

Lupranol BALANCE 50

High Performance. Naturally.



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MECC, Maastricht, The Netherlands

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■ • **BASF** Gruppe

Agenda

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■ BASF Gruppe

1. BASF Sustainability
2. Lupranol BALANCE 50
3. Eco-Efficiency Analysis
4. Results





1. BASF Sustainability

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BASF Sustainability

High-level commitment



“For us, sustainable enterprise means combining economic success with environmental protection and social responsibility, thus contributing to a high quality of life for coming generations.”

CEO, Jürgen Hambrecht

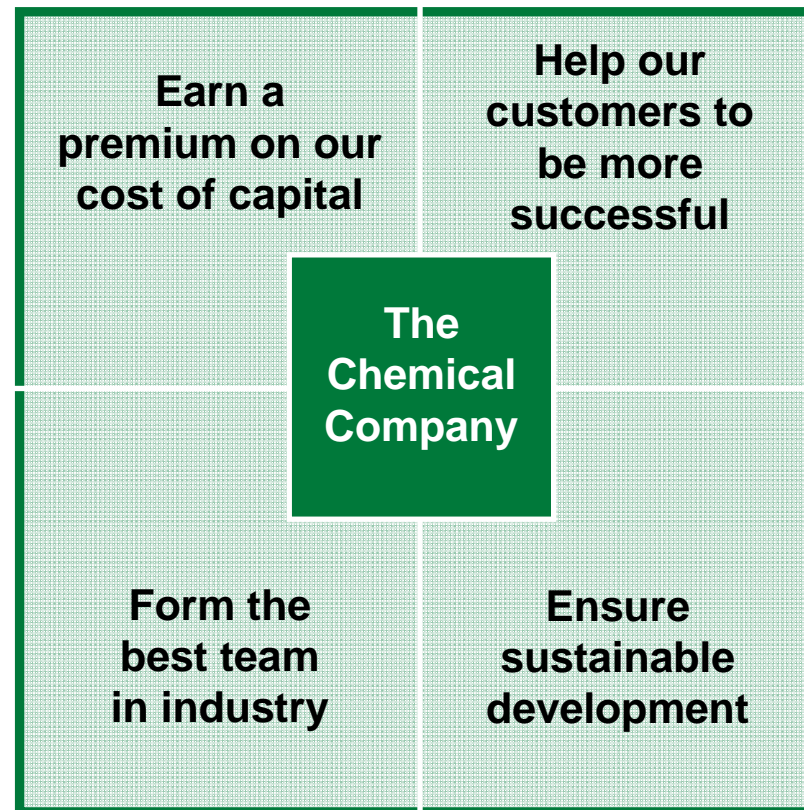
BASF 2015

Four strategic guidelines for long-term success

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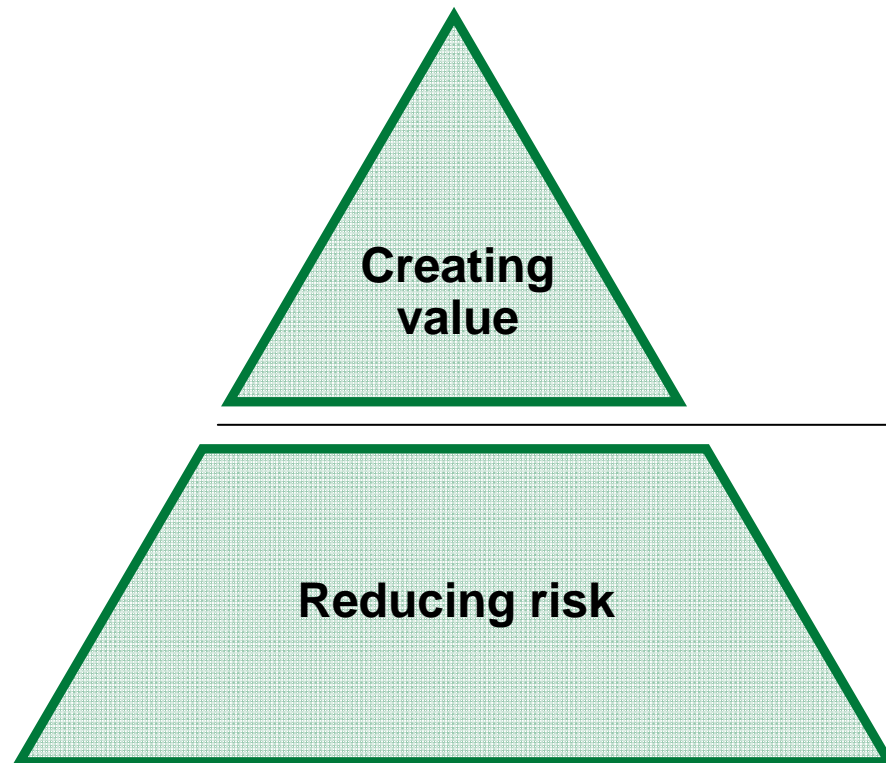
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Sustainable development

Long-term economic success

BASF 2015:
“Ensure sustainable development”



- Integrate sustainability in customer relationships
- Develop new target groups and markets
- Identify relevant sustainability issues
- Develop tailored solutions
- Reduce reputational risks
- Transparent communication

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Castor Oil Basics

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fast growing
plant

40 – 50 %
oil content



application in
medicine, cosmetic
and industry

OH-functional
non-edible
vegetable oil

Castor Oil Cultivable Area

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- Instead of plantation, little patches on middle sized acreages
- Farming with little or no irrigation
- No pesticides and nearly no fertilizer
- Truly GMO free crop
- Co-crop aside of millet, corn, etc.

(Statement Alberdingk Boley November 2007)

Brasil

India

China

Castor seed	1,28 Mio t / a ¹⁾
Castor oil	0,53 Mio t / a

¹⁾ Alberdingk Boley: Rizinussaaternten Februar 2008

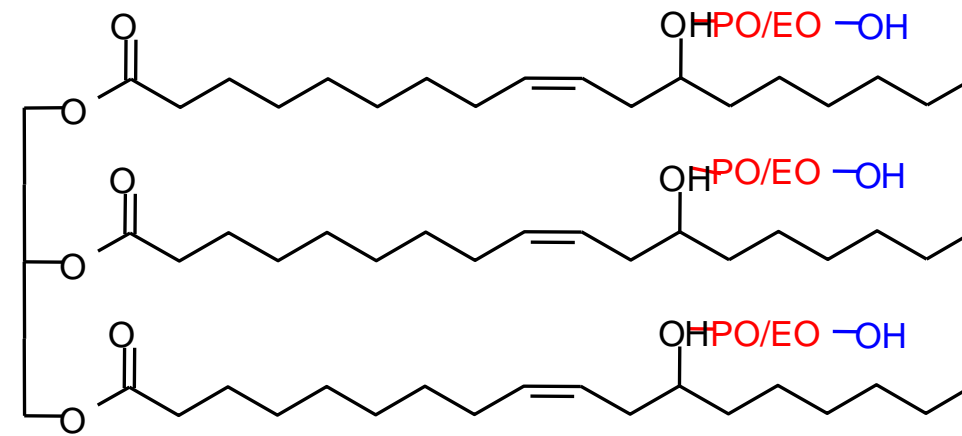
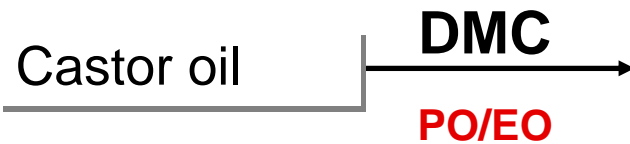
Lupranol BALANCE 50

DMC: Double-metal cyanide catalysis

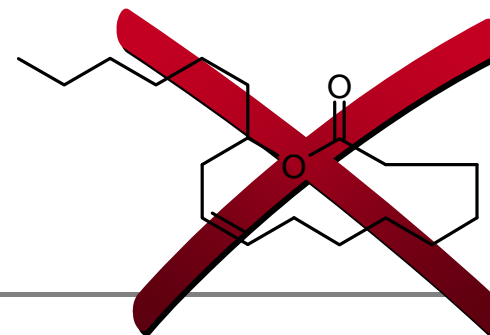
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- Neutral
- No saponification
- No ring-formation of ricinoleic acid
- Low in odors



Odor!

