

Biobased, renewable materials for textile applications

February 2023

FACTS & FIGURES



4

Business Units
Fiber/Textile/Leather/
Performance



3.000

Over 3,000 customers



5.000

Over 5,000 products



16

Represented in 16 countries



1.000

Around 1,000 employees
worldwide



340

Turnover 340 Mio EUR

HISTORY TIMELINE

Henkel

1876



1986

Purchase of Pulcra
(Latin): pure, clean

Cognis

Henkel's chemicals division was
turned into a spin-off to form
Cognis

1999



2001

Business
Textiles, leather and fibers business
sold to financial investors as a part
of Cognis

Pulcra Group

Foundation & Independence
of the Pulcra Group

2007 - 2008



2010

Headquarter
Takeover of the
Dr. Th. Böhme (production)
plant in Geretsried,
relocation of HQ

Devan Chemicals

Purchase of Devan International
Chemicals with HQ in Ronse,
Belgium

2021





DEVAN INTERNATIONAL CHEMICALS

Is officially part of the Pulcra Chemicals Group since July 2021. Since 45 years Devan Chemicals is committed to developing unique and innovative solutions for textile markets worldwide, with Sustainability and Research & Development being the heart of the business.





Sustainability

**A worldwide
priority**

Sustainability : different drivers

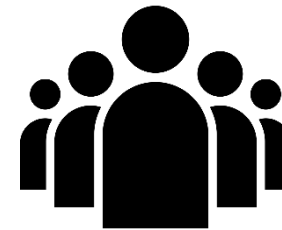
Three main drivers pushing the sustainability change



Governments



Brands & Retailers



Consumers

Sustainable Chemistry : a cornerstone in the Green Deal

Objectives

The EU's chemicals strategy aims to

- Better protect citizens and the environment
- Boost innovation for safe and sustainable chemicals

Actions

- Banning the most harmful chemicals in consumer products – allowing their use only where essential
- Account for the cocktail effect of chemicals when assessing risks from chemicals
- Phasing out the use of per- and polyfluoroalkyl substances (PFAS) in the EU, unless their use is essential
- Boosting the investment and innovative capacity for production and use of chemicals that are safe and sustainable by design, and throughout their life cycle
- Promoting the EU's resilience of supply and sustainability of critical chemicals
- Establishing a simpler “one substance one assessment” process for the risk and hazard assessment of chemicals
- Playing a leading role globally by championing and promoting high standards and not exporting chemicals banned in the EU



https://ec.europa.eu/environment/strategy/chemicals-strategy_cs?fbclid=IwAR09760e2ZfWeUtSE7sJGnTJAUEza3zAEjjPw4WKlpcUjMj_-tRyQWtHI



BRANDS & RETAIL: FOCUS Points



ZDHC (Zero Discharge of Hazardous Chemicals)

Removing added perfluorinated Chemicals (PFC's) from products

Removing harmful flame retardants

Green chemistry innovation



Sustainable fibres

Recycled fibres

Organic fibres

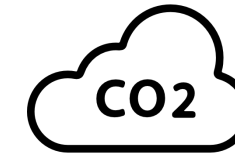
Traceability



Water reduction

Waste water reduction

Reduction of water use at consumer level



CO2 reduction in supply chain

Use of biobased raw materials

Reduction of energy in the supply chain and on consumer level

Net zero emission

Renewable energy



Zero waste


Biodegradability

Circularity

Recycling



NURTURING NATURE



Consumers are experiencing a new immediacy with nature, realizing its importance for better physical and mental wellbeing. This creates a brand opportunity to help consumers bring nature into the home as well as restore natural spaces. Brands should focus on unadulterated ingredients, alternative materials, and services that support enjoyment of the great outdoors in ways that make a positive impact on people and planet health.

