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/

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BIOFILMS 8

Nordre Fasanvej 113, 2nd floor
2000 Frederiksberg C
Denmark

info@cap-partner.eu
www.conferences.au.dk/biofilms8
INFORMATIONSUNDAYMONDAYTUESDAYORAL ABSTRACTSPOSTER ABSTRACTSAUTHOR INDEX

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.

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
CAP Partner
Nordre Fasanvej 113
2000 Frederiksberg C, Denmark
Tel: +45 70 20 03 05
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SOCIAL MEDIA
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 at 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:

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<thead>
<tr>
<th>Categories</th>
<th>Presentation time</th>
<th>Poster number</th>
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</thead>
</table>
| Sunday 27 May  
The biofilm matrix  
Molecular mechanisms in biofilm formation  
Bacterial attachment  | 12.00 - 13.00  
13.00 - 14.00 | Uneven numbers  
Even numbers |
| Monday 28 May  
Biofilm ecology  
Modelling biofilms  
Evolution in biofilms  
Other  | 11.30 - 12.30  
12.30 - 13.30 | Uneven numbers  
Even numbers |
| Tuesday 29 May  
Biofilm control  
Novel methods for biofilm characterization  | 10.50 - 11.40  
11.40 - 12.30 | Uneven numbers  
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: Pathogenesis, Virulence & Host Response; Clinical Microbiology; Microbial and Molecular Epidemiology; Microbiome and Microbial Ecology in Health; One Health - Emerging, Zoonotic & Environmental Diseases; Prevention, Therapy and Therapeutics; Antimicrobial Resistance; and Disease, Diagnosis and Diagnostics.

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.

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).
# PROGRAMME SUNDAY 27 MAY

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<tr>
<th>Time</th>
<th>Abs.</th>
<th>Title</th>
<th>Speaker</th>
<th>Area</th>
<th>Sponsored by</th>
</tr>
</thead>
<tbody>
<tr>
<td>07.30</td>
<td></td>
<td>Registration desk opens</td>
<td></td>
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<tr>
<td>09.00 - 09.15</td>
<td></td>
<td>Welcome &amp; Opening Ceremony</td>
<td>By Biofilms 8 Chair, Rikke Louise Meyer</td>
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</tr>
<tr>
<td>09.15 - 10.00</td>
<td>O1</td>
<td>Bird's Eye Lecture: The biofilm matrix: strategies for protection and exploitation</td>
<td>Nicola Stanley-Wall, UK</td>
<td>Auditorium Aula</td>
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<tr>
<td>09.30 - 10.40</td>
<td></td>
<td>Coffee/Tea Break</td>
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<tr>
<td>10.40 - 12.00</td>
<td>O1</td>
<td>Session 1: The biofilm matrix</td>
<td>Chair: Per Halkjaer Nielsen &amp; co-chair: Daniel Otzen</td>
<td>Auditorium Aula</td>
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<tr>
<td>10.40 - 11.00</td>
<td>O2</td>
<td>Glycosylated amyloid-like proteins in the structural extracellular polymers of aerobic granular sludge enriched with ammonium oxidizing bacteria</td>
<td>Yuemei Lin, The Netherlands</td>
<td>Exhibition area</td>
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<tr>
<td>11.00 - 11.20</td>
<td>O1</td>
<td>Functional of formal non-amyloidogenic fibres by recombinant Bacillus subtilis TasA</td>
<td>Elliot Erskine, UK</td>
<td>Auditorium Aula</td>
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<tr>
<td>11.20 - 11.40</td>
<td>O1</td>
<td>Insight into the RapA lectin and its use in the study of biofilm matrix formation by rhizobia</td>
<td>Patricia Abdian, Argentina</td>
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<tr>
<td>11.40 - 12.00</td>
<td>O1</td>
<td>Secreted, Large-Scale, Extracellular Membrane Systems in Microbial Biofilms</td>
<td>Matthew Fields, USA</td>
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<tr>
<td>12.00 - 14.00</td>
<td></td>
<td>Lunch &amp; Poster session</td>
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<tr>
<td>14.00 - 14.30</td>
<td>O1</td>
<td>Invited Lecture: Molecular interactions of staphylococcal biofilm forming proteins</td>
<td>Joan Geoghegan, Ireland</td>
<td>Auditorium Aula</td>
<td>Leica</td>
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<tr>
<td>14.30 - 14.50</td>
<td>O1</td>
<td>Cytochrome Bd-I is used for energy production in uropathogenic E. coli biofilms</td>
<td>Maria Hadjifrangiskou, USA</td>
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<tr>
<td>14.50 - 15.10</td>
<td>O1</td>
<td>Heat activates cyclic diguanylate production in bacteria</td>
<td>Joe Harrison, Canada</td>
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<tr>
<td>15.10 - 15.30</td>
<td>O1</td>
<td>Sortase-assembled pili of Enterococcus faecalis contribute to iron-mediated extracellular electron transfer and iron-augmented biofilm</td>
<td>Kimberly Kline, Singapore</td>
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<tr>
<td>15.30 - 16.00</td>
<td>O1</td>
<td>Physical determinants of amyloid assembly in biofilm formation</td>
<td>Maria Andreasen, Denmark</td>
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<tr>
<td>16.20 - 16.50</td>
<td>O1</td>
<td>Invited Lecture: How do bacteria respond to their adhering state?</td>
<td>Henny van der Mei, The Netherlands</td>
<td>Auditorium Aula</td>
<td>JPK</td>
</tr>
<tr>
<td>16.50 - 18.10</td>
<td>O1</td>
<td>Session 3: Bacterial attachment</td>
<td>Chair: Rikke Meyer &amp; co-chair: Thomas Andersen</td>
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<tr>
<td>16.50 - 17.10</td>
<td>O1</td>
<td>Cell lysis prompts an early mechanical coupling and biofilm formation in dilute bacterial suspensions</td>
<td>Iztok Dogsa, Slovenia</td>
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<tr>
<td>17.10 - 17.30</td>
<td>O1</td>
<td>Bone environment and its relationships with bacterial biofilm</td>
<td>Fany Reffuveille, France</td>
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<tr>
<td>17.30 - 17.50</td>
<td>O1</td>
<td>The role of dynamic Tad pili in bacterial surface sensing</td>
<td>Yves Brun, USA</td>
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<tr>
<td>17.50 - 18.10</td>
<td>O1</td>
<td>A role for two-component systems in bacterial attachment and antibiotic tolerance in Listeria monocytogenes</td>
<td>Hüsnü Aslan, Denmark</td>
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<tr>
<td>18.10 - 18.30</td>
<td>O1</td>
<td>Invited Lecture: Are biofilms really the dominant way of life for prokaryotes on Earth?</td>
<td>Hans-Curt Flemming, Germany</td>
<td>Auditorium Aula</td>
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<tr>
<td>18.30 - 20.30</td>
<td></td>
<td>Welcome Reception in the poster area (included in registration fee)</td>
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<td>Stakladen</td>
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**PROGRAMME MONDAY 28 MAY**