Lupranol BALANCE 50

Polyol Properties

■ OH-Number	50 mg KOH/g
■ Functionality	2.7
■ Viscosity	725 mPa·s
■ Excellent Odor	1.2
■ Biomass	31 %



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- Good processing profile
- Good mechanical properties
- Low emission – Low odor
- 25 % of renewable raw material in the foam



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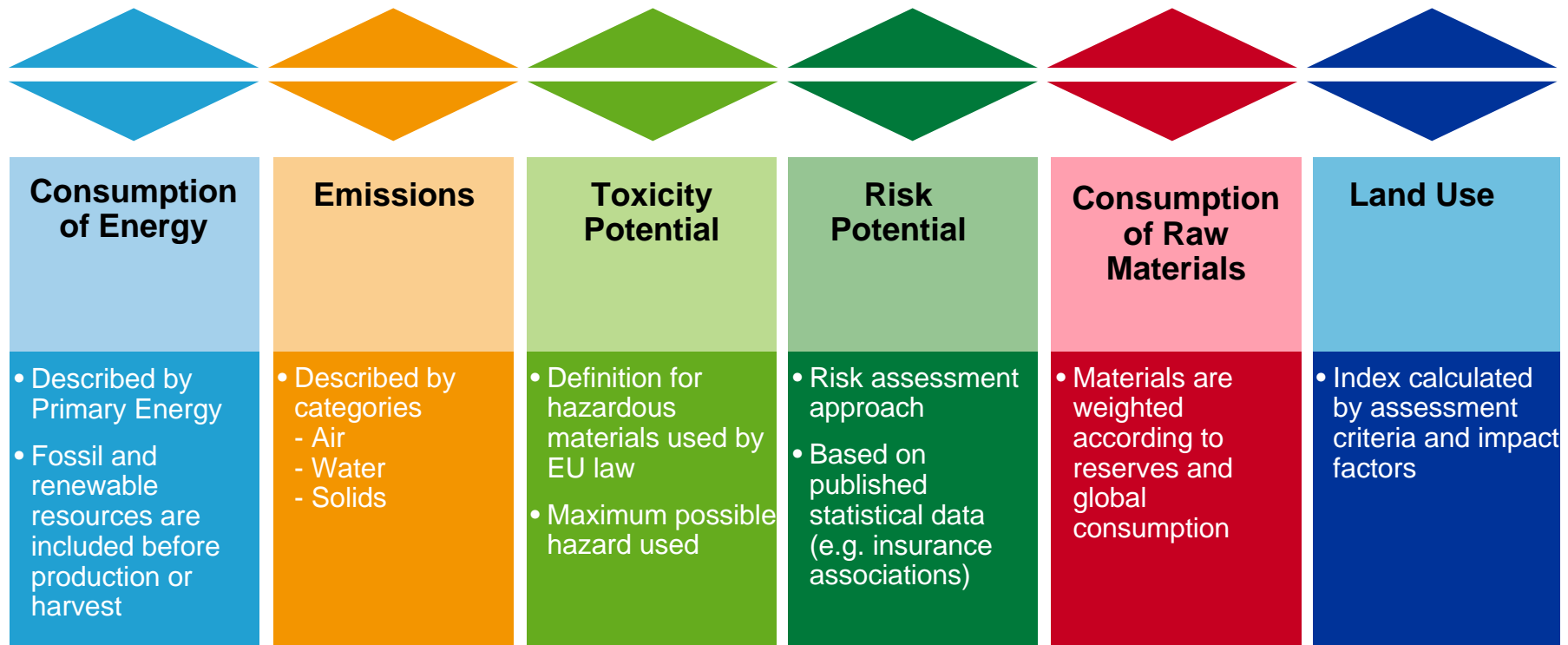
4. Results



Environmental Profile

„From the Cradle to the Workgate“

Environmental impact over the entire life cycle*



*Data acquisition and calculation is done according to ISO 14040 and 14044 (ecological part)

