

**EASTMAN**

**Formulations for personal care  
and cosmetics products with  
Eastman GEM™ retinyl sunflowerate  
high-purity pro-retinol antiaging ingredient**

Eastman **GEM™**  
retinyl sunflowerate



## **Eastman GEM™ retinyl sunflowerate**

### **INCI: retinyl sunflowerseedate**

Eastman GEM™ retinyl sunflowerate is a pro-retinol derivative composed of retinol and sunflower fatty acids. It is a biobased, formulation-stable, easy-to-handle, nonirritating antiaging ingredient. Retinyl sunflowerate is manufactured using Eastman's EPA award-winning GEM technology, which applies the 12 Design Principles of Green Chemistry. At room temperature, it is a pourable liquid and supplied as a high-purity (>95%) assay; therefore, it is free of carriers.


Eastman GEM retinyl sunflowerate is made from sunflower seed oil that contains >70% healthy unsaturated fatty acids.

### **Key product facts**

Eastman GEM retinyl sunflowerate is a yellow, pumpable, flowable liquid at room temperature.

Typical properties:

- Yellow liquid
- Retinyl ester assay >95%
- Average molecular weight: 549.5



## **Formulations for personal care and cosmetics products** with Eastman GEM retinyl sunflowerate

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## Formulation: clinical study

This retinyl sunflowerate formulation uses 2-ethylhexyl palmitate and other carriers to create a liquid crystalline lamellar-phase emulsion base for enhanced delivery of lipophilic actives like retinyl sunflowerate. The liquid crystal emulsion structure shows superior moisturization when compared to conventional emulsion structures and can provide enhanced resistance to wash off.

INCI name	Wt%	Trade name	Manufacturer	Function
Water (aqua)	60.9	—	—	—
Cetearyl alcohol (and) sodium cetearyl sulfate	10.0	Kolliphor® CSA	BASF	Emulsifier
Propanediol	10.0	Zemea®	DuPont Tate & Lyle	Solvent
Betaine	1.0	GENENCARE® OSMS BA	DuPont	Humectant
Ethylhexyl palmitate	20.0	Eastman GEM™ 2-ethylhexyl palmitate	Eastman	Emollient
Retinyl sunflowerseedate*	0.1	Eastman GEM™ retinyl sunflowerate	Eastman	Active
Acacia senegal gum	1.0	KerrPoly GA	Kerry	Polymer
Caprylhydroxamic acid (and) caprylyl glycol (and) glycerin	1.0	Spectrastat™	Inolex	Preservative

\*Recommended dosage = 0.1%

## Clinical results

Reduction in fine lines and wrinkles; improvement in the appearance of even skin tone

## Duration

12 weeks

## Number of subjects

37 subjects completed the study.

## Fine lines

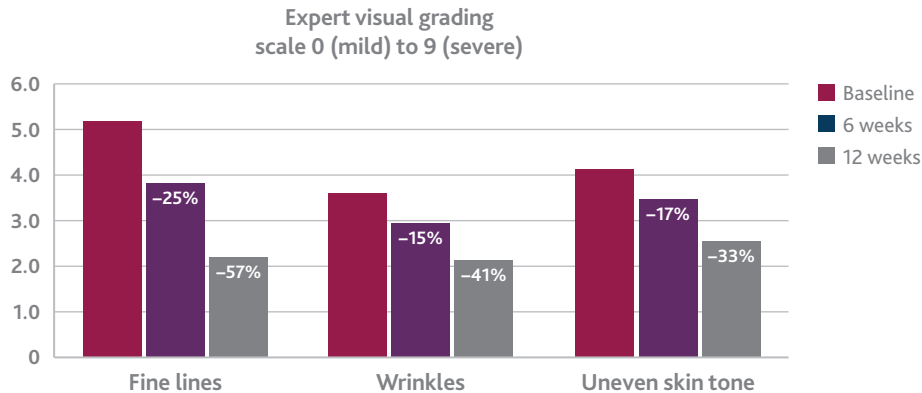
The product demonstrated a positive trend at week 6, with visual grading showing a 25% improvement in global fine lines. At week 12, visual grading showed a 57% improvement in global fine lines.

## Global wrinkles

The product demonstrated a positive trend at week 6, with visual grading showing a 15% improvement in global wrinkles. Visual grading showed a 41% improvement in global wrinkles at week 12.

