Formulator Report: Floramac® 10 Enhances Skin Care Products

Floramac 10 [INCI: Ethyl Macadamiate] is a unique botanically-derived emollient that can be utilized in a variety of cosmetic and personal care formulations, including creams / lotions, sunscreens[1], moisturizers, serums, color cosmetics, and hair care products; and is a suitable substitute for low viscosity silicones. **Floramac 10** is functional within formulations, and contributes to favorable product aesthetics. **Floramac 10** assists in the dispersion and solubilization of sunscreens; provides a dry emolliency, giving formulas a skin feel similar to that of cyclopentasiloxane (without the volatility); and imparts a degree of skin moisturization greater than silicones. It can be gelled to mimic a skin feel similar to traditional silicones, but is also miscible[2] in silicones such as cyclopentasiloxane, dimethicones (<100 cst), and phenyl trimethicone. It can easily work as a silicone alternative, or in conjunction with silicones in a finished formula.

Floramac 10 is EU and China REACH compliant, TGA approved, and listed on AICS.

Formulation Benefits:

- Assists in the dispersion and solubilization of sunscreens
- Alternative for some silicones
- Compatible with oils, volatile and non-volatile silicones
- Non-comedogenic
- Botanically-derived
- Allows for silicone-free claims
- Non-volatile
- High spread and low viscosity
- Tolerant of pro-oxidative environments
- Biodegradable[3]

Clinical Study Facts[4]:

In double-blind, vehicle-controlled, clinical studies, **Floramac 10** produced the following benefits:

- **Increased skin moisturization and silkiness / smoothness** as perceived by consumers (Figures 2, 3, and 4)
- **Increased skin cleanliness, effectiveness of eye-make-up removal, and less make-up residue** as perceived by consumers (Figure 2)
- **Minimized appearance of wrinkles** as perceived by consumers (Figure 3)
- **Increased skin radiance** compared to silicones (Figure 5)
- **Improved skin moisturization** compared to silicones (Figure 5)

1. Cargill has not tested Floramac 10 in final OTC drug formulations. Compliance with FDA regulations is the responsibility of the customer.
2. Miscibility is defined as a 50:50 mixture remaining clear and homogenous at room temperature after sitting overnight.
3. Biodegradable according to OECD 301B.
4. Final Reports available upon request. Figures can be found on the next two pages of this document.

Figures[5,6]:

Objective: To evaluate Floramac 10 for its potential to provide a similar skin feel to cyclopentasiloxane (Figure 2) and enhance consumer perception (Figure 3) when used in a clear under eye rejuvenator.

