Anti-biofilm efficacy of triclosan-amphotericinB combination against filamentous fungus, Aspergillus fumigatus

Tamimi, R., Kyazze, G. and Keshavarz, T.

A poster presented at Biofilms 8, Aarhus University, Aarhus, Denmark, 27-29 May 2018.

http://conferences.au.dk/biofilms8/home/

Programme & Abstracts

BIOFILMS 8

27 - 29 May 2018

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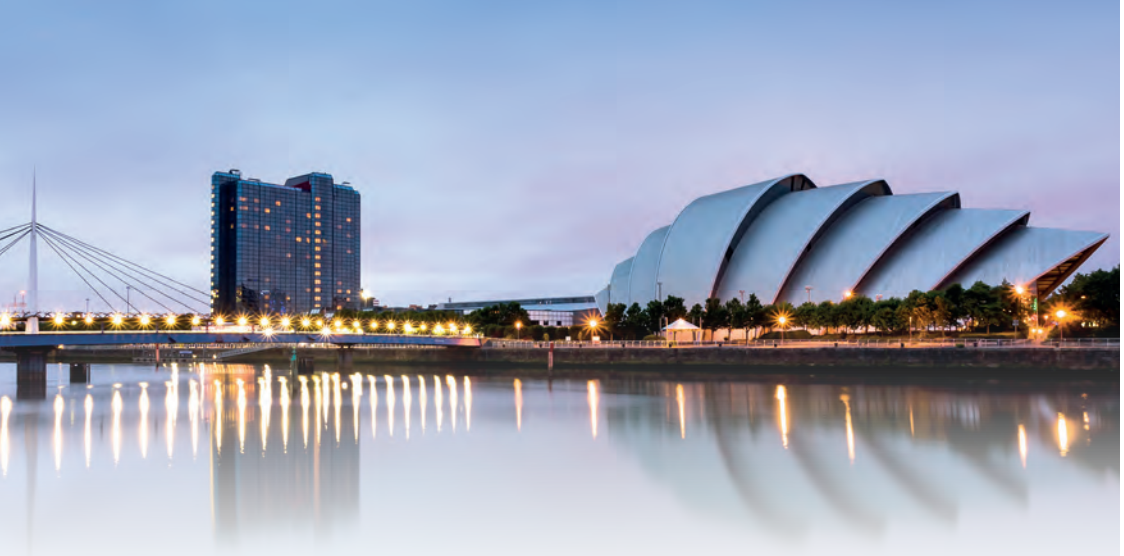

SAVE THE DATE

FEMS 2019

7-11 July 2019

8th Congress of European Microbiologists
Glasgow, Scotland | www.fems2019.org

WELCOME

Dear participant,

It is a great pleasure to welcome you to the Biofilms 8 conference in Aarhus, Denmark.

During the 2,5 conference days, you will experience a diverse programme that includes high level scientific presentations and networking activities - an excellent opportunity to exchange knowledge and experiences within biofilms.

Biofilms 8 is the 8th conference in a series that cover the topic of bacterial biofilms in the broadest sense. The conference focus is on the basic scientific question of how biofilms form, grow and interact with their surroundings. You will meet researchers from the natural sciences, engineering, and health science to exchange their research on how biofilms develop, how they interact with their surroundings, and how they can be controlled in a natural, industrial, or clinical setting.

The main subjects of the conference are:

- Molecular mechanisms in biofilm formation
- The biofilm matrix
- Bacterial attachment
- Modelling biofilms
- Biofilm ecology
- Evolution in biofilms
- Biofilm control
- Novel methods for biofilm characterization

We hope you will enjoy the conference and your stay in Aarhus!

Kind regards from the Local Organising Committee,

Rikke Louise Meyer
Associate professor, Interdisciplinary Nanoscience Center and Department of Bioscience, Aarhus University (Conference Chair)

GENERAL INFORMATION

CONFERENCE VENUE

Aarhus University
Bygning 1412 (Building 1412)
Nordre Ringgade 4
8000 Århus, Denmark

CONFERENCE LANGUAGE

The conference will be held in English.

