

**Substantiating Ingredient & formula
Sustainability**

Minimize your environmental footprint in the journey of a cosmetic product

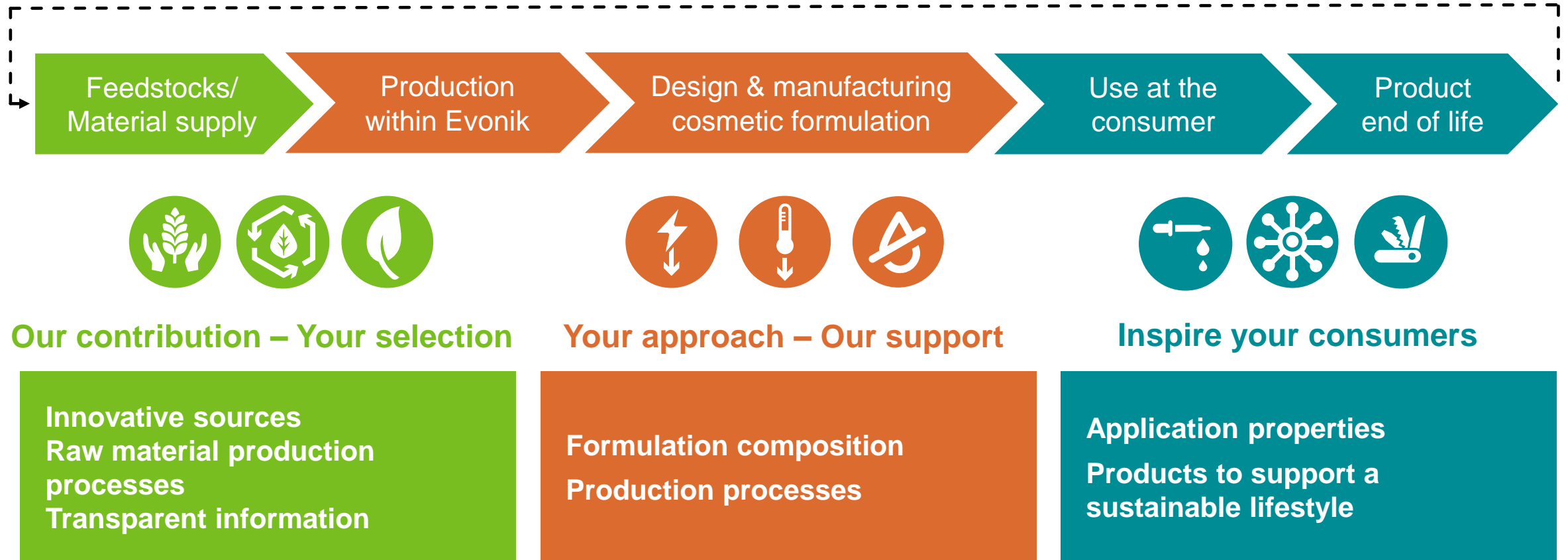
Eco Well Conference | March 2021

Anna Howe
Applied Technology Manager
Evonik Nutrition & Care
Care Solutions Business Line



The journey of a cosmetic product from raw materials

How to eco-design to reduce environmental impacts



From today to tomorrow

Let's discover jointly how to get there!





Market

Trends to have in mind



Natural and Sustainable

What's **inside products** and **how it impacts the environment** is important



Develop for next-generation consumers

Provide a purpose to purchase



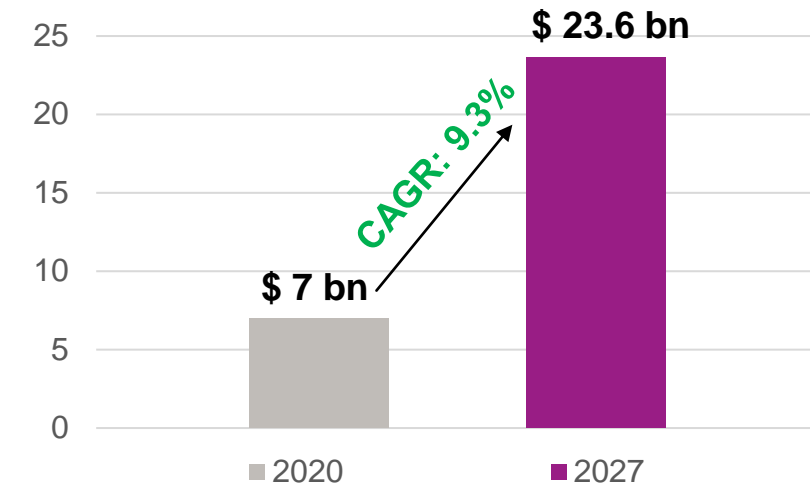
New brands

Indie Beauty brands, vegan brands **are launched** to serve changing **consumer needs**

Source: Mintel, Euromonitor, Internet blogs, WGSN beauty report

Global Natural and Organic Personal Care Industry, 2020-2027

Unit: USD billion

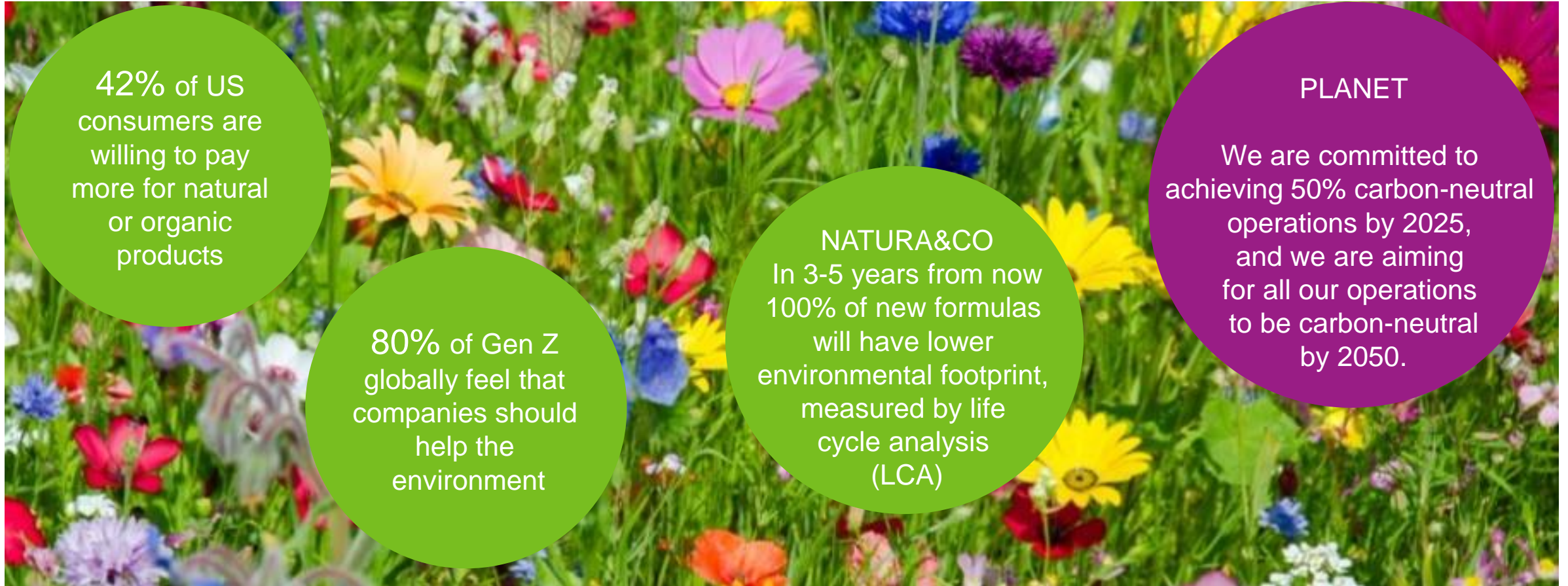


Consumers are now more than ever aware of the ingredients being used in their cosmetic products.

This projected increase is driven by manufacturers' response to consumer demand, which is likely being boosted from the rise of 'conscious beauty' in the personal care space.