## Skin tone evenness

The product demonstrated a positive trend at week 6, with visual grading showing a 17% improvement in skin tone evenness. At week 12, visual grading showed a 33% improvement in skin tone evenness.



## Light face and eye oil with Eastman GEM™ retinyl sunflowerate

Part	Product name	Wt%	Ingredient/INCI	Manufacturer
A	Neossance® Hemisqualane	80.00	C13-15 alkane	Aprinova
	Neossance® Squalane	13.75	Squalene	Aprinova
	Lincol IPP	2.50	Isopropyl palmitate	Eigenmann & Veronelli SpA
	Tinogard® TT	0.05	Pentaerythrityl tetra-di-t-butyl hydroxyhydrocinnamate	BASF
	Lipovol™ SUN	3.50	Helianthus annuus (sunflower seed) oil	Vantage
	Eastman GEM™ retinyl sunflowerate	0.10	Retinyl sunflowerseedate	Eastman
	Fragrance	0.10	Fragrance	—

### Procedure

1. Weigh out all ingredients into a clean, sanitized, stainless steel mixing vessel with mixer/homogenizer attachment.
2. Mix at a speed of 500–600 rpm.
3. Continue mixing until a clear solution is obtained.

## Antiaging eye cream with Eastman GEM™ retinyl sunflowerate

Part	Product name	Wt%	Ingredient/INCI	Manufacturer
A	Deionized water	79.60	Water (aqua)	—
	Sclerotium gum	0.50	Sclerotium gum	BASF
	Dermofeel® PA-12	0.10	Sodium phytate	Evonik-Dr. Straetmans
	Lecigel™	0.5	Sodium acrylates copolymer (and) lecithin	Lucas Meyer
B	Neossance® Squalane	4.00	Squalene	Aprinova
	Cetiol® SN	4.00	Cetearyl isononanoate	BASF
	Dow Corning® dimethicone fluid	3.00	Dimethicone	DuPont
	Heliofeel™	4.00	Glyceryl stearate citrate (and) polyglyceryl-3 stearate (and) hydrogenated lecithin	Lucas Meyer
	Neossance® Hemisqualane	3.00	C13-15 alkane	Aprinova
	Covi-Ox® T 50	0.10	Tocopherol	BASF
	Tinogard® TT	0.05	Pentaerythrityl tetra-di- <i>t</i> -butyl hydroxyhydrocinnamate	BASF
C	Eastman GEM™ retinyl sunflowerate	0.10	Retinyl sunflowerseedate	Eastman
	KEM EHG	1.00	Phenoxyethanol (and) ethylhexylglycerin	Akema
	Fragrance	0.05	Fragrance	—

### Procedure

1. Weigh out part A into a clean, sanitized, stainless steel mixing vessel with mixer/homogenizer, and heat to between 80° and 75°C.
2. Preheat part B to 70°–75°C. Once part A is homogeneous, incorporate part B. Mix until homogeneous at 1200 rpm.
3. Cool and incorporate part C at < 50°C. Continue mixing until homogeneous.
4. Control pH\* and adjust with citric acid.

\*pH @ 25°C: 5.0–5.5

## Antiaging Eastman GEM™ retinyl sunflowerate moisturization cream with UV protection

Part	Product name	Wt%	Ingredient/INCI	Manufacturer
A	Deionized water	66.95	Water (aqua)	—
	VEEGUM®	0.50	Magnesium aluminum silicate	Vanderbilt Minerals, LLC
	Zemea®	5.00	Propanediol	DuPont Tate & Lyle
	Dermofeel® PA-12	0.10	Sodium phytate	Evonik-Dr. Straetmans
	Biophilic™ H	4.00	Hydrogenated lecithin (and) C12-16 alcohols (and) palmitic acid	Lucas Meyer
	SAFIC' CARE T XG 200	0.30	Xanthan gum	Safic-Alcan
B	Crodamol™ GTCC	7.00	Caprylic/capric triglyceride	Croda
	Shea butter glycerides	3.00	Butyrospermum parkii (shea) butter	AAK
	Stearic acid USP (triple pressed)	1.00	Stearic acid	Vantage
	Dow Corning® dimethicone fluid	1.00	Dimethicone	DuPont
	Cetiol® SN	4.00	Cetearyl isononanoate	BASF
	Lecigel™	0.30	Sodium acrylates copolymer (and) lecithin	Lucas Meyer
	Parsol® 1789	2.00	Butyl methoxydibenzoylmethane	DSM
C	KEM EHG	1.00	Phenoxyethanol (and) ethylhexylglycerin	Akema
	Covi-Ox® T 50	0.10	Tocopherol	BASF
	Parsol® MCX	2.00	Ethylhexyl methoxycinnamate	DSM
D	Eastman GEM™ retinyl sunflowerate	0.10	Retinyl sunflowerseedate	Eastman
	Neossance® Hemisqualane	1.50	C13-15 alkane	Aprinnova
E	Sodium hydroxide, 50%	0.05	Sodium hydroxide	—
	Fragrance	0.10	Fragrance	—