NAME BADGES

All participants and exhibitors must wear the name badge in the conference area at all times. The badge must be visible.

LUNCH AND COFFEE BREAKS

Lunch is available in the poster area. Coffee is available in the exhibition area. See programme for exact time of breaks.
Exhibition area: Vandrehallen
Poster area: Stakladen & Richard Mortensen room

SPEAKER INFORMATION

Please bring your presentation to the session room before your session starts. We recommend you upload your presentation at least 30 min before your session. A technician will be present to assist in the upload if necessary. Please bring your presentation on a USB.

Unless otherwise agreed all presentations will be deleted after the conference in order to secure that no copyright issues will arise at the end of the conference.

WIFI

Free WiFi is provided throughout the venue by logging on the network "AU Guest". Open an internet browser and log on through one of the accounts.

MOBILE PHONES

All mobile phones must be on silent mode during the sessions.

CLOAK ROOM

A manned cloak room located in the basement under the auditorium "Aula" will be available throughout the conference.

LOST AND FOUND

Found items should be returned to the registration desk. If you lose something, please report to this desk for assistance.

CONFERENCE SECRETARIAT

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Find Biofilms 8 on Facebook (Search for "Biofilms Conference Series") and Twitter (@Biofilms8)
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CONFERENCE WEBSITE

www.conferences.au.dk/biofilms8

SOCIAL EVENTS

Welcome Reception (included in the registration fee)

Date:	27 May 2018
Time:	18.30 - 20.30
Place:	Poster area, Stakladen, Aarhus University

The welcome reception will take place in the poster area in Stakladen at Aarhus University from 18.30 - 20.30.

Conference Dinner (included in the registration fee)

Date:	28 May 2018
Time:	19.00 - 00.00
Place:	Turbinehallen, Kalkværksvej 12, 8000 Aarhus C

The conference dinner will take place from 19.00 - 00.00 in Turbinehallen. The Turbinehallen is a rustic and vibrant venue full of atmosphere and character, centrally located in Aarhus in the urban harbour area in the heart of the Aarhus Film Town.

Join us at the dinner and catch up with colleagues and friends, and make new acquaintances! Please note that the dinner is included in the registration fee, but registration is required.

HOW TO GET TO THE CONFERENCE DINNER VENUE:

To reach the dinner venue from the University, you can take bus 100, 200, 16 or 18 from the busstop "Aarhus Universitet. Randersvej/ Nordre Ringgade" at the intersection of Randersvej and Nordre Ringgade and get off at the Aarhus Central station. The dinner venue is located a 5-10 minutes walk from the central station.

ORGANISATION

Rikke Louise Meyer
Interdisciplinary Nanoscience Center and Department of Bioscience, Aarhus University (Chair)

Thomas Emil Andersen
University of Southern Denmark, Denmark

Mette Burmølle
Copenhagen University, Denmark

Matthew Fields
Center for Biofilm Engineering, Montana State University, USA

Ákos Kovács
Professor, Technical University of Denmark, Denmark

Per Halkjær Nielsen
Aalborg University, Denmark

Daniel Otzen
Aarhus University, Denmark

Trine Rolighed Thomsen
Aalborg University, Denmark

POSTER SESSIONS

The poster sessions are held during lunch breaks. Please be present at your poster during these times. See the exact time of your poster session here below:

	Categories	Presentation time	Poster number
Sunday 27 May	The biofilm matrix Molecular mechanisms in biofilm formation Bacterial attachment	12.00 - 13.00	Uneven numbers
		13.00 - 14.00	Even numbers
Monday 28 May	Biofilm ecology Modelling biofilms Evolution in biofilms Other	11.30 - 12.30	Uneven numbers
		12.30 - 13.30	Even numbers
Tuesday 29 May	Biofilm control Novel methods for biofilm characterization	10.50 - 11.40	Uneven numbers
		11.40 - 12.30	Even numbers

PRIZES AND AWARDS

Thanks to our 3 sponsors below, a number of prizes will be awarded during the closing ceremony on Tuesday 29 May 2018. The prizes will consist of 8 poster prizes and 1 Young Investigator Award. We deeply thank our sponsors for the support:

JOURNAL OF MEDICAL MICROBIOLOGY

Journal of Medical Microbiology provides comprehensive coverage of medical, dental and veterinary microbiology and infectious diseases, including bacteriology, virology, mycology and parasitology.

