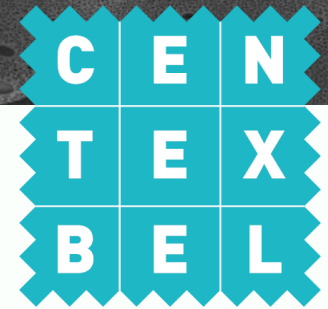
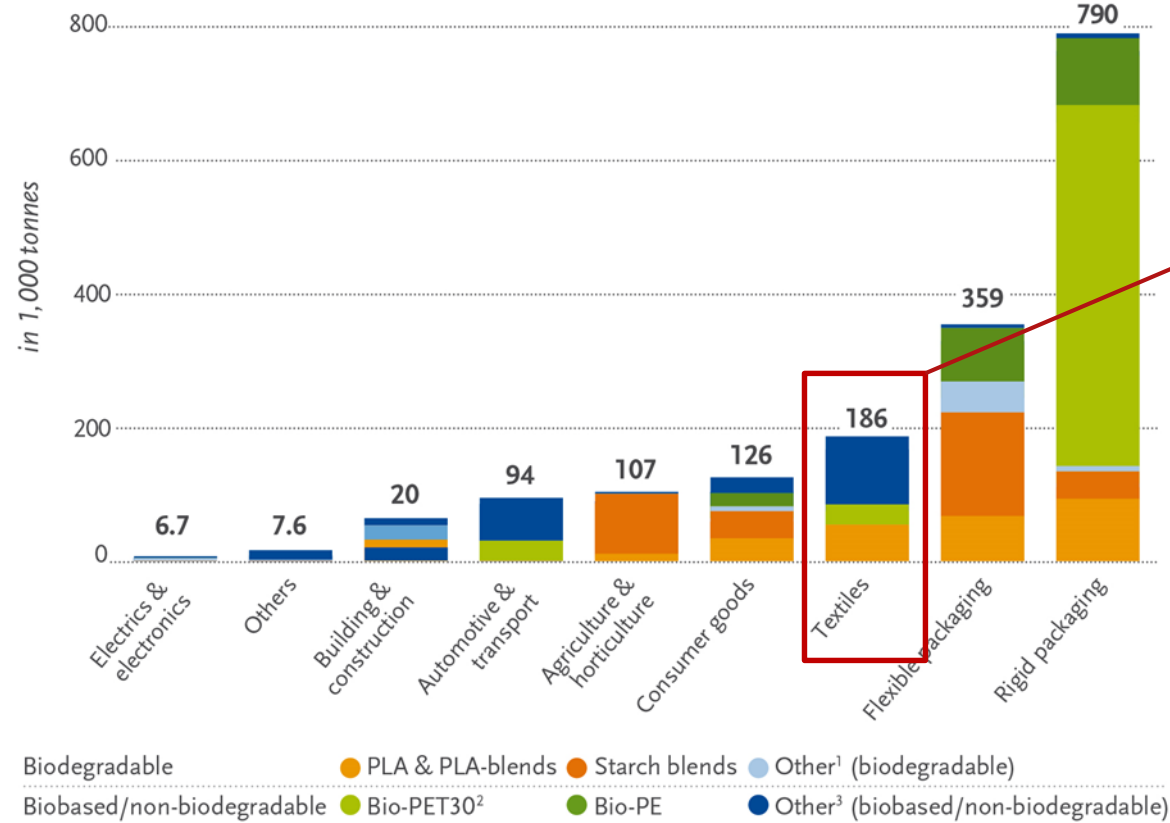


# New challenges for textile industry: eco-friendly and biobased coated textiles



David De Smet

## Global production capacities of bioplastics 2014 (by market segment)



Only a small fraction is for textile coatings

<sup>1</sup>Contains regenerated cellulose and biodegradable cellulose ester; <sup>2</sup>Biobased content amounts to 30%; <sup>3</sup>Contains durable starch blends, Bio-PC, Bio-TPE, Bio-PUR (except thermosets), Bio-PA, PTT

Source: European Bioplastics, Institute for Bioplastics and Biocomposites, nova-Institute (2015).