Source: Globe Newswire

Consumers put focus on environmental benefits



Source: WGSN report Gen Z: building new beauty; Mintel facial care Jan 2020; Mintel Eveline Poland, ; <https://www.wsj.com/articles/eu-to-cut-greenhouse-gas-emissions-to-zero-by-2050-11576203017>; Natura sustainability vision 2030

Selection Criteria for an improved ECO profile

How we can support you

Our contribution: providing raw materials for your selection



Organic sources & responsible palm



Reduced aquatic burden



Natural origin



Production processes with reduced CO₂ environmental footprint

Your approach – our support: optimizing production processes & formula composition



Low energy consumption



Cold production process



Minimalistic formula



“Waterless”¹

Inspire the consumer: Support them in living sustainably



Improved rinsability/less water consumption



No/reduced packaging



Multi-tasking product



Multipurpose use



Gender neutral

¹ Does not contain additional water

Our contribution: providing raw materials for your selection



Organic sources & responsible palm



Reduced aquatic burden



Natural origin



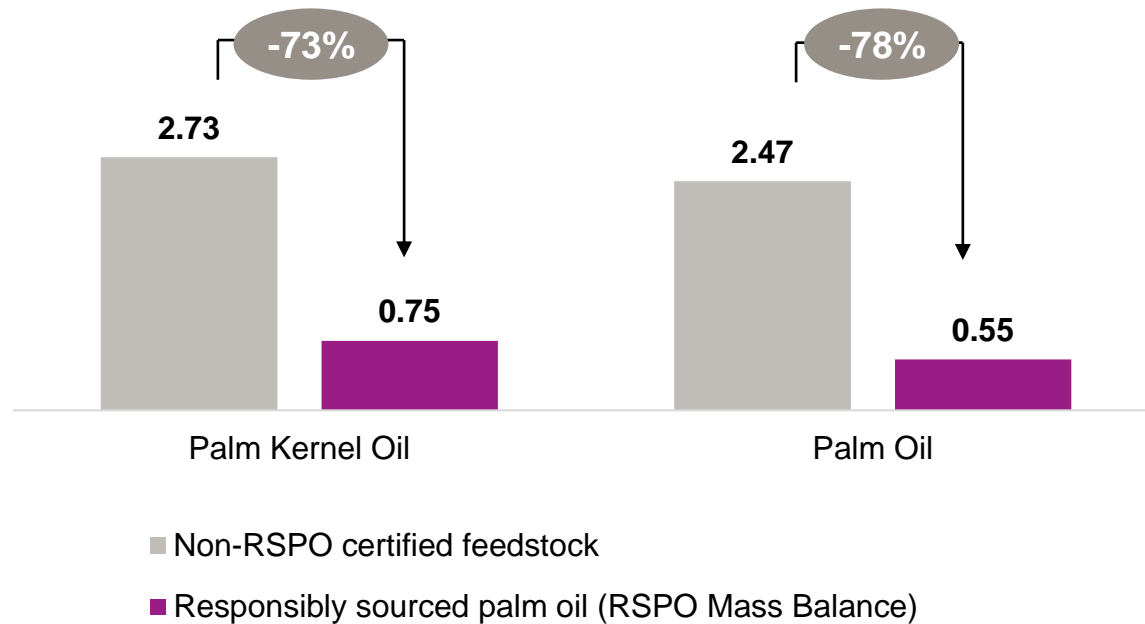
Production processes with reduced CO₂ environmental footprint

Carbon footprint of palm oil

Importance of using responsibly resourced palm



Global warming in kg CO₂ equivalents per kg oil *



* (incl. biogenic carbon, incl. Land use Change)

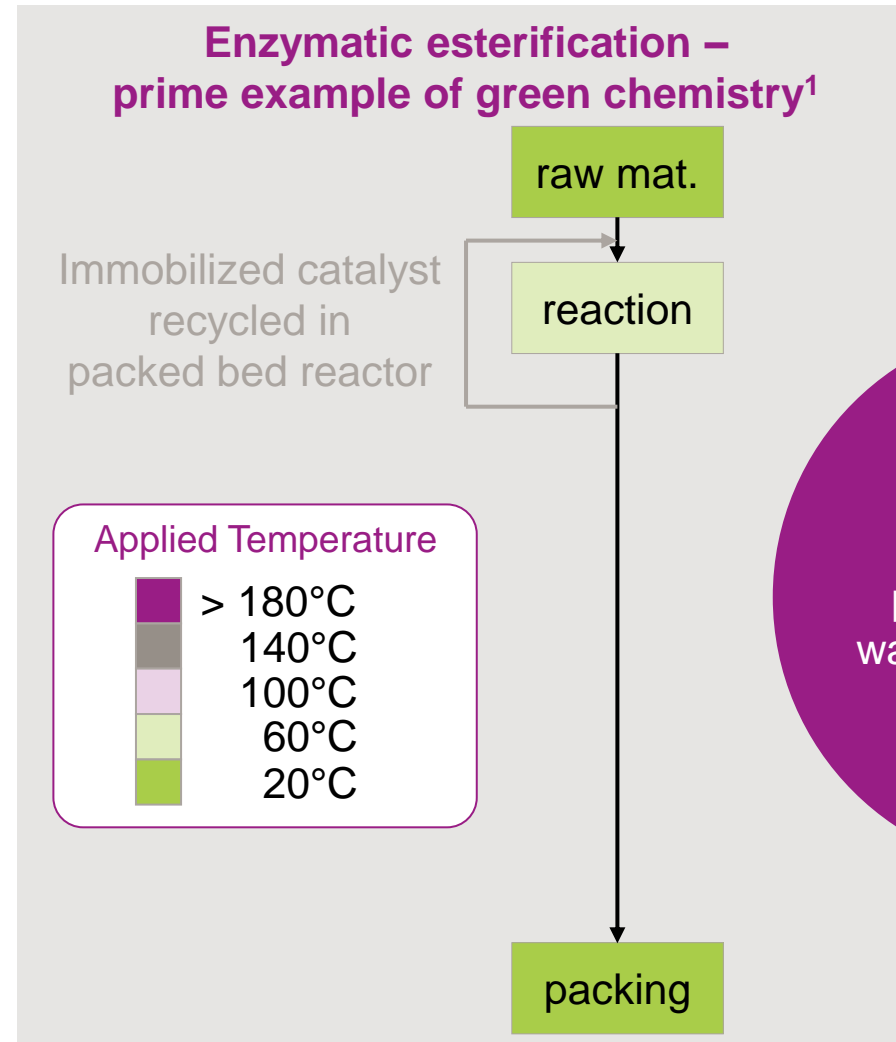
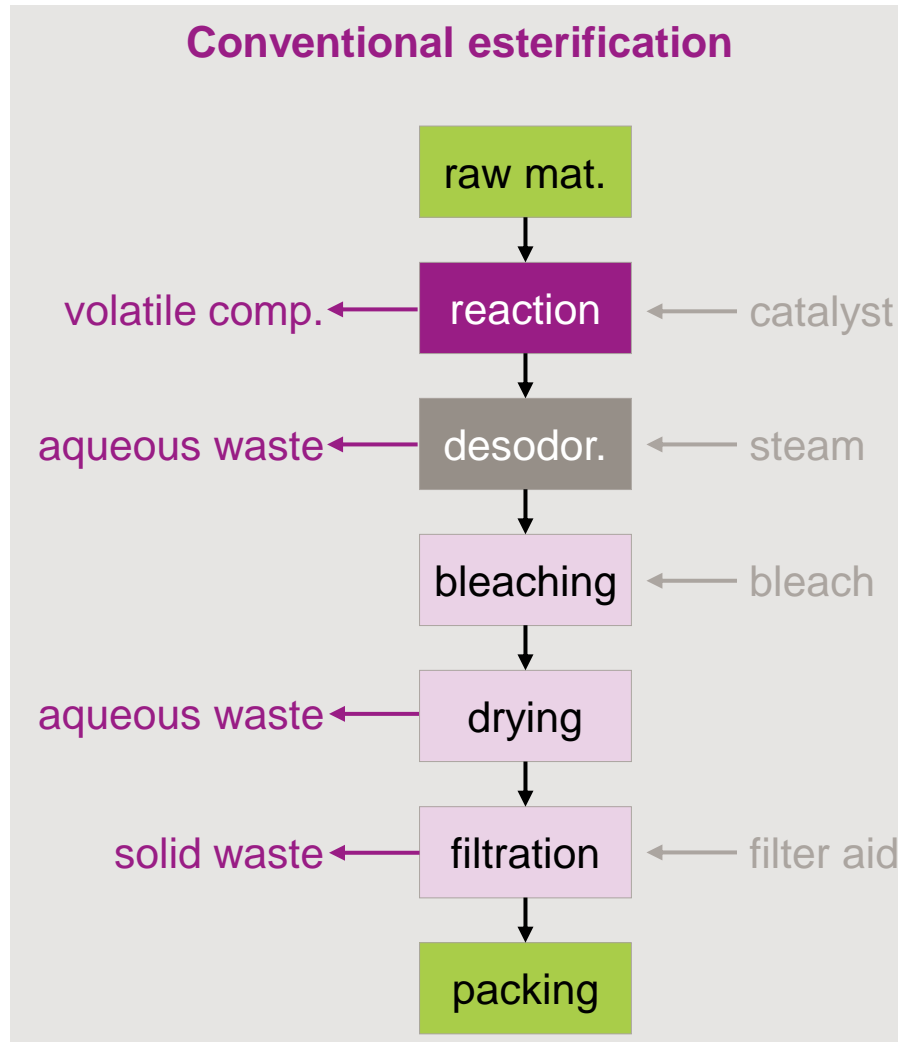
Switching to responsibly sourced palm oil has a significant impact on the carbon footprint of these ingredients

