Assessing microbial contamination and particulate matter exposure in Portuguese poultry facilities

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Introduction

In poultry farms, the combination of feathers, feces, and bedding material appears to be critical to the development of pathogens, enhancing the risks associated with zoonosis and its dissemination throughout the food chain [1]

Currently, the prevalent airborne microorganisms in animal production facilities are poorly described in terms of quantity, composition, and risk category. Identification and quantification on the other hand, would be useful for determining the causative agents and performing risk assessments [2].

Objective: This study intends to characterize microbial contamination in poultry pavilions through a multi-approach protocol for sampling and analyses.

Methods

1. Sampling

Methods

Particulate matter

Active sampling

LIGHTHOUSE

Microbial Characterization

Active sampling

Passive sampling

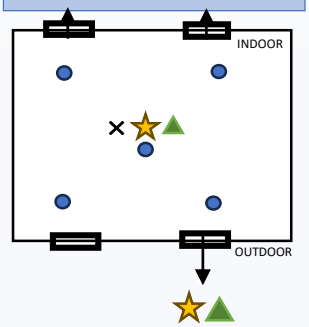
EDC

BEDDING MATERIAL

FEED

MAS-100

Strategy



Poultry pavilions (n=14)

3 Visits:
1st week
2nd week
3rd week

2 Seasons:
Summer
Winter

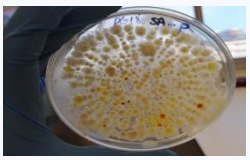
2. Analysis

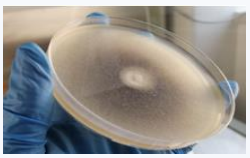
Particle assessment

Microbial characterization

Culture-based methods:

- Microbial quantification
- (Fungi and bacteria)
- Fungal identification
- Fungal resistant profile



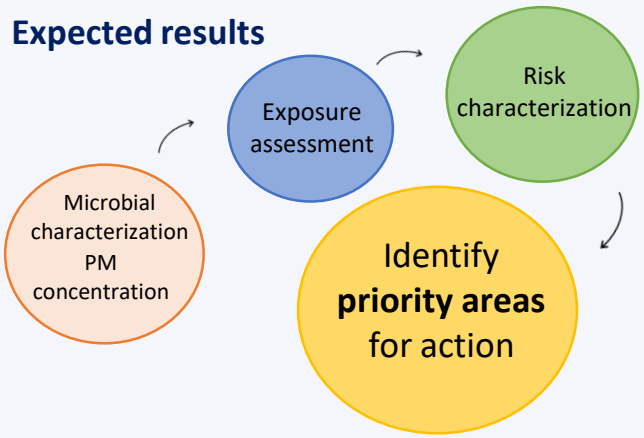


Molecular tools qPCR (Toxigenic fungi)

Mycotoxins detection (n= 38)

Cytotoxicity assessment (lung cells, kidney cells)

Expected results



Conclusion

- 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.
- SDGs will be supported.

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References: [1]Gomes, B.; Pena, P.; Cervantes, R.; Dias, M.; Viegas, C. Microbial Contamination of Bedding Material: One Health in Poultry Production. Int. J. Environ. Res. Public Health 2022, 19, 16508. https://doi.org/10.3390/ijerph192416508[2]Martin, E., Dziurowitz, N., Jäckel, U., & Schäfer, J. (2015). Detection of Airborne Bacteria in a Duck Production Facility with Two Different Personal Air Sampling Devices for an Exposure Assessment. Journal of Occupational and Environmental Hygiene, 12(2), 77–86. https://doi.org/10.1080/15459624.2014.946514