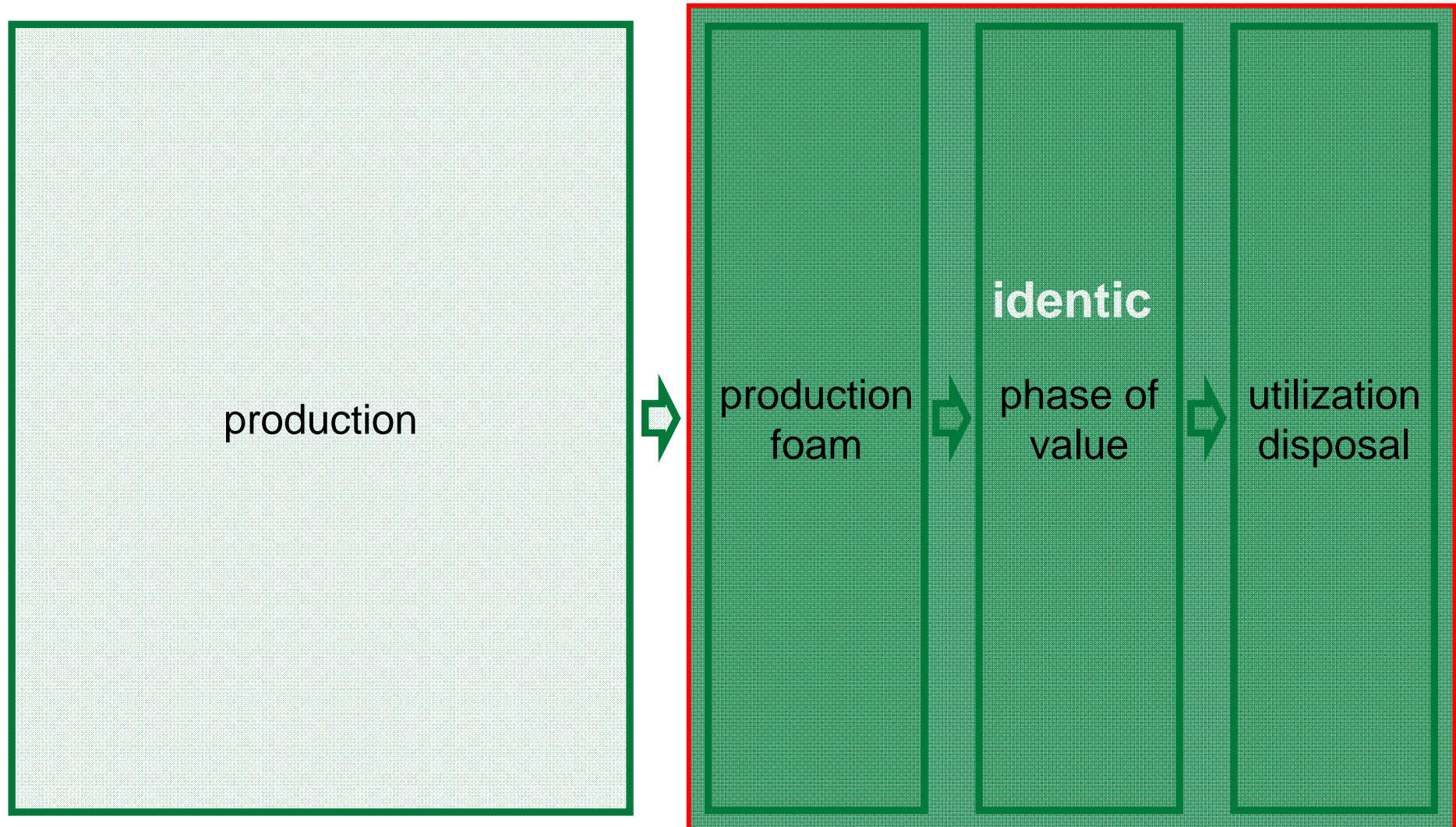
System boundaries

Compare Slab-Polyol vs. Lupranol BALANCE 50

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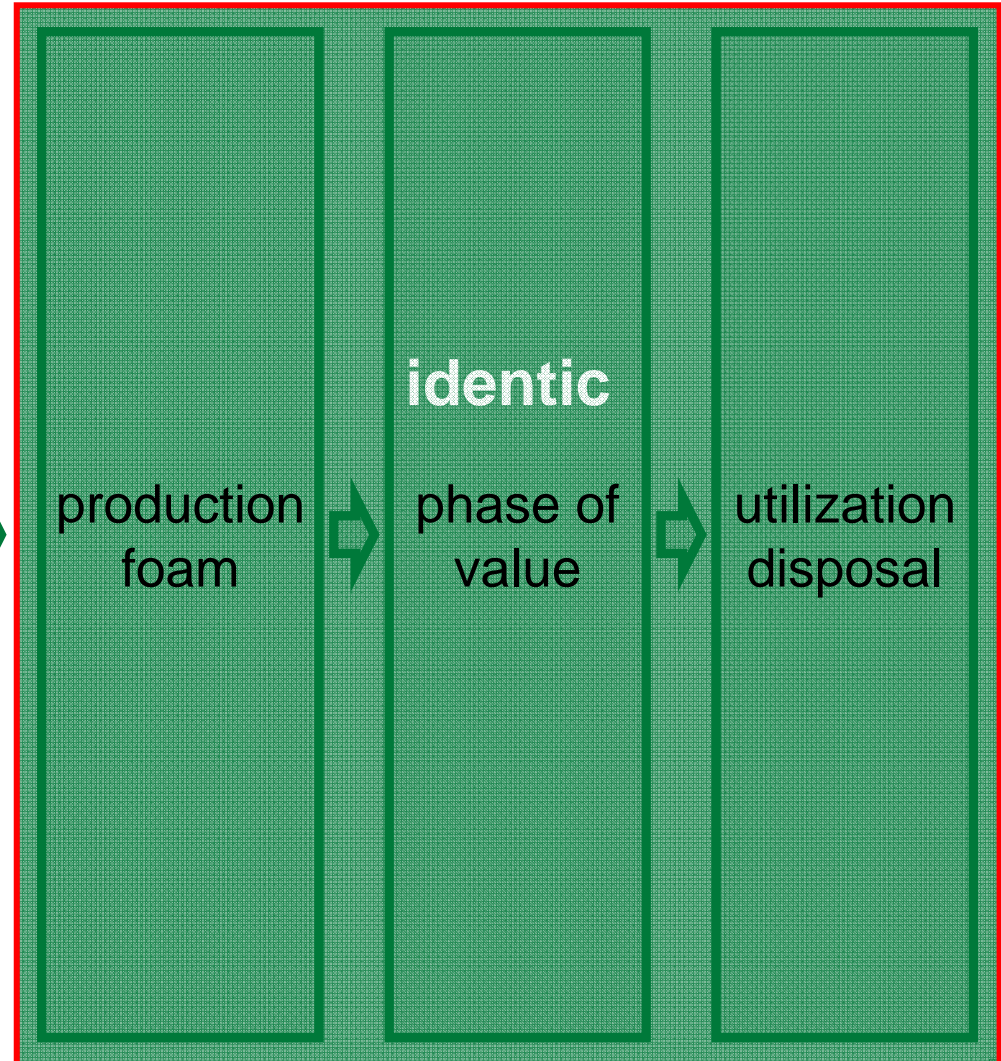
