

IBBS World



Newsletter of the International Biodeterioration and Biodegradation Society
Issue 30, August 2016

www.ibbsonline.org

IBBS International Conference

Biodeterioration and Protection of Cultural Heritage

This conference will be held on 8th and 9th September 2016 in Lodz University of Technology in Łódź, Poland.

The aim of the conference is to exchange and deepen the most current knowledge and experience in the processes of biodeterioration and biodegradation of historic objects: historic buildings, monuments, frescoes, murals, textiles, wood, paper, archives, as well as methods of protection, disinfection and preservation of historic objects. In addition, the conference aims to establish interdisciplinary cooperation - between microbiology, restorers and chemists. The conference is designed to gather together researchers from around the world as well as producers of biocides, companies involved in microbiological analytics and disinfection. The conference covers issues important to scientific as well as economic and cultural aspects



The programme contains a mix of plenary lectures, oral and poster presentations. Among the lecturers will be the world's specialists in biodeterioration of cultural heritage, among others: Christine Gaylarde (UK), Brenda Little (USA), Geoffrey Daniel (Sweden), Flavia Pinzari (Italy), Katja Sterflinger (Austria), Thomas Warscheid (Germany).

Detailed information is available on the conference website:
<http://www.biodeterioration2016.p.lodz.pl/>

Beata Gutarowska

Presidential Musings

Welcome to the summer edition of IBBS World – for those of us living in the northern hemisphere. It's August, we are in the midst of the cricket season (for those of you who understand our great sport), the sun is shining even here in England, the university students have mostly gone back to mum and dad and our academic members can get on with more interesting things – maybe even take a holiday themselves.



Here at the IBBS, after a successful joint meeting with the Institute of Corrosion in April, we are looking forward to Beata Gutarowska's "International Conference on Biodeterioration and Protection of Cultural Heritage" in Lodz, Poland on September 8-9 – more details and registration at <http://www.biodeterioration2016.p.lodz.pl>.

In addition, we are in the process of organising the 17th IBBS triennial symposium – IBBS 17 – in Manchester, UK in September 2017. We are expecting registration to begin shortly and we are already "open" for submission of abstracts and poster presentations and offers of sponsorship, with support already granted by the Federation of European Microbiological Societies (FEMS), of which IBBS is a member. All the information you'll ever need, and more, is at www.ibbs17.org.

My best wishes for an excellent summer and I very much hope to see you in Lodz in September.

John Gillatt

Editor's Notes

Once again it is my honour to be the guest editor of the IBBS Newsletter. As a Society we are very active in our chosen field, as you will see from all the contributions I have received. It is also a very important time in the life of the Society since, as I write, we are in the middle of an election for the post of Vice President. A first for the IBBS. I can't stress how important this is, as the successful candidate will, in one year's time, become our President. The candidates are Kathryn Whitehead and Brenda Little. Please contact our secretary as soon as you can and no later than August 19th to cast your vote. NB Only fully paid up members are eligible to vote.

This newsletter welcomes a new situations vacant / opportunities section. It is open to both those who have vacancies and those seeking opportunities. It is also good to see a report from Rob Melchers and Iwona Beech describing some of their recent research, plus a report on a successful Visegrad collaboration.

Malcolm Greenhalgh

If you have any news, meetings etc you would like us to publicise, please contact us at secretary@ibbsonline.org

Visegrad Project “Modern approach for biodeterioration assessment and disinfection of historical books”

The cultural heritage of the Visegrad Group (Poland, Czech Republic, Slovakia and Hungary) includes priceless historical items that should be protected for future generations. The history of the four central European countries is described on the pages of archival documents. This substantial collection is stored in more than three thousand museums and national archives. These institutions assemble, analyse, restore and provide access to archival collections. Archival objects of this type are very valuable; it is very important to assess the degree of material damage and extent of microbial contamination. This analysis must meet the criteria of non-invasiveness and at the same time provide full information regarding the extent of destruction.

To inhibit the progressive biodeterioration, and reduce the spread of contamination to other objects they need to be disinfected. Commonly used disinfection methods such as fogging with ethylene oxide or formaldehyde have now been withdrawn in EU countries due to their carcinogenic and other unacceptable properties. Other methods like gamma and UV radiation cannot be used due to significant reduction in the paper strength and change in its colour. Therefore new safer alternative methods for the disinfection of archival paper objects are required. They need to have high efficiency, durability and be safe for treated materials and staff.