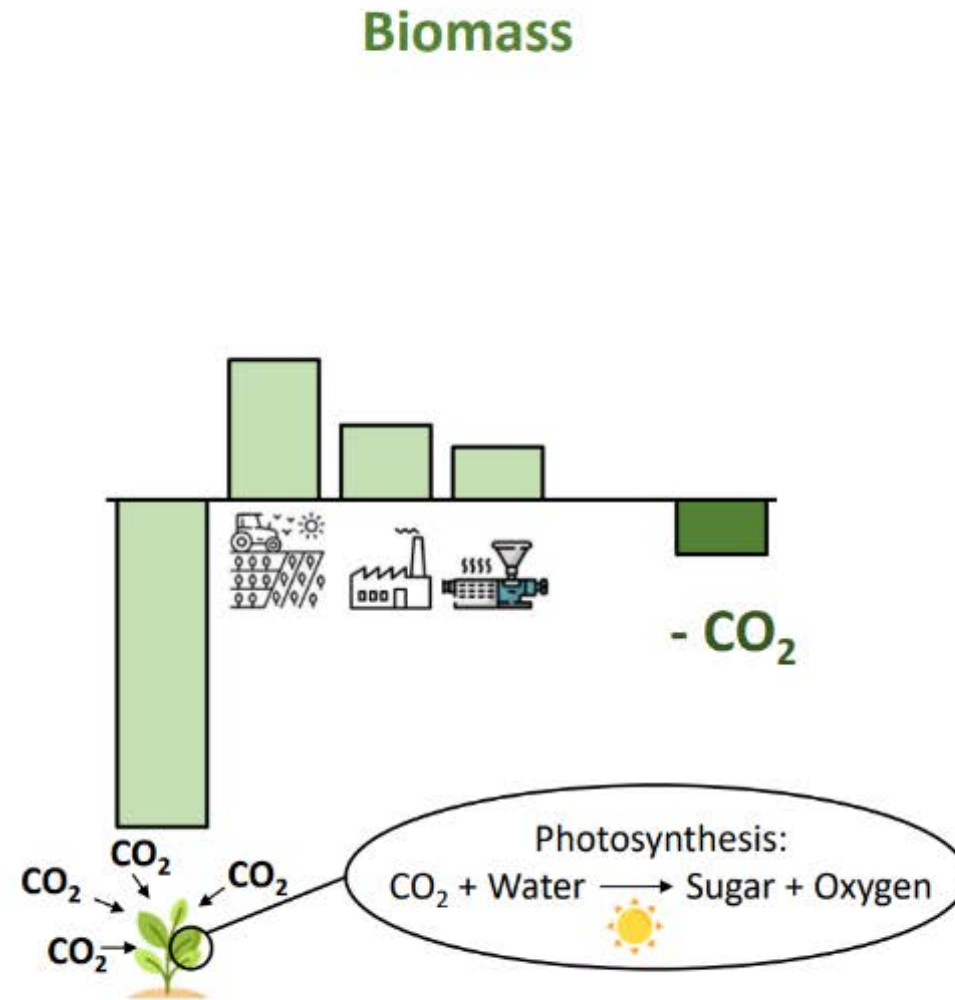
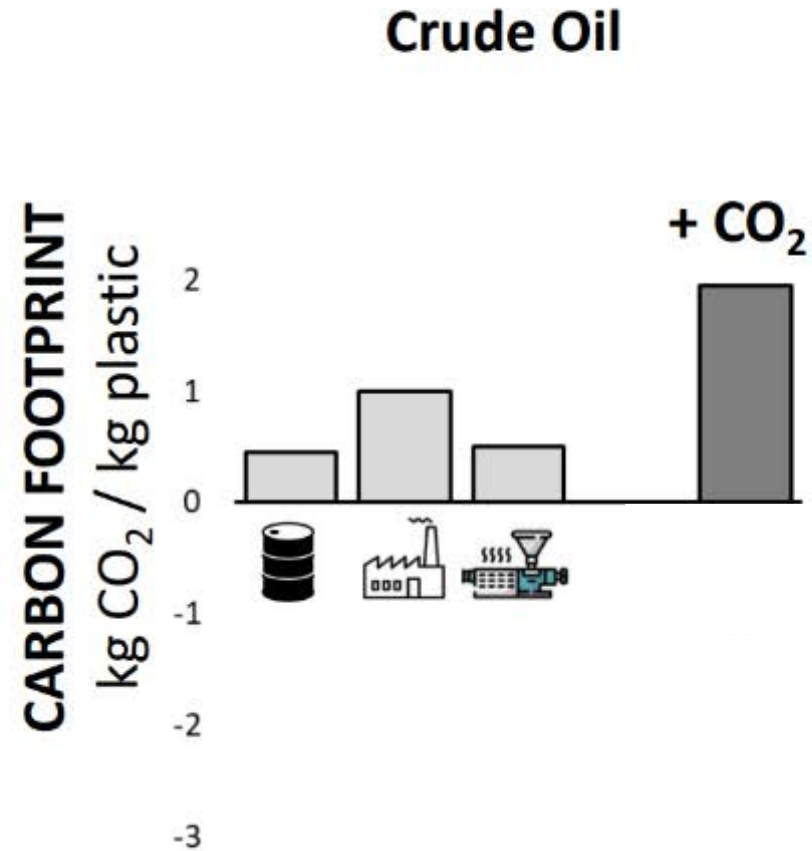
Towards sustainable Textiles

Impact possible on different levels

- Use of Low Carbon footprint sources throughout the chain (biobased – natural resources)
- Recycled fibres – Organic natural fibres
- Focus on increased durability (re-use – repair – recycle)
- Reduction of water use and energy consumption in application and consumer use
- Design with end-of-life in mind :
 - Easy disassembly of parts (zippers, dual layers..)
 - Re-use – repair
 - Easy to sort - recycle
 - Biodegradability



Biobased materials : a positive impact on carbon footprint



Tsiropoulos, Patel et al., *Journal of Cleaner Production* 2015
Benavides, Lee, Zarè-Mehrjerdi, *Journal of Cleaner Production* 2020

Source : Bioplastics in a Circular Economy Jan-Georg Rosenboom, jgr@mit.edu; Sirris Webinar Oct 18th, 2022

Oleochemistry: well known raw materials since hundreds of years

Raw Materials

				
Peanut Oil content: 44-55%	Soybean Oil content: 18-21%	Sunflower seed Oil content: 40-50%	Rice bran Oil content: 18-20%	Palm fruit Oil content: 20-25%
				