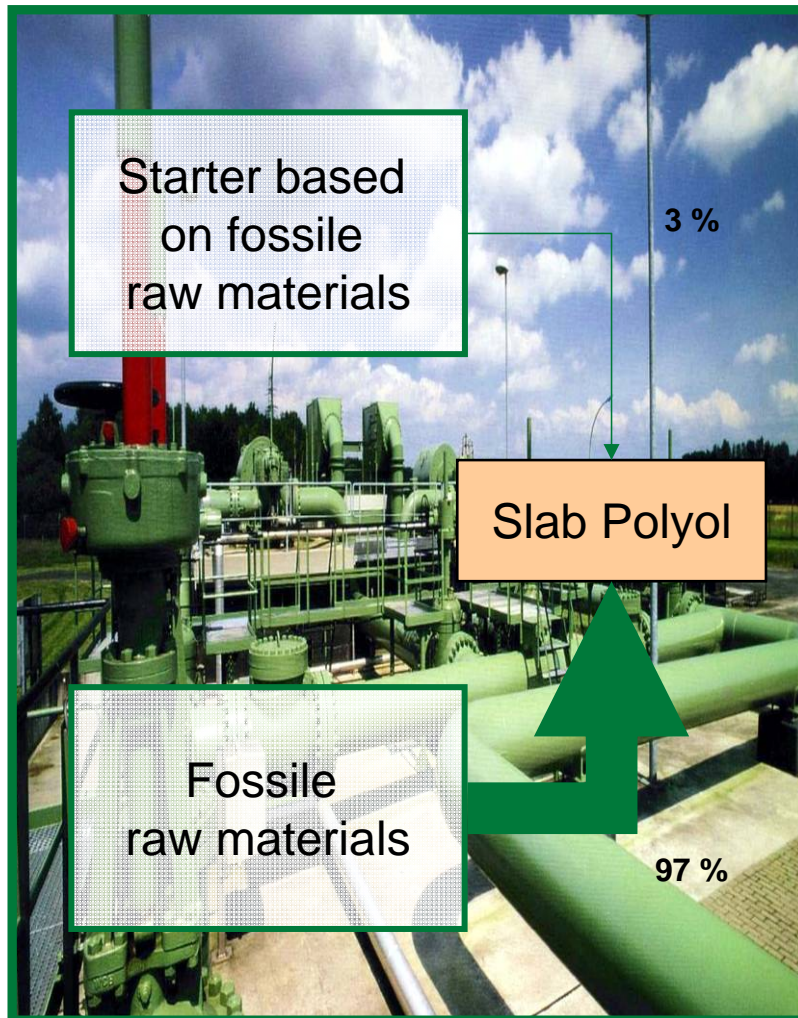


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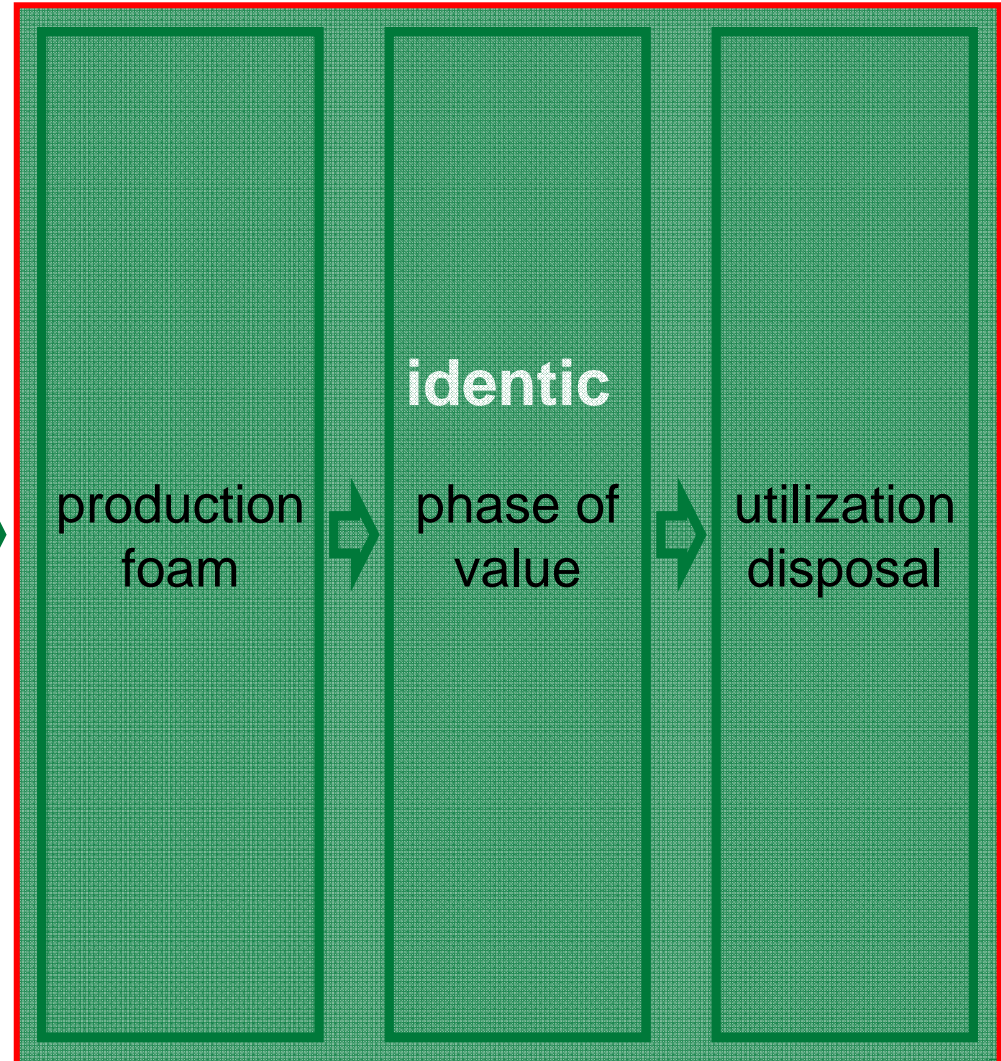
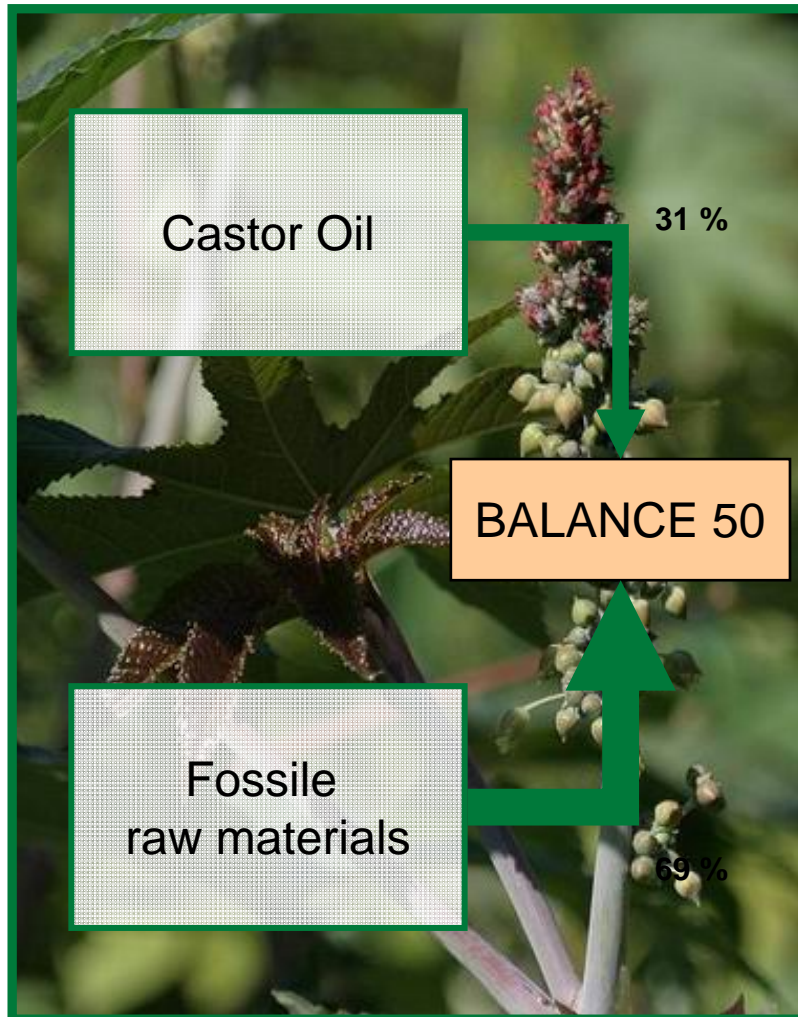
System boundaries