Benefits of RSPO certified palm oil

- Reduction of CO₂ emissions
- Social contribution
- **Contributes to deforestation-free supply chains**



Process comparison of conventional esterification vs. enzymatic production of emollient esters



¹ see green chemistry info

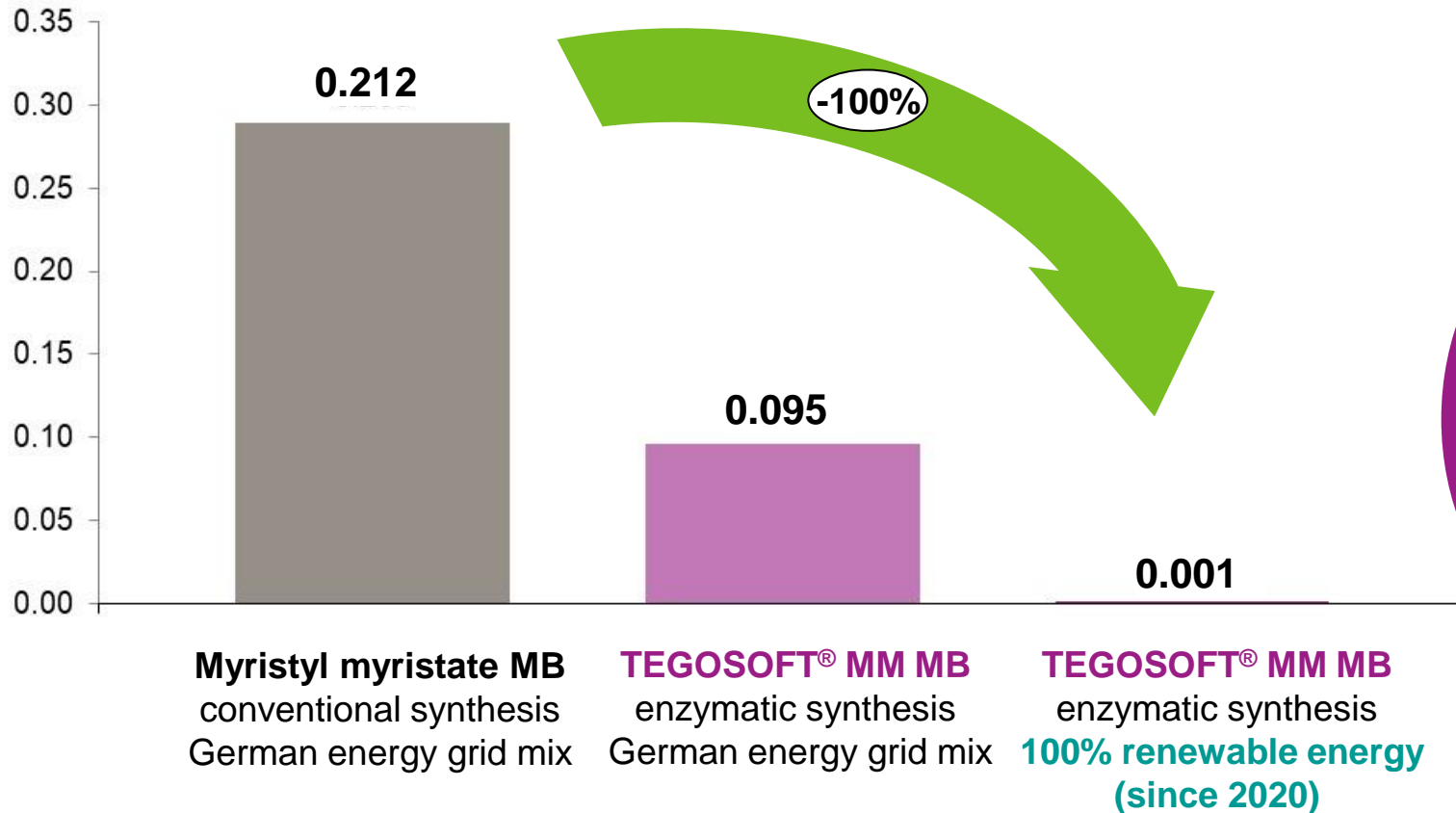
The enzymatic production process prevents waste and uses less energy.

The enzymatic esterification process reduces CO₂ emissions

Life cycle assessment based on Myristyl Myristate – gate to gate



kg CO₂ equivalents per kg emollient



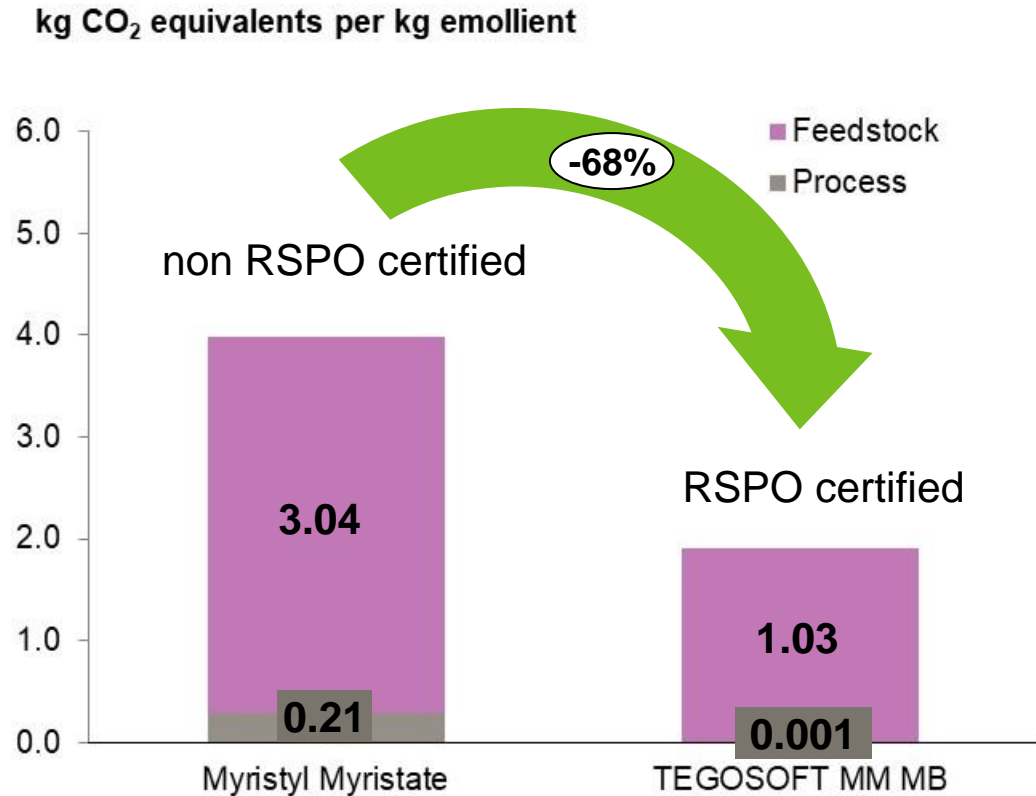
Global warming potential including biogenic carbon and land use change

» see LCA background info

This eco-efficient process fully running on renewable energy leads to an improved impact on global warming by **100%** lower CO₂ footprint compared to conventional chemical production

