

BASF's Skin Care Polymers Toolbox

Cosmedia® Ace: A Strong and Flexible Polymer

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abstract



Polymers are routinely used in a number of personal care and cosmetic products to thicken formulations and lend viscosity and stability to emulsions. They also help provide texture and increasingly sophisticated sensory effects. The better performing and more flexible a polymer, the more freedom it offers manufacturers in developing formulations. BASF's Skin Care Polymers Toolbox includes the newly designed multifunctional polymer Cosmedia® Ace which answers to the need in personal care market for elegant textures, versatility and cost-effectiveness.

Consumers are driving demand for interesting textures and sensory cues from skin care products – and sensory profile has become one of the key differentiators.

Flexibility is Key to Polymer Success

Polymers thicken formulations and lend stability to emulsions, and display predictable viscosity, texture, and sensory effects. They are routinely used in a number of personal care and cosmetic products. In fact, according to the Mintel Global New Products Database (GNPD) on finished products label, over half of all skincare products launched worldwide each year contain at least one polymer – including face, body, sun, after-sun, and cleansing products.

The more efficient and powerful a polymer, the smaller the amount needed to create attractive formulations – and the more additional ingredients can be used, such as fatty alcohols or waxes as classical thickeners, or emollients and emulsifiers for improved texture.

Formulators are increasingly choosing to use liquid dispersion polymers for greater convenience (ref: GNPD ingredient analytics). In addition, we are seeing increased demand for new cosmetic products that do not contain mineral oil or PEG derivatives (ref: Mintel GNPD on finished products label), as well as for low pH preservation.

Extensive Range of Polymers

BASF offers a wide range of polymers for the personal care industry, and its “Skin Care Polymers Toolbox” makes it easier for manufacturers to choose the most suitable one for their specific skin care applications. When creating its “toolbox”, BASF analyzed its complete polymer portfolio based on four criteria: Viscosity versus pH range, electrolyte tolerance, emulsifying capability, and sensory profile. Of the polymers included in the box, Cosmedia® SP, and Rheocare® HSP 1180 in particular can help cosmetics manufacturers optimize the sensory characteristics of their products. And now the range has been further enhanced with the addition of the strong and multifunctional liquid dispersion polymer Cosmedia® Ace.

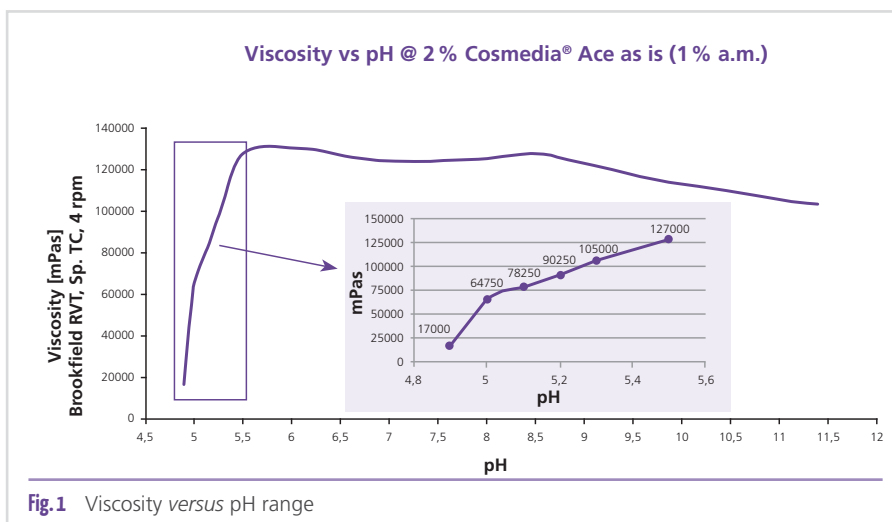


Fig.1 Viscosity versus pH range

Multifunctional Liquid Dispersion Polymer

BASF's Cosmedia® Ace (INCI: Sodium Polyacrylate, Dicaprylyl Carbonate, Polyglyceryl-3 Caprate) demonstrates a strong thickening capability and offers strong stabilizing and emulsifying properties. Cosmedia® Ace has been tested based on the four Skin Care Polymers Toolbox criteria. In terms of viscosity *versus* pH range (Fig. 1), Cosmedia® Ace offers excellent thickening over the widest pH range within the BASF Skin Care polymer portfolio: 5.0–12.0. The recommended pH range is 5.5–11.0. Cosmedia® Ace delivers improved thickening over benchmark products. (Fig. 2)