Production Slab Polyol

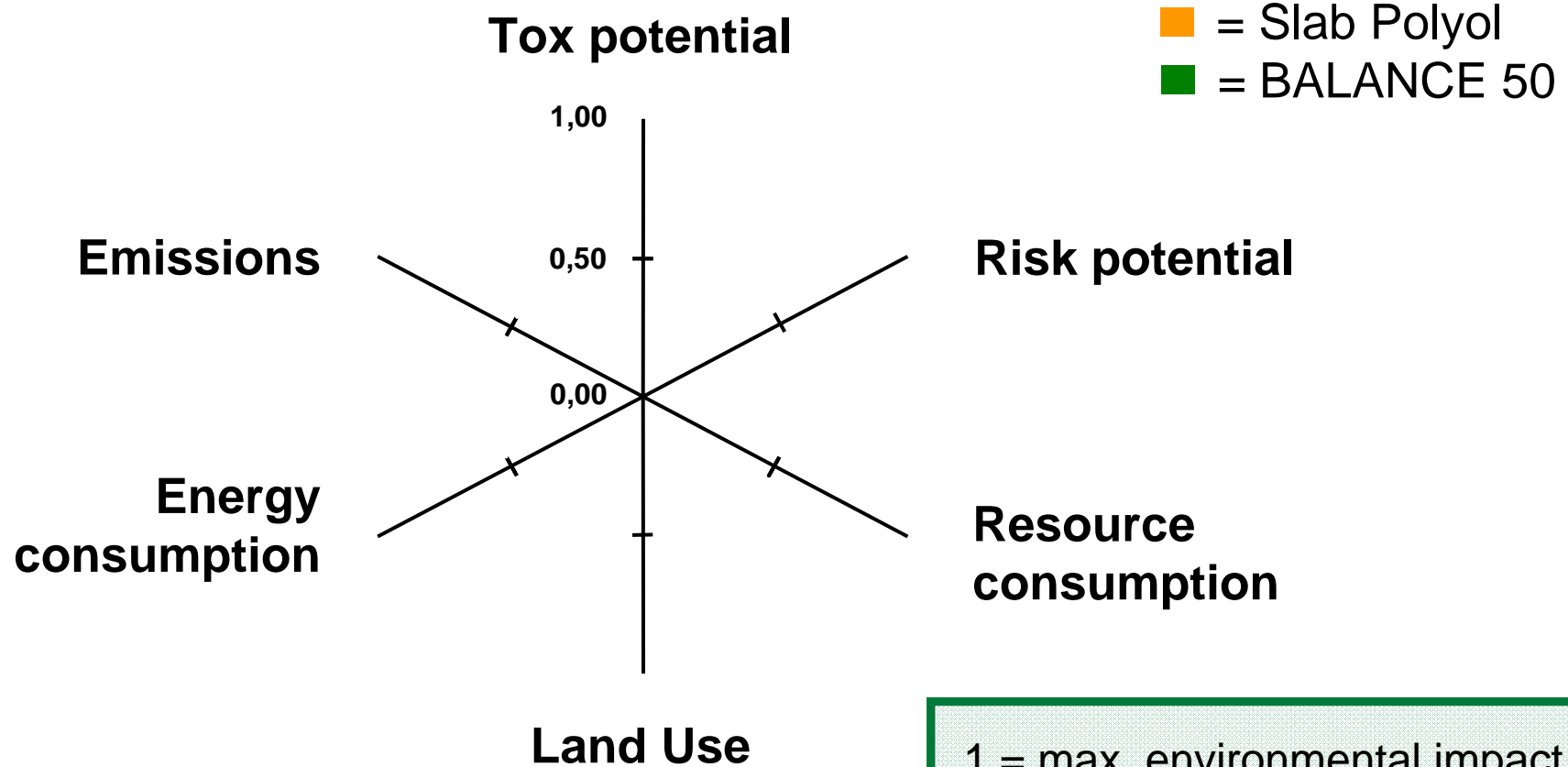


System boundaries

Production Lupranol BALANCE 50



Ecological Fingerprint



1 = max. environmental impact
0 = min. environmental impact

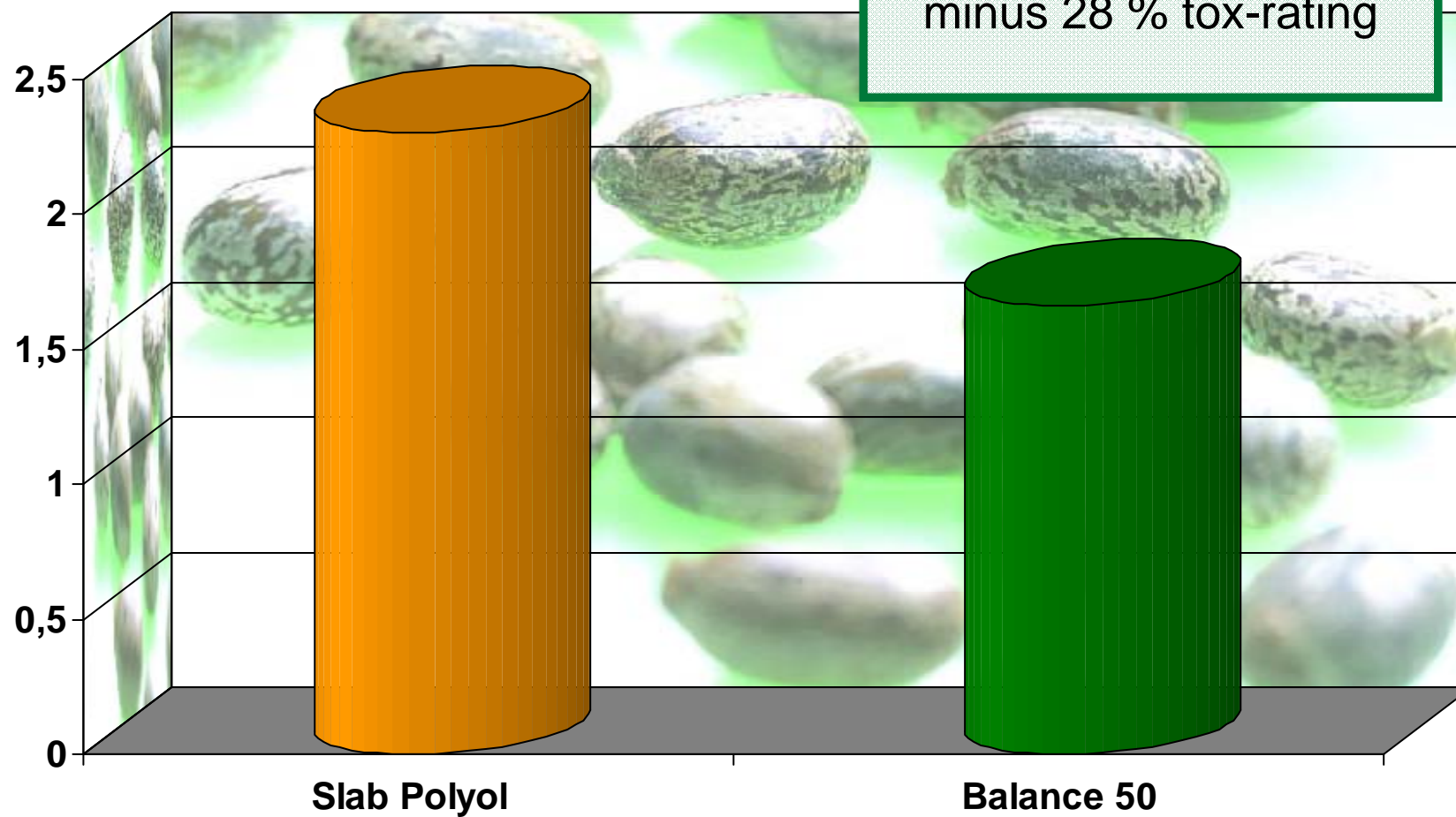
TOX potential

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TOX Points calculated Mio / t