The enzymatic esterification process uses RSPO certified raw materials

Life cycle assessment based on Myristyl Myristate



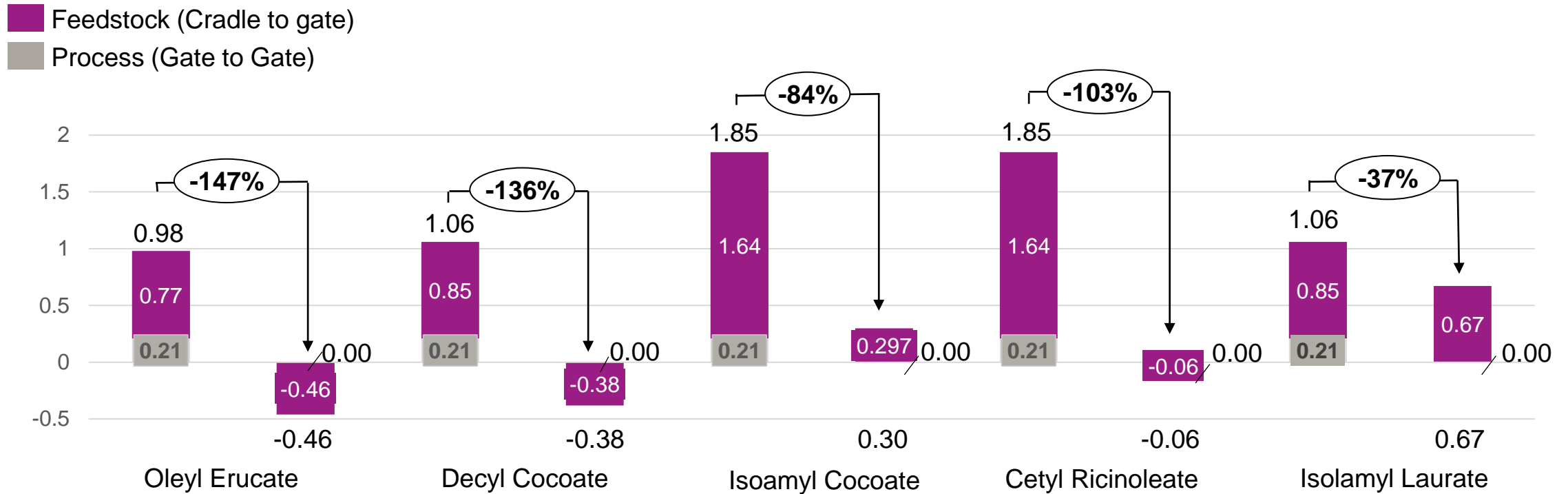
Global warming potential including biogenic carbon and land use change, exemplary for TEGOSOFT[®] MM MB¹
Process: gate to gate
Feedstock: cradle to gate

» see LCA background info

TEGOSOFT[®] MM MB has an improved impact on global warming by 68% lower CO₂ footprint compared to conventional chemical production & non RSPO certified feedstock

Environmental impact of a market product

Life Cycle Assessment of a typical O/W cream - Impact of ingredient types



Enzymatically produced esters have an improved impact on global warming by significantly lower CO₂ footprint compared to conventional chemical production & non RSPO certified feedstock

Environmental impact of your market product

Typical O/W cream - example



| Phase | Ingredients | w/w % |
|-------|--|----------------------------|
| A | dermofeel® NC MB (Polyglyceryl-3 Distearate, Glyceryl Stearate Citrate) | 3.00 |
| | TEGIN® M Pellets MB (Glyceryl Stearate) | 2.00 |
| | TEGO® Alkanol 1618 MB (Cetearyl Alcohol) | 1.00 |
| | Isoamyl Laurate | 5.00 |
| | Decyl Cocoate | 5.00 |
| | Oleyl Erucate Cetyl Ricinoleate | 5.00 3.00 |
| | TEGO® Feel C 10 (Cellulose) | 2.00 |
| B | Water | 70.80 |
| | Glycerin | 3.00 |
| | Xanthan Gum | 0.20 |
| C | Preservative, Perfume | q.s. |



Test formulations

- Natural origin content (incl. water, ISO 16128) c_{no} : 100.0%
- Skin care emulsion with **conventional esters**
- Skin care emulsion with **Evonik enzymatic esters**

Exchanging



emollients
(**18%**)

| | |
|--|-------------|
| dermofeel® sensolv MB (Isoamyl Laurate) | 5.00 |
| TEGOSOFT® DC MB (Decyl Cocoate) | 5.00 |
| TEGOSOFT® OER MB (Oleyl Erucate) | 5.00 |
| TEGOSOFT® CR MB (Cetyl Ricinoleate) | 3.00 |

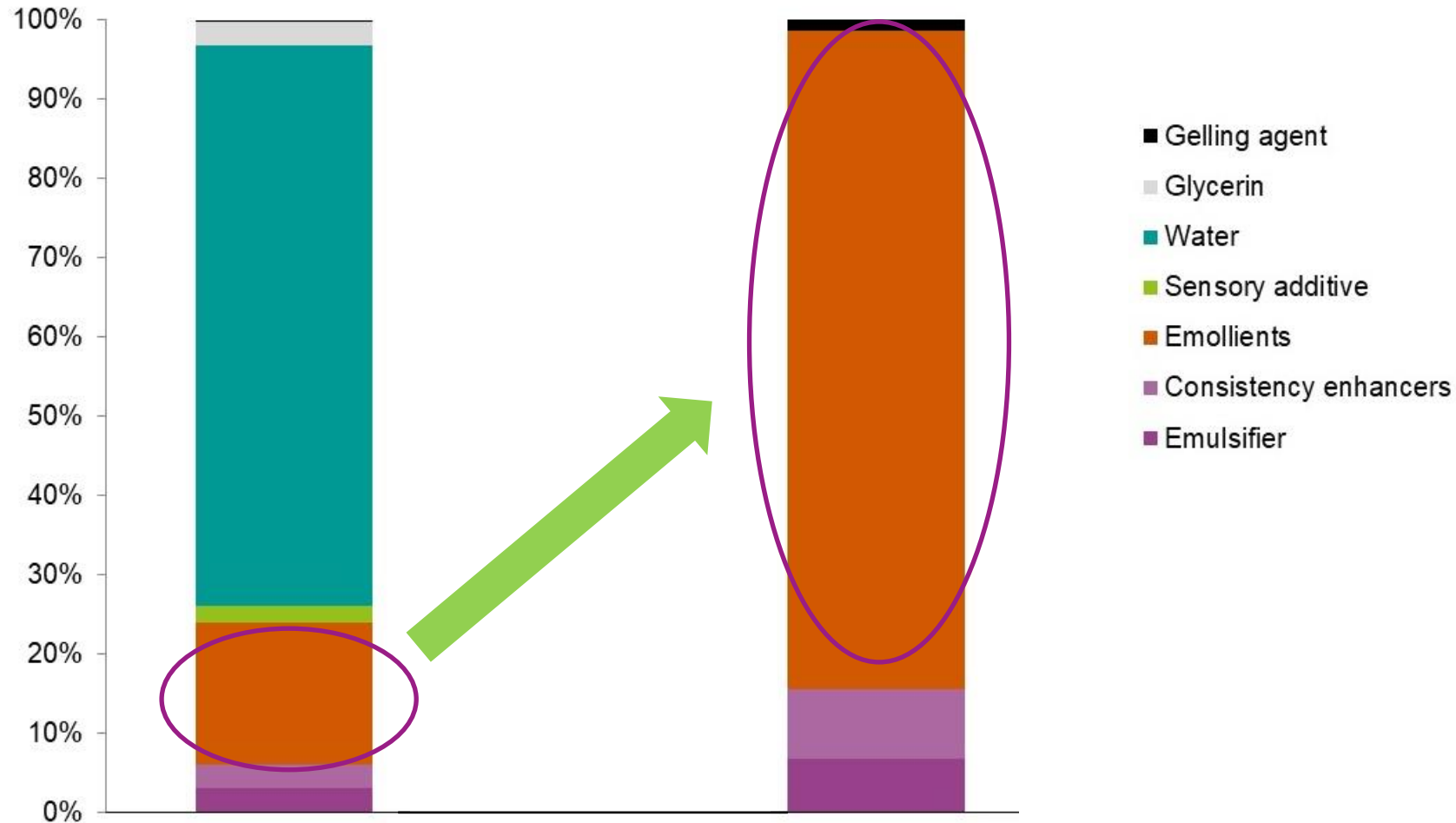
Environmental impact of a market product

