

Care  
Creations™

# Uvinul® Easy

## The easy way to make sunscreens

 **BASF**

The Chemical Company

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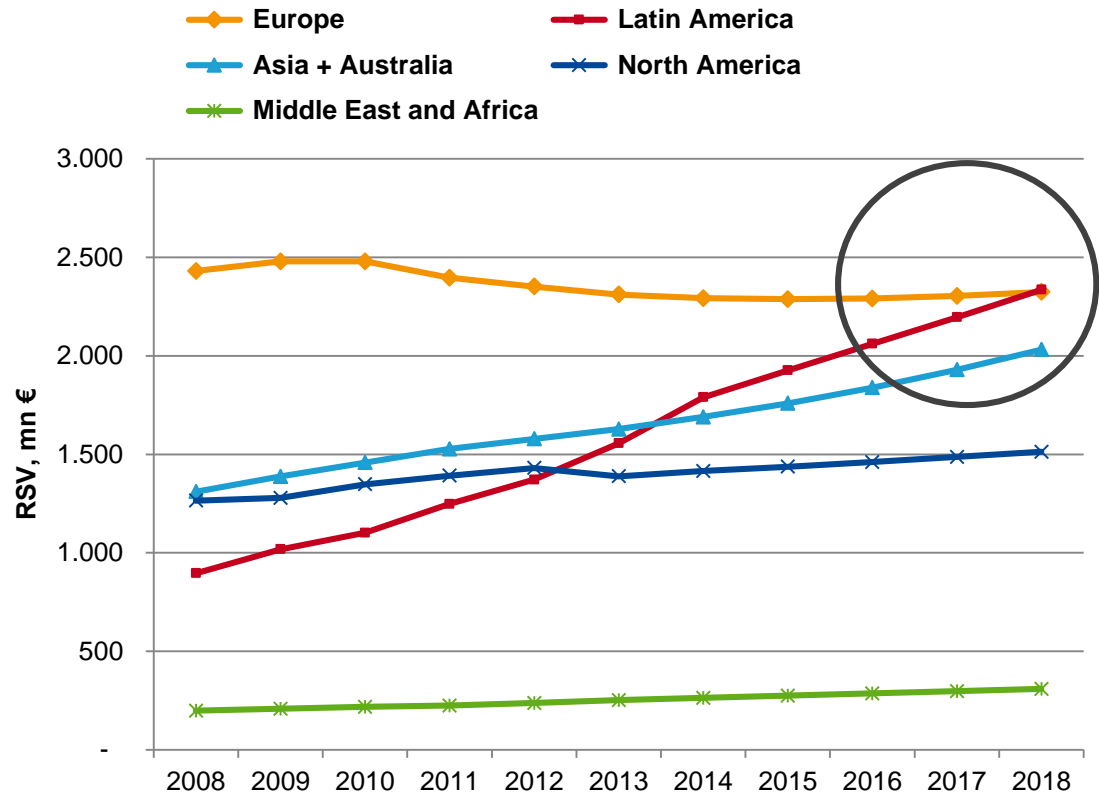
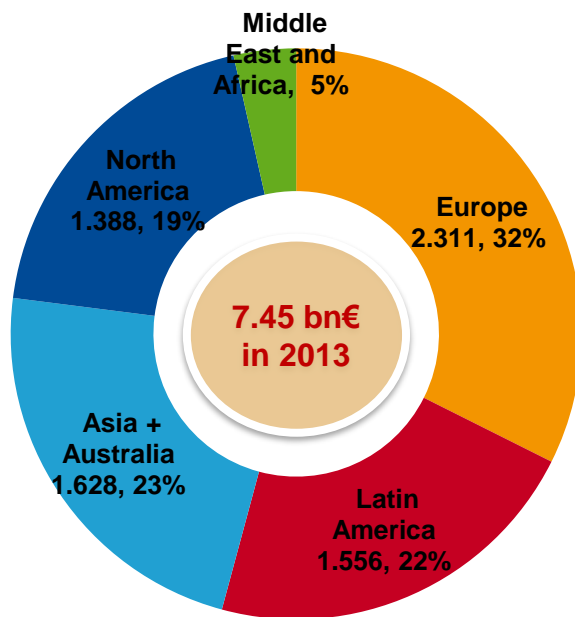