**Time** | **Abs.** | **Title**
---|---|---
08.00 | | Registration desk opens
09.00 - 09.40 | O17 | Bird's Eye Lecture: Cooperation and competition in biofilms
09.40 - 10.10 | | Coffee/Tea Break
10.10 - 10.30 | O18 | Biofilm architecture confers individual and collective protection against phage infection
10.30 - 10.50 | O19 | Effect of fluctuating environmental conditions on the spatial self-organization and emergent properties of a synthetic microbial biofilm
10.50 - 11.10 | O20 | AHL quorum sensing mediates species interactions in multispecies biofilms
11.10 - 11.30 | O21 | Biofilm thickness controls the contribution of stochastic and deterministic processes in microbial community assembly
11.30 - 13.30 | | Lunch & Poster session
13.30 - 14.00 | O22 | Invited Lecture: Multiscale analysis of microbial cross-feeding in biofilms: from Yellowstone hot springs to chronic wounds
14.00 - 14.20 | O23 | Developing a novel understanding of E. coli K-12 pellicle formation, morphology, and physiology
14.20 - 14.40 | O24 | Increasing the Space-Time Yield in Lactic Acid Production by the Use of Biofilms
14.40 - 15.00 | O25 | Estimation of mechanical and hydraulic biofilm properties from optical coherence tomography measurements
15.00 - 15.20 | O26 | Optically patterned biofilms for synthetic microbial consortia
15.20 - 15.50 | | Coffee/Tea Break
15.50 - 16.20 | O27 | Invited Lecture: Why evolution in biofilms is different, and a few remarkable consequences
16.20 - 17.40 | O28 | Long-term co-adaptation of Pseudomonas aeruginosa biofilms with amoeba affects virulence traits
16.40 - 17.00 | O29 | Evolution in changing environments: Specialist and generalist strategies during non-stable selection of the biofilm phenotype
17.00 - 17.20 | O30 | Cheating promotes evolution of hyper-cooperators by shifting phenotypic heterogeneity in biofilms
17.20 - 17.40 | O31 | Increased rate of mutation to antimicrobial resistance in polymicrobial biofilms
19.00 - 00.00 | | Congress Dinner at Turbinehallen, Aarhus (included in the registration fee, registration required)

