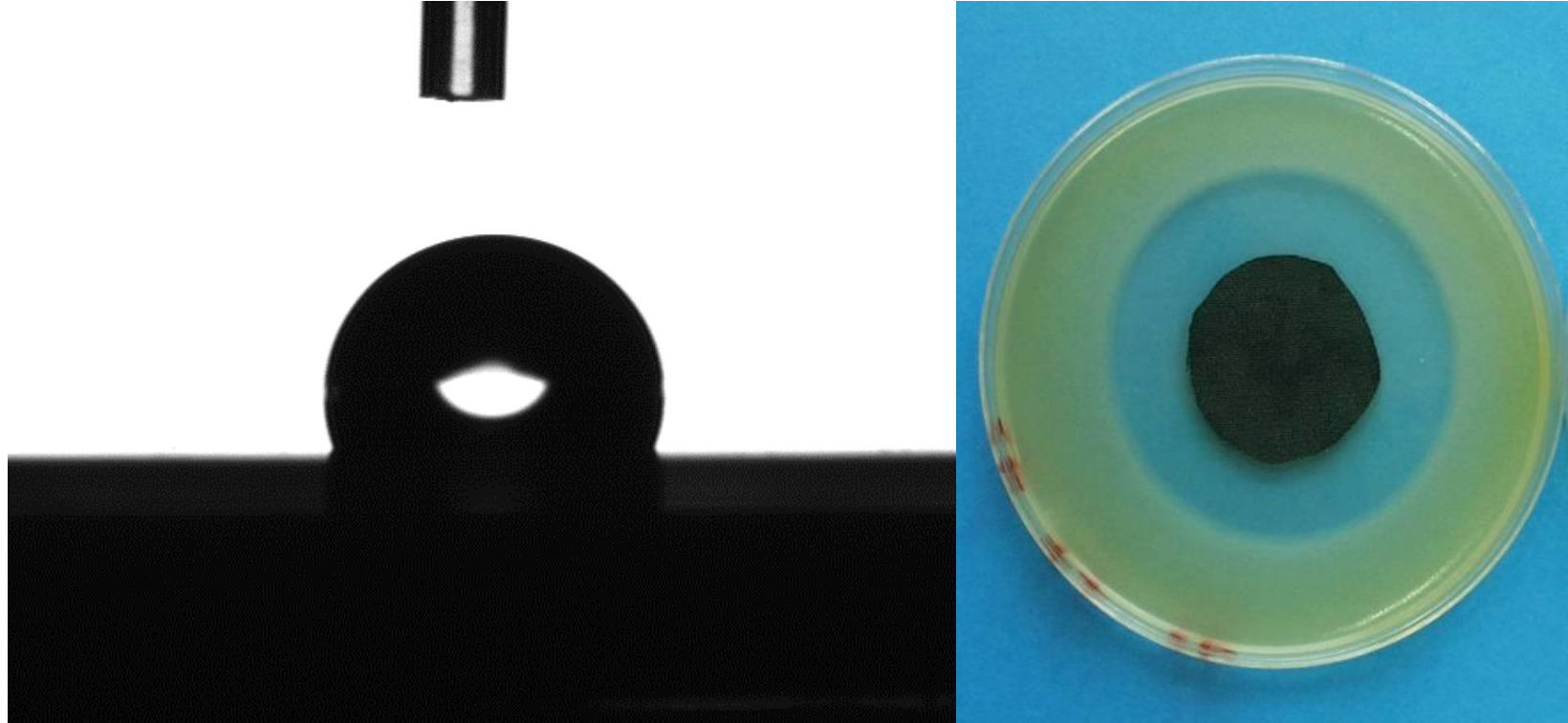




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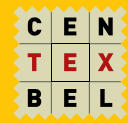


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Avec le soutien du Fonds européen
de Développement Régional
Met de steun van het Europees
Fonds voor Regionale Ontwikkeling

Duratex project

David De Smet



Duratex

- » *Water and oil repellent as well as antimicrobial textiles for building and architectural applications*
- » *Interreg V project France-Wallonia-Flanders*
- » *1/07/2016 – 30/06/2020*