# 1. Suncare Market



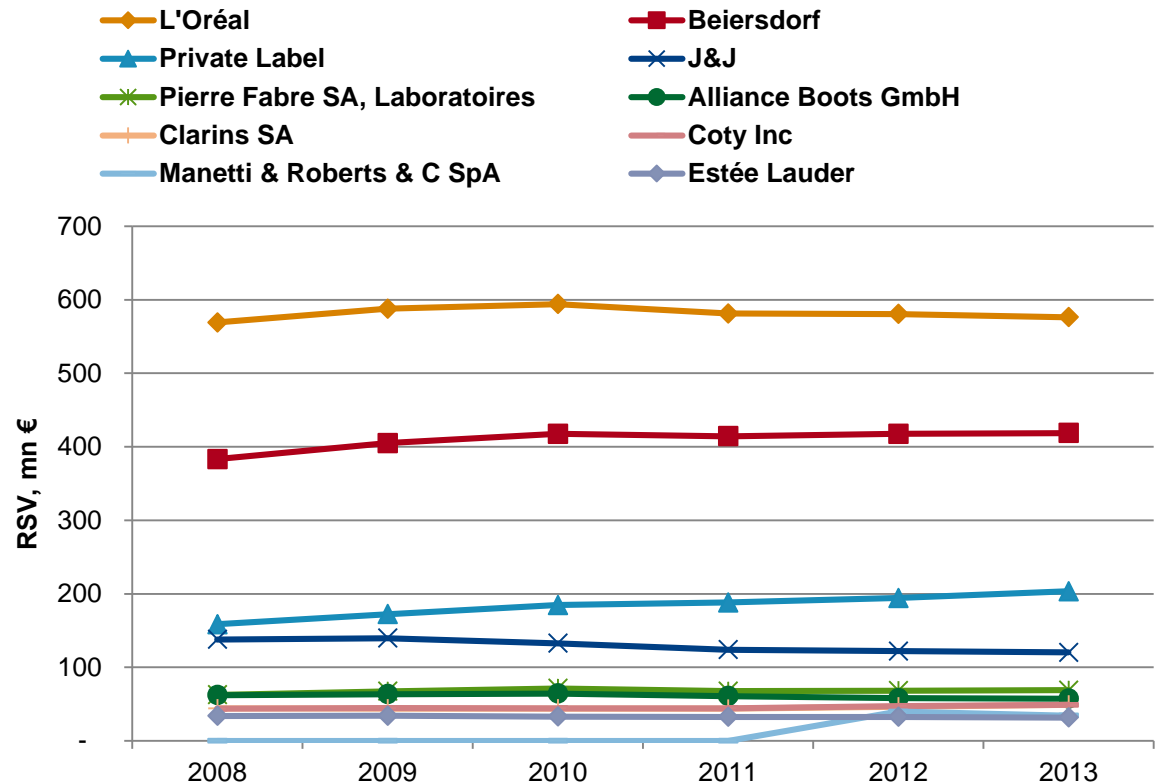
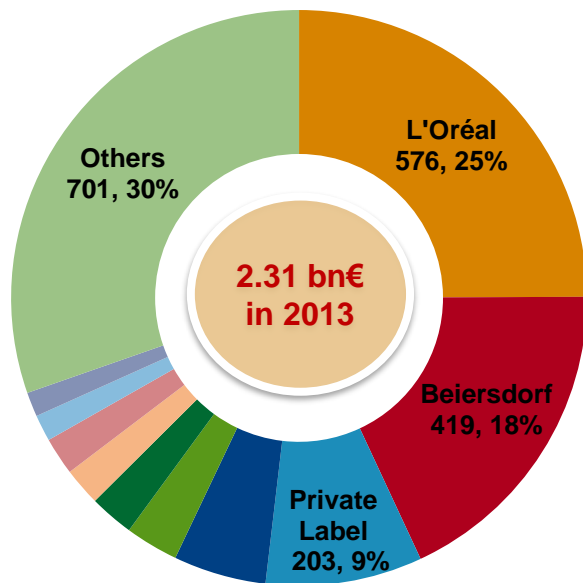
# Global Sun Care Market – Europe still #1

Latin America, the second biggest region for sun care nowadays, is expected to grow further at a high rate of 8.5% per year (CAGR 2013-2018) and reach the European sales by 2018.



# Potential for sun care business in Europe

L'Oréal and Beiersdorf dominate the market. Private Label accounts for a high share, **but smaller players account for 1/3 of the value.**



# Reason for UV Protection

**How the sun sees you - YouTube** (Aug 12, 2014 - Uploaded by Thomas Leveritt)  
<https://www.youtube.com/watch?v=o9BqrSAHbTc>

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Vis Camera



UV Camera

13.351.666  
53.167 1.745



# How Sunscreen works

**How the sun sees you - YouTube** (Aug 12, 2014 - Uploaded by Thomas Leveritt)  
<https://www.youtube.com/watch?v=o9BqrSAHbTc>