## Procedure

1. Weigh out the liquid component of part A into a clean, sanitized, stainless steel mixing vessel with mixer/homogenizer attachment. Heat to between 80° and 75°C.
2. Incorporate the xanthan gum (SAFIC' CARE TXG 200) slowly. Mix until homogeneous at 500 rpm.
3. Weigh out part B and add to part A while mixing until part A/B mixture is homogeneous. Incorporate the powder slowly to avoid gelling. Mix speed is 800–900 rpm.
4. Cool part A/B mixture. Incorporate part C at < 50°C. Continue mixing until homogeneous.
5. Once homogeneous, incorporate part D.
6. Incorporate part E into part A/B/C/D mixture. Mix until homogeneous and free of air.
7. Control pH\* and adjust with citric acid.

This light, oil-free formula is unstoppable. It has the power of Eastman GEM™ retinyl sunflowerate as the active ingredient, which has been shown to reduce the appearance of fine lines and wrinkles after only 6 weeks of use. In addition, the serum has two film formers to hold it in place and keep it working on your skin. The retinoid is stabilized in the formula by the addition of the antioxidant BHT.

\*pH @ 25°C: 5.5–6.0

## Long-wear antiaging serum with Eastman GEM™ retinyl sunflowerate

Part	Product name	Wt%	Ingredient/INCI	Manufacturer	Function
A	Eastman AQ™ 55 polymer	5.00	Polyester-5	Eastman	Film former
	Laponite-XLG	0.90	Lithium magnesium sodium silicate	BYK/Eckart	Film former/thickener
	Hallstar® PEG 6000 DS	0.50	PEG-150 distearate	Hallstar	Emulsifier/thickener
	KELTROL® CG	0.10	Xanthan gum	CP Kelco	Thickener
	Purified water	q.s.	Water (aqua)	—	—
B	Betafin® BP 20	1.00	Betaine	DuPont	Humectant
	Eastman GEM™ 2-ethylhexyl palmitate	2.00	Ethylhexyl palmitate	Eastman	Emollient
	As determined by formulator	Varies	—	—	Preservative
C	Isopropyl alcohol, cosmetic	0.90	Isopropyl alcohol	Shell	Solvent
	Eastman GEM™ retinyl sunflowerate	0.10	Retinyl sunflowerseedate	Eastman	Antiaging active
	Eastman Tenox™ BHT	0.02	Butylated hydroxytoluene	Eastman	Antioxidant

### Procedure

1. Combine all part A ingredients in heated purified water (60°–70°C) and stir to completely disperse.
2. Add part B to the cooled water phase while mixing. Homogenize to form an emulsion.
3. Add part C (actives) and blend to combine.

**TIP:** Prepare part C as an actives premix and store protected from light and air. A suitable premix may contain 10% R-SUN, 2% BHT in pure isopropyl alcohol to be diluted 100-fold into the final formula. Isopropyl alcohol acts as a diluent for the active and reduces dry time of the film, while BHT protects the retinoid from oxidation in the formula.

## About Eastman

### **It's all about the ingredients.**

Eastman is a global specialty materials company that produces a broad range of products found in items people use every day. With the purpose of enhancing the quality of life in a material way, Eastman works with customers to deliver innovative products and solutions while maintaining a commitment to safety and sustainability.

We have a long history of providing specialty ingredients to the personal care and cosmetics industry, offering a wide variety of products—from adhesion promoters to film formers to emollient esters.

Personal care and cosmetics formulators rely on our innovative solutions to create and successfully introduce new products with tangible consumer benefits.

To learn more about how Eastman ingredients can best enhance your personal care and cosmetics products, visit us at [eastman.com/personalcare](https://www.eastman.com/personalcare).



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