

HEDJUVAN CIRCULAR

Sustainable excipients for
the pharmaceutical industry

Derived from **Nature** - Driven by **Innovation**

Edition
October 2025



Reduced PCF. Sustainable Ethylenoxide from Biocircular source - ISCC PLUS Certified

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KLK OLEO and Sustainability

At KLK OLEO, we believe that sustainable solutions deserve the highest level of attention across all markets. That's why we are proud to be among the leading innovators when it comes to developing and delivering sustainable alternatives.

As a founding member of the Roundtable on Sustainable Palm Oil (RSPO), KLK OLEO is committed to responsible sourcing and production. Since 2023, KLK OLEO offers sustainable surfactants for technical applications using bio-circular ethylene oxide (EO) and propylene oxide (PO).

We are delighted to introduce the Hedjuvan Circular product line – a new generation of sustainable excipients designed for the pharmaceutical industry. These innovative ingredients reduce Product Carbon Footprint (PCF) across the pharmaceutical supply chain, supporting more climate-conscious drug manufacturing.

What is Bio-Circular Ethylene - and Propylene Oxide?

The Hedjuvan Circular range employs bio-attributed EO derived from renewable, bio-circular sourced raw materials instead of fossil based ones.

The recycled biogenic input is precisely tracked and corresponds to the certified bio-circular EO/PO quantity. Quality and performance match conventional materials, ensuring broad compatibility with existing pharmaceutical applications.

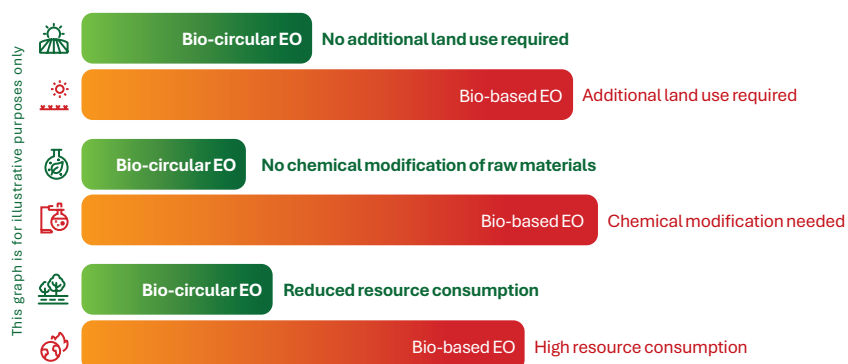
Thanks to ISCC PLUS certification, it is ensured that the EO and PO used for the production is verifiably derived from bio-circular sources, supporting transparent and traceable sustainability across the entire value chain.

Key advantages of bio-circular EO over bio-based EO (derived from bioethanol)

Bio-circular EO uses recycled organic materials, without the need for additional agricultural land.

The certified mass balance approach maintains **unchanged chemical identity of raw materials**.

By not using primary crops, water and fertilizer consumption is reduced, **improving sustainability**.



Hedjuvan Circular - Sustainable innovation, proven Quality

In the Hedjuvan Circular line, sustainability and quality work together. Products are manufactured at our Swiss site under the same stringent standards as conventional pharmaceutical excipients marketed under the “Hedjuvan” brand.

By incorporating bio-circular EO into formulations, the PCF is significantly reduced without altering other product parameters. The mass balance approach ensures no effective change in raw material chemical composition.



Polysorbates

Polysorbates are among the most widely used excipients for solubilization and emulsifying in human and veterinary pharmaceuticals across various dosage forms. Composed of three primary raw materials, each contributes to the product’s overall sustainability profile.

Palm-based fatty acids are always sourced according to RSPO standards. By incorporating bio-circular EO, sustainably sourced raw materials can reach nearly 100%.

Macrogols / Polyethylene Glycols (PEGs)

Macrogols/PEGs are versatile excipients used across pharmaceutical formulations. PEGs consist almost entirely of EO, aside from the starter molecule.

Bio-circular EO significantly impacts the proportion of sustainably sourced raw materials, with greater impact as molecular weight increases. Hedjuvan Circular Macrogols can substantially reduce the PCF of final pharmaceutical products.

Macrogol Lauryl Ether

Macrogol Lauryl Ether serves as an emulsifier and solubilizer in pharmaceutical products, primarily in creams and lotions. Various types of macrogol lauryl ethers are described in the monographs, with the most common being macrogol lauryl ether with an ethoxylation grade of 9 mol.

This product is mainly used utilized in ointments for itching relief and as a local anesthetic and in diagnostic reagents.

Product Carbon Footprint Overview

Product Family	Product Name	Compendial Name	Approximate reduction of the total Global Warming Potential (GWP) (incl. CO2 emissions and removals) by Circular grade.	Approximate content of renewable raw materials (incl. bio-circular EO)
POLYSORBATES	Hedjuvan-PS 20	Polysorbate 20	75 %	25%100%
	Hedjuvan-PS 60	Polysorbate 60	66 %	35%100%
	Hedjuvan-PS 80	Polysorbate 80	96 %	35%100%
MACROGOLS / POLYETHYLENE GLYCOLS	Hedjuvan-MG 300	Macrogol 300 / Polyethylene Glycol 300	66 %	0%65%
	Hedjuvan-MG 400	Macrogol 400 / Polyethylene Glycol 400	75 %	0%75%
	Hedjuvan-MG 600	Macrogol 600 / Polyethylene Glycol 600	84 %	0%80%
	Hedjuvan-MG 1000	Macrogol 1000 / Polyethylene Glycol 1000	87 %	0%90%
	Hedjuvan-MG 1500	Macrogol 1500 / Polyethylene Glycol 1500	85 %	0%95%
	Hedjuvan-MG 3350	Macrogol 3350 / Polyethylene Glycol 3350	90 %	0%97%
	Hedjuvan-MG 4000	Macrogol 4000 / Polyethylene Glycol 4000	91 %	0%98%
OTHERS	Hedjuvan-PD9	Macrogol Lauryl Ether 9 EO	80 %	0%70%

Standard grade | Circular grade

Disclaimer – Cradle-to-Gate Product Carbon Footprint (PCF)
The presented Product Carbon Footprints (PCFs) reflect cradle-to-gate greenhouse gas (GHG) emissions, including biogenic removals and emissions, stated as GWP (global warming potential) total (incl. bio. CO2 emissions and removals)”. All relevant GHG emissions are considered in accordance with the latest Together for Sustainability (TfS) PCF Guidance and ISO 14067. Calculations are primarily based on data from third-party verified databases to ensure accuracy and reliability. For ISCC PLUS bio-circular ethylene oxide (HPEO) the data of the suppliers are used.

Note on Biogenic Emissions: Biogenic emissions refer to CO₂ and other GHGs released from biological sources, such as the combustion or decomposition of biomass. These are treated distinctly in carbon accounting due to their potential for natural reabsorption through photosynthesis and other biological processes.



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KLK OLEO Life Science represents the strategic cooperation between KLK EMMERICH GmbH, Kolb Distribution Ltd., and KLK Kolb Specialities B.V. to offer innovative solutions in the field of life science.

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