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Vis Camera

UV Camera

13.351.666

53.167 1.745

## 2. Uvinul® Easy

Composition and Principle

Performance

Safety

Regulatory

Intellectual Property





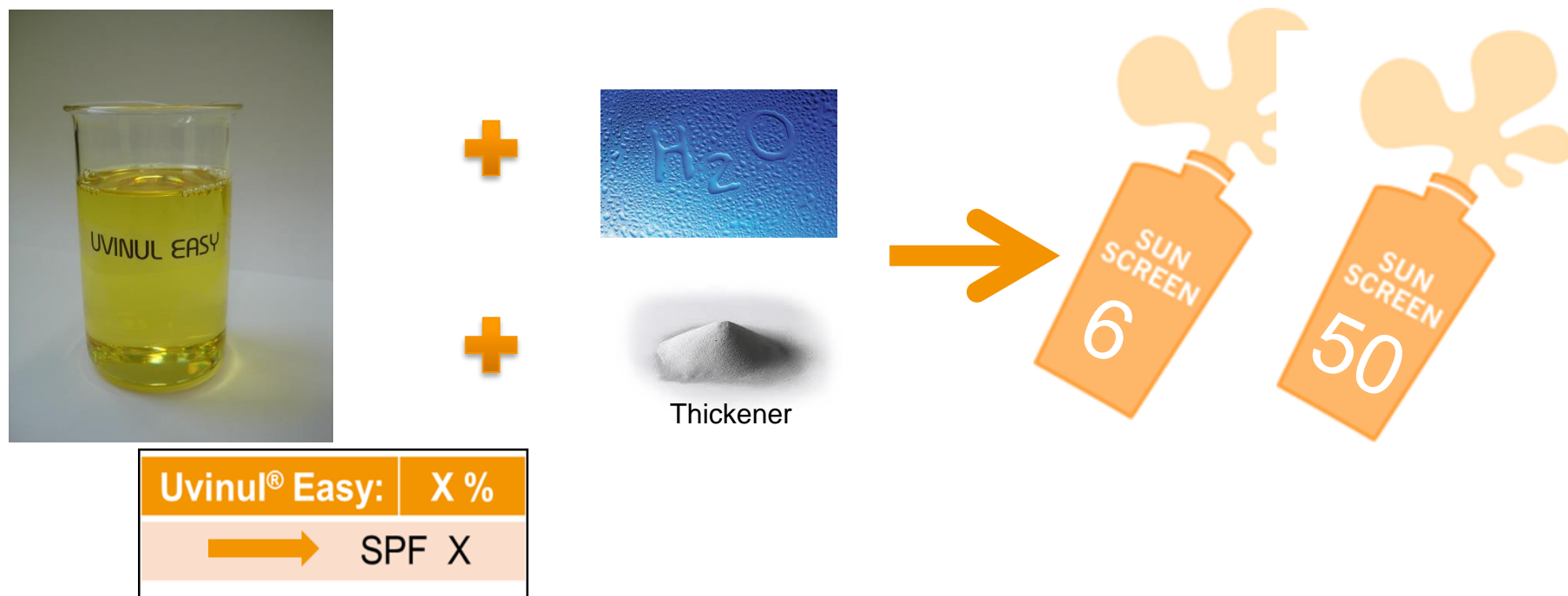
# Introduction

Development of Sun Care products is more and more complex and requires in-depth knowledge:

- Solubility & Efficacy data of UV absorbers
- UV Filter combination to achieve the 1/3 UVA-PF/SPF or PA claim
- Regulation in different countries
- Intellectual properties of third parties of UV filters composition

The answer of BASF to reduce complexity in sun care is ... **Uvinul® Easy**

# How to make a Sunscreen with Uvinul® Easy



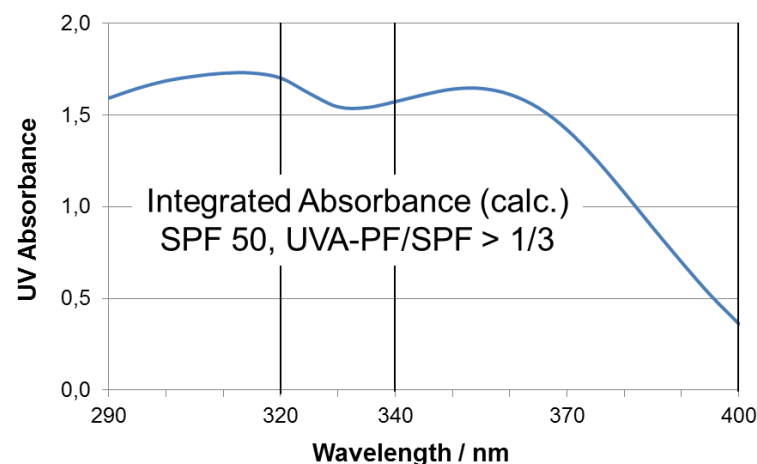
**With Uvinul® Easy sunscreen products with SPF 6 to 50 can all be manufactured with ONE UV Filter composition, even by cold process.**

# Uvinul® Easy - UV filter composition

## INCI:

Dibutyl Adipate (and) Diethylamino Hydroxybenzoyl Hexyl Benzoate (and) Ethylhexyl Methoxycinnamate (and) Laureth-7 Citrate (and) Polyglyceryl-2 Dipolyhydroxystearate (and) Ethylhexyl Triazone (and) Bis-Ethylhexyloxyphenol Methoxyphenyl Triazine (and) Lauryl Glucoside (and) Triethanolamine (and) Aqua

## Example: Use of 50% Uvinul Easy



BASF Sunscreen Simulator (50% dilution):

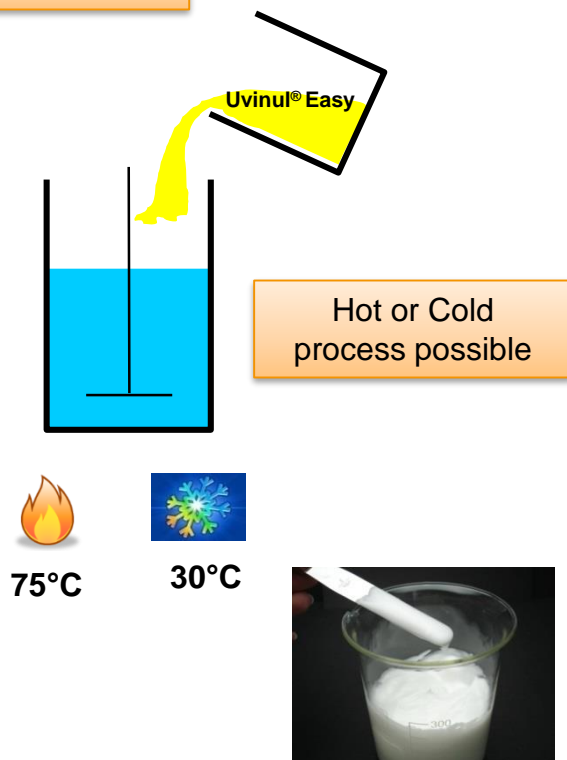
SPF	50.9
UVA-PF ( <i>in vitro</i> )	18.3
UVA-PF/SPF ( <i>in vitro</i> )	0.36