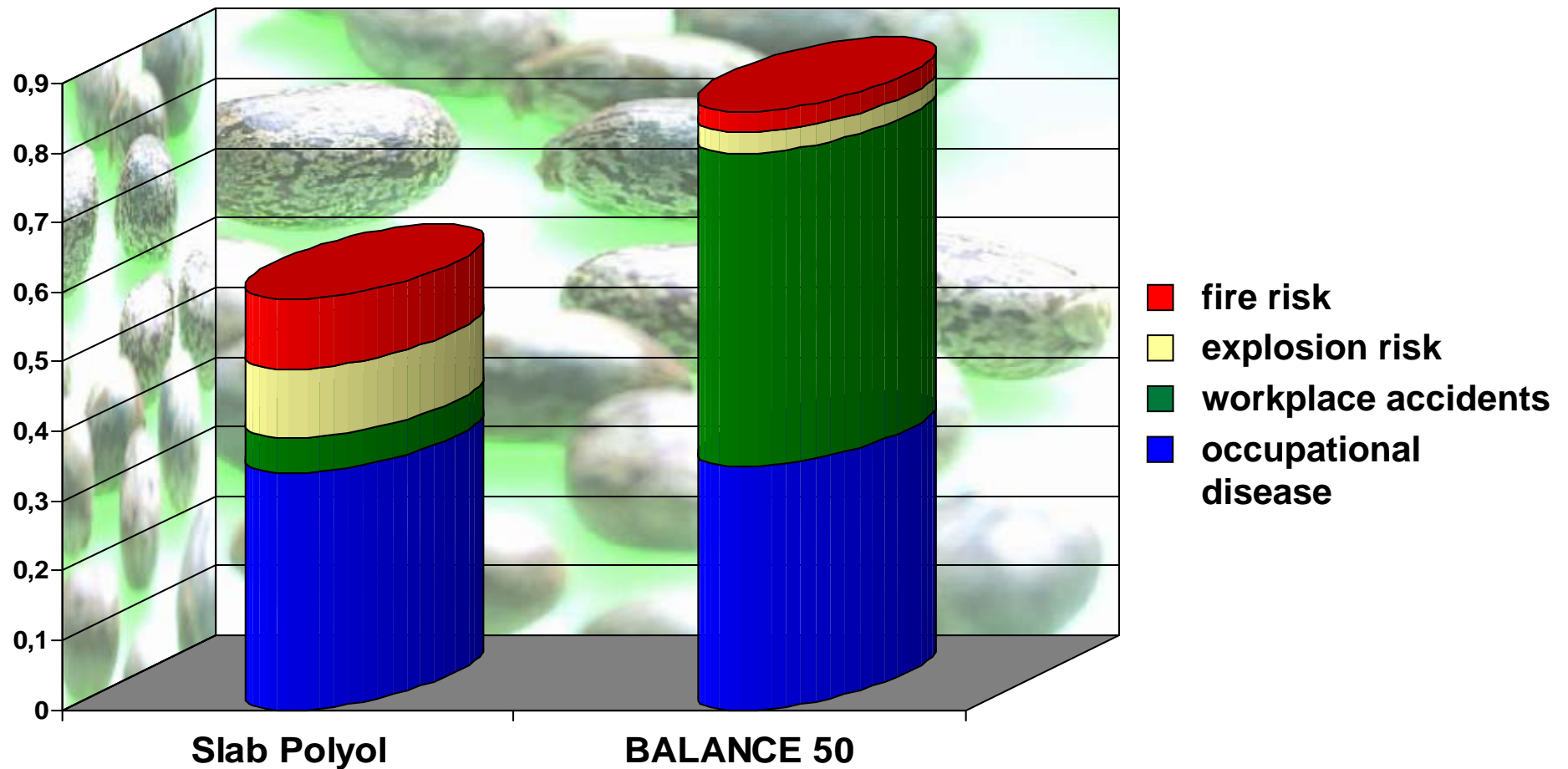
Risk potential

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Risk Points calculated / t



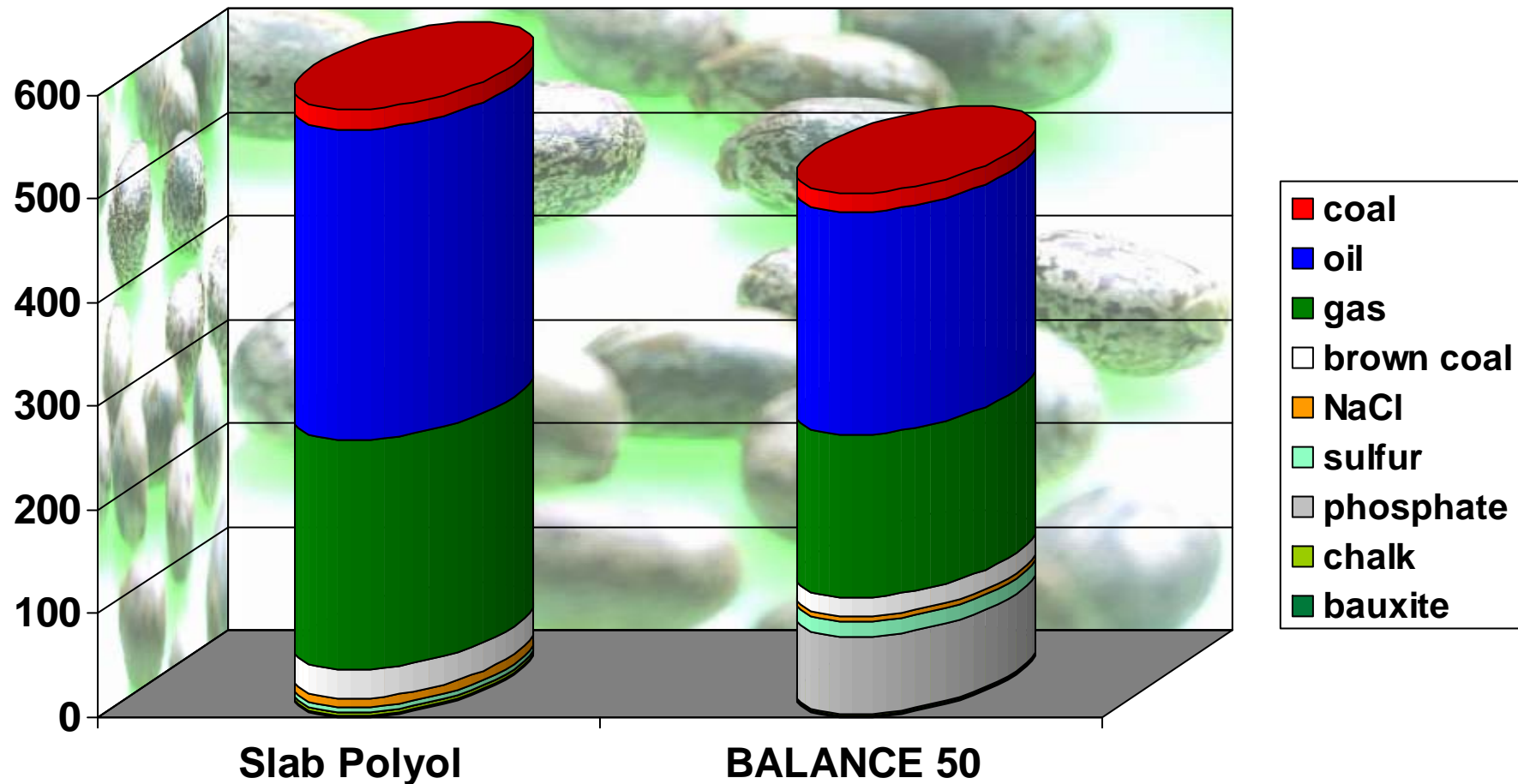
Resource consumption

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kg/(a*Mio t)^{1/2} / t



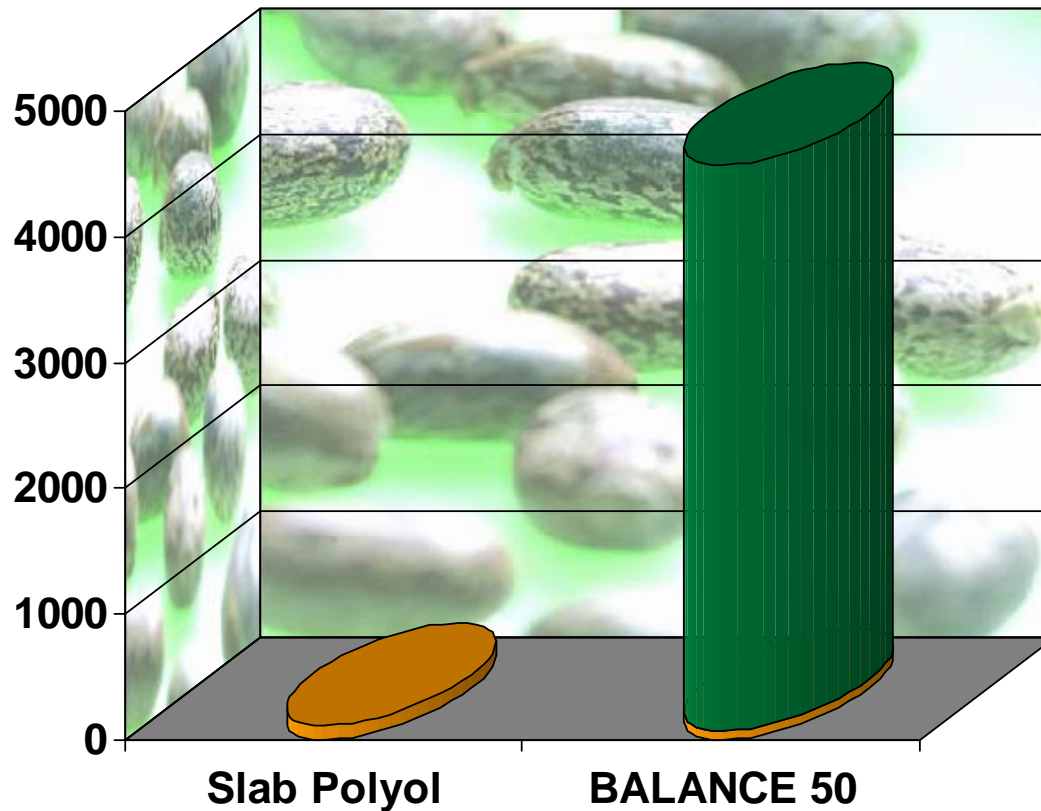
Land-Use

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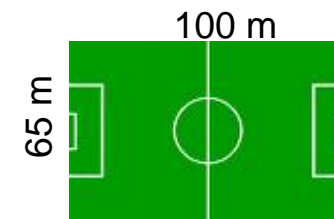


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weighted Land-Use $\text{m}^2\text{a} / \text{t}$



- Arid to semi-arid climates are ideal
- Improved yield via hybrid castor seeds
- Productivity 1087 kg/ha



= 1000 kg

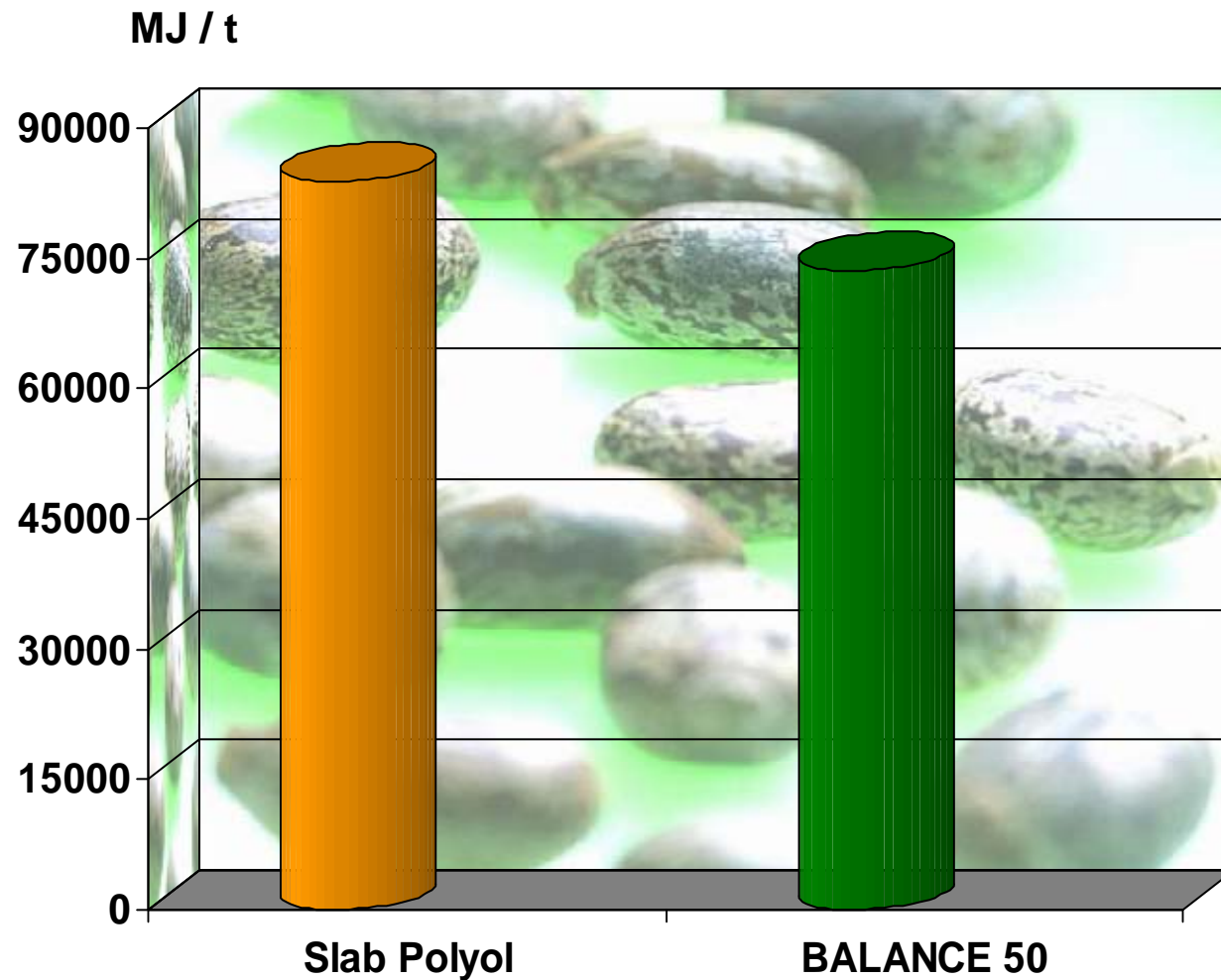
Lupranol BALANCE 50

Energy consumption

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delta:

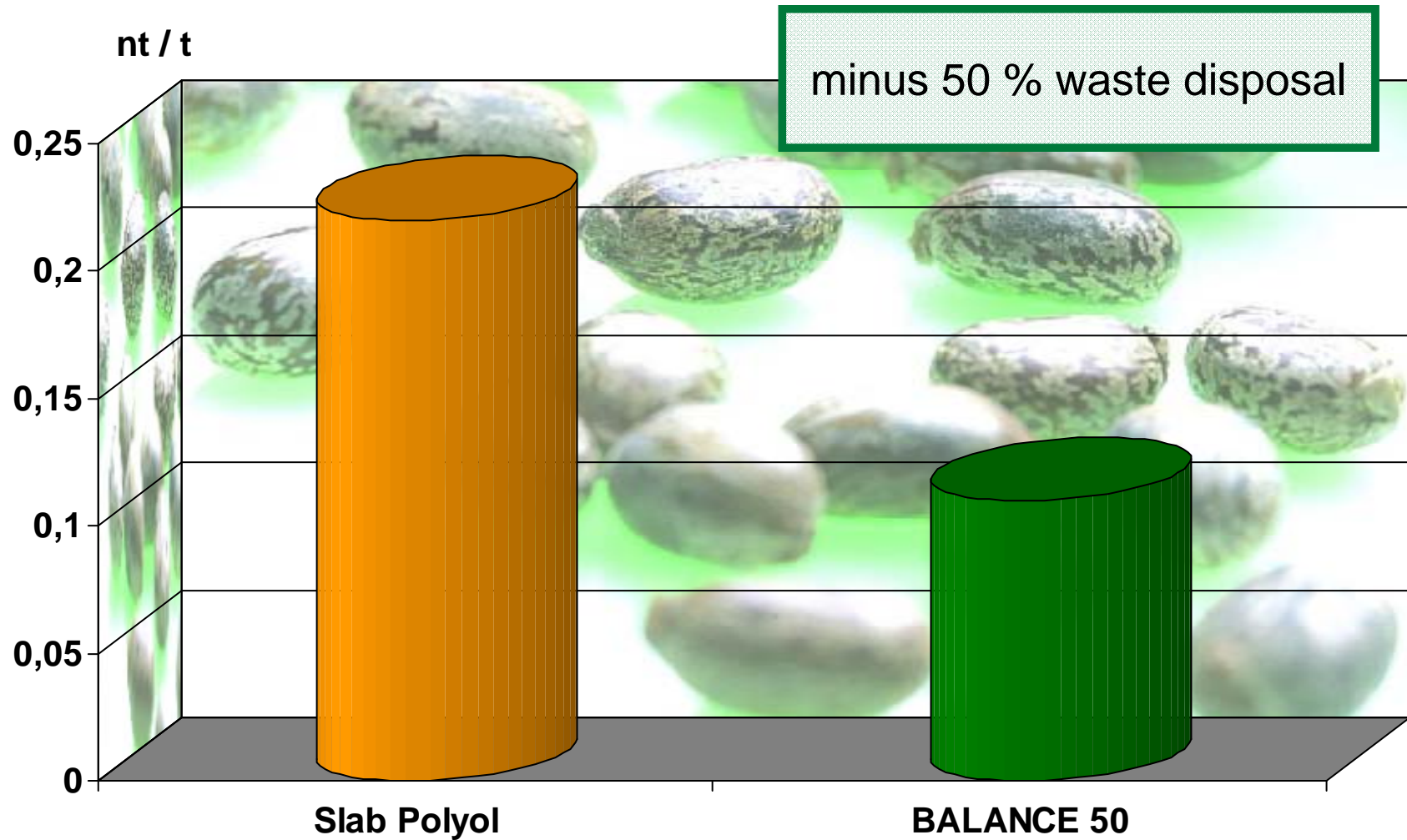
10100 MJ / t

⇒ 2800 kWh

⇒ Equivalent to
98.000 homes
energy consumption/month
(US conventional polyols
substituted by BALANCE 50)

