

Evonik Biosurfactants Clean and Green

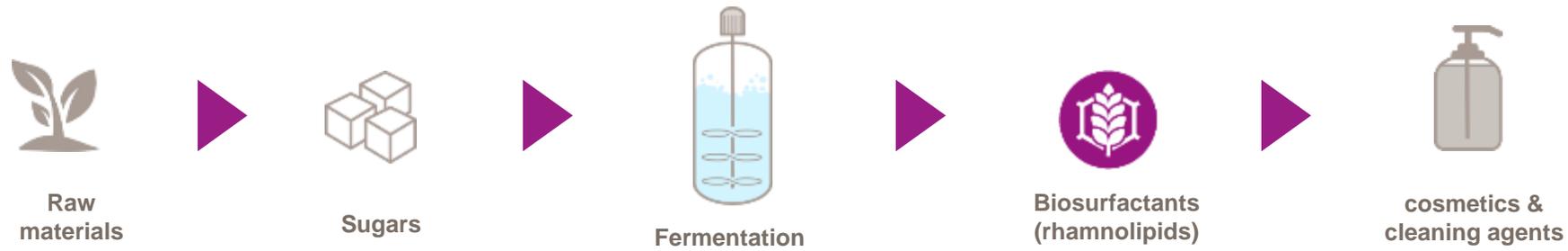
Morgan Stanley Expert Call
Dr. Hans Henning Wenk, Vice President R&D of Business Line Care Solutions
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Biosurfactants are the next game changer in Evonik's innovation portfolio

Leading the way for a sustainable ingredient portfolio transformation

A unique process resulting in a unique product



Fulfilling today's and tomorrow's consumer needs

Origin	Sensorials	Performance	Environmental
<ul style="list-style-type: none"> 100% renewable No tropical oils Natural ingredient 	<ul style="list-style-type: none"> Mild to skin Pleasant skin feel Creamy foam 	<ul style="list-style-type: none"> Excellent foaming High cleansing/degreasing Hard water resistant 	<ul style="list-style-type: none"> Bio-processed 100% bio-degradable Low aquatox



Next generation of surfactants

Biosurfactants vs. biobased surfactants

Biosurfactants (Rhamnolipids)

Natural surfactants produced by fermentation



Derived from plant based sugars



Bio-processing (fermentation)

No hazardous feedstocks



Nature identical structures



Consumer perceivable mildness benefit



Best in class environmental profile

Biobased surfactants

Synthetic surfactants from renewable raw materials



Derived from (tropical) oils



High temperature/pressure involved
May use hazardous raw materials



Synthetic structures

Examples: Alkyl polyglucosides, Glucamides, nonionic surfactants made from biobased ethylene oxide

Geared for growth following a successful series of launches

Large-scale production of world's first "green" biosurfactant (rhamnolipids)

2018

Pilot launch



- **Launch** in selected **personal care** applications
- Personal Care ingredient "RHEANCE® One" **awarded at "in-cosmetics"** 2018
- Several commercial personal care products followed

2019

Expansion into Home Care



- **Leveraging volume potential** with home care applications
- **Unilever** with successful market launch of a dishwashing product in 2019

Planned
2022

Industry-scale investment



- Commercializing **Evonik's leading biotechnology capabilities:**
 - Planned by 2022, Evonik will be the **first company to produce biosurfactants on industrial scale**
 - Basic engineering currently conducted at our **biotech hub in Slovakia**



EVONIK

Leading Beyond Chemistry