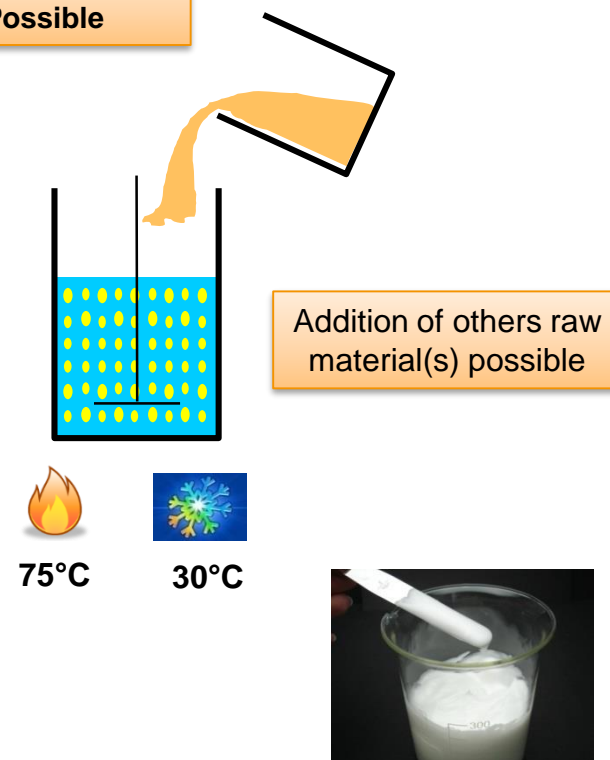
**UV Filter combination that guarantees  
broad spectrum UV protection between SPF 6 and SPF 50**

# Uvinul® Easy - How does it work?

## EASY Process

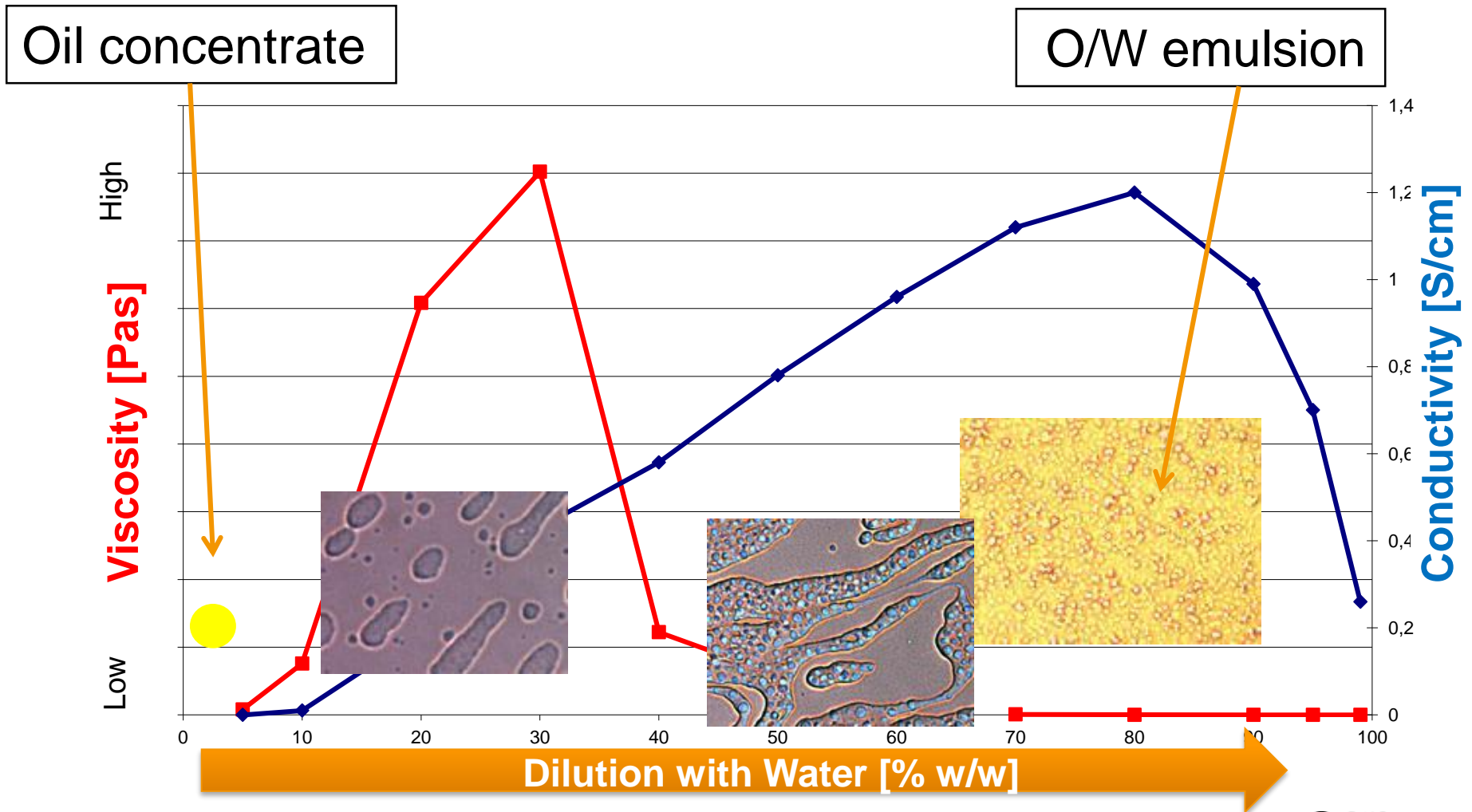


## Customization Possible



**Easy process and customization of final formulation still possible!**

# PIC – Principle Phase Inversion Concentrate



# Possible Thickeners

Trade Name	INCI Name
Avicel PC611	Microcrystalline Cellulose
<b>Cosmedia® SP</b>	Sodium Polyacrylate
Carbopol Ultrez-21 Carbopol Ultrez-20	Acrylates/C10-30 Alkyl Acrylate Crosspolymer
Carbopol Ultrez 10 <b>Rheocare® C Plus</b>	Carbomer
Keltrol T <b>Rheocare® XG</b>	Xanthan Gum
<b>Luvigel® Fit UP</b>	Acrylates/C10-30 Alkyl Methacrylate Copolymer
<b>Tinovis® ADE</b>	Sodium Acrylates Copolymer (and) Hydrogenated Polydecene (and) PPG-1 Trideceth-6
<b>Tinovis® GTC</b>	Acrylates/Beheneth-25 Methylacrylate Copolymer