Articles are published in the following areas:
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JOURNAL OF MEDICAL MICROBIOLOGY
The full breadth of clinical microbiology

NPJ BIOFILMS AND MICROBIOMES

The journal hosts cross-disciplinary discussions and allows for our understanding of mechanisms governing the social behaviour of microbial biofilm populations and communities, and their impact on life, human health, and the environment, both natural and engineered.

npj | Biofilms and Microbiomes

MICROORGANISMS JOURNAL

Microorganisms (ISSN 2076-2607) is an international, peer-reviewed open access journal which provides an advanced forum for studies related to prokaryotic and eukaryotic microorganisms, viruses and prions. Articles published in Microorganisms are indexed in PubMed (NLM).

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PROGRAMME SUNDAY 27 MAY

Time	Abs.	Title	Speaker	Area	Sponsored by
07.30		**Registration desk opens**			
09.00 - 09.15		**Welcome & Opening Ceremony** By Biofilms 8 Chair, Rikke Louise Meyer		**Auditorium Aula**	
9.15 - 10.00	O1	**Bird's Eye Lecture: The biofilm matrix: strategies for protection and exploitation**	**Nicola Stanley-Wall,** UK	**Auditorium Aula**	MICROBIOLOGY SOCIETY
10.00 - 10.40		**Coffee/Tea Break**		**Exhibition area**	
10.40 - 12.00		**Session 1: The biofilm matrix** **Chair: Per Halkjær Nielsen & co-chair: Daniel Otzen**		**Auditorium Aula**	THORLABS
10.40 - 11.00	O2	Glycosylated amyloid-like proteins in the structural extracellular polymers of aerobic granular sludge enriched with ammonium oxidizing bacteria	Yuemei Lin, The Netherlands		
11.00 - 11.20	O3	Formation of functional non-amyloidogenic fibres by recombinant Bacillus subtilis TasA	Elliot Erskine, UK		
11.20 - 11.40	O4	Insight into the RapA lectin and its use in the study of biofilm matrix formation by rhizobia	Patricia Abdian, Argentina		
11.40 - 12.00	O5	Secreted, Large-Scale, Extracellular Membrane Systems in Microbial Biofilms	Matthew Fields, USA		
12.00 - 14.00		**Lunch & Poster session**		**Poster & Exhibition area**	
14.00 - 14.30	O6	**Invited Lecture:** **Molecular interactions of staphylococcal biofilm forming proteins**	**Joan Geoghegan,** Ireland	**Auditorium Aula**	
14.30 - 15.50		**Session 2: Molecular mechanisms in biofilm formation** **Chair: Daniel Otzen & co-chair: Rikke Meyer**			Leica
14.30 - 14.50	O7	Cytochrome Bd-I is used for energy production in uropathogenic E. coli biofilms	Maria Hadjifrangiskou, USA		
14.50 - 15.10	O8	Heat activates cyclic diguanylate production in bacteria	Joe Harrison, Canada		
15.10 - 15.30	O9	Sortase-assembled pili of Enterococcus faecalis contribute to iron-mediated extracellular electron transfer and iron-augmented biofilm	Kimberly Kline, Singapore		
15.30 - 15.50	O10	Physical determinants of amyloid assembly in biofilm formation	Maria Andreasen, Denmark		
15.50 - 16.20		**Coffee/Tea Break**		**Exhibition area**	
16.20 - 16.50	O11	**Invited Lecture: How do bacteria respond to their adhering state?**	**Henny van der Mei,** The Netherlands	**Auditorium Aula**	
16.50 - 18.10		**Session 3: Bacterial attachment** **Chair: Rikke Meyer & co-chair: Thomas Andersen**			JPK Instruments
16.50 - 17.10	O12	Cell lysis prompts an early mechanical coupling and biofilm formation in dilute bacterial suspensions	Iztok Dogsa, Slovenia		
17.10 - 17.30	O13	Bone environment and its relationships with bacterial biofilm	Fany Reffuveille, France		
17.30 - 17.50	O14	The role of dynamic Tad pili in bacterial surface sensing	Yves Brun, USA		
17.50 - 18.10	O15	A role for two-component systems in bacterial attachment and antibiotic tolerance in Listeria moncytogenes	Hüsnü Aslan, Denmark		
18.10 - 18.30	O16	**Invited Lecture:** **Are biofilms really the dominant way of life for prokaryotes on Earth?**	**Hans-Curt Flemming,** Germany	**Auditorium Aula**	
18.30 - 20.30		**Welcome Reception in the poster area** **(included in registration fee)**		**Stakladen**	PERFECTUS BIOMED