Life Cycle Assessment of a typical O/W cream - Impact of ingredient types



weight % raw material

% contribution CO₂ equivalents



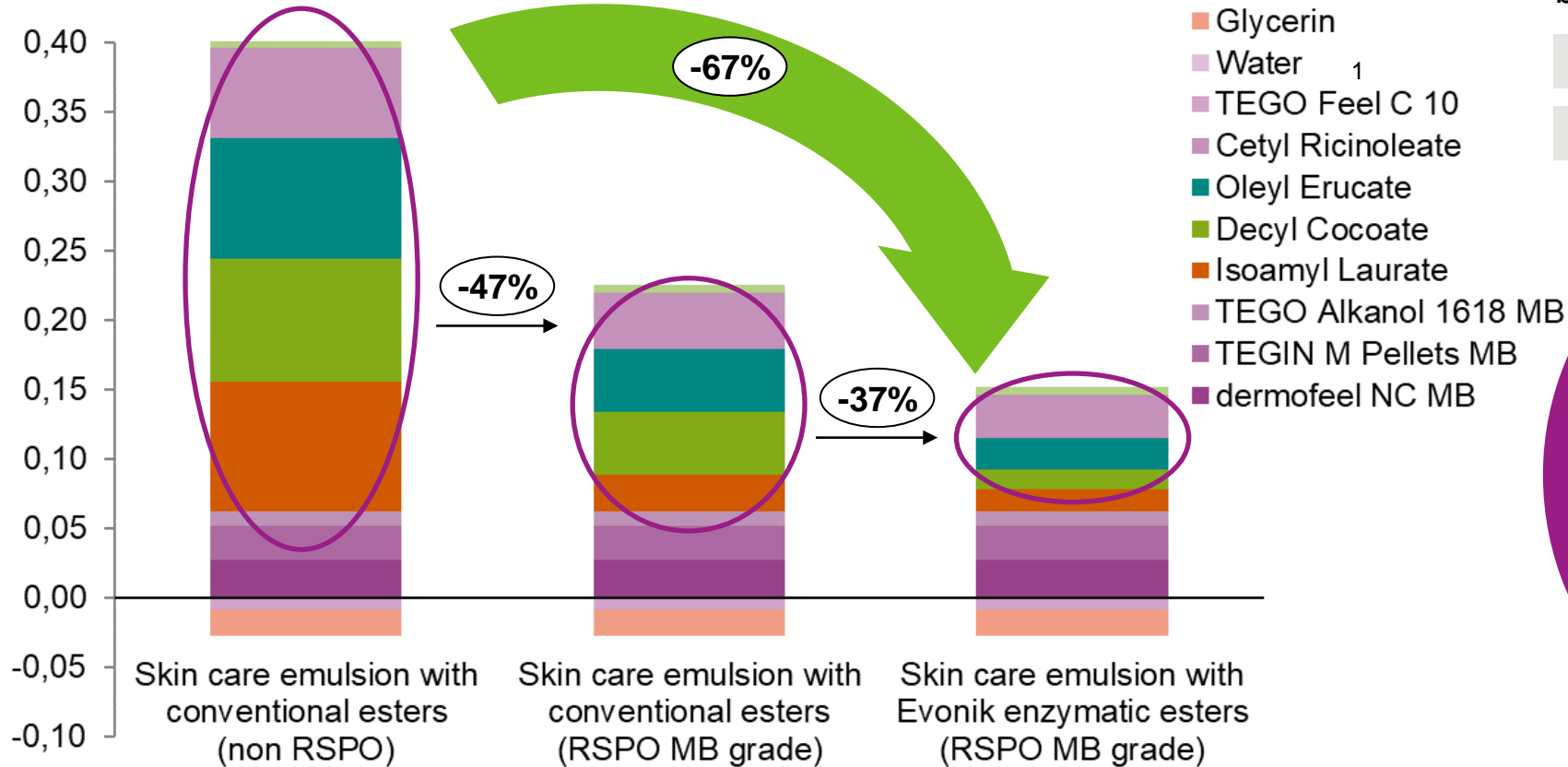
By far the biggest impact on the CO₂ footprint of a typical O/W formulation is contributed by the emollients

Environmental impact of your market product

Life Cycle Assessment of a typical O/W cream – cradle to gate



kg CO₂ equivalents per kg emulsion



- Xanthan Gum
- Glycerin
- Water ¹
- TEGO Feel C 10
- Cetyl Ricinoleate
- Oleyl Erucate
- Decyl Cocoate
- Isoamyl Laurate
- TEGO Alkanol 1618 MB
- TEGIN M Pellets MB
- dermofeel NC MB



Global warming potential including biogenic carbon and land use change

» see LCA background info

¹ see further explanation

By changing to Evonik enzymatic emollients in the final formulation an improved impact on global warming by **67%** lower CO₂ footprint compared to using conventional chemical emollients is possible

Overview

Your approach – our support: optimizing production processes & formula composition



Low energy consumption



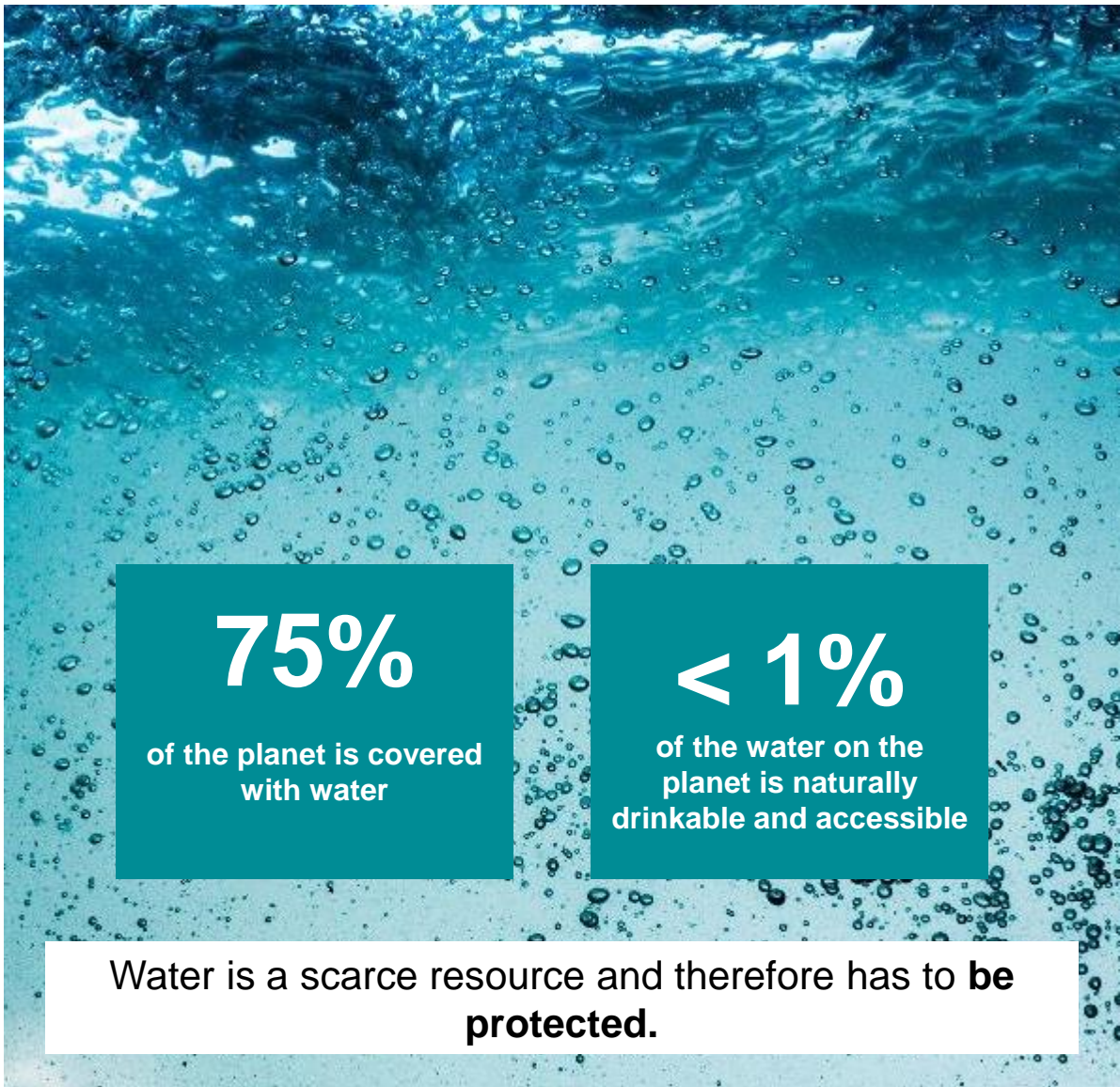
Cold production process



Minimalistic formula



“Waterless”¹



75%

of the planet is covered with water

< 1%

of the water on the planet is naturally drinkable and accessible

Water is a scarce resource and therefore has to **be protected.**



On average, a standard cosmetic product comprises

70 - 80%
of water

< 1,000 L

of “virtual water” is used to clean, refresh and process products

Water is a key component in beauty and personal care.

