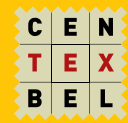


# Functionalisation of tissues using biobased antibacterial agent

## David De Smet



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# Antimicrobial additives

- » Selecting biobased antimicrobial products:
  - > Commercial availability
  - > Toxicity
  - > Cost price
  - > Odour
  - > Compatibility
  - > Metal free



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# Antimicrobial additives

- Commercially available products
  - KemNat
- Seaweed extracts
- Tannic acid
- Essential oils
- 2,3-dihydroxypropyl laurate (monolaurin)
- ...



Wallonie



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# Screening

- » Solution/dispersion of additive
- » Application on textile via foulard
- » Evaluation
  - > Agar diffusion test
  - > ISO 20743 (determination of antibacterial activity)

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# Screening

- » No antibacterial effect of seaweed extracts
- » Difference in antibacterial activity between polyester and cotton fabrics and depending on weight and structure of fabric
- » Some biobased products active towards both Gram- and Gram+ bacteria, whilst other are more selective (tannic acid)

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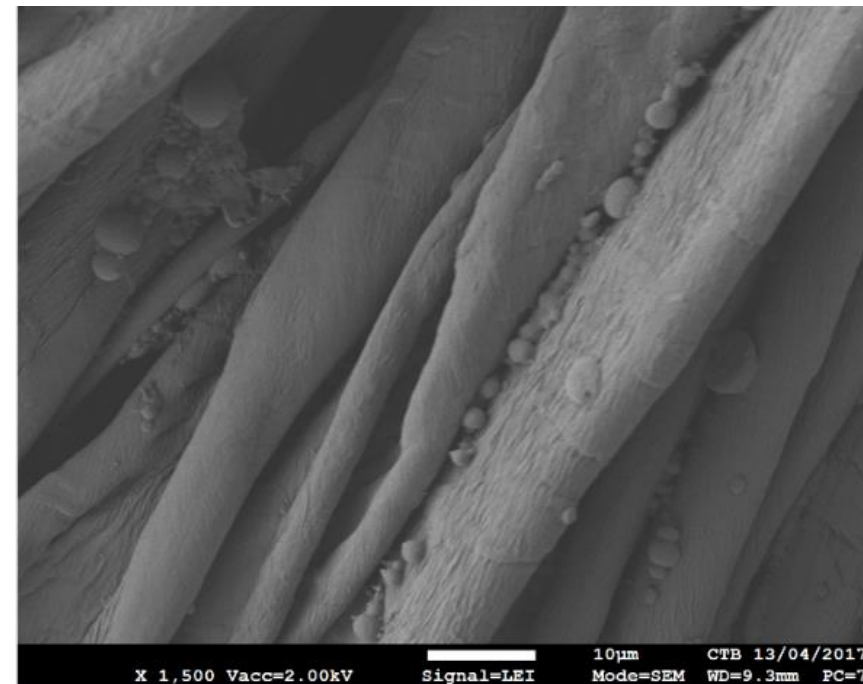
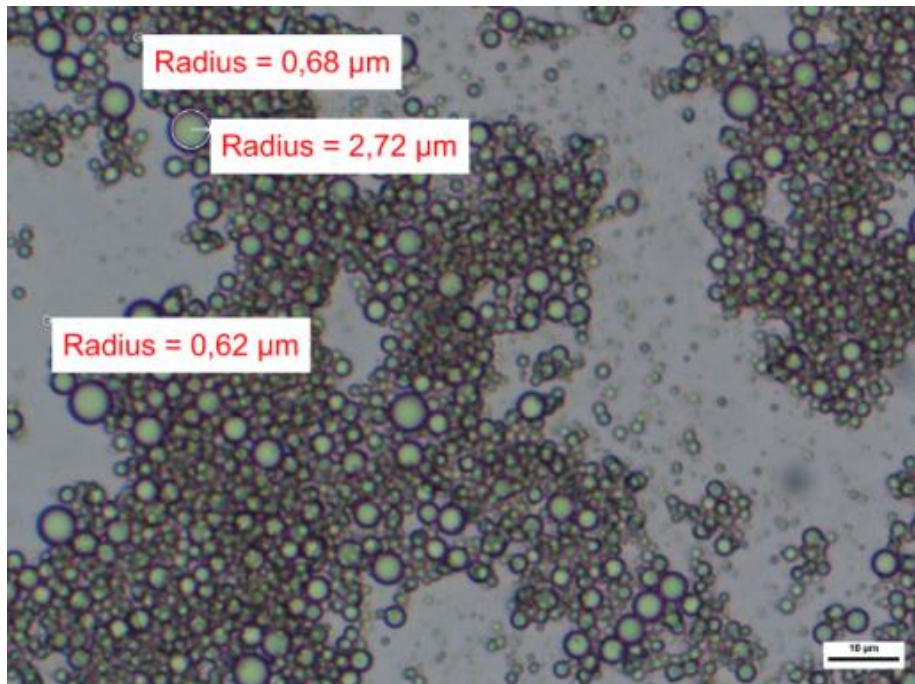
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# Micro encapsulation