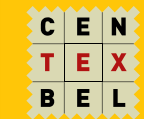
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Objectives

- » DURATEX wants to develop ecofriendly textile via extrusion & coating for building and architectural applications
 1. Antimicrobial textile free of (nano)silver or other metals
 2. Water and oil repellent textile free of C6 and C8 fluorocarbons

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Results at the end of the project

- » *Overview of ecological antimicrobial, water and oil repellent additives*
- » *Up to date knowledge of the legislation*
- » *Guidelines in applying different technologies for water and oil repellent textiles and their compatibility with antimicrobial formulations*
- » *Realising a durable textile*

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Target group

» Target companies are involved in:

- > *Coating*
- > *Extrusion*
- > *Chemical additives*
- > *Technical textile and interior textiles*

» *All other companies looking for water and oil repellent and/or antimicrobial textile*



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GoToS3

- » *GoToS3 is a portfolio of 16 Interreg France-Wallonia-Flanders projects*
 - > New materials and chemistry
 - > Textile
 - > Health and care
 - > Agriculture and food
 - > Cultural and creative industries
 - > Industry 4.0



Wallonie



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Wallonie



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GoToS3



GoToS3
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» Objectives

- > *Improving and supporting of transborder cooperation in research and innovation*
- > *Reinforcing transborder economical development of SMEs*

» <http://www.gotos3.eu/index.php/fr> / <http://www.gotos3.eu/nl>

Financing

» *Duratex project wordt is financed within the Interreg V France-Wallonia-Flanders program (<http://www.interreg-fwvl.eu/nl>), a transborder collaboration program with financial support of the European Funds for regional development with cofinancing by Wallonia and the province West-Flanders*

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Transborder collaboration

» *Necessary to realise the objectives*

» *Partners*

> *Centexbel (FL)*

> *Certech (WL)*

> *Ceti (FR)*

> *Ensait (FR)*

> *UCL (WL)*



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Transborder collaboration

- » *UCLouvain and Certech have the necessary expertise for creating superhydrophobic and oleophobic surfaces*
- » *Ensait and Centexbel have both knowledge and experience in developing ecofriendly products*
- » *Centexbel, Ensait and Ceti have the required expertise in textile functionalisation*

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Transborder collaboration

- » Centexbel
 - > *Coordinator*
 - > *Applying biobased antimicrobial products via coating and finishing*
 - > *Assistance in developing superhydro- and oleophobic formulation and application*
- » Certech
 - > *Development of superhydro- and oleophobic formulation*
- » Ceti
 - > *Applying biobased antimicrobials via extrusion on pilot scale*
- » Ensait
 - > *Applying biobased antimicrobials via extrusion and diffusion*
- » UCL
 - > *Development of superhydro- and oleophobic formulation*



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Website

» *More info about Duratex project*

- > *Project description*
- > *News*
- > *Events and presentations*
- > *Partner description*
- > *Duratex newsletter*

» *3 languages (French, Dutch and English)*

» <https://interreg-duratex.eu/fr> / <https://interreg-duratex.eu/nl>



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Duratest Newsletter

- » *You want to keep being posted? -> Newsletter*
- » *Registration via website <https://interreg-duratest.eu/node/2>*
- » *Language: English*
- » *An example: <https://sway.com/tPYEoKVW2M28i3jK>*



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Folder



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Duratex s'inscrit dans le cadre du programme Interreg V France-Wallonie-Flandres et a pour objectif le développement de revêtements protecteurs pour les textiles présentant des propriétés hydrofuges, oléophobes et antimicrobiennes.

Les méthodologies mises en œuvre répondront aux exigences de l'industrie textile (coût, vitesse de production, obtention de fonctionnalités complexes, etc.) tout en étant écologiques et applicables via des appareillages déjà existants. Par ailleurs,

Duratex tient à anticiper les futures réglementations européennes bannissant le recours aux composés C8 fluorocarbonés (FC) pour l'obtention de propriétés hydro-/oléo-phobes ainsi que l'utilisation de certains composés biocides tels que les nanoparticules d'argent, qui posent problème pour l'environnement (régulation 528/2012).