Source: [Cosmetic Business](#) 2019; [Beauty Alley](#) 2018, Mintel GNPD 2021

Consumers care

Conserving water has become a global initiative



Source: Base: 2000 US internet users aged 18+; 3,000 Japanese nationals of age 20 or above nationwide (valid responses: 1,834 people); 1,000 Canadian internet users aged 18
Lightspeed GMI/Mintel; 2019

Happy Hands Bar

MK 2/21-5



| Phase | Ingredients | w/w % |
|-----------------------------|--|-------|
| A | Ricinus Communis (Castor) Seed Oil; Beeswax; Copernicia Cerifera (Carnauba) Wax; Helianthus Annuus (Sunflower) Seed Oil; Tocopherol; Ascorbyl Palmitate (KahlJelly 7235 MB Natural, KahlWax) | 45.70 |
| | Rhus Verniciflua Peel Wax; Simmondsia Chinensis (Jojoba) Seed Oil; Cetearyl Alcohol; Myristyl Alcohol; Caprylic/Capric Triglyceride; Copernicia Cerifera (Carnauba) Wax; Helianthus Annuus (Sunflower) Seed Oil; Tocopherol (KahlComplex 6422 Veggiesoft, KahlWax) | 20.00 |
| | Helianthus Annuus (Sunflower) Seed Wax; Olea Europaea (Olive) Oil; Rhus Verniciflua Peel Wax; Shorea Robusta Resin (KahlWax 2225 Phyto, KahlWax) | 10.00 |
| | Hydrolyzed Sunflower Seed Wax (KahlWax 6607H Hydrolyzed Sunflower, KahlWax) | 5.00 |
| | TEGOSOFT® OER MB (Oleyl Erucate) | 6.00 |
| | TEGOSOFT® DC MB (Decyl Cocoate) | 5.00 |
| | TEGOSOFT® CR MB (Cetyl Ricinoleate) | 2.00 |
| | Olea Europaea (Olive) Fruit Oil | 2.70 |
| | dermofeel® viscolid MB (Hydrogenated Vegetable Oil) | 2.00 |
| | dermosoft® GMCY MB (Glyceryl Caprylate) | 0.50 |
| | dermofeel® TocoSkin (Tocopherol; Helianthus Annuus (Sunflower) Seed Oil) | 0.20 |
| | dermofeel® Toco 70 non GMO (Tocopherol; Helianthus Annuus (Sunflower) Seed Oil) | 0.20 |
| | Bodyflux® Olive (Ceramide NP) | 0.20 |
| Perfume Creamy Mango (Mane) | 0.50 | |



Processing

1. Heat phase A to 85 - 90 °C
2. Stir well until homogeneous
3. Cool down to 75 - 80 °C
4. Fill into final packaging or mold

Remarks

Viscosity: solid

Natural content c_n (incl. water, ISO 16128): 73.2%

Natural origin content c_{no} (incl. water, ISO 16128): 99.1%

[Go back to overview](#)

Beachy Body Butter Bar

MK 4/21-3



| Phase | Ingredients | w/w % |
|---|--|-------|
| A | Hydrogenated Rapeseed Oil (KahlWax 6237 Rapeseed, KahlWax) | 43.20 |
| | Helianthus Annuus (Sunflower) Seed Wax; Helianthus Annuus (Sunflower) Seed Oil; Ascorbyl Palmitate; Tocopherol (KahlWax 6607L MB Sunflower, KahlWax) | 8.90 |
| | Oryza Sativa (Rice) Bran Wax (KahlWax Rice 2811, KahlWax) | 3.00 |
| | Prunus Amygdalus Dulcis (Sweet Almond) Oil | 12.50 |
| | TEGOSOFT® DC MB (Decyl Cocoate) | 11.50 |
| | TEGOSOFT® OER MB (Oleyl Erucate) | 5.00 |
| | Persea Gratissima (Avocado) Oil | 5.00 |
| | TEGOSOFT® CR MB (Cetyl Ricinoleate) | 3.00 |
| | TEGOSOFT® MM MB (Myristyl Myristate) | 2.00 |
| | Argania Spinosa Kernel Oil | 1.30 |
| | dermofeel® viscolid MB (Hydrogenated Vegetable Oil) | 2.00 |
| | dermosoft® GMCY MB (Glyceryl Caprylate) | 0.50 |
| | dermofeel® TocoSkin (Tocopherol; Helianthus Annuus (Sunflower) Seed Oil) | 0.20 |
| | dermofeel® Toco 70 non GMO (Tocopherol; Helianthus Annuus (Sunflower) Seed Oil) | 0.20 |
| | Bodyflux® Olive (Ceramide NP) | 0.10 |
| | TEGO® Sterol KCS (Potassium Cholesteryl Sulfate) | 0.10 |
| | Ricinus Communis (Castor) Seed Oil; CI 77891; Polyhydroxystearic Acid (Covapate Uniwhite LC 9781, Sensient) | 1.00 |
| Perfume Vanilla Cocos Natura (Düllberg) | 0.50 | |



Processing

1. Heat phase A to 85 - 90 °C
2. Stir well until homogeneous
3. Cool down to 75 - 80 °C
4. Fill into final packaging or mold

Remarks

Viscosity: solid

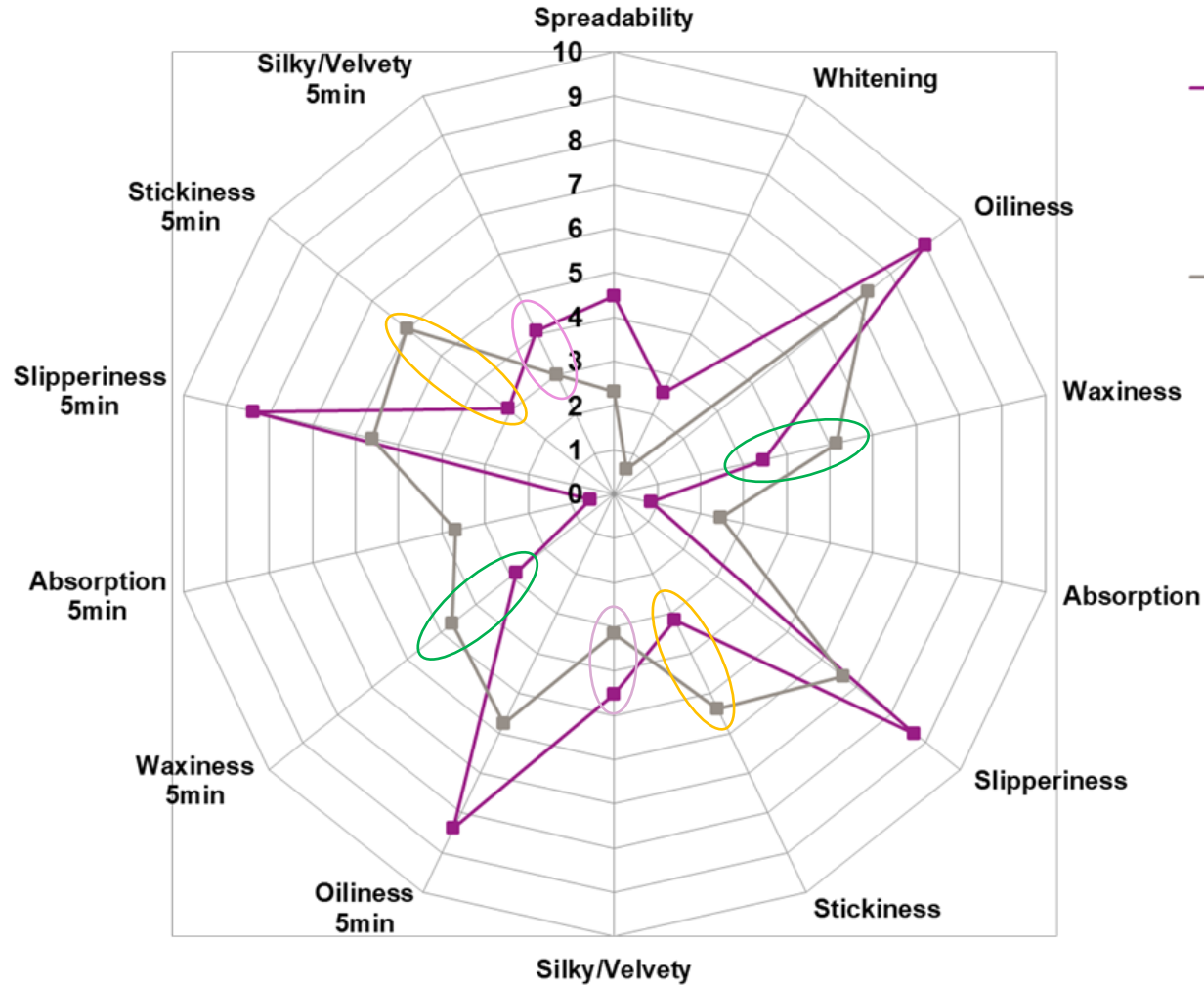
Natural content c_n (incl. water, ISO 16128): 75.7%

Natural origin content c_{no} (incl. water, ISO 16128): 99.6%

[Go back to overview](#)

Sensory Panel

Comparison with market product ALVERDE Feste Körperbutter (Body Butter Bar)



Beachy Body Butter Bar MK 4/21-3

Compared to market product:

- More velvety-silky feel due to TEGOSOFT® CR MB
- Smoother skin feel during and after application
- Less sticky and less waxy

[Go back to overview](#)

