Identification of bacteria isolated from bioaerosols collected from public playgrounds in Lublin

Szymon Strawa[1], Damian Oleksiak[1],, Ilona Sadok[2], Marcin Skowronek[3], Rafał Łopucki[3]

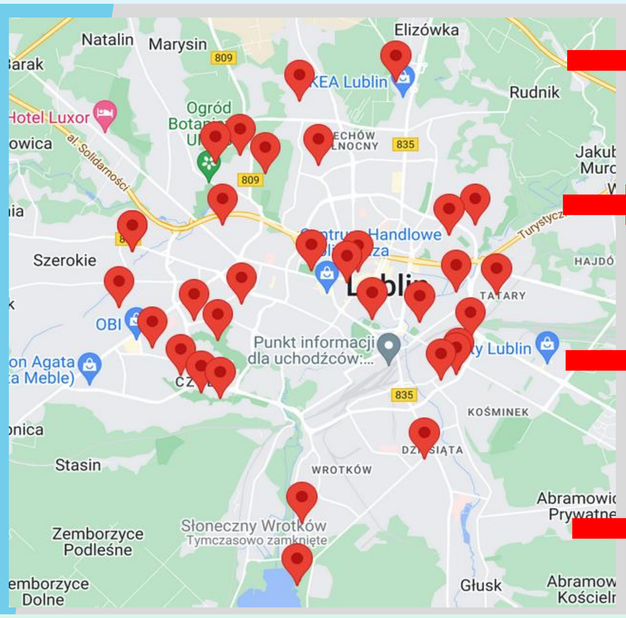
[1]Biotechnology Scientific Club of the John Paul II Catholic University of Lublin, Faculty of Medicine, the John Paul II Catholic University of Lublin, Poland

[2]Department of Chemistry, Institute of Biological Sciences, Faculty of Medicine, the John Paul II Catholic University of Lublin

[3]Department of Biomedicine and Environmental Research, Institute of Biological Sciences, Faculty of Medicine, the John Paul II Catholic University of Lublin

Abstrakt: Research on playground safety typically focuses on physical safety issues. Special de-vices and materials are designed to reduce the likelihood of children sustaining physical injuries. Significantly less attention, however, is given to the microbiological safety of playground users. Importantly, studies concerning microbiological safety in playgrounds overlook aero-sol-borne microorganisms, but there is a possibility of the negative impact of bioaerosol components on humans (infections and allergic reactions) . This study aimed to examine which bacteria are present in the aerosol at urban play-grounds during the summer season when these places are most intensively used by children.

Herein presented data are obtained under the project 'Bacterial antibiotic resistance: a global challenge - local action', which aims at:



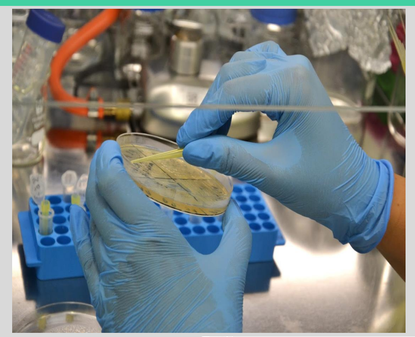
- Stimulating scientific passions among the members of the Scientific Club
- Creating favourable conditions for establishing cooperation between science and society
- Improving microbiological safety in urban playgrounds
- Making the public aware of the microbiological safety of children's facilities

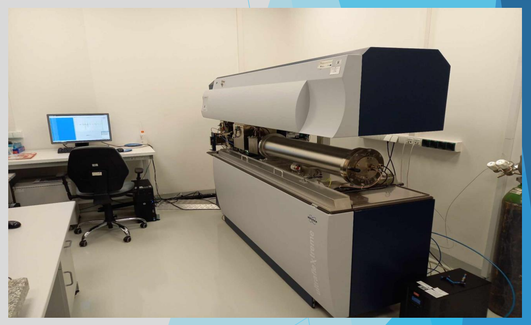
Materials and Methods:

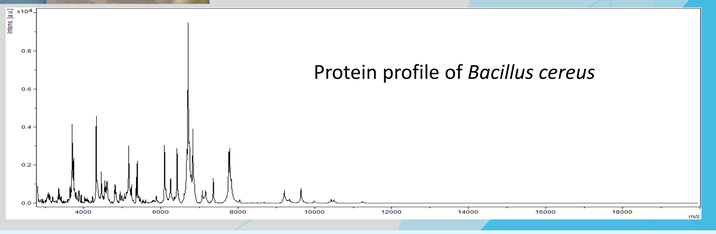
BACTERIAL CULTURE

BIOAEROSOL COLLECTION USING AIR SAMPLER CORIOLIS µ

BACTERIA IDENTYFICATION USING MALDI-TOF TECHNIQUE AND BIOTYPER SOFTWARE



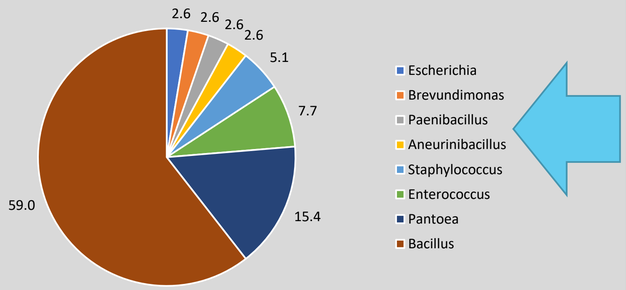




Protein profile of *Bacillus cereus*

Results:

Proportion of the particular genus of bacteria in bioaerosol at 25 playgrounds surveyed in Lublin



Species of bacteria identified in bioaerosol samples from 25 playgrounds in Lublin

Species name	Number of isolates	Percentage of isolates[N=39]
Aneurinibacillus migulanus	1	2.6
Bacillus cereus	7	17.9
Bacillus licheniformis	1	2.6
Bacillus megaterium	4	10.3
Bacillus mycoides	1	2.6
Bacillus pumilus	2	5.1
Bacillus subtilis	1	2.6
Bacillus thuringiensis	7	17.9
Brevundimonas diminuta	1	2.6
Enterococcus casseliflavus	1	2.6
Enterococcus durans	1	2.6
Enterococcus mundtii	2	5.1
Escherichia coli	1	2.6
Paenibacillus glucanolyticus	1	2.6
Pantoe aagglomerans	6	15.4
Staphylococcus pseudintermedius	2	5.1

Conclusion:

This research indicates that the analysis of bioaerosol composition should be incorpo-rated into the standard microbiological monitoring of playgrounds. This will enhance the identification of the microorganisms, including potentially pathogenic ones, with which child-ren actively engaging in such environments come into contact.

Ministerstwo Edukacji i Nauki

The project is financed from the state budget, granted by the Minister of Education and Science under "Student Science Clubs Create Innovations" (SKN/SP/570395/2023).