Het Interreg V Frankrijk-Wallonië-Vlaanderen project Duratex zal de ontwikkeling van ecovriendelijke fluorvrije hydro- en oleofobe en zilvervrije antimicrobiële finishes. De ontwikkelde methodologieën zullen voldoen aan de vereisten van de textielindustrie (kost, productiesnelheid, bekomen van complexe functionaliteiten), zullen ecologisch zijn en aan te brengen met de huidige machines. De superhydrofobe en oleofobe finish zal aangebracht worden via foulard, terwijl de antibacteriële producten zullen geïncorporeerd worden in het garen (extrusie) en aangebracht worden op textiel via diffusie of foulard.

De toekomstige Europese wetgeving, die het gebruik van fluorocarbons (C8) zal bannen alsook het gebruik van bepaalde biocides toxisch voor het milieu (regulatie 528/2012) zoals (nano)zilver, zal in rekening gebracht worden.

Interested in fluorine-free superhydrophobic and non-toxic antimicrobial finishes?

Intéressé par des finitions antimicrobiennes non toxiques et superhydrophobes sans fluor?

Geïnteresseerd in fluorvrije superhydrofobe, niet-toxische en antimicrobiële finishes?

contact David De Smet
 dds@centexbel.be

COORDINATOR
 Centexbel

PARTNERS
 Certech | Cetl | Ensait | UCL

WEBSITE
 English
<https://www.interreg-duratex.eu/>
 French
<https://www.interreg-duratex.eu/fr>
 Dutch
<https://www.interreg-duratex.eu/nl>



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Le projet Duratex est soutenu par le cadre du programme Interreg V France-Wallonie-Flandres, un programme de collaboration transfrontalière avec le soutien du Fonds européen de développement régional, et cofinancé par la province de Flandre occidentale et la Région wallonne.

www.interreg-fwvl.eu



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Het Duratex project wordt gefinancierd binnen het Interreg V programma Frankrijk-Wallonië-Vlaanderen, een grensoverschrijdend samenwerkingsprogramma met financiële steun van het Europees Fonds voor Regionale Ontwikkeling, en cofinanciering door de provincie West-Vlaanderen en Wallonië.

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Need?

- » *Pressure from environmental organisations and consumer*
- » *Legislation*
 - > *Biocide regulation 528/2012*
 - > *REACH regulation (fluorocarbons)*
- » *Label e.g. Oeko-Tex*



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Oeko-Tex

PFC's, Per- and polyfluorinated Compounds/Per- und polyfluorierte Verbindungen ^{11,19}				
PFOS, PFOSA, PFOSE, N-Me-FOSA, N-Et-FOSA, N-Me-FOSE, N-Et-FOSE; Sum/Summe[µg/m2]	<1.0	<1.0	<1.0	<1.0
PFOA[µg/m2]	<1.0	<1.0	<1.0	<1.0
PFHpA[mg/kg]	0.05	0.1	0.1	0.5
PFNA[mg/kg]	0.05	0.1	0.1	0.5
PFDA[mg/kg]	0.05	0.1	0.1	0.5
PFUdA[mg/kg]	0.05	0.1	0.1	0.5
PFDoA[mg/kg]	0.05	0.1	0.1	0.5
PFTTrDA[mg/kg]	0.05	0.1	0.1	0.5
PFTeDA[mg/kg]	0.05	0.1	0.1	0.5
Further Perfluorinated carbonic acids, each; according to Annex 5/je; gemäß Anhang 5[mg/kg]	0.05			
Perfluorinated sulfonic acids, each; according to Annex 5/je; gemäß Anhang 5[mg/kg]	0.05			
Partially fluorinated carbonic / sulfonic acids, each; according to Annex 5/je; gemäß Anhang 5[mg/kg]	0.05			
Partially fluorinated linear alcohols, each; according to Annex 5/je; gemäß Anhang 5[mg/kg]	0.50			
Esters of fluorinated alcohols with acrylic acid, each; according to Annex 5/je; gemäß Anhang 5[mg/kg]	0.50			

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Results

- » *Superhydro- and oleophobicity*
 - > *Presentation of Alain Jonas (UCLouvain)*