**Compatibility of thickeners with Uvinul® Easy confirmed**



# Easy Sunscreens SPF 6 – SPF 50

## Results SPF<sub>in vivo</sub> Testing















**Formulation Base:**      **X % Uvinul® Easy**  
    y % Thickener (e.g. Tinovis® ADE)  
    z % Preservation & Fragrance System

Target SPF	6 <small>UV12055-2-18</small>	10 <small>UV12055-2-17</small>	15 <small>UV12055-2-16</small>	20 <small>UV12055-2-15</small>	25 <small>UV12055-2-14</small>	30 <small>UV12055-2-13</small>	50 <small>UV12055-2-12</small>
concentration X % Uvinul® Easy	6%	10%	15%	20%	25%	30%	50%
SPF <i>in vivo</i>	 <b>6.5</b> (+/- 2.5)	 <b>10.0</b> (+/- 2.6)	 <b>17.6</b> (+/- 5.0)	 <b>20.9</b> (+/- 4.8)	 <b>30.4</b> (+/- 3.8)	 <b>35.0</b> (+/- 5.3)	 <b>57.8</b> (+/- 8.9)

**SPF<sub>in vivo</sub> confirmed in many tests between SPF 6 and SPF 50**

# Easy Sunscreens SPF 6 – SPF 50

## Results UVA-PF<sub>in vitro</sub> Testing

SPF Target	6 UV12055-2-18	10 UV12055-2-17	15 UV12055-2-16	20 UV12055-2-15	25 UV12055-2-14	30 UV12055-2-13	50 UV12055-2-12
concentration of Uvinul® Easy	6%	10%	15%	20%	25%	30%	50%
							
UVA-PF (in-vitro)*	<b>4.7</b>	<b>6.5</b>	<b>7.3</b>	<b>8.7</b>	<b>9.8</b>	<b>12.2</b>	<b>19.3</b>
UVA-PF/SPF > 0.33	<b>0.79</b> 	<b>0.65</b> 	<b>0.49</b> 	<b>0.43</b> 	<b>0.39</b> 	<b>0.41</b> 	<b>0.39</b> 
PA claim	PA++	PA++	PA++	PA+++	PA+++	PA+++	PA++++

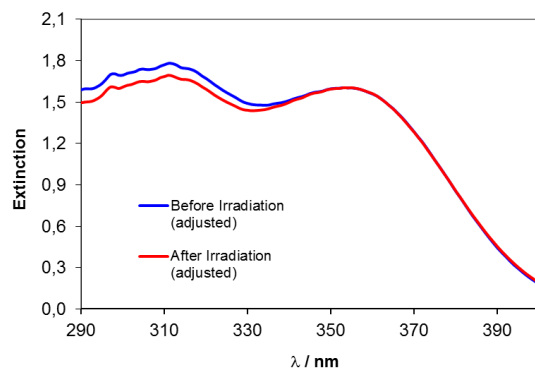
**Good News for Daily Care:**  
**The lower the SPF the higher the relative UVA protection**

\* On Sandblasted 4-5µm PMMA plates – 1.2mg/cm² application rate

# Easy Sunscreens

## Photostability

SPF Target	6 UV12055-2-18	10 UV12055-2-17	15 UV12055-2-16	20 UV12055-2-15	25 UV12055-2-14	30 UV12055-2-13	50 UV12055-2-12
concentration of Uvinul® Easy	6%	10%	15%	20%	25%	30%	50%
UVA-PF before irradiation	4.4	6.2	7.9	9.4	11	12.6	19.4
UVA-PF after irradiation	4.7	6.5	7.3	8.7	9.8	12.2	19.3
Photodegradation	No significant degradation of UVA absorption during irradiation						



**Uvinul® Easy provides photostable UV absorption.  
No degradation of performance during irradiation**

# Skin Compatibility of Formulations with Uvinul® Easy

1. **Sun Care formulations** with 30% and 50% Uvinul® Easy were tested for skin tolerance over a period of 14 days / twice daily application on inner forearm (UV-DE-12-055-2-13 and UV-DE-12-055-2-12)