Cosmedia® Ace also demonstrates better electrolyte tolerance (Fig. 3) than benchmark products. Its strong thickening capability enables it to overcome the reduced viscosity caused by electrolytes (% NaCl at 1% active matter and pH 6.0).

To evaluate the polymer's emulsifying capability (Fig. 4), Cosmedia® Ace was dispersed in water at a chosen a.m. A standardized oil phase comprising a 1:1:1 ratio of Cetiol® C 5 (Coco-Caprylate), Myritol® 318 (Caprylic/Capric Triglycerides), and Cegesoft® PS 6 (Olus Oil) was added (5% by 5%). The test demonstrated the polymer's

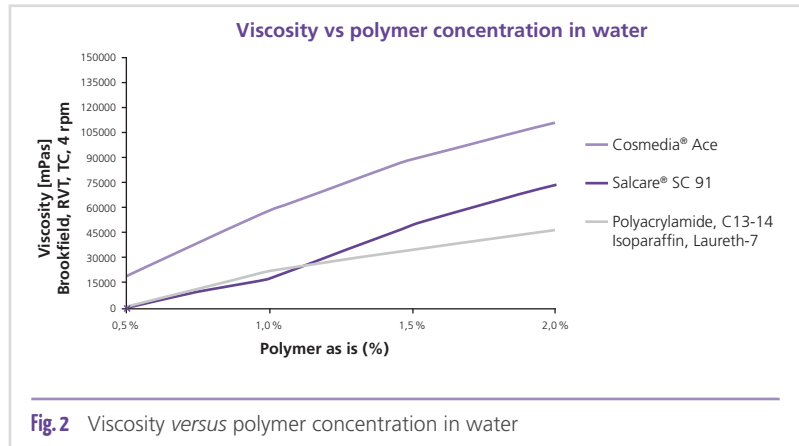


Fig. 2 Viscosity *versus* polymer concentration in water

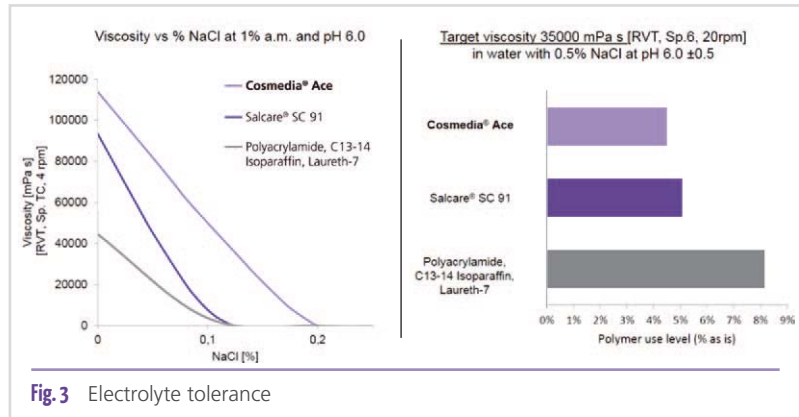




Fig. 3 Electrolyte tolerance



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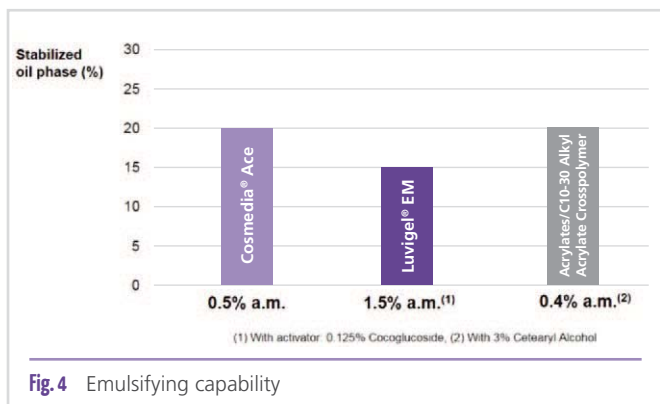