- » *Antimicrobial textiles*
 - > *Coating/Finishing*
 - > *Diffusion*
 - > *Extrusion*

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Antimicrobial additives

» *Selecting biobased antimicrobial products:*

- > *Commercial availability*
- > *Toxicity*
- > *Cost price*
- > *Odour*
- > *Compatibility*
- > *Metal free*

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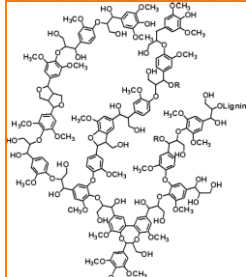
Antimicrobial additives

Compounding - spinning

Tannic acid

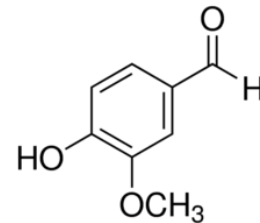


Lignin

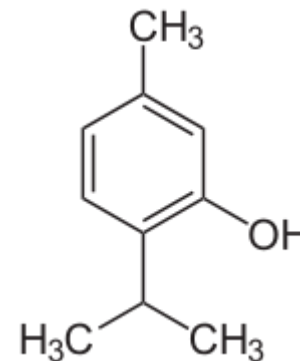


Diffusion

Vanillin

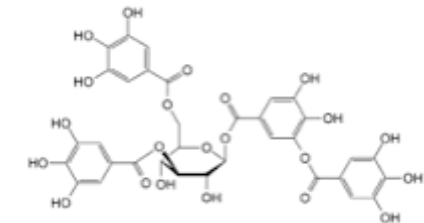


Thymol

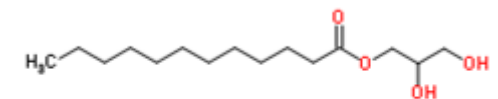


Foulard

- Kemnat
- *Tannic acid*



- *2,3-dihydroxypropyl laurate*



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Micro encapsulation

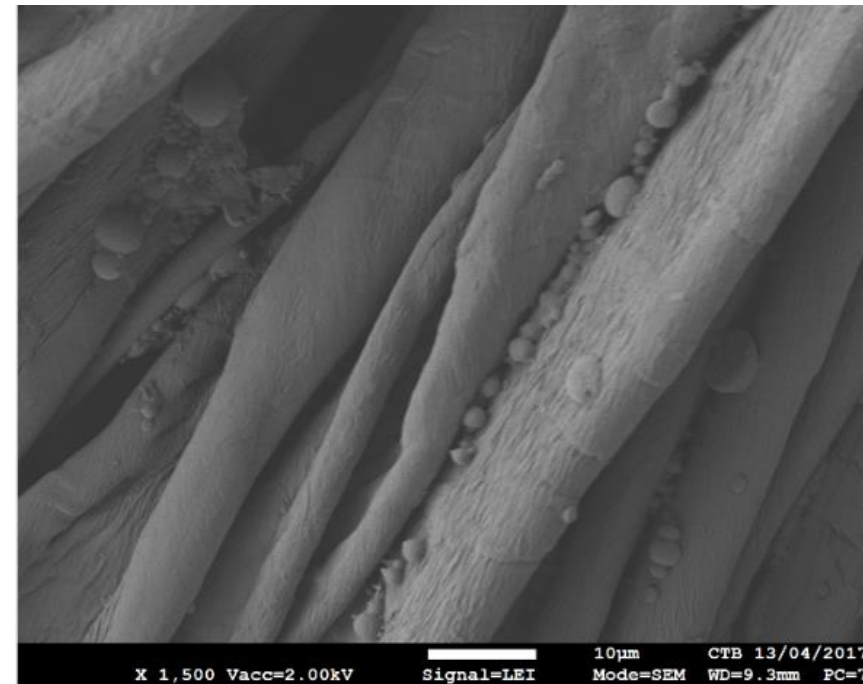
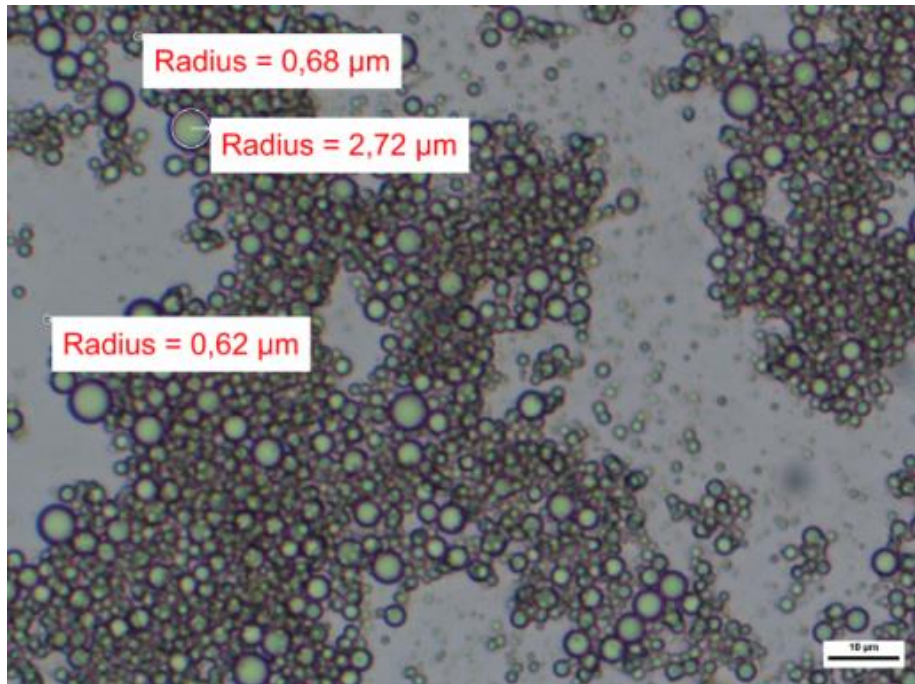
- » *PU-urea microcapsules*
- » *Biobased and non-toxic products*
- » *Encapsulating grapefruit oil and citronellal*
- » *Core material should not contain reactive hydroxyl groups*