Emissions

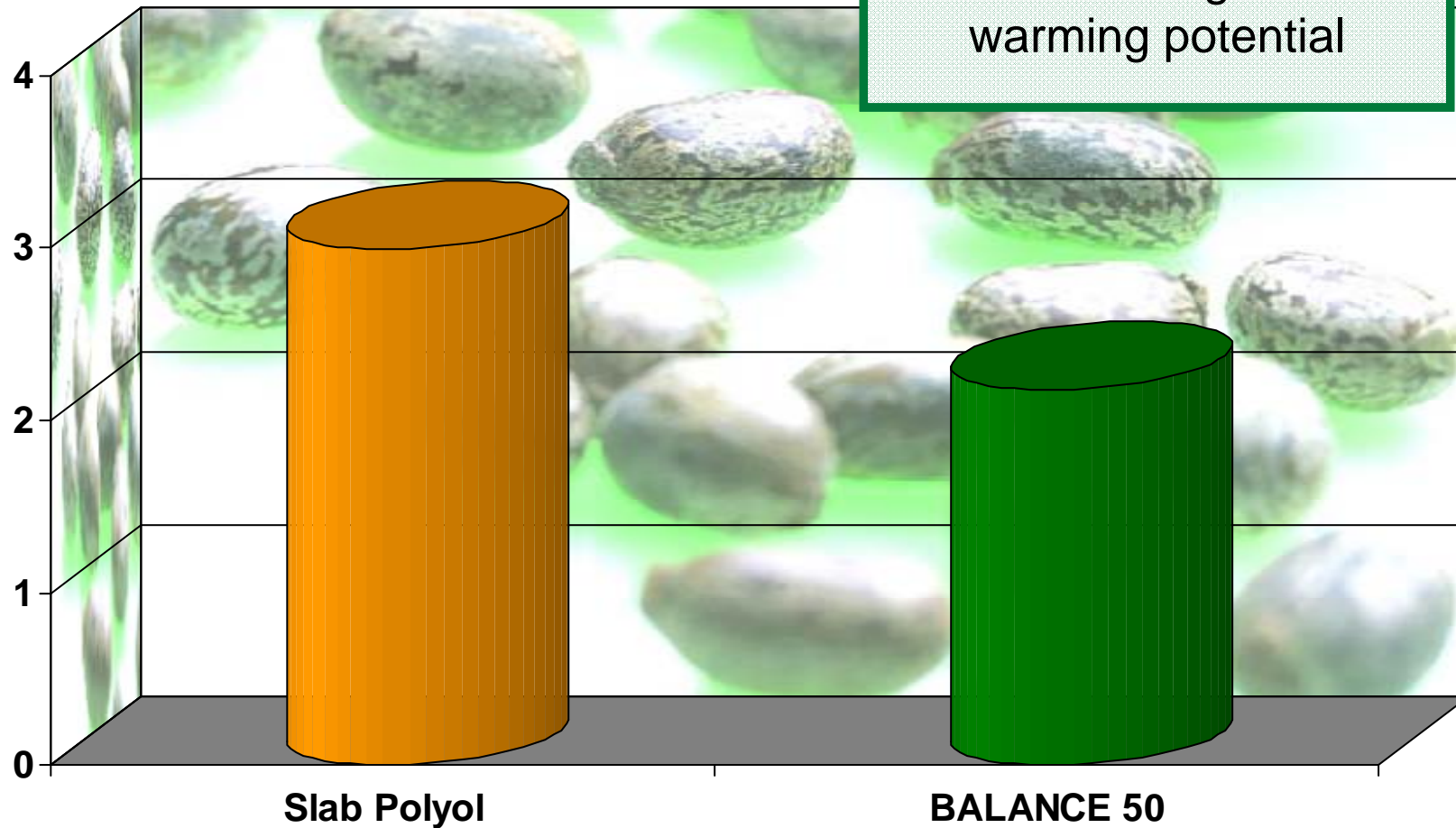
Waste accumulation



Emissions

Global warming potential

t CO₂-Equivalent / t



Emissions

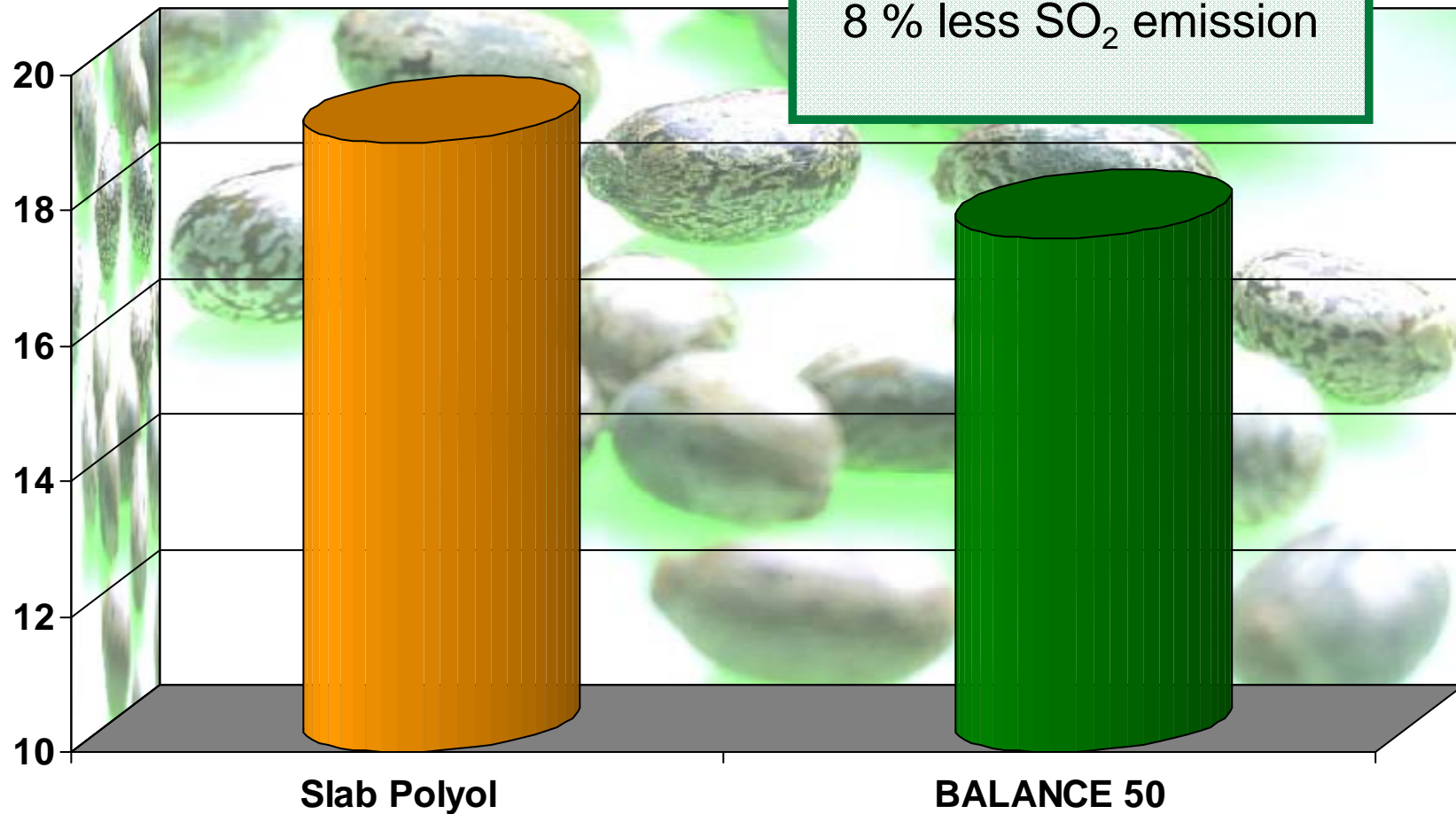
„Acid Rain“ – SO₂-Emissions

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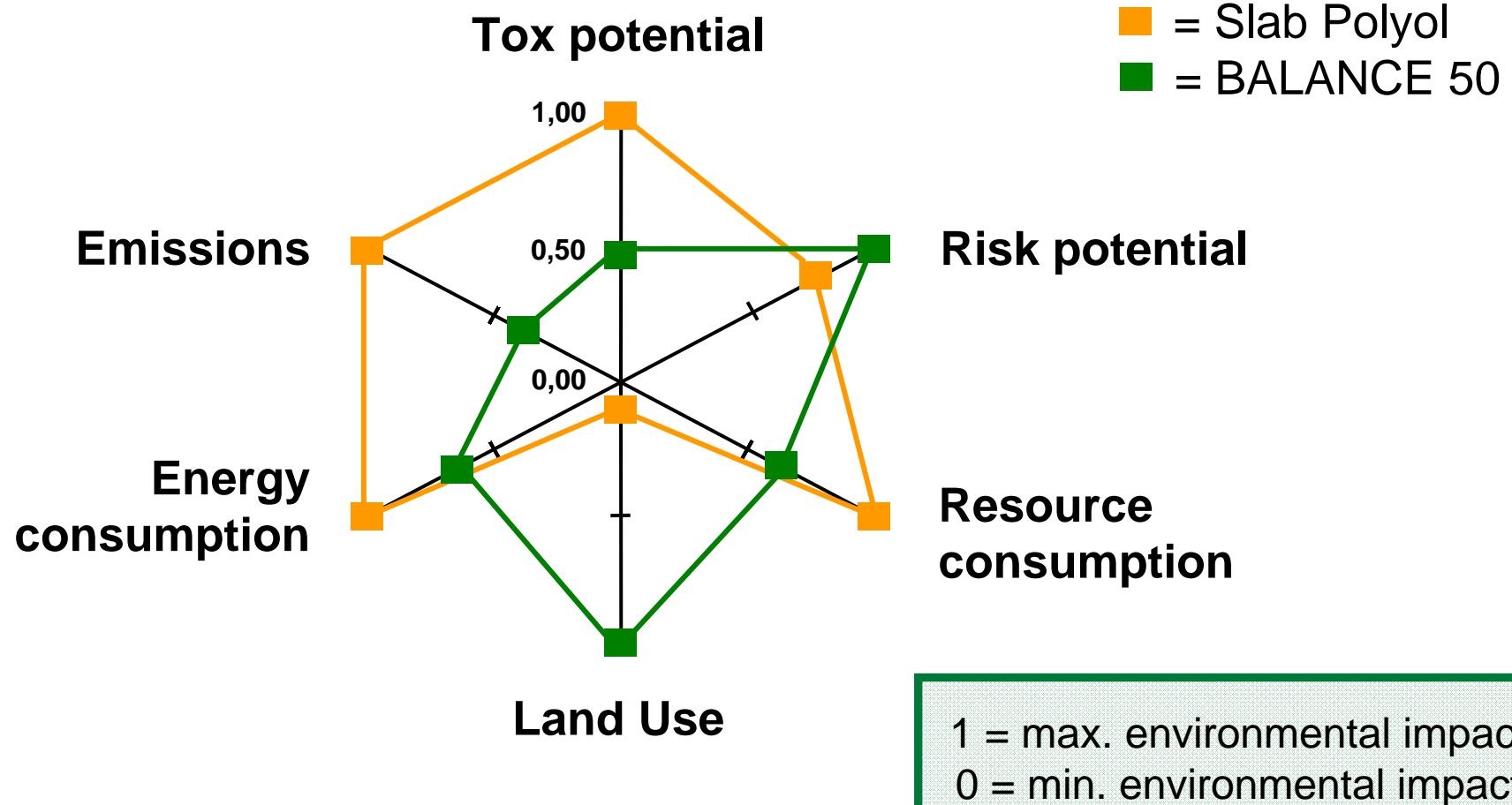


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kg SO₂ Equivalent / t



Ecological Fingerprint Results



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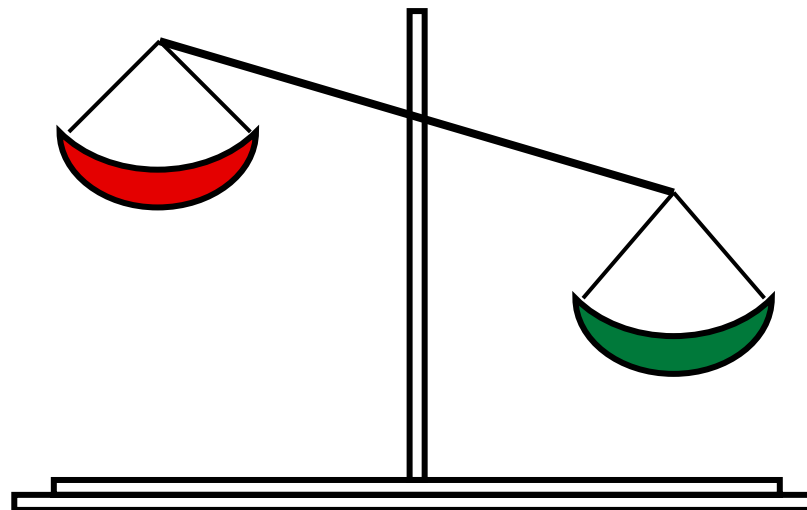
Results

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- higher land-use
- limited competition with food chain
- + up to 25% of bio-mass in resulting PU foam
- + less energy consumption
- + less resource consumption
- + less global warming potential
- + less SO₂ emission („Acid Rain“)
- + more ecologically friendly



Results

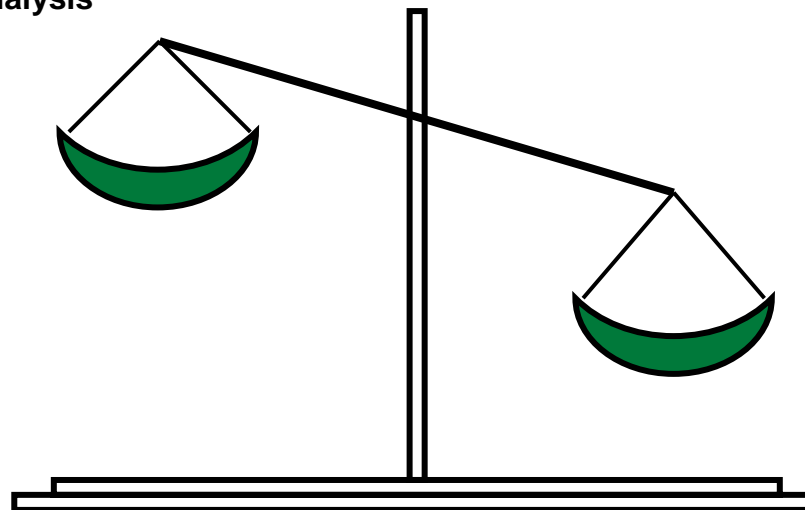
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Validated Method
Eco-Efficiency Analysis



Lupranol®

BALANCE



Thank you for your attention !