Figure 2. Floramac 10 vs. Cyclopentasiloxane

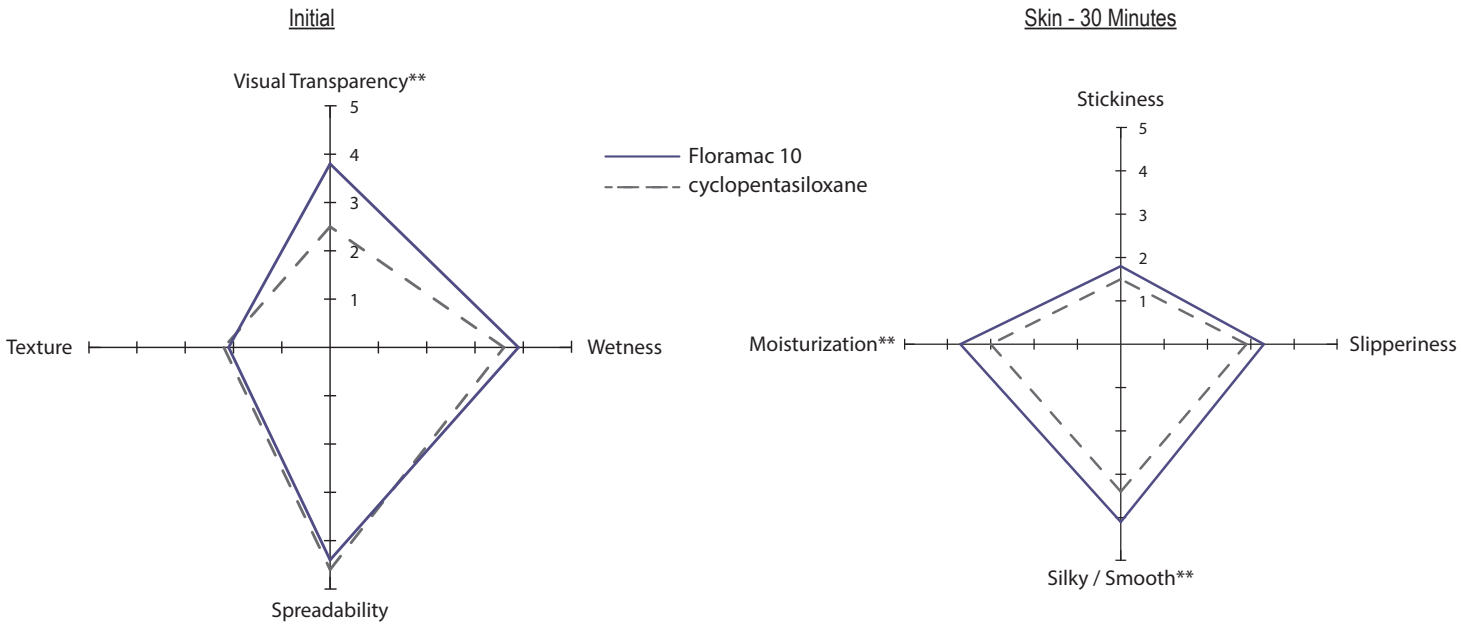
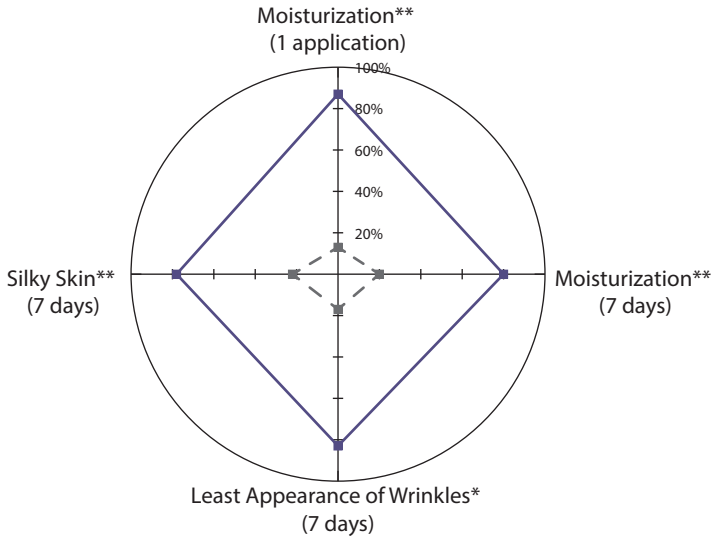


Figure 2. Initially, **Floramac 10** resulted in a **more visually transparent** under eye rejuvenator than cyclopentasiloxane. Thirty minutes post-application to the skin, **Floramac 10 left the skin perceivably more silky / smooth and moisturized.** (See Claim Sheet 16-090.)

Figure 3. Consumers Prefer Floramac 10 over Cyclopentasiloxane In a Clear Under Eye Rejuvenator

Figure 3. **87% of consumers preferred** the skin **moisturization** produced by the product with **Floramac 10** compared to cyclopentasiloxane after one use. After seven days of use, **consumers preferred** the product with **Floramac 10** for **skin moisturization and silkiness**, as well as for **least appearance of wrinkles**. (See Claim Sheet 16-090.)



5. All studies were conducted double-blind, vehicle-controlled, and randomized.
6. Statistical (**) and directional (*) significance was apparent where indicated ($p<0.05$ and $p<0.1$, respectively).

Figure 4. 82% of Consumers Preferred a Cleansing Oil Gel with Floramac 10

Objective: To evaluate Floramac 10 for its potential to enhance consumer perception (Figure 4) when used in a cleansing oil gel, as compared to olive oil.