Inspire the consumer: Support them in living sustainably



Improved rinsability/less water consumption



No/reduced packaging



Multi-tasking product



Multipurpose use



Gender neutral

Ultimate trouble-free smooth cream

L108-1.14-0120



| PHASE | INGREDIENTS | INCI | %W/W |
|-------|-----------------------------------|---|---------------|
| A | Deionised Water | Aqua | 61.00 |
| | dermorganics® Glycerin | Glycerin | 4.00 |
| | dermofeel® PA-3 | Sodium Phytate; Aqua; Alcohol | 0.10 |
| B | Xanthan Gum FNCSP-PC | Xanthan Gum | 0.30 |
| | Kelcogel CG LA | Gellan Gum | 0.10 |
| C | symbio®muls GC MB | Glyceryl Stearate Citrate; Cetearyl Alcohol; Glyceryl Caprylate | 6.50 |
| | TEGOSOFT® MM MB | Myristyl Myristate | 2.00 |
| | dermofeel® sensolv MB | Isoamyl Laurate | 1.00 |
| | Safflower Oil, pressed, organic | Carthamus Tinctorius Seed Oil | 5.00 |
| | TEGOSOFT® DC MB | Decyl Cocoate | 11.00 |
| | TEGOSOFT® OER MB | Oleyl Erucate | 5.00 |
| | dermofeel® Toco 70 non GMO | Tocopherol; Helianthus Annuus Seed Oil | 0.20 |
| D | dermorganics® 1388 | Glycerin; Aqua; Sodium Levulinate; Sodium Anisate | 3.50 |
| | Perfume | Parfum | 0.30 |
| | | | 100.00 |

Natural content c_n : 67.7%,
 Natural origin content c_{no} : 99.7%
 Organic content c_o : 9.1%
 Organic origin content c_{oo} : 10.6%
 (incl. water, ISO 16128)

Processing

1. Mix phase A and phase B separately and heat up to 60°C. Disperse phase B in phase A until completely dissolved.
2. Emulsify phase C into phase A/B while stirring.
3. Homogenize.
4. Start to cool down under medium stirring.
5. Add phase D to A/B/C. Adjust the pH-value, if necessary.









Specification

Appearance: White cream | pH-value: 5.2 - 5.4
 Viscosity: Brookfield (21°C) TC93; 10rpm / helip.: 10000 - 30000 mPas
 Stability test: passed
 Microbiological safety: challenge test passed

Ultimate trouble-free smooth cream

L108-1.14-0120



| PHASE | INGREDIENTS | INCI | %W/W |
|-------|---|---|---------------|
| A | Deionised Water | Aqua | 61.00 |
| |  dermorganics® Glycerin ¹ | Glycerin | 4.00 |
| | dermofeel® PA-3 | Sodium Phytate; Aqua; Alcohol | 0.10 |
| B | Xanthan Gum FNCSP-PC | Xanthan Gum | 0.30 |
| | Kelcogel CG LA | Gellan Gum | 0.10 |
| C |  symbio®muls GC MB ² | Glyceryl Stearate Citrate; Cetearyl Alcohol; Glyceryl Caprylate | 6.50 |
| |  TEGOSOFT® MM MB ² | Myristyl Myristate | 2.00 |
| |  dermofeel® sensolv MB ² | Isoamyl Laurate | 1.00 |
| | Safflower Oil, pressed, organic ¹ | Carthamus Tinctorius Seed Oil | 5.00 |
| |  TEGOSOFT® DC MB ² | Decyl Cocoate | 11.00 |
| |  TEGOSOFT® OER MB ² | Oleyl Erucate | 5.00 |
| |  dermofeel® Toco 70 non GMO ¹ | Tocopherol; Helianthus Annuus Seed Oil | 0.20 |
| D |  dermorganics® 1388 ¹ | Glycerin; Aqua; Sodium Levulinate; Sodium Anisate | 3.50 |
| | Perfume | Parfum | 0.30 |
| | | | 100.00 |

Improved ECO profile



**Organic sources¹
& based on responsible palm²**

Organic origin content: 10.6 %



Low energy consumption - lower processing temperature & higher emulsification efficacy



Multipurpose use

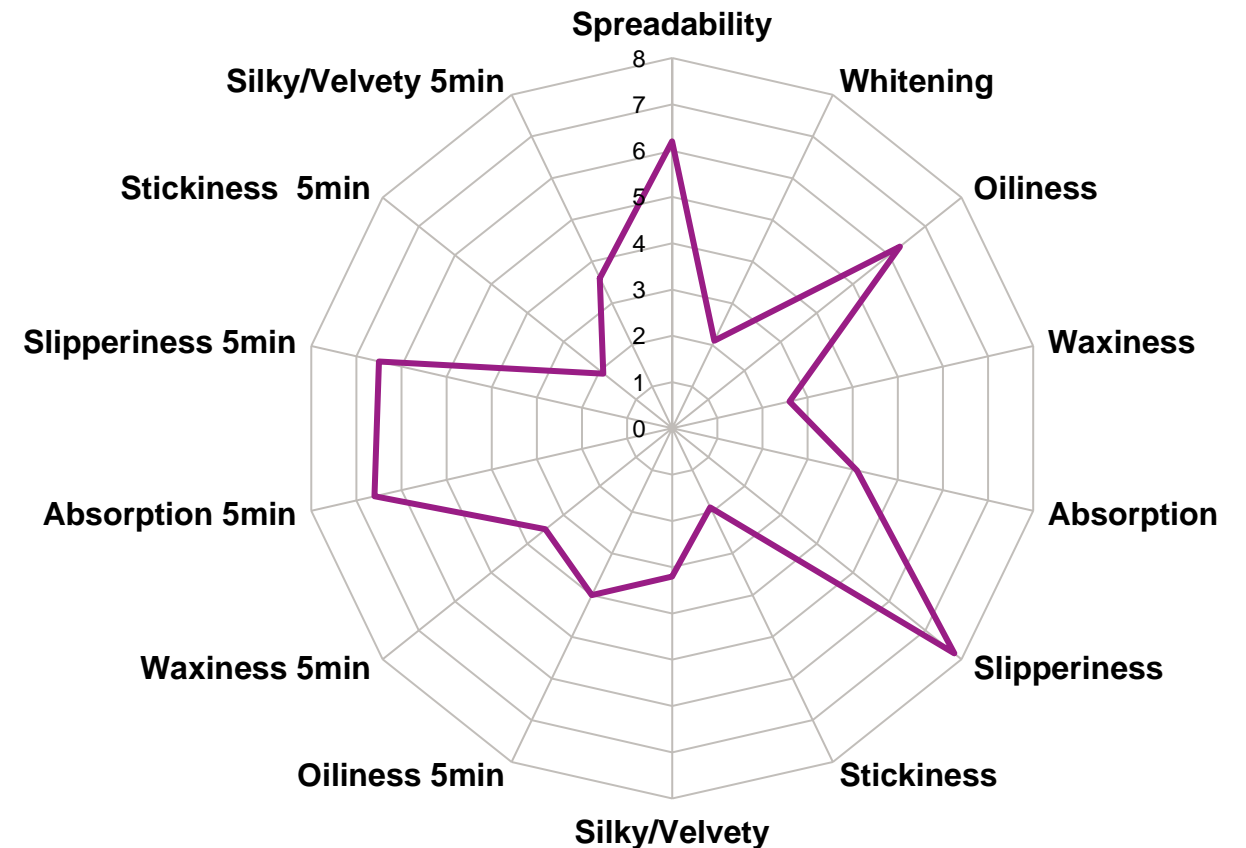
Ultimate trouble-free smooth cream

L108-1.14-0120



Sensory

- **symbio[®]mul**s GC MB provides a caring skin-feel with a light protection film
- **With a low-waxy, non-sticky after feel**
- **Good absorption after application**
- **With moisturizing and softening properties**



n=15

CAREtain®able Caring W/O-Fluid

H 22/19-15



| PHASE | INGREDIENTS | INCI | %W/W |
|-------|---|--|--------|
| A | ISOLAN® 17 MB | Polyglyceryl-4 Diisostearate/Poly-hydroxystearate/Sebacate; Caprylic/Capric Triglyceride; Polyglyceryl-3 Oleate; Diisostearyl Polyglyceryl-3 Dimer Dilinoleate | 5.00 |
| | dermofeel® sensolv MB | Isoamyl Laurate | 8.00 |
| | TEGOSOFT® DC MB | Decyl Cocoate | 8.00 |
| | TEGOSOFT® OER MB | Oleyl Erucate | 8.00 |
| | TEGOSOFT® CR MB | Cetyl Ricinoleate | 1.00 |
| | Safflower Seed Oil, cold pressed, organic | Carthamus Tinctorius (Safflower) Seed Oil | 5.00 |
| | dermosoft® GMC MB | Glyceryl Caprate | 0.50 |
| | dermofeel® Toco 70 non GMO | Tocopherol; Helianthus Annuus (Sunflower) Seed Oil | 0.20 |
| B | Zinc Stearate | | 0.60 |
| C | Water | Aqua | 55.70 |
| | dermorganics® Glycerin | Glycerin | 3.00 |
| | Zinc Sulfate Heptahydrate | | 2.00 |
| | Alcohol | Ethanol | 3.00 |
| | | | 100.00 |

Natural content c_n : 63.9%,
Natural origin content c_{no} : 100% (incl. water, ISO 16128)

Processing

1. Mix ingredients of phase C at room temperature in a separate beaker.
2. Start with phase A (room temperature) in the main beaker.
3. Add phase B to phase A and disperse with Ultra Turrax at 24.000 rpm for 1 minute.
4. Add phase C to phase A/B for 90 seconds while stirring at 13.400 rpm with Ultra Turrax.
5. Homogenize with Ultra Turrax at 20.400 rpm for 1 minute.