As a consequence, three research institutions: Lodz University of Technology (Institute of Fermentation Technology and Microbiology, Institute of Papermaking and Printing) in Lodz, Poland, Slovak Academy of Science (Institute of Molecular Biology) in Bratislava, Slovakia and University of Chemistry and Technology (Department of Biochemistry and Microbiology) in Prague, Czech Republic, successfully submitted a project entitled “Modern approach for biodeterioration assessment and disinfection of historical book collections” from the International Visegrad Fund (IVF). The main objective of the project is to identify the microorganisms involved in the biodeterioration of historical archival objects using various analytical methods and determination of antimicrobial activity and the impact of new methods of disinfection on paper properties. This project was carried out from January to June 2016 with the requirement that in addition to the research there should be an ongoing cooperation between scientific institutions. During the project three seminars were organised: "Methodologies to identify the microflora responsible of biodeterioration of archival documents" in Bratislava, Slovakia (31.03-01.04.2016), “Disinfection of historical books collections”, in Prague, Czech Republic (28.04-29.04.2016) with the final summary meeting at the Lodz University of Technology in Lodz, Poland (29-30.06.2016).

The project was broken down into five tasks, the first was focused on the inventory of archival collections and the choice of books with signs of biodeterioration. Next was an assessment of the preservation state and the degree of microbiological contamination of selected objects. The degree of destruction was then established as 20-60%, depending on the book fragment (frame, block, paper). The major microbiological destruction involved was mainly book covers and therefore the disinfection of them was of major importance. Those microorganisms that could be cultured were identified using the classical molecular method on the basis of 16S rRNA genes or ITS regions sequencing and the determination of protein profile by MALDI-TOF. Viable but not culturable (VNBC) microorganisms were identified by means of next-generation sequencing (NGS) using an Illumina Sequencing platform. The results for culturable microorganisms were comparable; however, the NGS gave the most complete image of microbial contamination of archival books. These research methods used were non-invasive and could be applied in restoration.

The next stage of the project was the determination of the effectiveness of three new methods of disinfection (low temperature plasma, thyme essential oil micro-atmosphere, silver nano-particle misting). Noteworthy was the innovative scope of these studies. All three disinfection methods were effective against microorganisms, however the most effective, especially against moulds, was thyme essential oil micro-atmosphere. The use of low temperature plasma was limited only to the surface of disinfected material. The silver nano-particle misting also showed good antibacterial and antifungal activity. Studies into the influence of the three novel disinfection methods on paper properties i.e. colour change and mechanical parameters, showed no significant changes, indicating the possibility of their use in disinfection of paper art-works. The final stage of the project was the publication of a monograph aimed at conservators of archives and libraries. It was sent to the most important museums and archives in the Visegrad countries and is available on the project website. Another important effect of the project was to establish the cooperation between scientific institutions and archives in the field of cultural heritage protection.

Project information:

www.v4biodeterioration.p.lodz.pl www.facebook.com/v4biodeterioration www.twitter.com/V4Biodeter

Project coordinator: Lodz University of Technology (LUT), Faculty of Biotechnology and Food Sciences, Institute of Fermentation Technology and Microbiology, Poland

Partners: University of Chemistry and Technology, Prague (UCT), Faculty of Chemical Technology, Department of Biochemistry and Microbiology, Prague, Czech Republic; Slovak Academy of Sciences, Institute of Molecular Biology, Laboratory of Environmental and Food Microbiology, Bratislava, Slovakia

Prepared by: Beata Gutarowska



International team including IBBS members investigates offshore MIC

Authors: Rob Melchers and Iwona Beech



Offshore oil and gas exploration and production is moving to deeper and deeper waters (currently up to 3 km deep) and to more extreme climates, including the Tropics. Increasingly the trend is to use vessels such as FPSOs (Floating Production Storage and Offloading vessels) that are moored with multiple wire ropes and steel chains. The ropes typically are 100 mm diam. and chains commonly are 76 mm diam. but sizes more than 150mm. are used for some cases. Keeping the platforms 'on-station' is critical for uninterrupted production and for reducing risks of accidental oil spills and environmental impacts.

Recent observations of very high rates of pitting corrosion on some chains in the Tropics caused considerable concern for operators and classification societies. Initial investigations as part of the SCORCH (seawater corrosion and wear of chains) project, funded by key players in the offshore industry, led to the strong suspicion that MIC (microbiologically influenced corrosion) was involved. This was based in part on the high levels of water pollution found at the offshore sites, even though these are very far off the local coasts. In an effort to throw more light on this and to try to identify the bacterial species involved, a new project, funded through Deepstar®, a consortium including many offshore operators, commenced in 2015. The project includes an international team of researchers including microbiologists, chemists and engineers.