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Micro encapsulation



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Micro encapsulation

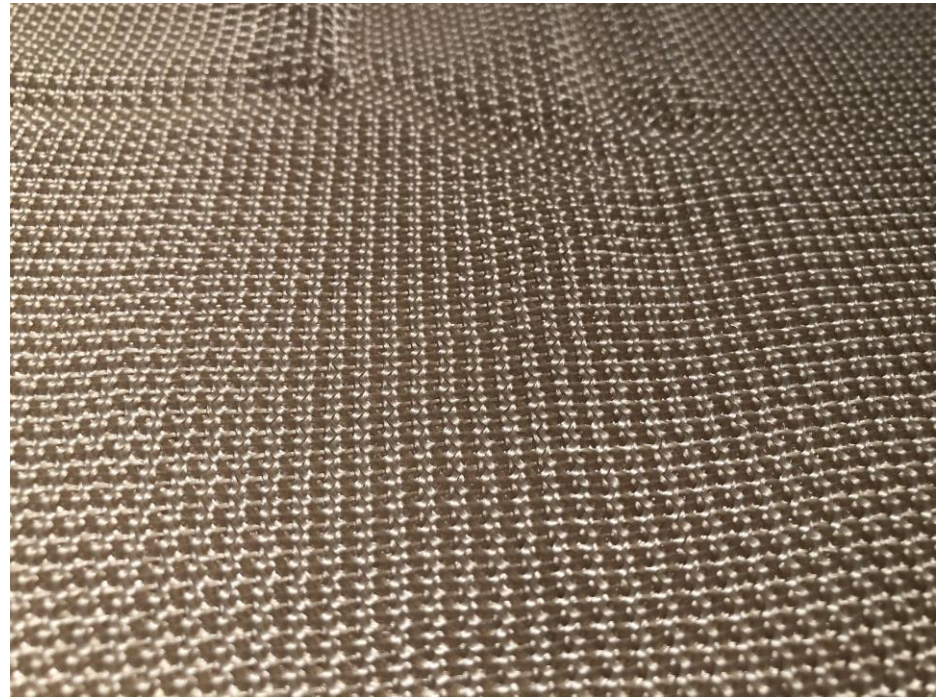
» *Applied on cotton woven and knitted fabric and PES woven fabric*