**Speaker** | **Area** | **Sponsored by**
---|---|---
Kevin Foster, UK | Auditorium Aula | Microbiology Society
Lucia Vidakovic, Germany | Auditorium Aula | Unisense
Davide Ciccarese, Switzerland | Auditorium Aula |
Sujatha Subramoni, Singapore | |
Jane Fowler, Denmark | |
Ross Carlson, USA | Auditorium Aula | Microbiology Society
Stacey Golub, UK | |
Laure Cuny, Germany | |
Morez Jafari, The Netherlands | |
Xiaofan Jin, USA | |
Vaughn Cooper, USA | Auditorium Aula | BioNordika
Diane McDougald, Australia | |
Jonas Stenløkke Madsen, Denmark | |
Marivic Martin, Germany | |
Jeremy Webb, UK | |

*Auditorium Aula*

*Turbinehallen* Kalkværskvej 12, 8000 Aarhus
### Programme Tuesday 29 May

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<tr>
<th>Time</th>
<th>Abs.</th>
<th>Title</th>
<th>Speaker</th>
<th>Area</th>
<th>Sponsored by</th>
</tr>
</thead>
<tbody>
<tr>
<td>08.30 - 09.00</td>
<td>032</td>
<td>Invited Lecture: Tuning biofilms architecture to control their functions</td>
<td>Romain Briandet, France</td>
<td>Auditorium Aula</td>
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<tr>
<td>09.00 - 09.30</td>
<td></td>
<td>Coffee/Tea Break</td>
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<td>Exhibition area</td>
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<tr>
<td>09.30 - 10.50</td>
<td>O33</td>
<td>Characterization of anti-curli antibody based approaches to eradicate Salmonella Typhimurium biofilms</td>
<td>Sarah Tursi, USA</td>
<td>Auditorium Aula</td>
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<tr>
<td>09.30 - 10.50</td>
<td>O34</td>
<td>A New Strategy for Biofilm Control Using Bioinspired Dynamic Surface Topography</td>
<td>Dacheng Ren, USA</td>
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<tr>
<td>10.10 - 10.30</td>
<td>O35</td>
<td>Biofilm control in cooling towers: the effect of biodispersants on freshwater biofilms developed in flow lanes</td>
<td>Luciana Di Gregorio, Italy</td>
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<tr>
<td>10.30 - 10.50</td>
<td>O36</td>
<td>Substrate Mediated Enzyme Prodrug Therapy (SMEPT) to combat implant-associated biofilms</td>
<td>Signe Maria Nielsen, Denmark</td>
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<tr>
<td>10.50 - 12.30</td>
<td></td>
<td>Lunch &amp; Poster session</td>
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<td>Poster &amp; Exhibition area</td>
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<tr>
<td>12.30 - 13.00</td>
<td>O37</td>
<td>Invited Lecture: Interrogating the interplay of metabolism and structure in bacterial communities</td>
<td>Lars Dietrich, USA</td>
<td>Auditorium Aula</td>
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<tr>
<td>13.00 - 14.00</td>
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<td>Session 8: Novel methods for biofilm characterization</td>
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<td></td>
<td></td>
<td>Chair: Trine Thomsen &amp; co-chair: Per Halkjær Nielsen</td>
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<tr>
<td>13.00 - 13.20</td>
<td>O38</td>
<td>Novel uses for Synchrotron Radiation in the study of Biofilms</td>
<td>Ben Libberton, Sweden</td>
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<tr>
<td>13.20 - 13.40</td>
<td>O39</td>
<td>Introducing a novel, fully-automated cultivation and screening tool for the structural and mechanical investigation of biofilms by means of optical coherence tomography</td>
<td>Luisa Gierl, Germany</td>
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<tr>
<td>13.40 - 14.00</td>
<td>O40</td>
<td>Nanoparticle-based chemical imaging in biofilms and tissues</td>
<td>Michael Kühl, Denmark</td>
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<tr>
<td>14.00 - 14.30</td>
<td></td>
<td>Awards Ceremony, Introducing Biofilms 9 &amp; Closing Session</td>
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<td>Auditorium Aula</td>
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</tbody>
</table>
**[P100] ELECTROCHEMICALLY DEPOSITED SURFACES BASED ON COPPER AND SILVER WITH BIOCIDAL EFFECT AGAINST METHICILLIN RESISTANT STAPHYLOCOCCUS AUREUS**

Yijuan Xu¹, Trine Rolighed Thomsen², Lone Gram¹, Nicole Ciacotich³

¹Danish Technological Institute, Aarhus, Denmark
²Aalborg University, Life Science Division, The Danish Technological Institute, Dept. of Chemistry and Bioscience, Aarhus, Denmark
³Technical 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 Tamimi¹, Godfrey Kyazze¹, Tajalli Keshavarz¹

¹University 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/ml) and AMB (0.125 to 16 mg/ml). 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 10⁶ conidia/ml was incubated 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 10⁶ conidia/ml was incubated at 37° for 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.