PROGRAMME MONDAY 28 MAY

Time	Abs.	Title	Speaker	Area	Sponsored by
08.00		**Registration desk opens**			
09.00 - 09.40	O17	**Bird's Eye Lecture: Cooperation and competition in biofilms**	**Kevin Foster,** UK	**Auditorium Aula**	MICROBIOLOGY SOCIETY
9.40 - 10.10		**Coffee/Tea Break**		**Exhibition area**	
10.10 - 11.30		**Session 4: Biofilm ecology** **Chair: Mette Burmølle & co-chair: Ákos Kovács**		**Auditorium Aula**	UNISENSE
10.10 - 10.30	O18	Biofilm architecture confers individual and collective protection against phage infection	Lucia Vidakovic, Germany		
10.30 - 10.50	O19	Effect of fluctuating environmental conditions on the spatial self-organization and emergent properties of a synthetic microbial biofilm	Davide Ciccarese, Switzerland		
10.50 - 11.10	O20	AHL quorum sensing mediates species interactions in multispecies biofilms	Sujatha Subramoni, Singapore		
11.10 - 11.30	O21	Biofilm thickness controls the contribution of stochastic and deterministic processes in microbial community assembly	Jane Fowler, Denmark		
11.30 - 13.30		**Lunch & Poster session**		**Poster & Exhibition area**	
13.30 - 14.00	O22	**Invited Lecture:** **Multiscale analysis of microbial cross-feeding in biofilms: from Yellowstone hotsprings to chronic wounds**	**Ross Carlson,** USA		MICROBIOLOGY SOCIETY
14.00 - 15.20		**Session 5: Modelling biofilms** **Chair: Matthew Fields & co-chair: Rikke Meyer**		**Auditorium Aula**	ZEISS
14.00 - 14.20	O23	Developing a novel understanding of E. coli K-12 pellicle formation, morphology, and physiology	Stacey Golub, UK		
14.20 - 14.40	O24	Increasing the Space-Time Yield in Lactic Acid Production by the Use of Biofilms	Laure Cuny, Germany		
14.40 - 15.00	O25	Estimation of mechanical and hydraulic biofilm properties from optical coherence tomography measurements	Morez Jafari, The Netherlands		
15.00 - 15.20	O26	Optically patterned biofilms for synthetic microbial consortia	Xiaofan Jin, USA		
15.20 - 15.50		**Coffee/Tea Break**		**Exhibition area**	
15.50 - 16.20	O27	**Invited Lecture:** **Why evolution in biofilms is different, and a few remarkable consequences**	**Vaughn Cooper,** USA		
16.20 - 17.40		**Session 6: Evolution of biofilms** **Chair: Ákos Kovács & co-chair: Mette Burmølle**		**Auditorium Aula**	BioNordika
16.20 - 16.40	O28	Long-term co-adaptation of Pseudomonas aeruginosa biofilms with amoeba affects virulence traits	Diane McDougald, Australia		
16.40 - 17.00	O29	Evolution in changing environments: Specialist and generalist strategies during non-stable selection of the biofilm phenotype	Jonas Stenløkke Madsen, Denmark		
17.00 - 17.20	O30	Cheating promotes evolution of hyper-cooperators by shifting phenotypic heterogeneity in biofilms	Marivic Martin, Germany		
17.20 - 17.40	O31	Increased rate of mutation to antimicrobial resistance in polymicrobial biofilms	Jeremy Webb, UK		
19.00 - 00.00		**Congress Dinner at Turbinehallen, Aarhus** **(included in the registration fee, registration required)**		**Turbinehallen** Kalkværskvej 12, 8000 Aarhus	