- » PU-urea microcapsules
- » Biobased and non-toxic products
- » Encapsulating grapefruit oil and citronellal
- » Core material should not contain reactive hydroxyl groups
- » Foulard application



# Micro encapsulation



*Cotton: antibacterial effect towards S. aureus and E. coli*  
*PES: antibacterial effect towards S. aureus*

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# Coating

- » Polyester fabric
- » Biobased PU dispersion
  - > Tannic acid
    - + not compatible
- » Biobased 2K PU
  - + not compatible with antibacterial products with reactive OH-group

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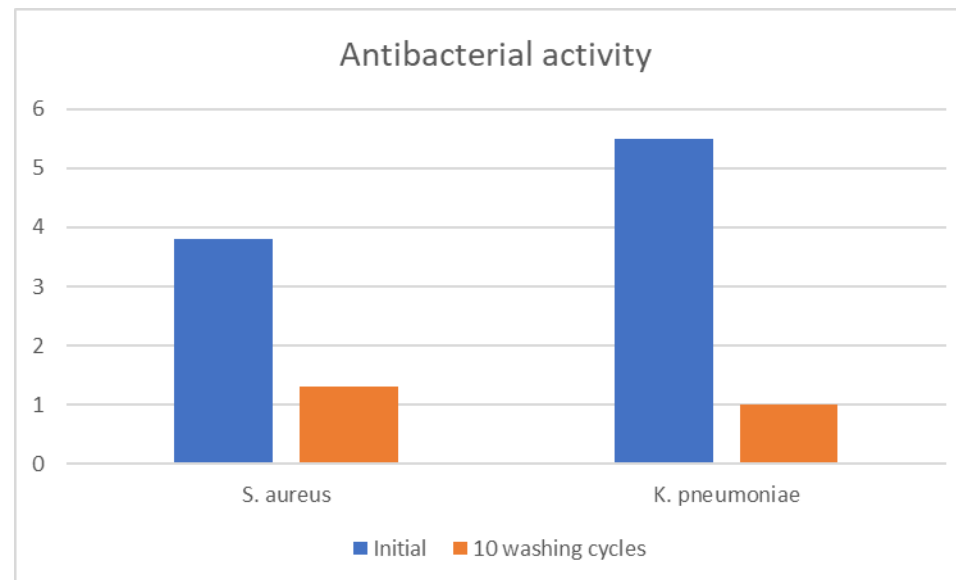
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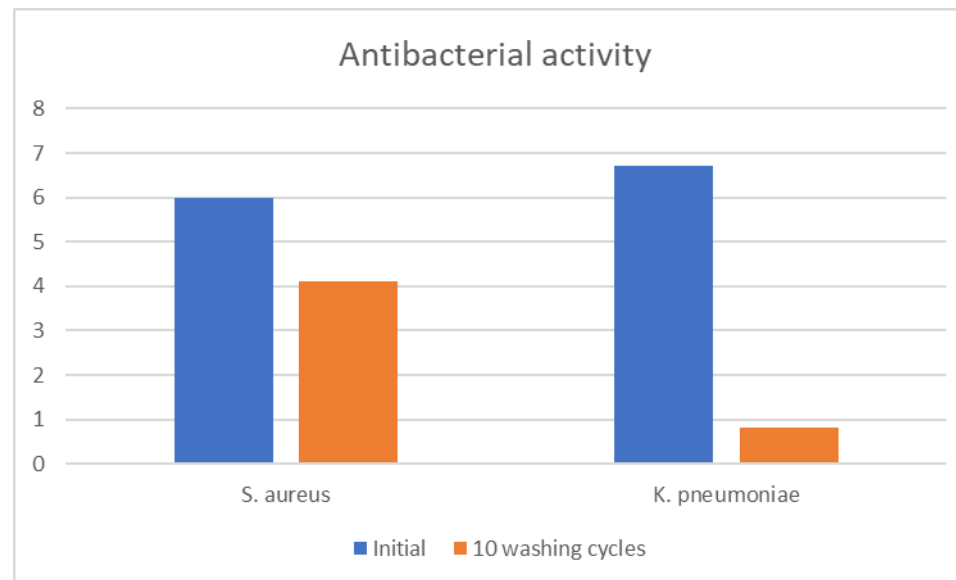
# Antibacterial bio PUD coating