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

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Tannic acid in PP (extrusion)

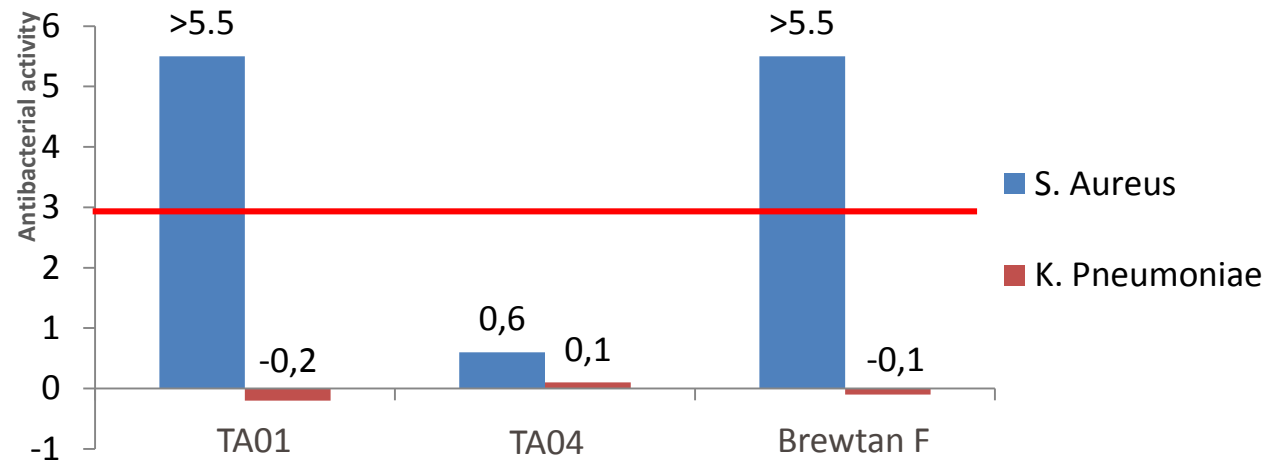


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Tannic acid in PP (extrusion)

Transfer test ISO 20743



Antibacteriële activiteit of PP knitted fabric with tannic acid

TA01 has better antibacterial properties against S. Aureus

Spinning and knitting of PP+0.5%TA01 and PP+1%TA01

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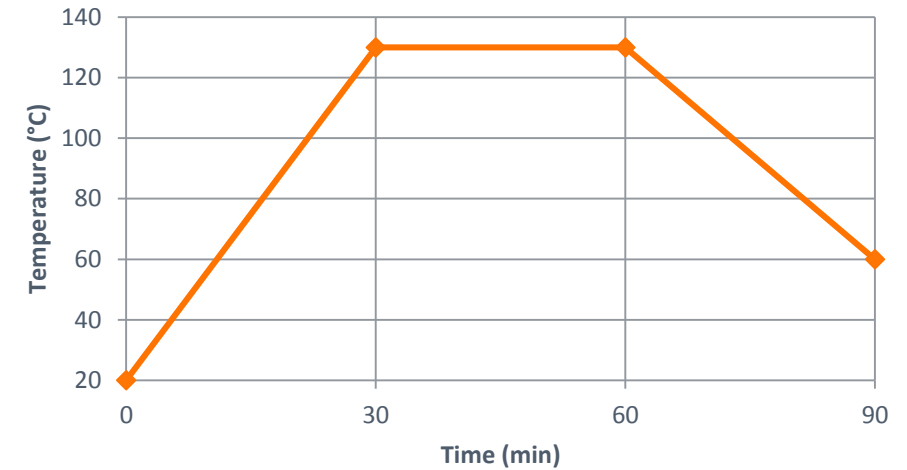


Antimicrobial formulation for diffusion

» Diffusion process

- > High temperature (130°C)
- > Other parameters
 - pH
 - ethanol
 - Concentration
- > Products tested in combination or seperately
 - » E.g. Cinnamaldehyde + Carvacrol