PROGRAMME TUESDAY29 MAY

Time	Abs.	Title	Speaker	Area	Sponsored by
08.30 - 09.00	O32	Invited Lecture: **Tuning biofilms architecture to control their functions**	**Romain Briandet,** France	**Auditorium Aula**	
09.00 - 09.30		**Coffee/Tea Break**		**Exhibition area**	
09.30 - 10.50		**Session 7: Biofilm control** **Chair: Thomas Andersen & co-chair: Trine Thomsen**		**Auditorium Aula**	AH diagnostics
09.30 - 09.50	O33	Characterization of anti-curli antibody based approaches to eradicate Salmonella Typhimurium biofilms	Sarah Tursi, USA		
09.50 - 10.10	O34	A New Strategy for Biofilm Control Using Bioinspired Dynamic Surface Topography	Dacheng Ren, USA		
10.10 - 10.30	O35	Biofilm control in cooling towers: the effect of biodispersants on freshwater biofilms developed in flow lanes	Luciana Di Gregorio, Italy		
10.30 - 10.50	O36	Substrate Mediated Enzyme Prodrug Therapy (SMEPT) to combat implant-associated biofilms	Signe Maria Nielsen, Denmark		
10.50 - 12.30		**Lunch & Poster session**		**Poster & Exhibition area**	
12.30 - 13.00	O37	Invited Lecture: **Interrogating the interplay of metabolism and structure in bacterial communities**	**Lars Dietrich,** USA		
13.00 - 14.00		**Session 8: Novel methods for biofilm characterization** **Chair: Trine Thomsen & co-chair: Per Halkjær Nielsen**		**Auditorium Aula**	FLUXION
13.00 - 13.20	O38	Novel uses for Synchrotron Radiation in the study of Biofilms	Ben Libberton, Sweden		
13.20 - 13.40	O39	Introducing a novel, fully-automated cultivation and screening tool for the structural and mechanical investigation of biofilms by means of optical coherence tomography	Luisa Gierl, Germany		
13.40 - 14.00	O40	Nanoparticle-based chemical imaging in biofilms and tissues	Michael Kühl, Denmark		
14.00 - 14.30		**Awards Ceremony, Introducing Biofilms 9 & Closing Session**		**Auditorium Aula**	

[P100] ELECTROCHEMICALLY DEPOSITED SURFACES BASED ON COPPER AND SILVER WITH BIOCIDAL EFFECT AGAINST METHICILLIN RESISTANT STAPHYLOCOCCUS AUREUS

Yijuan Xu[1], Trine Rolighed Thomsen[2], Lone Gram[3], Nicole Ciacotich[3]

[1]*Danish Technological Institute, Aarhus, Denmark*
[2]*Aalborg University, Life Science Division, The Danish Technological Institute, Dept. of Chemistry and Bioscience, Aarhus, Denmark*
[3]*Technical University of Denmark, Department of Biotechnology and Biomedicine,, Kgs. Lyngby, Denmark*

Introduction: Inert surfaces can be a reservoir for pathogenic agents and play an important role in the acquisition and spread of healthcare infections. Therefore, surface treatments that aim to provide the surfaces with antibacterial activity are receiving increasing attention and scientific interest. Copper can inactivate a multitude of bacteria, fungi and viruses and copper or copper alloys have been suggested as alternative to stainless steel to help reduce the occurrence of hospital-acquired infections. Silver also has antibacterial activity and it has been suggested to combine these for enhanced, potentially synergistic, antibacterial action.

