

ORAL COMMUNICATIONS III

CHARACTERIZATION OF MICROBIOLOGICAL CONTAMINATION IN PORTUGUESE ELEMENTARY SCHOOLS

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Identification of body burdens resulting from multipollutant (real-life scenario) indoor exposures and associated health effects, with specific focus on vulnerable population groups and sensitive life stages.

InChildHealth addresses the call HORIZON-HLTH-2021-ENVHLTH-02-02: Indoor air quality and health

Bolsa de Investigação: Ref.ª: IPL/2022/InChildhealth/BI/12M





CHARACTERIZATION OF MICROBIOLOGICAL CONTAMINATION IN PORTUGUESE ELEMENTARY SCHOOLS

- > 90 % of children time is spent in indoor environment^[1]
- Most school-age children's exposure occurs in schools, at home^[2], in sports halls, and in commuting









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CHARACTERIZATION OF MICROBIOLOGICAL CONTAMINATION IN PORTUGUESE ELEMENTARY SCHOOLS



> IAQ is an important determinant of human health, especially for children^[3]

Impact the school occupants 'health and well-being^[4]



Impact learning conditions^[4]



More efficiency, more sustainability (at all levels)^[4]



Good IAQ, optimal ventilation, healthy buildings, healthy environment^[4]





PROJECT GOALS



- Characterization of air quality in children's environments
- Identification of emission sources and influencing factors affecting children's exposure
- Estimation about associated health effects resulting from exposures
- Development of novel technologies to improve indoor environmental quality to reduce health effects
- Engaging school children, educational experts, and policymakers in the scientific process.
- Preparation of quality standards and guidelines regarding IAQ





Quality standards and guidelines, policy briefs and training material, conference, FAIR datasets

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Indoor environments to be assessed:

- 5 elementary schools (1 classroom, 1 outdoor, 1 sports/hall)
- 5 houses

Sampling methods:

- Settled dust (composite sample)
- EDC

Assays:

- Fungi qPCR
- Metabarcoding of bacteria and fungi
- Detection of mycotoxins and endotoxins

Schools Sports Halls Homes Outdoor	WP2 - Sources and routes of exposure Micro-environments assessment approach	 WP4 – Technology development and mitigation strategies, interventions Monitoring devices: LAMP, miniAero, Aero-S3DP, AMR-S3DP and AirSensis. Personal monitoring approach with wearable and silent personal monitoring system (PM10, PM2.5, CO2, VOC- Transport contribution) Image: A stransport contribution Image: A stransport co
Physical parameters and chemical pollutants	Microbial contamination	
Online measurements tested against conventional methods Temperature, humidity, PM, VOCs, CO ₂ , CO, NO ₂ , SO ₂ , NH ₃ , H ₃ S, CH ₄ , O ₃ ,	Active sampling Impinger and Impaction Microbial assessment by culture-dependent and	
Radon, BC, nanoparticles emerging pollutants	independent methods, microbial resistance profile, mycotoxins and endotoxins	strategies, hygiene strategy
WP3 – Epidemiological studies and controlled interventions Health effects of airborne exposures on respiratory symptoms and infections Absenteeism, cognition, fatigue, headache	WP5 – Exposure assessment and health risk characterization Integrated Risk Assessment tool for 7 European cities exposure $t_i = \sum_{i=1}^{n} C_i t_{ij}$	WP6 - Citizen engagment / science Co-creation of training material ar participation in research activities Impact assessment framework
Cytotoxicity pipeline	<i>j</i> -1	1

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CHARACTERIZATION OF MICROBIOLOGICAL CONTAMINATION IN PORTUGUESE ELEMENTARY SCHOOLS - PROPOSAL

Indoor environments to be assessed:

- 6 elementary schools (1 classroom, 1 cantine, 1 library, 1 sports/hall, locker rooms, 1 outdoor)
- 5 Houses

Sampling methods:

- Air sampling (MAS, Andersen, Coriolis)
- Settled dust (composite sample)
- EDC (including on T-shirts)
- Swabs
- Mops

Assays:

- Culture based-methods (Fungi and bacteria)
- Azole resistance screening
- Aspergillus section Fumigati sequencing and mutations detection

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- Mucorales order resistance screening and sequencing
- MRSA
- Fungi qPCR
- Metabarcoding of bacteria and fungi
- Detection of mycotoxins and endotoxins
- Cytotoxicity (A549 lung)



METHODOLOGY FOR EXPOSURE ASSESSMENT





Active Sampling

Air sampling:

MAS

Andersen

Coriolis

Passive Sampling

- Settled dust
- EDC
- Swabs
- Mops

Culture-based methods (fungi and bacteria)

Microbial Resistance screening

Toxigenic fungi detection through qPCR

Detection of mycotoxins and endotoxins

Cytotoxicity assessment



OUTCOMES



Characterization of microbial exposure in schools indoors

Guidance material for exposure assessors in IAQ assessments

Health promotion and disease prevention in the school community and beyond



Awareness of the decision-makers

Guidelines and policy briefs for EU policies and recommendations



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