## Conclusion:

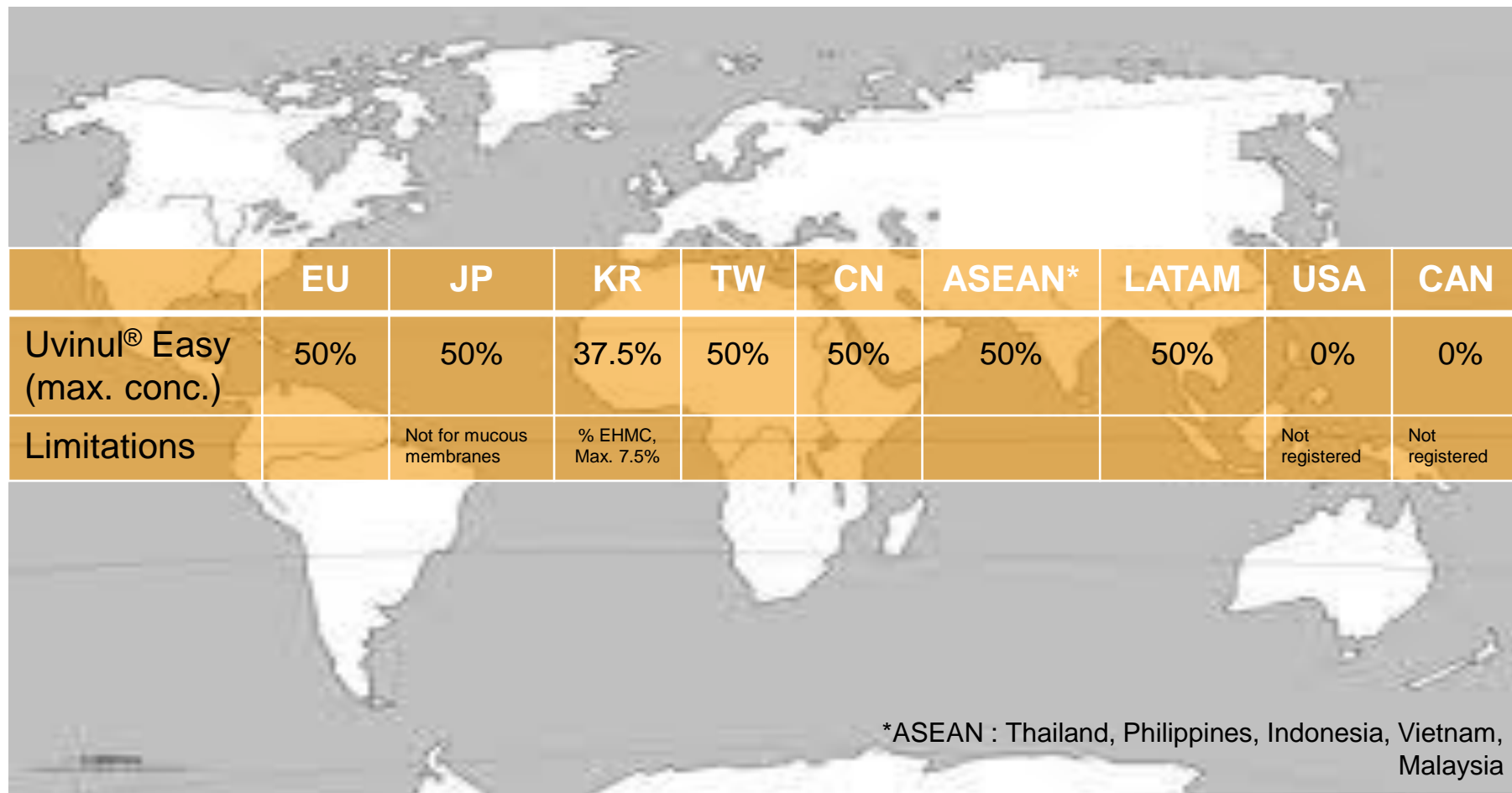
Neither of the test formulations (with 30% & 50% Uvinul® Easy) induced any visible signs of skin irritation under conditions of regular use

2. **A daily care formulation** with 15% Uvinul® Easy was applied twice daily over a test period of 28 days / twice daily application on inner forearm and face/neck as well as in a 14 day ophthalmologically controlled test in the eye area (UV-DE-12-055-13-3)

## Conclusion:

The formulation significantly increased skin moisturization compared to the untreated control area. The test product did not induce any visible sign of irritation under conditions of regular use

# Regulatory



	EU	JP	KR	TW	CN	ASEAN*	LATAM	USA	CAN
Uvinul® Easy (max. conc.)	50%	50%	37.5%	50%	50%	50%	50%	0%	0%
Limitations		Not for mucous membranes	% EPMC, Max. 7.5%					Not registered	Not registered

\*ASEAN : Thailand, Philippines, Indonesia, Vietnam, Malaysia

### 3. Applications

Sun Protection

Daily Care

Decorative Cosmetics





# Flexibility in Formulation Type



Suncare cream/lotion



Suncare spray



Daily care with SPF



Make-up with SPF




**One product for different application formats**

## 4. Summary



# Summary

- Uvinul® Easy is the answer to the more and more complex formulation requirements in sun care
- Sun protection formulations prepared with Uvinul® Easy from SPF 6 to SPF 50 always meet the European Commission recommendation for UVA protection 
- Uvinul® Easy meets the *four basic requirements* for personal ingredients:  
1. Efficacy, 2. Safety, 3. Registration, 4. Patent Freedom (to operate)
- Uvinul® Easy is handled easily / in cold or hot process / further customization is possible.
- The flexibility of Uvinul® Easy and the various application formats are ideal for line extensions in and into sun care, daily care and decorative cosmetics.



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# BACK UP slides





# Intellectual Property (IP)

*patent freedom (freedom to operate)*



**Uvinul Easy has been filed for patent by BASF, but 3<sup>rd</sup> party IP has also to be considered:**

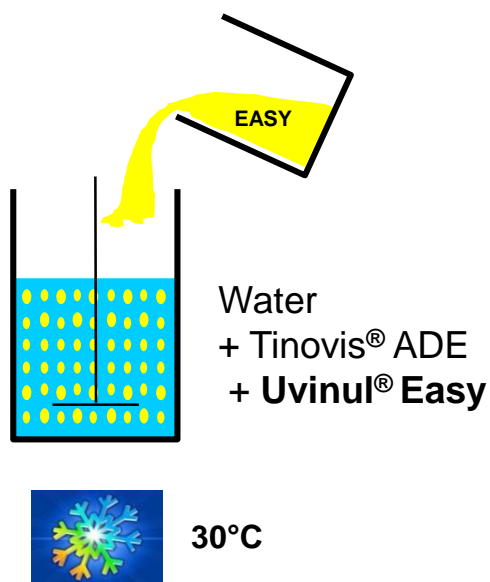
There are hundreds of application patents that may have to be considered in sun care. In the case of Uvinul Easy, BASF has analyzed relevant 3<sup>rd</sup> party patent rights e.g. the combination of Tinosorb® S and Cetiol® B has been identified in a 3<sup>rd</sup> party patent application (DE 10038713 from Beiersdorf).