- » Waterbased PU coating functionalised with Kemnat
- » Washing @ 40°C (ISO 6330)



# Antibacterial bio PUD coating

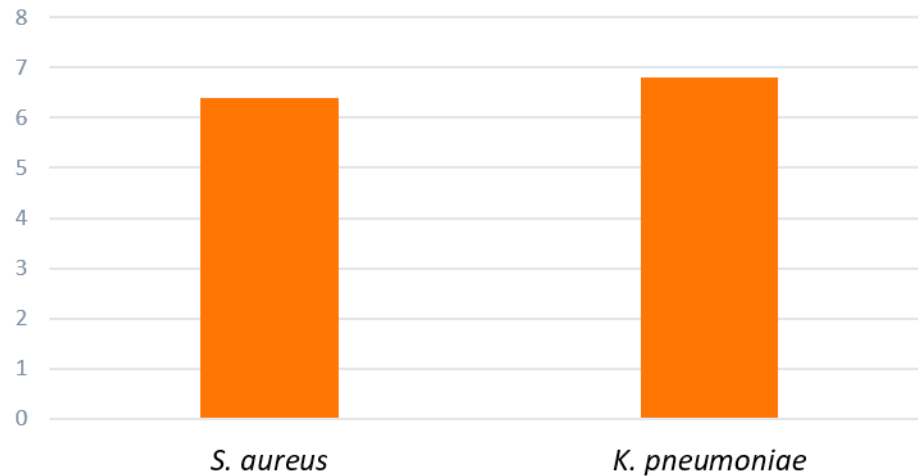
- » Waterbased PU coating functionalised with vanillic acid
- » Washing @ 40°C (ISO 6330)



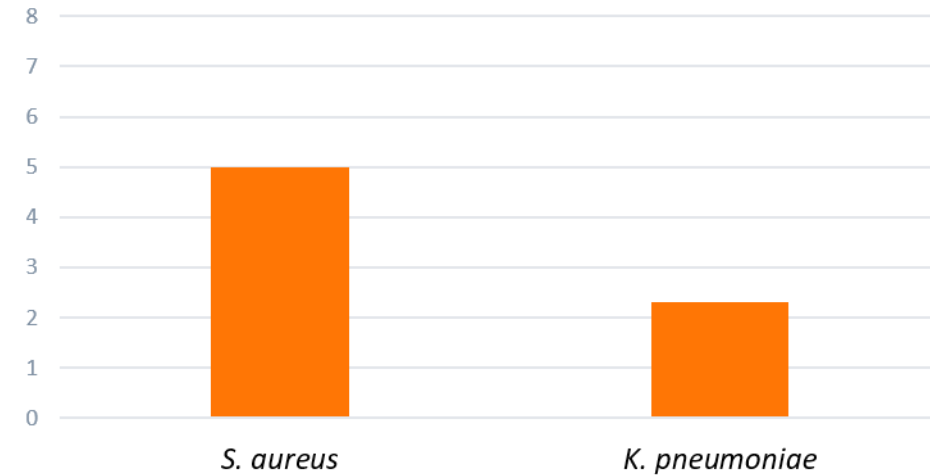
# Antibacterial bio PUD coating

- » Waterbased PU coating functionalised with monolaurin
- » Washing @ 40°C (ISO 6330)

Antibacterial activity before washing



Antibacterial activity after 10 washing cycles



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# Biobased coating: 2K Bio PU

- » Washfastness
  - Up to 90°C
- » Resistance to hydrostatic pressure
  - > 10 m (after min. 20 washing cycles at 60°C)
- » Hydrolysis resistance
- » QUV resistance



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# Antibacterial 2K PU coating



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## » Biobased 2K PU

### > Monolaurin

+ *Strong antibacterial effect against K. pneumoniae*

### > ISO 20743

<i>S. Aureus</i>	<i>K. pneumoniae</i>
0.3	2.2



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# Antibacterial 2K PU coating



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## » Biobased 2K PU

> Vanillic acid

+ *Strong antibacterial effect against K. pneumoniae and S. aureus*

> ISO 20743

<i>S. Aureus</i>	<i>K. pneumoniae</i>
> 5.7	> 6.7

# Acknowledgement

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EUROPESE UNIE



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de gedreven provincie