High temperature (HT) Process



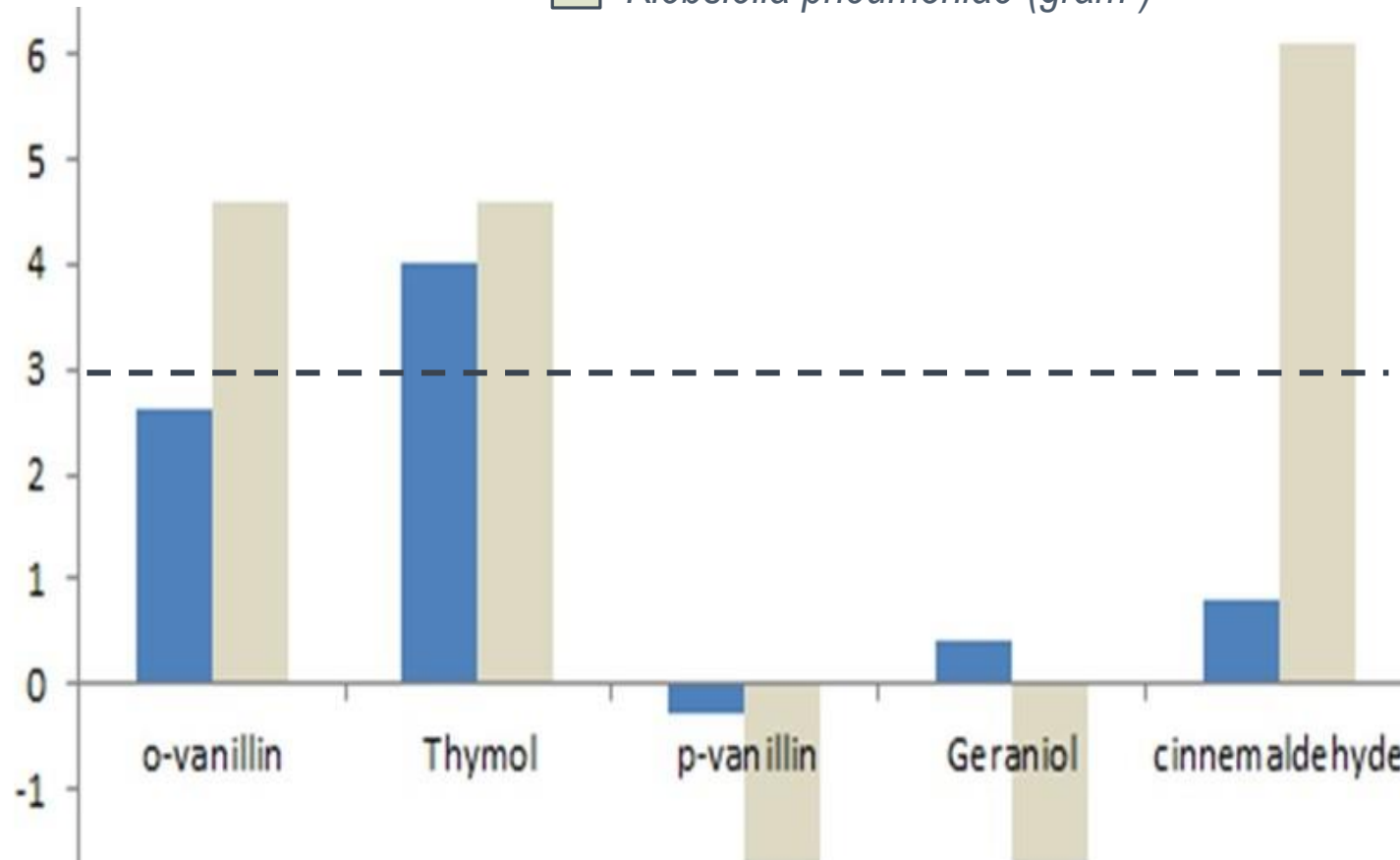
Product tested seperately or in combination with carvacrol

Para-Vanillin	Ortho-Vanillin
Thymol	Tanal 04
Cinnamaldehyde	Brewtan F
Geraniol	

Transfer ISO 20743

A=antibacterial activity

- *Staphylococcus aureus* (gram+)
- *Klebsiella pneumoniae* (gram-)