A site located some 113 km offshore in water 1463m deep was selected for study. Using the IlluminaMiSeq system microbial populations in the local seawater were compared with those attached to carbon steel coupons, including those microbial cells removed from the metal surface by the traditional scraping method, and those remaining on the metal surface after scraping. This showed at least two distinct layers of bacterial population next to the corroding steel. The inner layer showed a preponderance of gammaproteobacterial sequences, with Stramenopiles (diatom) sequences prevalent. These are organisms known for hydrocarbon degradation. Also, the total DNA from the innermost layer was 1500 times that from the outermost layer. The inner layer also showed a high level of Rhodobacteriaceae, known to be key biofilm formers. There were very few SRB but a high abundance of aerobic micro-algal sequences in the inner biofilm. This suggests these species are the initial colonizers for carbon steel surfaces in a marine environment.

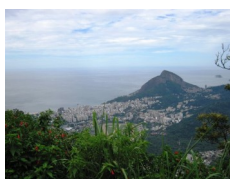
The project findings add to the already considerable information on the microorganisms present in the open sea, although it appears relatively little attention has been given to differences between open seawater (planktonic) microbial populations and those accumulating on inert surfaces immersed in the sea. Also, the findings illustrate that it is insufficient to consider only surface deposits removed by physical means, as these cannot remove the complete biofilm for analysis.

The overall technical aspects of the project were facilitated and financially supported by Deepstar® project CTR12402 Integrity Management of Mooring Systems Against Corrosion) and by AMOG Consulting, Houston TX (Tim Lee) and Devin L. Witt (Chevron, Houston). The research team is being led by Research Prof Iwona Beech at the University of Oklahoma with the support of Drs Sukriye Celikkol-Aydin, Z. Makama and Christine Gaylarde and in cooperation with Prof Rob Melchers (University of Newcastle, Australia).

LABS9

The 9th Latin American Biodeterioration and Biodegradation Symposium will be taking place from 2nd to 5th October this year in Rio de Janeiro. As you doubtless know, it has been an exciting year in Brazil, with the Olympics just beginning and the impeachment of President Dilma Rousseff under consideration, not to mention the worldwide publicity about the risks of the Zika virus to pregnant women. The LABS9 organisers have had an equally interesting time, with financial restrictions rife and considerable difficulty raising sufficient funds for the Symposium. Nevertheless, LABS9 WILL go ahead and I will be there. I hope to see as many of you as possible in Rio; it's an amazing city populated by wonderful people. We have some exciting papers being offered, and, although the coffee breaks may not be the lavish arrays we have come to expect at Brazilian events, they will still occur, around the poster exhibition. There is still time to submit a paper, if you send it immediately directly to Marcia Lutterbach at marcia.lutterbach@int.gov.br. You can register for the Symposium at: www.labs9.org

Christine Gaylarde



NEW

Student Bursaries Update

The IBBS Council has decided to increase small bursaries from a maximum of £250 to £1,000 and extend them to now include both undergraduate microbiology student projects and postgraduate student research. Undergraduate applications must be made on behalf of named students by IBBS members in higher education or research institutes. The research project must be on a biodeterioration or biodegradation related topic. Postgraduates must be IBBS members and they may apply for up to £1,000 research support or £500 to be used to attend a relevant conference. The closing date for 2016 applications is **1st October 2016**. For further details and an application form please check the IBBS website at: www.ibbsonline.org/bursaries

IBBS17 Update



The triennial meeting of the IBBS is to be held on 6th-8th September 2017 at the Manchester Metropolitan University, UK. The venue has excellent facilities plus it is close to the city centre, giving the benefit of a wide range of hotels to suit all budgets and great transport links.

Planning for the conference is moving ahead at a fast pace with latest details to be found on its own dedicated website: www.ibbs17.org Keep checking the website for future updates.

The first flier has been prepared and hopefully you all will have seen it. We are now ready to accept papers and posters and look forward to receiving abstracts. As this is our triennial meeting we are happy to accept presentations on all aspects of the science that falls within the scope of the IBBS.

FEMS

IBBS is a member organisation of FEMS, which is a European based collective of national microbiological societies and is dedicated to all things microbiological. Furthermore IBBS is in the privileged position of being one of only two societies that are not national societies, but are globally based.

You will have recently received from our hard working secretary, a copy of the FEMS August 2016 newsletter.

Amongst other valuable information it contains a report of last year's Eurobiofilms conference. FEMS is also very active in promoting / supporting microbiology meetings of all types and has very kindly acceded to a request by the IBBS17's organising committee for support. FEMS also extends its support via a range of meeting attendance and research grants to individuals who are members of FEMS affiliated societies. IBBS members are eligible to apply.