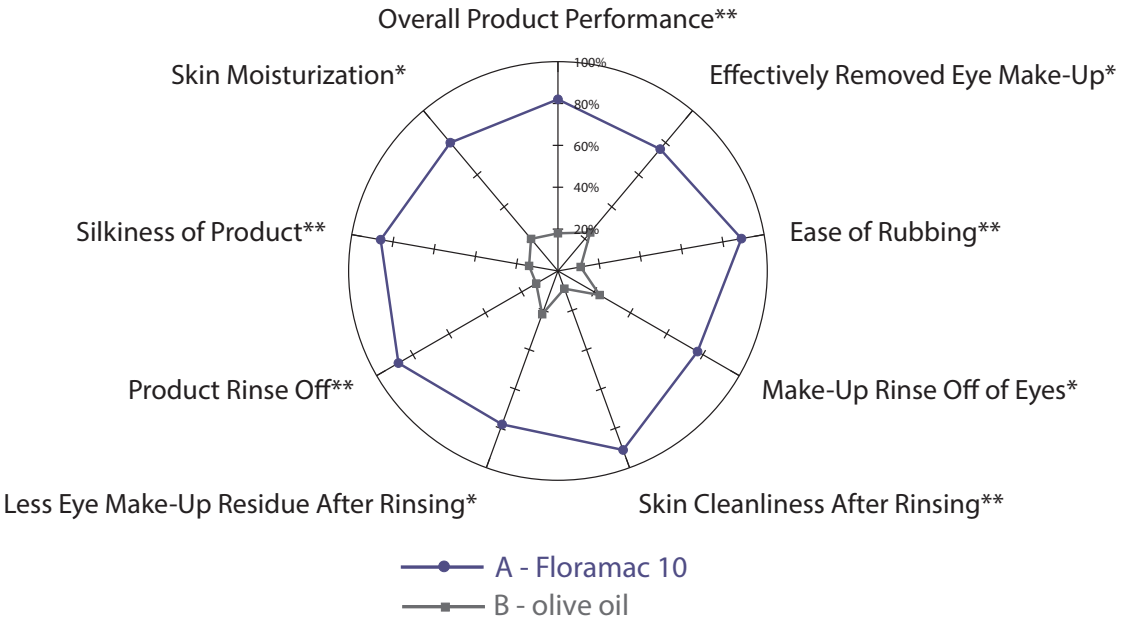


Figure 4. 82% of consumers preferred a make-up removing cleansing oil gel containing Floramac 10 compared to a cleansing oil gel with olive oil. **Floramac 10** was also **preferred for ease and effectiveness of make-up removal**. (See Claim Sheet 16-092.)

Figure 5. Increased Skin Radiance and Moisturization with Floramac 10

Objective: Floramac 10 and cyclopentasiloxane were each loaded at 5% in a simple o/w emulsion and compared for skin radiance (*i.e.* gloss) and moisturization[7] in a vehicle-controlled, randomized, double-blind clinical study (n=15). (Figure 5)

