



MODERN APPROACH FOR BIODETERIORATION ASSESSMENT AND DISINFECTION OF HISTORICAL BOOK COLLECTIONS

SMALL GRANT CO-FUNDED
BY INTERNATIONAL VISEGRAD FUND

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Project team



Lodz University of Technology

Beata Gutarowska
Anna Otlewska
Katarzyna Pietrzak



Slovak Academy of Sciences

Domenico Pangallo
Maria Buckova
Tomas Grivalsky
Lenka Jeszeova
Lucia Krakova
Andrea Puskarova



University of Chemistry
and Technology Prague

Katerina Demnerova
Klara Drabkova
Michal Durovic
Irena Kucerova
Marketa Skrdlantova

Project coordinator: Beata Gutarowska

Culture Heritage

Total in V4: **3320**
museums, archives



Microorganisms in archival's biodeterioration

Alternaria
Aspergillus
Aureobasidium
Chaetomium
Cephalosporum
Cladosporium
Epicoccum
Penicillium
Stachybotrys
Trichoderma

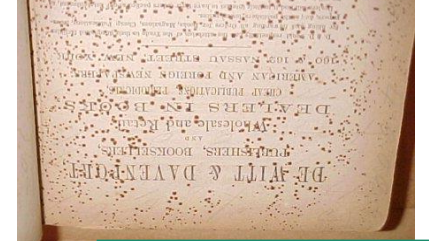
Bacillus
Cellulomonas
Clostridium
Cytophaga