Specification

Appearance: White fluid

Viscosity: Brookfield (21°C) RV DV-I, sp. 5, 100 rpm: 2 Pas






Stability test: Passed

Microbiological safety: Challenge test passed

CAREtain®able Caring W/O-Fluid

H 22/19-15



| PHASE | INGREDIENTS | INCI | %W/W | |
|----------------------------|---|---|---|------|
| A |      | ISOLAN® 17 MB | Polyglyceryl-4 Diisostearate/Poly-hydroxystearate/Sebacate; Caprylic/Capric Triglyceride; Polyglyceryl-3 Oleate; Diisostearoyl Polyglyceryl-3 Dimer Dilinoleate | 5.00 |
| | | dermofeel® sensolv MB | Isoamyl Laurate | 8.00 |
| | | TEGOSOFT® DC MB | Decyl Cocoate | 8.00 |
| | | TEGOSOFT® OER MB | Oleyl Erucate | 8.00 |
| | | TEGOSOFT® CR MB | Cetyl Ricinoleate | 1.00 |
| | | Safflower Seed Oil, cold pressed, organic | Carthamus Tinctorius (Safflower) Seed Oil | 5.00 |
| | | dermosoft® GMC MB | Glyceryl Caprate | 0.50 |
| dermofeel® Toco 70 non GMO | Tocopherol; Helianthus Annuus (Sunflower) Seed Oil | 0.20 | | |
| B | Zinc Stearate | | 0.60 | |
| C | Water | Aqua | 55.70 | |
| | dermorganics® Glycerin | Glycerin | 3.00 | |
| | Zinc Sulfate Heptahydrate | | 2.00 | |
| | Alcohol | Ethanol | 3.00 | |
| | | | 100.00 | |

Improved ECO profile



Production process with reduced environmental footprint (emollients)



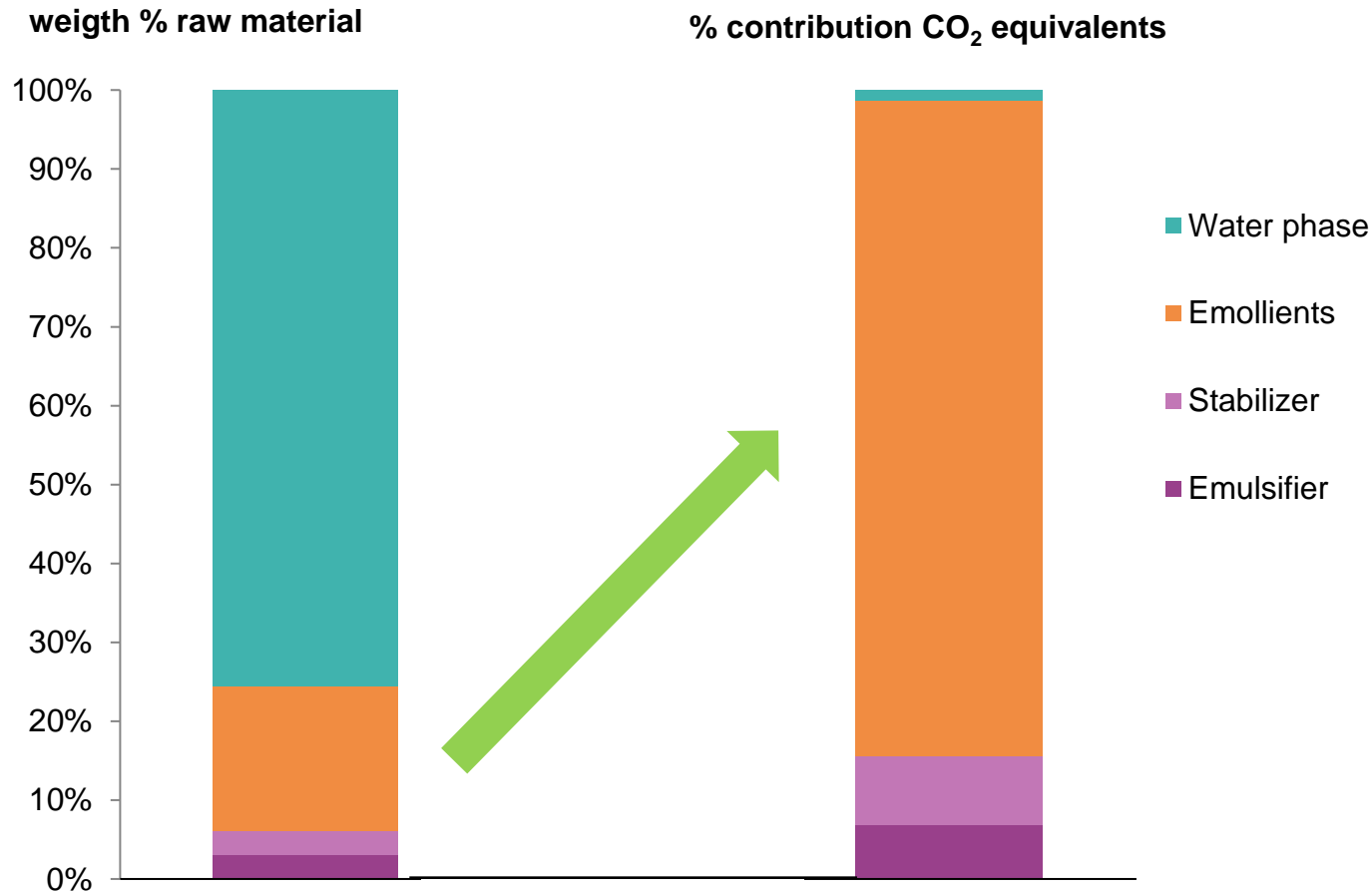
Cold production process



Multipurpose use

Example: Environmental impact of a final formulation

Impact of ingredient types on the CO₂-footprint



By far the biggest impact on the CO₂ footprint of a typical **W/O** formulation is contributed by the emollients

By changing to Evonik enzymatic emollients in the final formulation, an improved impact on global warming by lower CO₂ footprint compared to using conventional chemical emollients is possible

Minimize your environmental footprint in the journey of a cosmetic product

Our contribution: Providing raw materials for your selection



Your approach – our support: optimizing production processes & formula composition





Inspire the consumer: Support them in living sustainably





- How to influence the profile of a cosmetic product to achieve a holistic sustainability approach
 - Full transparency of information is key for the choice of raw materials
 - Consider product positioning from the beginning for selecting the composition and manufacturing of the formulation
 - Use your product communication to motivate consumers to take part and contribute


We can get you started intoBeauty® – CAREtain® Toolbox


 Startcenter


 Product Area


 Sample order


 Product Selection Tool


 Trend-inspired concepts

 Videos


 CAREtain® Toolbox

 Sensory Kaleidoscope

 Ceramide Knowledge

 Certificates & Factsheets

PRODUCT SEARCH



PRODUCT CATEGORY

Advanced Botanicals...

Antimicrobial skin...

Antic...

Delivery Svstems

Glycerolipids

Hval

SUSTAINABILITY CRITERIA


Constitution


ISO 16128 Interpretation


Natural Cosmetic Compliance


Origin / RSPO


INCI


Eco Application 


Eco Synthesis 


Reaction Type 

Natural Part n_p 


Organic Part o_p 


Synthetic Part s_p 


Animal Part a_p 


Carbon Distribution... 


Renewable Carbon C...


Active 


Residual Solvents 


Residual Additives 

Palmbased Part r_p 


RSPO Certification... 


Feedstocks 


Regional Origin 


Responsible Sourcing... 


Renewable electricity...


NaTrue STATUS 


COSMOS STATUS... 

Halal STATUS 


Kosher STATUS 

Vegan 


Biodegradability 

Natural Index I_n 


Natural Origin Index I...


Organic Index I_o 


Organic Origin Index ...



| | | Name | Category | Palmbased Part r _p | RSPO Certification |
|---|----|---------------------|-------------------------|-------------------------------|--------------------|
| > | 🖨️ | | | | |
| > | ⊗ | TEGO® Care PBS 6 MB | Oil in water emulsifier | | |

 Save as PDF handout (1 of max. 10)

 Show marked products

 Reset all

<https://intobeauty.evonik.com/caretaintoolbox/>



EVONIK

Leading Beyond Chemistry