In the meantime BASF has acquired a license, so there is no restriction in the use of Uvinul Easy in this respect.

# Sun Protection Products with Uvinul<sup>®</sup> Easy

## Cream / Lotion / Spray

# Sun Care Gel Cream SPF 30



Emulsion SPF 30




# Sun Care Gel Cream

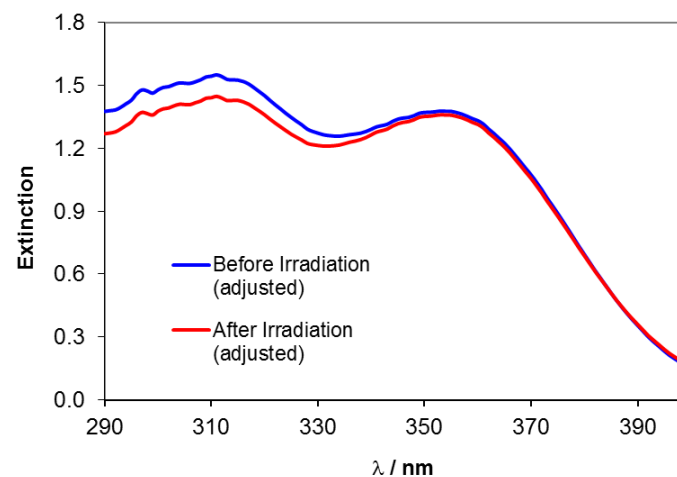
**SPF 30**



**PA+++**

UV-DE-12-055-2-13

	UV-DE-12-055-2-13
Filter composition	30.0% Uvinul® Easy
Thickener	Tinovis® ADE
UV Filters concentrations	15.3%
SPF in vivo	35 +/- 5.3
UVA-PF (Colipa)	12.2
UVA-PF/SPF	> 1/3 
PA claim	PA+++



Application: 1,2mg/cm<sup>2</sup> / Irradiation: 15.18J/cm<sup>2</sup>  
 Prototype measured on roughened PMMA plates according to Colipa UVA method.

# Sun Care Gel Cream

SPF 30  PA+++ UV-DE-12-055-2-13

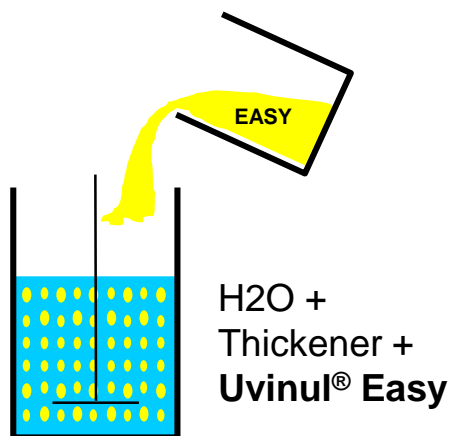
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Phase	Ingredients	INCI	% by weight
A	Uvinul® Easy	Dibutyl Adipate, Diethylamino Hydroxybenzoyl Hexyl Benzoate, Ethylhexyl Methoxycinnamate, Laureth-7 Citrate, Polyglyceryl-2 Dipolyhydroxystearate, Ethylhexyl Triazone, Bis-Ethylhexyloxyphenol Methoxyphenyl Triazine, Lauryl Glucoside, Triethanolamine	30.00
B	Water, demin.	Aqua	66.60
	Tinovis® ADE	Sodium Acrylates Copolymer, Hydrogenated Polydecene, PPG-1 Trideceth-6	3.20
	Edeta® BD	Disodium EDTA	0.20
C	Preservative		qs
	Sodium Hydroxide (30% solution)	Sodium Hydroxide	qs

# Daily Care with Uvinul® Easy



# Daily Care Cream SPF 15



30°C



+ Active Ingredient(s)




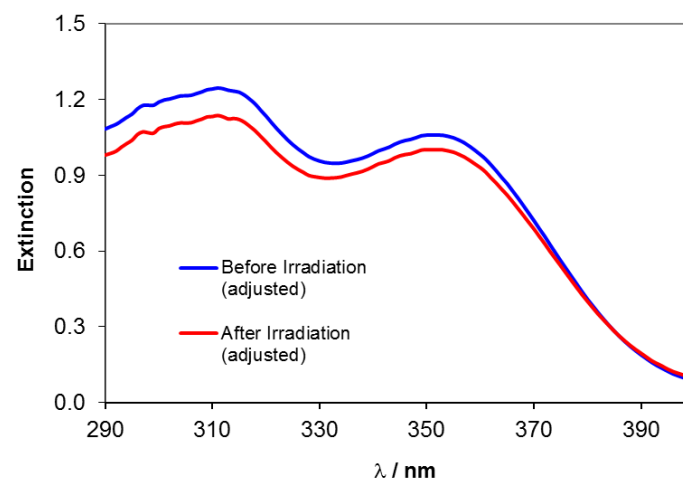
Daily Cream



# Daily Care Cream

**SPF 15**  **PA++** UV-DE-12-055-13-3

	UV-DE-12-055-13-3
Filter composition	15.0% Uvinul® Easy
Thickener	Cosmedia® SP
UV Filters concentration	7,65%
SPF in vivo	15 (in silico)
UVA-PF (Colipa)	5.8
UVA-PF/SPF	> 1/3 
PA claim	PA++



Application: 1,2mg/cm<sup>2</sup> / Irradiation : 7.56J/cm<sup>2</sup>  
 Prototype measured on roughened PMMA plates according to Colipa UVA method.