Aim: The purpose of the present study was to investigate the antibacterial efficacy of a novel electroplated copper-silver alloy coating against methicillin resistant *S. aureus* (MRSA) with the aim of developing antibacterial surfaces for the medical and health care sector. We investigated if the alloy could prevent adhesion and biofilm formation.

Methods: The EPA Test Method for Efficacy of Copper Alloy Surface as a Sanitizer was carried out on Cu/Ag coating and stainless steel against MRSA. In a static biofilm model, four different surfaces were evaluated in parallel (Cu/Ag, Cu, Ag coatings and stainless steel) to estimate MRSA biofilm formation.

Results: Under dry conditions, the Cu/Ag coating reduced in numbers of MRSA on the surface with more than 99.9% after 2 hours of exposure as compared to numbers on stainless steel. When testing for MRSA biofilm formation, no difference was observed between silver and stainless steel coupons. However, compared with stainless steel, the most significant bacterial number reduction was found for the copper surface (close to 100 fold) followed by the Cu/Ag electroplated surfaces (10 fold) ($P<0.001$).

Conclusions: Pure copper-coated and copper-silver alloy surfaces were effective in killing bacteria and preventing MRSA biofilm formation *in vitro*. Further research is planned to determine the efficacy against other clinically relevant pathogens and to do *in vivo* test for biocidal and antibiofilm efficacy in healthcare settings.

[P101] ANTI-BIOFILM EFFICACY OF TRICLOSAN-AMPHOTERICINB COMBINATION AGAINST FILAMENTOUS FUNGUS, ASPERGILLUS FUMIGATUS

Roya Tamimi[1], Godfrey Kyazze[1], Tajalli Keshavarz[1]

[1]*University of Westminster, London, United Kingdom*

Triclosan (TRC), an antimicrobial agent, has been reported to be safe for topical and surface-coating applications. It possesses a broad-spectrum of antimicrobial activity. The combination of TRC and DispersinB (DspB, a biofilm disruptor) displayed synergistic efficacy against *Staphylococcus aureus*, *Staphylococcus epidermidis*, *Escherichia coli,* and *Candida albicans*. There was a significant difference in the adherence of each of these microorganisms to TRC+DspB-coated silicone catheters compared with uncoated control catheter. Therefore, TRC+DspB has antibiofilm effect against both gram positive and gram negative, as well as yeast strains. Furthermore, for the first time, TRC effect against *Aspergillus fumigatus* biofilm formation on a glass surface was investigated alone and in combination with amphotericinB (AMB). AMB is effective against fungal infections. Viability was measured by determining colony forming units (c.f.u.) using 6-mm paper disks impregnated with TRC (0.5 to 32 mg/l) and AMB (0.125 to 16 mg/l). The diameters of the growth inhibition zone on agar plates were measured after incubation at 37° for 24 hrs. Determination of metabolic activity of hyphae was assessed using viability staining with FUN-1. Double-strength RPMI–2% glucose medium+MOPS containing 10^6 conidia/ml was incubated at 37° for 24 hrs. Subsequently, TRC and AMB at Minimum Inhibitory Concentration (MIC) doses were added and incubated at 37° for more 24 hrs. As control, *A. fumigatus* hyphae were incubated in the absence of TRC and AMB in the medium. Microscopic visualization and image acquisition of biofilms were conducted using a confocal laser scanning microscope (CLSM). Based on the optical microscopy and CLSM images, the number of hyphae structures as well as extracellular polymeric substances (EPS) formation were reduced in TRC and AMB/MICs treated samples in comparison with the non- treated control groups. Also, 3D surface plots showed the least biofilm depth in TRC/MIC treated sample in comparison with AMB/MIC treated, and control groups. Finally, Synergy Checkerboard Assay revealed that there is a synergistic activity when *A. fumigatus* was treated with TRC following by AMB.