

# Sustainable Green Emollients: Plant Alkanes Replacing Volatile Silicones (Engineering Review 2022)

Por Cristiano Ricardo · Publicado em 23/11/2022

Technical dermocosmetic engineering lecture by Prof. Cristiano Ricardo on sustainable green emollients: plant alkanes replacing volatile silicones (Green Chemistry & Cosmetic Raw Material R&D), featuring colorful schematic diagrams and clinical data.

Versão online e eventuais atualizações:

<https://professor.cristianoricardo.com/post/sustainable-green-emollients-plant-alkanes-replacing-volatile-silicones-2022-11-23>

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Green Chemistry & Cosmetic Raw Material R&D · Cosmetic Engineering & Science

Transitioning from petroleum-derived volatile cyclosiloxanes (D5, D6) to circular, bio-based hydrocarbons.

## Engineering Mechanism & Kinetic Flowchart

Cyclopentasiloxane (D5)

? Synthetic Organosilicon

? Environmental Bioaccumulation (vPvB)

Global Regulatory Restrictions

C13-15 Alkane (Hemisqualane)

? 100% Fermented Sugarcane

? Readily Biodegradable (OECD 301)

Identical Dry Sensorial Slip & Spread

## Fermentation-Derived Hemisqualane (C13-15 Alkane)

Engineered through the yeast fermentation of renewable sugarcane, this branched isoalkane replicates the low surface tension, volatility, and feather-light dry slip of D5 silicone without aquatic toxicity.

## Spreading Cascade Optimization

Blending fast-spreading polar esters with slow-spreading vegetable triglycerides establishes a continuous sensory cascade: instant spreadability on initial rub-out transitioning to long-lasting barrier comfort.

## OECD 301 Ready Biodegradability

Modern sustainable inputs must achieve > 60% mineralization into CO<sub>2</sub> and water within a 10-day window under OECD 301 guidelines, preventing persistent micro-pollutants in wastewater.

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