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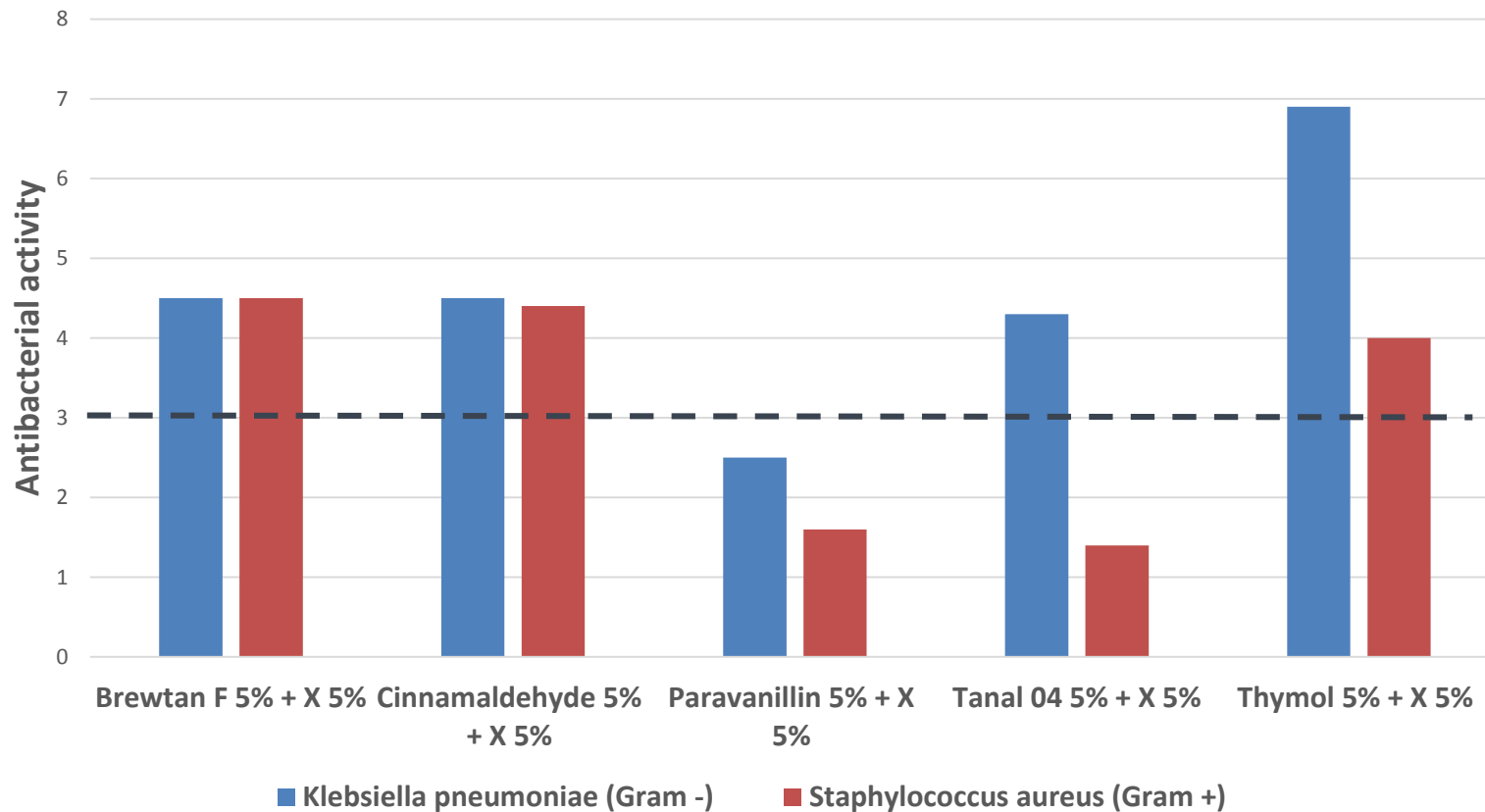
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Transfer ISO 20743

Mixture of two active components



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Acknowledgement

Projet soutenu par
Project ondersteund door

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