More information: [www.bio-based.eu/markets](http://www.bio-based.eu/markets) and [www.downloads.ifbb-hannover.de](http://www.downloads.ifbb-hannover.de)

# Outline

- Introduction
- Results
- Conclusions and outlook

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# Challenge

- ECHA limiting use of several chemicals
- "Bio, eco, natural and environmentally friendly" consciousness
- Roughly 50 years of both oil and natural gas left (BP Statistical Review of World Energy 2016)

# Opportunity

- Developing eco-friendly and/or biobased solutions
  - Eco-friendly repellent textiles
  - 2K biobased PU coating free of solvent
  - Biobased additives

# Outline

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# Duratex



Interreg

France-Wallonie-Vlaanderen



UNION EUROPÉENNE  
EUROPESE UNIE



met de steun van  
west-vlaanderen  
de gedreven provincie



Wallonie

GoToS3

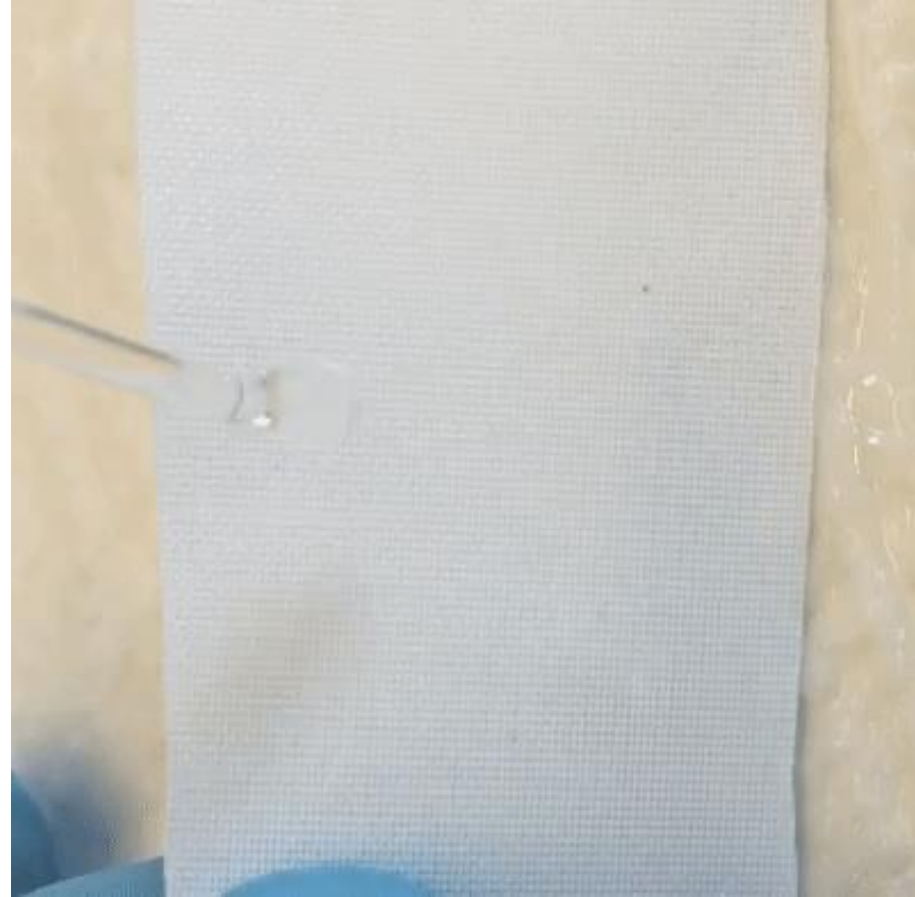
DURATEX

Avec le soutien du Fonds européen de Développement Régional - Met de steun van het Europees Fonds voor Regionale Ontwikkeling

- Ecofriendly water and oil repellent and antimicrobial textile
- Transcollaboration
  - Centexbel (VL)
  - UCL and Certech (WL)
  - Ensait and CETI (FR)