Future Meetings

IBBS Meeting—Biodeterioration & Protection of Cultural Heritage. Lodz, Poland. September 8th-9th 2016. Further details at: <http://www.ibbsonline.org/meetings>

LABS 9 - The Ninth Latin American Biodeterioration and Biodegradation Symposium. Rio De Janeiro, Brazil October 2nd-5th October 2016. Further details at: <http://www.labs9.org> or email at contact@labs9.org

YOCOCU 2016 — Youth in Conservation of Cultural Heritage Conference. Madrid, Spain. September 21st-23rd 2016 Further details at: ibbsonline.org/meetings

IBBS-17, Manchester, UK September 6th-8th 2017. Further details posted at: <http://www.ibbs17.org>

BioRemid-2017

We are pleased to invite you to the International Meeting on New Strategies in Bioremediation Processes BioRemid-2017, which will be held from 9th to 10th March, 2017. This will take place in Granada, under the leadership of the Water Research Institute at University of Granada. The meeting is also supported by the Biodegradation, Bioremediation and Biodeterioration (BBB) group of the Spanish Society of Microbiology (SEM).

The objective of this meeting is to bring together scientists and industry professionals in a friendly environment to share the latest developments and innovations to combat environmental problems. In particular, emerging and priority pollutants, consortium-based strategies, and identification and monitoring of biohazards will be discussed. Other topics like biosafety and new technologies such as nanoparticles will also be considered in depth. We encourage mainly high quality oral presentations on the most relevant bioremediation topics.

For further information please see the website: <http://www.granadacongresos.com/bioremid>

We look forward to meeting you in Granada.

Joint IBBS / Institute of Corrosion (Engineering Division) Meeting

This one day event was held at the National Motorcycle Museum, Birmingham, UK on Tuesday, 26th April 2016 on the subject of 'Microbial Corrosion Issues in Heating and Cooling Systems'. A series of presentations were given:

- 1) "MICrobes – what's lurking in your system?" by Elise Maynard, Chair of the Water Management Society.
- 2) "The role of SRB in MIC" was given by Jill Cooper (Suez Ltd).
- 3) "Pre-commissioning Cleaning Process and What can go Wrong" - Chris Parsloe (Parsloe Consultants) and Pam Simpson (WWTL)
- 4) "The Role of CSCA in Improving Management of Water Quality" - Alan Edwards (Alan Edwards and Partners)
- 5) "Non-Biocidal Antifouling Coatings" - Robert Moorcroft & Prof. Robert Akid, School of Materials, University of Manchester.
- 6) "Design, Installation and Protection of Closed-Loop Systems" - Les Bekesi (Lendlease)

Following the presentations there were meetings of CED working groups on Nuclear; Coatings; Oil-field Chemicals and Corrosion; Water Treatment; Cathodic Protection and Corrosion in Concrete.

For further information contact IBBS Council member, Pam Simpson, who organised and chaired the meeting. (e-mail address: info@whitewatertech.co.uk)



Situations Vacant / Opportunities

Sukriye Celikkol-Aydin

(PhD in Environmental Sciences, 2013 from Bogazici University, Istanbul, Turkey) has experience in molecular methods (DNA-RNA extraction, PCR, DGGE, qPCR, FISH, next generation sequencing etc.) and bioinformatics (QIIME etc.). Her PhD was on bacterial diversity of drinking water reservoirs and detection of pathogenic E.coli by immunomobilisation on gold-coated surfaces. Post-doc research involved microbiologically influenced corrosion in fuel-seawater environments and bacterial and fungal diversity of biodeteriorated samples such as wood, brick and gypsum. Research also on marine sediments and wastewater. A co-author of various papers. She has been away for maternity leave but is now ready to get back to work and looking for opportunities as a post-doc or researcher.

Excellent references available from previous employers:
Prof. Iwona Beech, University of Oklahoma:

ibeech@ou.edu

Prof. Recep Avci, Montana State University:

avci@montana.edu

Prof. Bahar Ince, Bogazici University: ba-har.ince@boun.edu.tr

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Richard Greenhalgh

BSc (Hons) in marine and freshwater biology (University of Hull). PhD in microbiology (University of Manchester). Research focussed on biofilm formation and metagenomics and material science, i.e. polymer/biocide formulation and microbial attachment/ kill dynamics. Three papers were generated (in press) plus a commercially available antimicrobial product for use in polymers. As well as the standard microbiological skills I have expertise in many analytical molecular techniques including DNA extraction, PCR, gel electrophoresis, blotting, Community fingerprinting (DGGE, T-RFLP), metagenomic DNA extraction and Nex Gen sequencing. Also genetic recombination techniques, fluorescence microscopy, UV/Vis & IR spectrophotometry and the development of novel fluorescence reporter systems for antimicrobial efficacy testing (in situ and in vitro). Confident with computer programs such as Python, Matlab, SPSS and Excel.

I am interested in many different aspects of microbiology especially; biofilms, in silico, (meta)genomic, evolutionary and systems microbiology and look forward to developing my career.

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