musty odour



discoloration



foxing



properties changes



structure losses



powdery decomposition



petrification

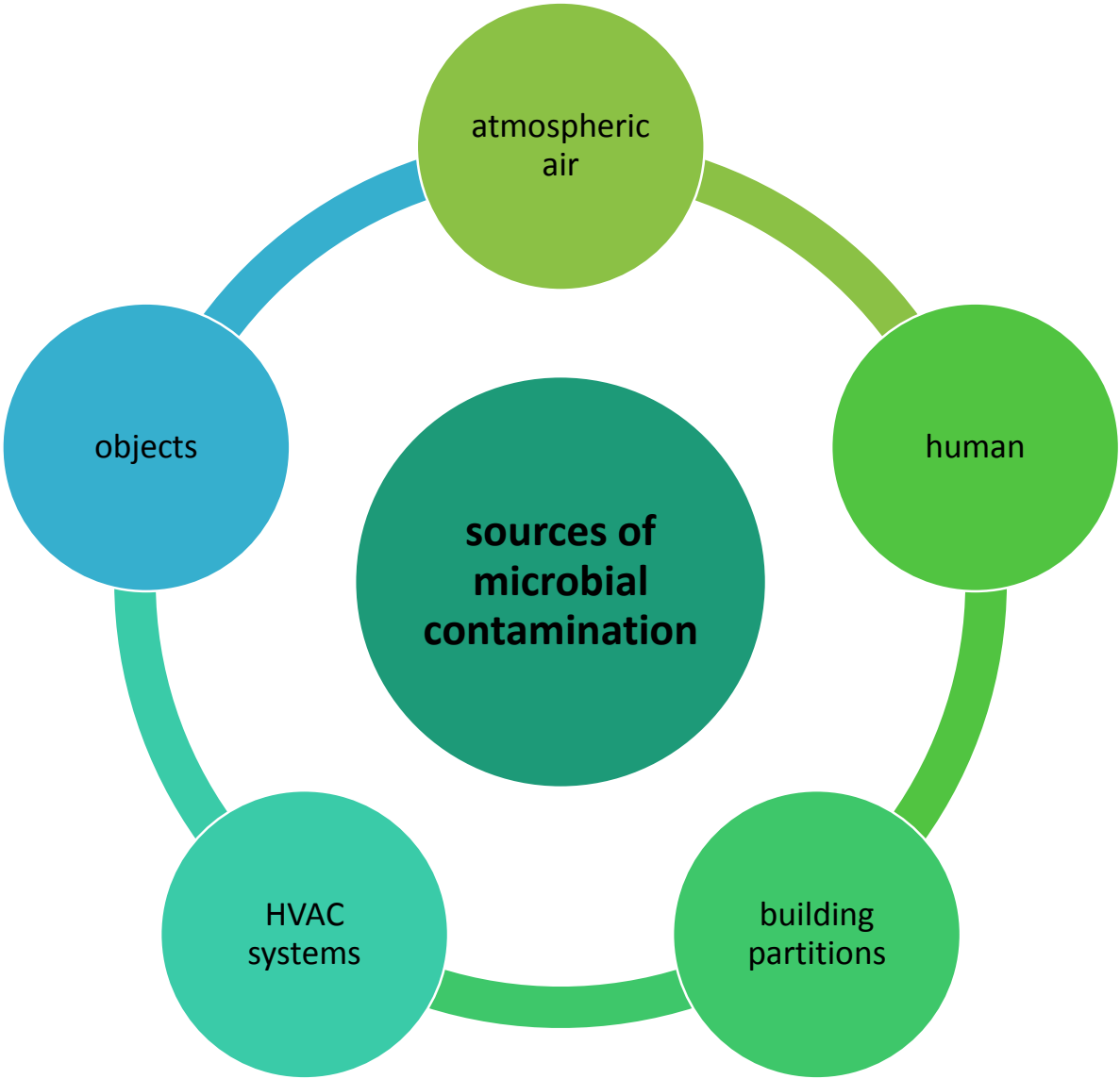


paper defects



biofilm

Biodeterioration of historical books





Biodeterioration study of archival

Mechanical

- structure (SEM, XRD, mechanical study)

Chemical

- chemical composition (FT-IR, NIR)
- ink (HPLC, SEM-EDX)

Biological

- **culture-dependent methods**
- **chemical method (MALDI-TOF)**
- molecular methods
 - clone library constructions
 - fingerprinting (DGGE, TGGE, ARDRA, T-RFLP, SSCP, ARISA)
 - **next generation sequencing**
 - RNA analysis



Disinfection methods

Physical

- dehydration, gamma irradiation, low-oxygen environments, freezing, refrigeration, high temperature and pressure, ultraviolet radiation, **low-temperature plasma**

Chemical

- alcohols, phenols, azoles, **essential oils**, quaternary ammonium compounds, acids, ethylene oxide, formaldehyde, **silver nanoparticles**, titanium dioxide

Disinfection methods



Ethylene oxide fumigation



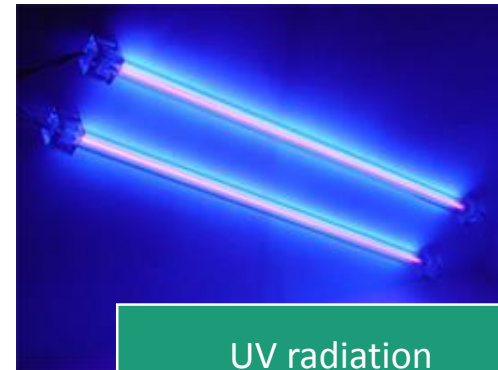
Low-oxygen environment



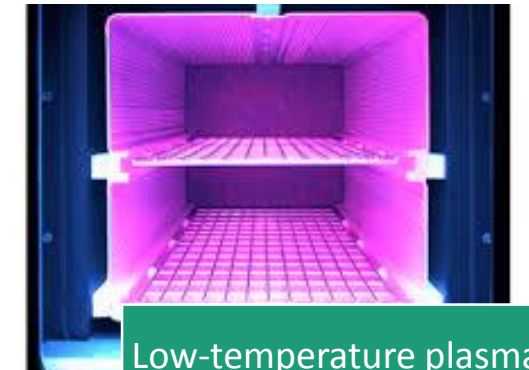
Gamma irradiation




AgNPs misting



UV radiation



Low-temperature plasma



MODERN APPROACH FOR BIODETERIORATION ASSESSMENT AND DISINFECTION OF HISTORICAL BOOK COLLECTIONS

Duration: 16.11.2015 – 28.07.2016

1. Research aim: identification of microorganisms active in biodeterioration of historical books collection, assesment of the disinfection effectiveness and the effects interaction with paper (5 tasks)
2. Collaboration (science, archives, museums for staff and students), Hungarian partner (?), future application to EU programs, also V4 grants (standard, strategic)
3. Workshops
4. Scientific publications, reports, monography, conference presentations
5. Promotion of the project (website, social networks, mass media, posters, bulletins)