Fig. 4 Emulsifying capability

strong emulsifying power compared to benchmark products. The polymer’s sensory profile (Fig. 5) was investigated by means of a BASF in-house test method, Pillow Talk™: An expert panel consisting of 14 trained individuals tested Cosmedia® Ace in an air-conditioned room (temperature of 22 °C, HR 40 %). 100 µl polymer dispersion was applied on the inside of their forearms and evenly distributed. Then, 20 seconds after drying, the after feel of the skin was compared with the texture of nine pillows made from different fabrics. Panelists testified that Cosmedia® Ace provides an elegant after feel (velvety) with a soothing effect (powdery and waxy).

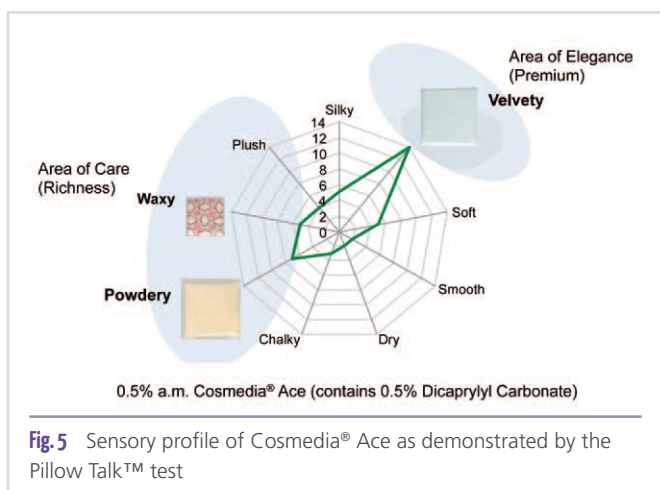


Fig. 5 Sensory profile of Cosmedia® Ace as demonstrated by the Pillow Talk™ test

Easy Handling in Manufacturing

Cosmedia® Ace is an off-white liquid dispersion. Its advantage is its quick swelling, enabling easy handling in manufacturing: In only five minutes, it results in a smooth, homogeneous gel even when using basic stirring equipment. Its liquid presentation eliminates the need to perform pre-swelling or neutralization, as required with powders. It is cold processable, allowing easy and quick dispersion in water, and can be added at any stage in the formulating process. Cosmedia® Ace consists of approx. 50 % active matter – the recommended dose is 0.5–3.0 %. Cosmedia® Ace is China compliant (IECIC approved).

Formulations Up Close

With its multiple dispersion polymer performance, Cosmedia® Ace is suitable for a variety of applications where elegant texture is a priority. “It’s Ace!” (Tab. 1, Fig. 6) soothing gel cream allows harmonious fading and absorption, while the formulation highlights the emulsification power of Cosmedia® Ace in simple conditions. Thanks to its simultaneously strong emulsifying and stabilizing power, only 1 % Cosmedia® Ace is needed to stabilize 20 % emollients.