Sesame seed Oil content: 45-50%	Cotton seed Oil content: 33-40%	Rapeseed Oil content: 28-45%	Camellia Oil content: 58-60%	Castor seed Oil content: 50-70%
				
Coconut Oil content: 40-70%	Safflower seed Oil content: 29-45%	Corn germ Oil content: 30-40%	Walnut Oil content: 40-65%	Flaxseed Oil content: 29-44%

Oils & fat

Oleochemicals

fatty acid methyl ester

fatty alcohols

fatty acids

glycerine

Specialties

sulfo fatty acid esters

guerbet alcohols
alkyl chlorides
fatty alcohol ethoxylates
fatty alcohol sulfates
technical esters
alkyl polyglucosides

conjugated fatty acids
alkyl epoxyesters
dimer acids
fatty acids ethoxylates
azelaic/pelargonic acids
fatty acid esters

triacetin
partial glycerides

Applications

Detergents
Cosmetics
Inks
Lubricants

Additives
For Coatings
And
Textile
Applications

Use of biobased raw materials in both our DNA

- 1876 : Foundation of **Henkel** in Aachen: first branded detergent in Germany
- **1881**: Foundation of Boehme Fettchemie (= **Oleochemistry**) in Chemnitz: manufacture of **textile chemicals and auxiliaries**
- 1935 : Integration into the Henkel group as Boehme Fettchemie; continuous growth due to innovations and the founding of subsidiaries in foreign countries
- 1970: Henkel Textile Technology; further growth in the home market and abroad, acquisition of Standard Chemical Products / USA
- 1986 : Acquisition of **Pulcra**/Spain; extension of textile business through affiliated companies in the Middle East and South America
- 1999: The chemicals division of Henkel becomes **Cognis** as a result of a carve-out
- 2000 : Acquisition of Hispano Chimica strengthens Leather Finishing business and offers access to the global distribution network
- 2007 : Carve-out of **Cognis Process Chemicals** into **Pulcra Chemicals**
- 2021 : Acquisition of **Devan Chemicals**

- 1995: Halogen-free flame retardants (**Eco-flam®**)
- 1999: Non migrating antimicrobial (**BI-OME®**)
- 2001: Masterbatch for inherent performance properties (@2spin)
- 2002: Non-chlorine wool shrink-resist (**Dylan™**)
- 2005: **Environmentally more acceptable insect resist (Insecta™)**
- 2008: Reactive capsules (no need of binders) (**Thermic®**)
- 2010: **Introduced probiotics in textiles (Purissimo®)**
- 2013: Fluorine free water repellent finish (**H2O Repel®**)
- 2017: Fluorine free stain release (**Stain release**)
- 2019: **Bio sourced Flame Retardant (Bio-flam®)**
- 2019: Biocide free odour control (**Odour Breakdown®**)
- 2020: **Bio sourced PCM: (Tones Of Cool® Bio)**
- 2020: **Natural Antimicrobial (BI-OME® NTL)**
- 2021: **Bio sourced scents (SceNTL®)** ,
- 2021 : **Softener and quickdry (Passerelle® NTL)**
- 2022 : **R-VITAL NTL biobased and biodegradable encapsulated products**

Wide range of applications and products available



Spin finish



Softeners



Leather



Thermoregulation



Cosmetotextiles



Odour control



Moisture manangemt



Allergen control

Wide range of natural ingredients



Spin finish



Softeners



Leather



Thermoregulation



Cosmetotextiles



Odour control



Moisture managment



Allergen control

Test methods

- **ASTM D6866-20** method for Biocontent
- Test done by external lab
- Distinguishes the carbon content from biomass vs. the carbon content from fossil fuels
- Biomass contains a well characterized amount of C14, that easily differentiated from fossil fuel based materials that does not contain any C14.
- Since the amount of C14 in biomass is known, the percentage of carbon from renewable sources can be calculated easily from the TOTAL organic carbon in the sample.
- Alternative test method EN 16785



Test methods

Biodegradability in Water (OECD 301 & 302)

- Test with activated sludge obtained from a sewage treatment plant (predominantly domestic sewage)

Biodegradability in Soil (OECD 304, EN 17033)

- Test with soil under conditions suitable for plant cultivation

Biodegradability in Seawater (OECD 306)

- Uses natural seawater both as an aqueous phase and as a source of microorganisms

Note: These procedures are standardized to a limited extent. The limitation is related to the difficulty of standardization of soil/water samples between laboratories.



In short

- Oleochemicals & derivatives have been used for quite some time in different applications and markets
- Different types of textile products can contain renewable raw materials
- The use of biobased textile finishes will help in lowering the CO₂ content of textiles
- The components used can be derived from renewable raw materials such as coconut oil, sunflower oil, palm stearine, peanut oil, rapeseed oil and many more.
- These products can help in fiber extrusion and spinning, in leather application and in textile finishes
- Both Pulcra Chemicals and Devan have a long history in using plant based raw materials
- Textile finishes can also help to make textiles more durable

Thank you!

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