally, change in color (ΔE) from post-dye was measured after each wash / rinse cycle for a total of 8 cycles.

Study Design: Hair tresses were dyed with orange semi-permanent hair dyes with and without 2% Floraesters K-20W Jojoba. The change in color (ΔE) of the hair tresses was measured immediately after dyeing (0 washes), and again after 3 and 6 wash cycles.
Semi-Permanent Hair Dye: Increased Deposition

Figure 4: Hair tresses dyed with semi-permanent hair dye containing 2% Floraesters K-20W Jojoba achieved up to 19% greater color intensity in 20 minutes (p<0.05). (See Claim Sheet 17-105.)

Study Design: Hair tresses were dyed with brown semi-permanent hair dyes with and without 2% Floraesters K-20W Jojoba. The change in color (ΔE) of the hair tresses was measured immediately after dyeing. (PQ6 = polyquaternium-6; Q80 = quaternium-80)

Semi-Permanent Hair Dye: Enhanced Color Retention

Figure 5: Hair tresses dyed with semi-permanent hair dye containing 2% Floraesters K-20W Jojoba resulted in up to 53% less color loss after 6 wash cycles (p<0.05). (See Claim Sheet 17-106.)

Study Design: Hair tresses were dyed with brown semi-permanent hair dyes with and without 2% Floraesters K-20W Jojoba. The change in color (ΔE) of the hair tresses was measured immediately after dyeing, and again after 3 and 6 wash cycles.
Semi-Permanent Hair Dye: Increased Consumer Preference

This semi-permanent hair dye with Floraesters K-20W Jojoba increases color uptake (i.e. deposition) and provides more even coverage, leaving hair color looking rich and radiant. Studies have also shown that Floraesters K-20W Jojoba provides longer lasting hair color (less color loss due to washing), decreasing the need for frequent hair dyeing.

**Formula: Whisk Away Grays Semi-Permanent Hair Dye**

This semi-permanent hair dye with Floraesters K-20W Jojoba increases color uptake (i.e. deposition) and provides more even coverage, leaving hair color looking rich and radiant. Studies have also shown that Floraesters K-20W Jojoba provides longer lasting hair color (less color loss due to washing), decreasing the need for frequent hair dyeing.

### Phase A
- **Oxowax**
- Genapol LA 070 S
- Ritacet 20
- Hicall K-230

### Phase B
- Lanette® E
- Deionized Water

### Phase C
- Vibracolor® Moonlight Blue
- Vibracolor Ruby Red
- Vibracolor Citrus Yellow
- Vibracolor Flame Orange
- Deionized Water

### Phase D
- Floraesters K-20W Jojoba
- Propylene Glycol USP/EP

### Phase E
- Merquat® 100 Polymer
- Citric Acid, USP (30% Solution)

#### Procedure:
1. Mix the ingredients of Phase A at 70-80°C with moderate propeller agitation.
2. In a separate vessel, combine the ingredients of Phase B at 70-80°C with moderate propeller agitation.
3. Once Phase B is uniform, add Phase B to Phase A.
4. Switch Phase AB to homomixing.
5. In separate vessel, combine the dyes with the deionized water of Phase C. Mix until the dyes dissolve.
6. Add Phase C to Phase AB while maintaining a temperature of 70-80°C. Continue homomixing until uniform. Switch to moderate propeller agitation and cool to 55-60°C.
8. Add Phase D to Phase ABC with moderate propeller agitation.
9. Cool mixture to 40-50°C. Add the Merquat 100 Polymer with moderate propeller agitation.
10. Once mixture has cooled to 30-40°C, adjust pH to 4.0-4.5 with the Citric Acid, USP (30% Solution) of Phase E.

### Ingredient Information

**Floraesters K-20W Jojoba**

- pH: 4.0 - 4.5
- Viscosity: 153K - 320K