<http://v4biodeterioration.p.lodz.pl/>

Schedule

Date	Project task
16.11.2015 – 15.12.2015	1st task: The inventory of historical library collections (National Library, National Museum, PL; National Archives, National Library–Klementinum, National Library of Technology, CZ; National Archive, National Library, SK) and the choice of objects with biodeterioration symptoms (SAS, UCT, LUT).
15.12.2015	Deadline to send min. 3 books with visible biodeterioration signs to LUT. Book must have full description (age, place of storage etc.) – the more information, the better.
6.01.2016	Deadline to sign Contract with IVF
15.12.2015 – 15.01.2016	2nd task: Assessment of the microbial contamination of all historical books at LUT (cataloguing, culture method). Selection of 3 the most microbially contaminated books for further studies. Those 3 books will be divided into 3 parts and send to partners.
15.01.2016	Deadline to send parts of books from LUT to SAS and UCT.
15.01.2016 – 31.03.2016	3rd task: Analysis of microbial biodiversity using high throughput sequencing (Illumina platform) (SAS), MALDI-TOF-MS (UCT) and ITS region (LUT).
31.03.2016 – 1.04.2016	Workshop: 'Methodologies to identify the microflora responsible of biodeterioration of archival documents' in Bratislava, Slovakia.
15.04.2016	Deadline to send detailed report from 1-3 tasks to LUT.

Schedule

Date	Project task
15.01.2016 – 28.04.2016	4th task: Determination of the effectiveness disinfection methods of historical books (non-thermal plasma at UCT; essential oils at SAS, nanosilver misting at LUT). Performing RNA analysis before and after disinfection.
28.04.2016 – 29.04.2016	Workshop ‘Disinfection of historical books collections’ in Prague, Czech Republic.
28.04.2016	Deadline to hand on (personally) the disinfected book parts to LUT.
13.05.2016	Deadline to send detailed report from 4 th task to LUT.
31.05.2016	Deadline to write 1 st publication from 1-3 tasks (SAS).
28.04.2016 – 03.06.2016	5th task: Determination of the influence of disinfection methods on mechanical and optical parameters of historical books at the Institute of Papermaking and Printing, LUT.
3.06.2016	Deadline to prepare detailed report from 5 th task (LUT).
29.06.2016 – 30.06.2016	Summary project meeting in Lodz, Poland.
30.06.2016	Deadline to write 2 nd publication from 4-5 tasks (UCT).
30.06.2016	Deadline to write Monograph (LUT).
1.07.2016 – 22.07.2016	Preparation of the final report (narrative, financial, audit).
28.07.2016	Deadline for final report and financial settlement

Finances

No	Items	from Fund				own contribution				Total
		PL	CZ	SK	Sum	PL	CZ	SK	Sum	
1	Printing and publishing costs, delivery	555,00	165,00	0,00	720,00	0,00	0,00	0,00	-	720,00
2	Rent of premises and related technical services	390,00	360,00	400,00	1 150,00	0,00	0,00	0,00	-	1150,00
3	Fees for artists	0,00	0,00	0,00	-	0,00	0,00	0,00	-	0,00
4	Fees for experts	0,00	0,00	0,00	-	0,00	0,00	0,00	-	0,00
5	Accommodation and board	464,00	480,00	360,00	1 304,00	0,00	0,00	0,00	-	1304,00
6	Transportation costs	171,25	225,77	252,98	650,00	268,72	354,26	397,02	1 020,00	1670,00
7	Translation, interpreting costs	0,00	0,00	0,00	-	0,00	0,00	0,00	-	0,00
8	Awards and prizes	0,00	0,00	0,00	-	0,00	0,00	0,00	-	0,00
9	Office supplies and consumption material	280,02	707,96	987,02	1 975,00	387,03	445,99	602,98	1 436,00	3411,00
10	PR costs (e.g. advertising)	0,00	0,00	0,00	-	0,00	0,00	0,00	-	0,00
11	Website design and update	100,00	0,00	0,00	100,00	218,00	0,00	0,00	218,00	318,00
12	Overheads (max. 15%)	38,73	61,27	0,00	100,00	126,25	199,75	0,00	326,00	426,00
Total		1999,00	2000,00	2000,00	5 999,00	1000,00	1000,00	1000,00	3 000,0	8999,00

Contact

Coordinator

Lodz University of Technology
Faculty of Biotechnology
and Food Sciences
Institute of Fermentation
Technology and Microbiology
Wolczanska 171/173
90-924 Lodz, Poland

v4biodeterioration@info.p.lodz.pl

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www.twitter.com/V4Biodeter

Partners

University of Chemistry
and Technology Prague
Faculty of Chemical Technology
Department of Biochemistry
and Microbiology
Technická 3
166 28 Prague 6,
Czech Republic

Slovak Academy of Sciences
Institute of Molecular Biology
Laboratory of Environmental and
Food Microbiology
Dubravska Cesta 21
84551 Bratislava, Slovakia