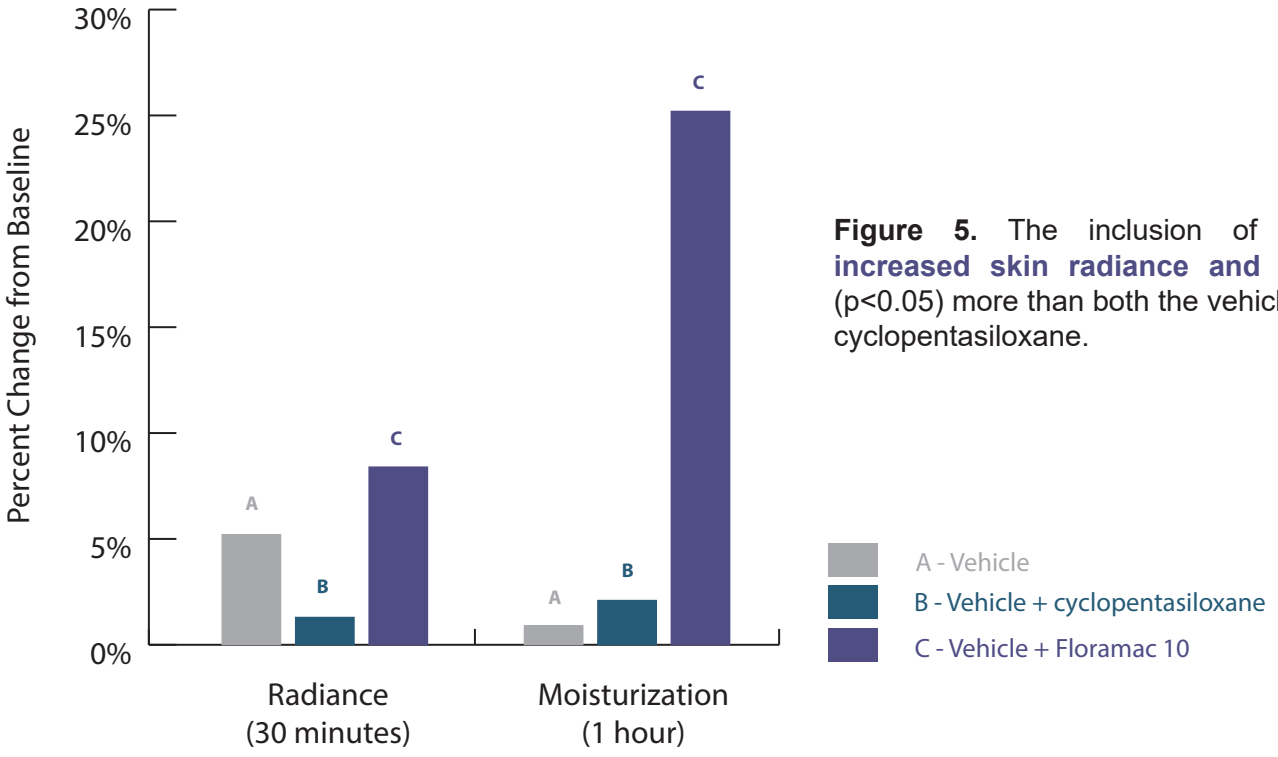


Figure 5. The inclusion of **Floramac 10 increased skin radiance and moisturization** ($p<0.05$) more than both the vehicle and vehicle + cyclopentasiloxane.

7. Skin radiance (*i.e.* gloss) and moisturization measurements were captured using the Glossymeter GL 200 and Corneometer CM 825, respectively; both instruments are products of Courage+Khazaka (Köln, Germany).

Formula: Water-Free Cleansing Oil Gel[8]

This cleansing oil gel uses Floramac 10 to rid the face of dirt and residue, leaving the skin soft and hydrated. Floraesters® K-100 Jojoba has been shown to enhance barrier recovery, increase skin hydration, and reduce erythema. Florabeads Jojoba add gentle yet effective exfoliation.

Phase	Trade/Common Name	INCI Name	Manufacturer	% wt./wt.
A	**Floramac 10**	**Ethyl Macadamiate**	**Floratech**	**55.35**
	Salacos® PG-218	Polyglyceryl-10 Dioleate	Nisshin Oillio Mills Ltd.	7.50
	Salacos® DG-158	Polyglyceryl-2 Sesquicaprylate	Nisshin Oillio Mills Ltd.	3.80
	Polyaldo® 10-1-CC Kosher FG	Polyglyceryl-10 Caprylate/Caprate	Lonza, Inc.	7.00
	AJK-OD2046[9]	Octyl Dodecanol (and) Dibutyl Lauroyl Glutamide (and) Dibutyl Ethylhexanoyl Glutamide	Ajinomoto Co. Inc.	7.00
B	**Floramac 10**	**Ethyl Macadamiate**	**Floratech**	**q.s.**
	Covi-ox® T 70 C	Tocopherol	BASF Corporation	0.05
	Floraesters K-100® Jojoba	**Hydrolyzed Jojoba Esters (and) Jojoba Esters (and) Water (Aqua)**	**Floratech**	**1.00**
	Glycerine 99.7% USP Kosher	Glycerin	Acme-Hardesty Co.	1.00
C	Eldew® PS-203	Phytosteryl/Octyldodecyl Lauroyl Glutamate	Ajinomoto Co. Inc.	0.50
	Fragrance[10]	-----	-----	q.s.
	Preservative[11]	-----	-----	q.s.
D	**Florabeads® 60/100 Jojoba White (Natural)**	**Jojoba Esters**	**Floratech**	**6.00**
			Total	**100.00**

Procedure:

1. Mix the ingredients of Phase A at 110-115°C with moderate propeller agitation. Keep mixing until the AJK-OD2046 is completely dissolved and the mixture becomes uniform. (Failure to complete this process affects the viscosity of the final product.)
2. Mix the Floraesters K-100 Jojoba with the Glycerine 99.7% USP Kosher of Phase B at room temperature with moderate propeller agitation. Once uniform, add the Floramac 10 and the Covi-Ox T 70 C to the mixture. With continued mixing, begin heating to 80-85°C.
3. When Phase A becomes uniform, begin cooling to 80-85°C.
4. Add Phase B to Phase A at 80-85°C with moderate propeller agitation.
5. When the mixture becomes uniform, begin cooling to room temperature. Stop mixing at 50-55°C and continue cooling without mixing.
6. When the mixture forms a solid gel at room temperature, break the gel by mixing with moderate to rapid propeller agitation. Keep mixing until the gel becomes a uniform liquid.
7. Add the ingredients of Phase C in the order listed to the mixture at room temperature with moderate to rapid propeller agitation.
8. Add the ingredients of Phase D to Phase ABC at room temperature with moderate to rapid propeller agitation.

8. INCI/Trade names must be verified with each manufacturer.
9. 80.0% Eutanol G (BASF Corporation), 12.0% GP-1 (Ajinomoto Co. Inc.), and 8.0% EB-21 (Ajinomoto Co. Inc.) can be pre-mixed and used as an alternative to the AJK-OD2046.
10. Fragrance: Sea Kelp H16040 supplied by Symrise
11. Preservative: Sensiva® SC 50 [INCI: Ethylhexyl Glycerin] supplied by Schülke Inc.