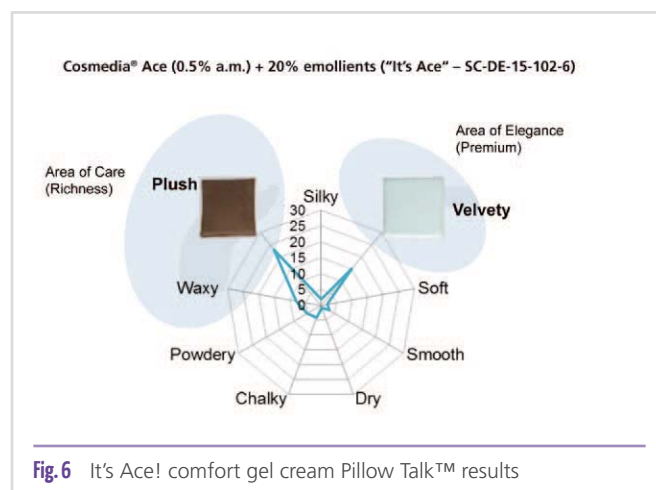


Fig. 6 It’s Ace! comfort gel cream Pillow Talk™ results

Phase	Ingredients	INCI	% by weight	Function
A	Cosmedia® Ace	Sodium Polyacrylate, Dicaprylyl Carbonate, Polyglyceryl-3 Caprate	1.00	Rheology modifier
	Water, demin.	Aqua	75.92	
B	Glycerin	Glycerin	3.00	Humectant
C	Cetiol® C 5	Coco-Caprylate	6.66	Emollient
	Myritol® 318	Caprylic/Capric Triglyceride	6.66	Emollient
	Cegesoft® PS 6	Olus Oil	6.66	Emollient
D	Perfume	Parfum	q.s.	Fragrance
	Euxyl K 100 (Schülke)	Benzyl alcohol, Methylchloroisothiazolinone, Methylisothiazolinone	0.10	Preservative

Specifications
 pH value (23 °C): 5.3–5.6
 Viscosity (Brookfield; RVF; spindle TE; 4 rpm; 23 °C): 112500–187500 mPa s

Tab. 1 It’s Ace! comfort gel cream (SC-DE-15-102-6) – Cosmedia® Ace in simple conditions

The combination of Cosmedia® Ace and Luvigel® STAR AT 3 results in an interesting cushioning and soothing effect. For instance, the cold-processable face cream Night Pillow (Tab. 2, Fig. 7) provides a waxy feel that is comparable to formulations based on fatty alcohols. Cosmedia® Ace achieved the highest scores in the “velvety and care” area of Pillow Talk™ when combined with Luvigel® Star AT 3: Night Pillow delivers a velvety after feel even in cold-processable emulsions.

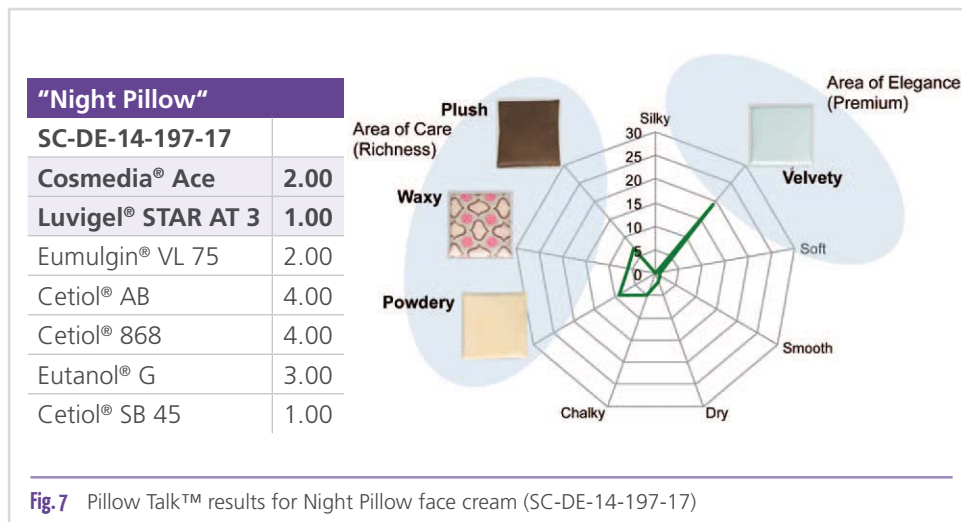


Fig. 7 Pillow Talk™ results for Night Pillow face cream (SC-DE-14-197-17)