# Fluorfree superhydrophobic finish



# Superomniphobic C6 and C8 free formulation

**Water (10  $\mu$ l)**  
***contact/ roll-off angle ( $^{\circ}$ )***

144 / 5-7



**Olive oil (10  $\mu$ l)**  
***contact/ roll-off angle ( $^{\circ}$ )***

144 / 13-18



# 2K Biobased PU coating

Coating	additive	watercolumn (cm)			weldable
		initial	washing (20x 40°C)	Hydrolysis (70°C, 95% R.H.; 3 weeks)	
A	adhesion promotor	$\geq 1000$	$\geq 1000$	$\leq 10$	no
B	adhesion promotor	$\geq 1000$	$\geq 1000$	$\leq 10$	no
D	adhesion promotor	$\geq 1000$	$\geq 1000$	$\leq 10$	no
E	adhesion promotor	$\geq 1000$	$\geq 1000$	$\leq 10$	no
F	adhesion promotor	$\geq 1000$	$\leq 10$	$\geq 1000$	no
G	adhesion promotor	$\geq 1000$	$\leq 10$	$\geq 1000$	no

# 2K Biobased PU coating

- Compatible with additives (not waterbased)
- Flexible coating
- Not sticky and slip resistant

# Bio FR

- Development Centexbel-Maes Matress Ticking
- Biobased content: 92%
- Interzum award 2017



# Biobased antimicrobial products

- Plant, animal or marine origin
- Phenolic, ammonia/amine groups,...
- Efficacy depending on:
  - Fabric type (chemistry)
  - Structure of the textile
  - Fabric weight

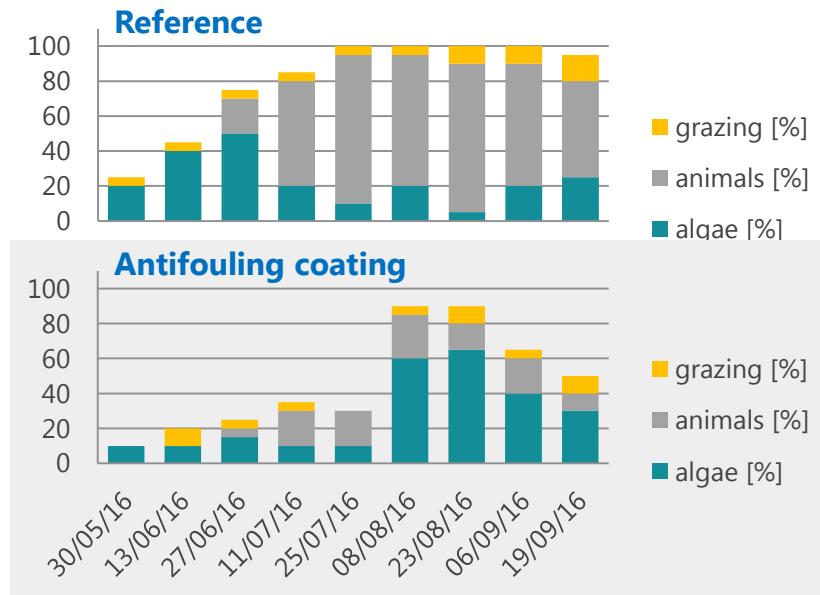
# Biobased antimicrobial products

	<i>Staphylococcus aureus</i>	<i>Escherichia coli/ Klebsiella pneumoniae</i>
Thymol and carvacrol	✓	✓
Chitosan	✓	✓
Monolaurin	✓	
Tannic acid	✓	
Vanillic acid	✓	✓
Curcumin	✓	✓

- Thymol and carvacrol and chitosan active at low levels
- Biocide regulation!

# Biobased antifouling additive

- Effective against hard fouling (e.g. barnacles, mussels etc.)





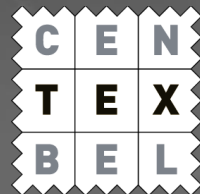
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# Conclusions and outlook

- Biobased PU's are promising candidates for renewable textile coatings
- Biobased functional additives can be implemented for different applications
  - FR
  - Antimicrobial
  - Antifouling
  - Abrasion resistance
  - ...

# Questions ?



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