# Daily Care Cream

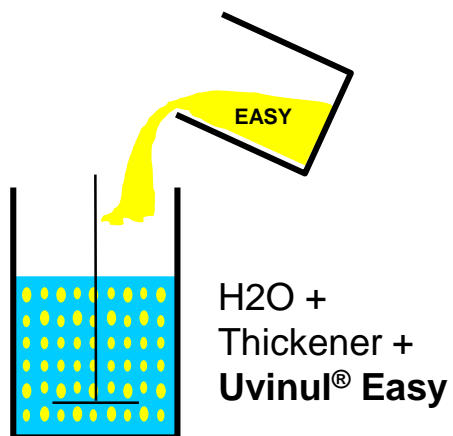
**SPF 15**  **PA ++** UV-DE-12-055-13-3

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Phase	Ingredients	INCI	% by weight
A	Cetiol® Sensoft	Propylheptyl Caprylate	10.00
	Uvinul® Easy	Dibutyl Adipate, Diethylamino Hydroxybenzoyl Hexyl Benzoate, Ethylhexyl Methoxycinnamate, Laureth-7 Citrate, Polyglyceryl-2 Dipolyhydroxystearate, Ethylhexyl Triazone, Bis-Ethylhexyloxyphenol Methoxyphenyl Triazine, Lauryl Glucoside, Triethanolamine	15.00
B	Water, demin.	Aqua	65.40
	Glycerin	Glycerin	3.00
	Cosmedia® SP	Sodium Polyacrylate	0.40
	Edeta® BD	Disodium EDTA	0.20
C	Tinovis® ADE	Sodium Acrylates Copolymer, Hydrogenated Polydecene, PPG-1 Trideceth-6	1.50
D	Techpolymer MBP 8 (Sekisui Plastics)	Polymethyl Methacrylate	2.00
	Xiameter PMX-0245 Cyclopentasiloxane (Dow Corning)	Cyclopentasiloxane	2.00
	Dermican™ SPB LS 9837	Glycerin, Aqua, Acetyl Tetrapeptide-9	0.50
E	Perfume	Parfum	qs
	Preservative		qs

# Decorative Cosmetics with Uvinul<sup>®</sup> Easy

# BB Cream



30°C



+ Timica® Terra White  
Black  
Yellow  
Red




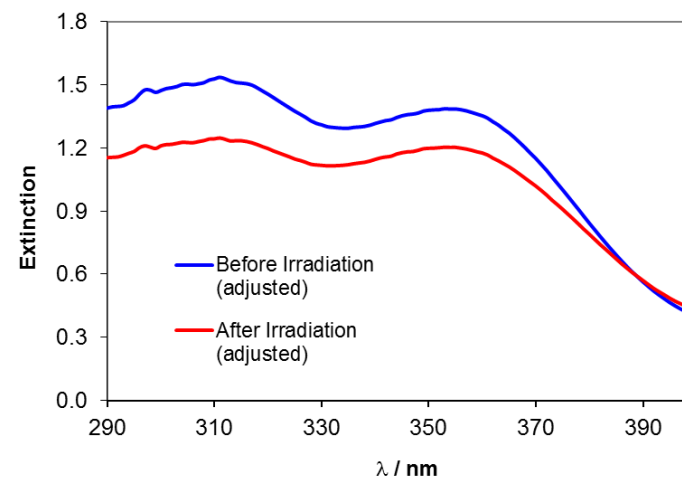
BB Cream



# BB Cream


**SPF 30**  **PA+++** UV-DE-12-055-6-7

	UV-DE-12-055-6-7
Filter composition	30.0% Uvinul® Easy
Stabilization / Thickener	Eumulgin® BA25 / Rheocare® XG
UV Filters concentration	15,3%
SPF in vivo	30 (in silico)
UVA-PF (Colipa)	11,4
UVA-PF/SPF	> 1/3 
PA claim	PA+++



Application: 1,2mg/cm<sup>2</sup> / Irradiation : 18,41J/cm<sup>2</sup>  
 Prototype measured on roughened PMMA plates according to Colipa UVA method.

# BB Cream

SPF 30  PA+++ UV-DE-12-055-6-7



Phase	Ingredients	INCI	% by weight
A	Eumulgin® BA 25	Beheneth-25	1.00
	Uvinul® Easy	Dibutyl Adipate, Diethylamino Hydroxybenzoyl Hexyl Benzoate, Ethylhexyl Methoxycinnamate, Laureth-7 Citrate, Polyglyceryl-2 Dipolyhydroxystearate, Ethylhexyl Triazone, Bis-Ethylhexyloxyphenol Methoxyphenyl Triazine, Lauryl Glucoside, Triethanolamine	30.00
B	Water, demin.	Aqua	53.60
	Rheocare® XG (Europe only)	Xanthan Gum	0.50
	1,3-Butanediol	Butylene Glycol	5.00
C	Xiameter PMX-0245 Cyclopentasiloxane (Dow Corning)	Cyclopentasiloxane	0.50
D	Chione™ M SVA	Synthetic Fluorphlogopite, Lauroyl Lysine	1.00
	Timica® Terra Black MN4498	Mica, Iron Oxides, Titanium Dioxide	0.40
	Timica® Terra Yellow MN4502	Mica, Iron Oxides, Titanium Dioxide	4.00
	Timica® Terra White MN4501	Mica, Titanium Dioxide	3.00
	Timica® Terra Red MN4506	Mica, Iron Oxides, Titanium Dioxide	1.00
	Preservative		qs
	Perfume cabano One Rose RS32126 (Technico Flor)	Parfum	qs
	Sodium Hydroxide (30% solution)	Sodium Hydroxide	qs



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