Phase	Ingredients	INCI	% by weight	Function
A	Water, demin.	Aqua	79.20	
	Glycerin	Glycerin	2.00	Humectant
	Euxyl PE 9010 (Schülke)	Phenoxyethanol, Ethylhexylglycerin	1.00	Preservative
	Sensiva SC 50 (Schülke)	Ethylhexylglycerin	0.50	Auxiliary
B	Cosmedia® Ace	Sodium Polyacrylate, Dicaprylyl Carbonate, Polyglyceryl-3 Caprate	2.00	Rheology modifier
C	Eumulgin® VL 75	Lauryl Glucoside, Polyglyceryl-2 Dipolyhydroxystearate, Glycerin	2.00	Emulsifier (O/W)
	Cetiol® AB	C12-15 Alkyl Benzoate	4.00	Emollient
	Cetiol® 868	Ethylhexyl Stearate	4.00	Emollient
	Eutanol® G	Octyldodecanol	3.00	Emollient
	Cetiol® SB 45	Butyrospermum Parkii Butter	1.00	Emollient
D	Perfume “Cotton touch” (Symise)	Parfum	0.30	Fragrance
	Luvigel® STAR AT 3	Polyurethane-39	1.00	Rheology modifier

Specifications:
 pH value (23 °C): 5.5
 Viscosity (Brookfield; RVF; spindle TE, helipath; 4 rpm; 23 °C): 62500 mPa s

Tab. 2 Cold-processable face cream Night Pillow (SC-DE-14-197-17) provides a waxy after feel

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Phase	Ingredients	INCI	% by weight	Function
A	Water, demin.	Aqua	73.95	
	Glycerin	Glycerin	5.00	Humectant
B	Cosmedia® Ace	Sodium Polyacrylate, Dicaprylyl Carbonate, Polyglyceryl-3 Caprate	0.80	Rheology modifier
C	Emulgade® PL 68/50	Cetearyl Glucoside, Cetearyl Alcohol	2.00	Emulsion base
	Eumulgin® SG	Sodium Stearoyl Glutamate	0.25	Emulsifier (O/W)
	Cutina® HVG	Hydrogenated Vegetable Glycerides	2.00	Consistency agent
	Cetiol® Ultimate*	Undecane, Tridecane	6.00	Emollient
	Myritol® 312	Caprylic/Capric Triglyceride	5.00	Emollient
	Cegesoft® PS 6	Olus Oil	3.00	Emollient
	Lipofructyl™ Argan LS 9779	Argania Spinosa Kernel Oil	0.50	Active ingredient
	Covi-ox® T 90 EU C	Tocopherol	0.20	Active ingredient
D	Euxyl PE 9010 (Schülke)	Phenoxyethanol, Ethylhexylglycerin	1.00	Preservative
	Perfume "Green nature" (Symrise)	Parfum	0.30	Fragrance

Specifications:
pH value (23 °C): 6.0
Viscosity (Brookfield; RVF; spindle TE, helipath; 4 rpm; 23 °C): 200000 mPa s

Tab. 3 Butter cream Natural Balance (SC-DE-14-194-16) – more than 98 % of its ingredients are from renewable sources

Natural-based Compounds

Natural polymers for cosmetic applications – including gums, starches, and protein-based polymers – are still scarcely stable enough to deliver the thickening performance required by manufacturers. Because of this, BASF chose to focus on developing a powerful new polymer that allows manufacturers to create formulations with only very low polymer concentrations. Cosmedia® Ace contains Sodium Polyacrylate, a polymer based on mineral oil – but both the activator Dicaprylyl Carbonate (Cetiol® CC) and the carrier emollient Polyglyceryl-3 Caprate are produced using renewable sources. Thanks to its strength and flexibility, Cosmedia® Ace satisfies thickening and emulsifying needs at a very low dose, allowing the optimum use of ingredients: For example, more than 98 % of ingredients in Butter Cream Natural Balance (Tab. 3) are from renewable sources.

Conclusion

BASF's Personal Care business combines market empathy and science excellence to develop high-performance concepts and ingredients that help its customers meet both consumers' functional and emotional needs. As one of the most high-performing polymers from BASF's Skin Care Polymers Toolbox, Cosmedia® Ace offers remarkable performance together with flexibility. What is more, its distinct sensory benefits – with the velvety and soothing after feel it lends emulsions – are very popular with consumers.

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