H&TRC Health and Technology Research Center | ESCOLA SUPERIOR DE TECNOLOGIA DA SAÚDE DE LISBOA INSTITUTO POLITÉCNICO DE LISBOA | cE3c centre for ecology, evolution and environmental changes | FCT Fundação para a Ciência e a Tecnologia MINISTÉRIO DA CIÊNCIA, TECNOLOGIA E ENSINO SUPERIOR | chrc COMPREHENSIVE HEALTH RESEARCH CENTRE

V H&TRC BOOTCAMP 2023

ASPERGILLUS FUMIGATUS EXPOSURE TROUGH A QUALITATIVE MICROBIAL RISK ASSESSMENT IN THE POULTRY INDUSTRY

Bianca Gomes[1,2*], Elisabete Carolino[1], Carla Viegas [1,3]

[1]H&TRC – Health & Technology Research Center, ESTeSL – Escola Superior de Tecnologia e Saúde, Lisboa;

[2] CE3C- Center for Ecology, Evolution and Environmental Changes, Faculdade de Ciências, Universidade de Lisboa, Lisboa;

[3]NOVA National School of Public Health, Public Health Research Centre, Comprehensive Health Research Center, CHRC, NOVA University Lisbon, Lisbon, Portugal

**Contacto: bianca.gomes@estesl.ipl.pt*

Background

Currently, the prevalent airborne microorganisms in animal production facilities are poorly described in terms of quantity, composition, and risk category. Few studies have already evidence *Aspergillus fumigatus*, belonging to WHO critical priority group list (2022) in the poultry environment. To mitigate and reduce contaminants, global guidelines for what constitutes good microbiological indicators from environmental samples must be established [1]. Quantitative microbial risk assessment (QMRA) is a novel method for estimating the risk of exposure to pathogens. So far, no research has been conducted to design QMRA that take into account the risks associated with fungal contamination in poultry environment.

Aims

This study aims to characterize *Aspergillus fumigatus* exposure through a **QMRA** in the **poultry industry.**

Methods

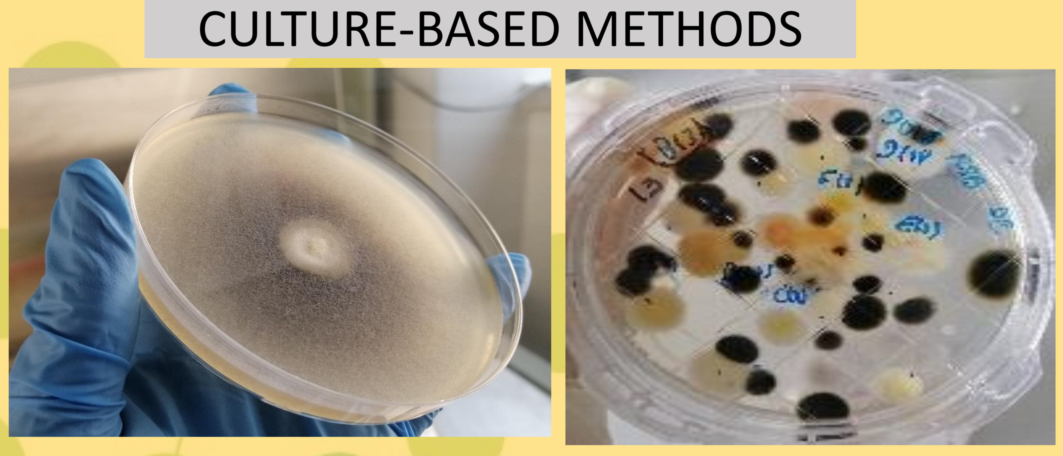
SAMPLING CAMPAIGN

ACTIVE SAMPLING METHODS | PASSIVE SAMPLING METHODS

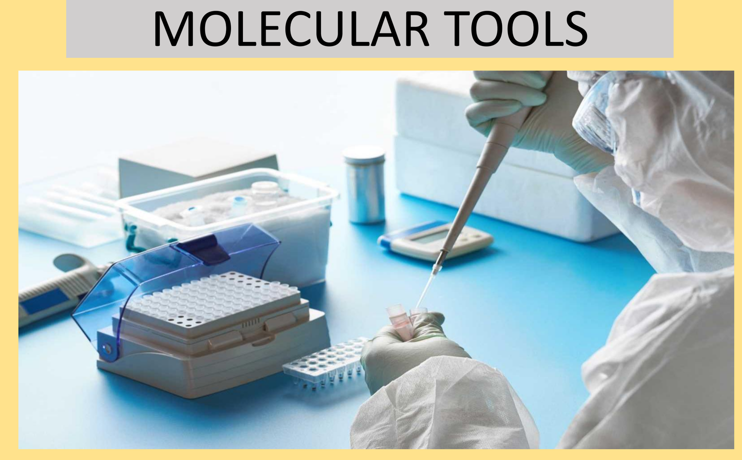
Andersen | MAS | Coriolis | EDC | Bedding material | Animals feed | Surface swabs

FUNGAL IDENTIFICATION AND CHARACTERIZATION

CULTURE-BASED METHODS

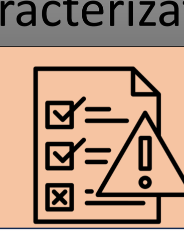


MOLECULAR TOOLS



RISK CHARACTERIZATION TROUGH QMRA FRAMEWORK

Fungal concentrations → Exposure assessment / Dose-response data → Statistic Analysis → Risk characterization



Conclusions

- The application of a QMRA for *Aspergillus fumigatus* exposure in the poultry industry will allow to **recommend microbial indicators** which can be used to guide **risk reduction decisions**.
- The framework will contribute for the awareness and foster workplace solutions that will encourage **safer working conditions** and **advance the health of animals, people**, and the **environment.**
- Several SDGs will be supported.

2 ZERO HUNGER | 3 GOOD HEALTH AND WELL-BEING | 8 DECENT WORK AND ECONOMIC GROWTH

Expected results

1. Characterize fungal contamination in Portuguese poultry pavilions.
2. Develop a QMRA for the poultry industry.
3. Link diverse contamination sources to health consequences induced by fungal contamination.
4. Set critical limits for *Aspergillus fumigatus* exposure.
5. Formulate guidelines and recommendations to prevent fungal contamination in the poultry business.

References

[1] Gomes, B., Pena, P., Cervantes, R., Dias, M., & Viegas, C. (2022). Microbial Contamination of Bedding Material: One Health in Poultry Production. *International Journal of Environmental Research and Public Health*, *19*(24), 16508

[2] WHO. WHO Fungal Priority Pathogens List to Guide Research, Development and Public Health Action. Available online: https://www.who.int/publications-detail-redirect/9789240060241 (accessed on 30 June 2023).

Funding and Acknowledgment

This work was supported by national funds through FCT/MCTES/FSE/UE, UI/BD/153746/2022 and CE3C unit UIDB/00329/2020 within the scope of a PhD Grant. H&TRC authors gratefully acknowledge the FCT/MCTES national support through the UIDB/05608/2020 and UIDP/05608/2020.

htrc@estesl.ipl.pt

https://htrcenter.wordpress.com/

H&TRC
Health and Technology Research Center