Microbiologic contamination present in mops and cloths used for cleaning procedures in firefighters' headquarters

2nd CHRC Annual Summit

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Outline

1. Background
2. Methods
3. Results
4. Take home messages

1. Background

Several occupational environments in Portugal have already been characterized regarding the *Aspergillus* genus prevalence, demonstrating its critical dissemination indoors (Viegas et al. 2019-2021).

Environmental Research 175 (2019) 133–141

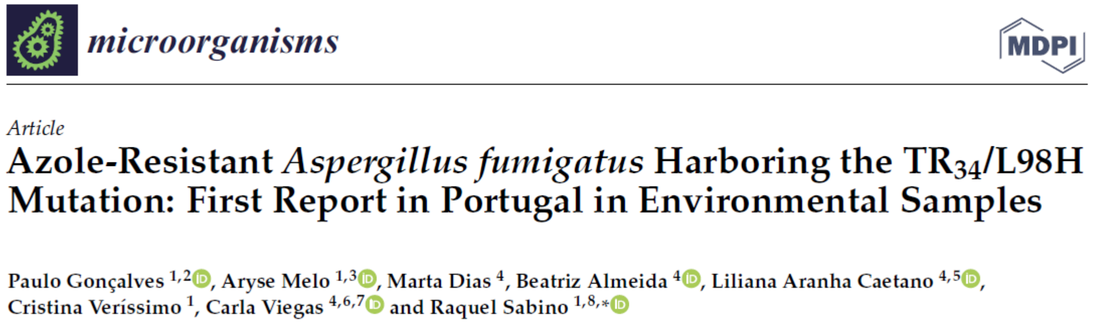
Contents lists available at ScienceDirect

Environmental Research

journal homepage: www.elsevier.com/locate/envres

Aspergillus spp. prevalence in Primary Health Care Centres: Assessment by a novel multi-approach sampling protocol

Carla Viegas[a,b,*], Beatriz Almeida[a], Anita Quintal Gomes[a,c], Elisabete Carolino[a], Liliana Aranha Caetano[a,d]



microorganisms

MDPI

Article

Azole-Resistant *Aspergillus fumigatus* Harboring the TR_{34}/L98H Mutation: First Report in Portugal in Environmental Samples

Paulo Gonçalves [1,2], Aryse Melo [1,3], Marta Dias [4], Beatriz Almeida [4], Liliana Aranha Caetano [4,5], Cristina Veríssimo [1], Carla Viegas [4,6,7] and Raquel Sabino [1,8,*]

Air Quality, Atmosphere & Health
https://doi.org/10.1007/s11869-019-00781-x

Aspergillus spp. burden on filtering respiratory protective devices. Is there an occupational health concern?

Carla Viegas [1,2,3] · Marta Dias [1] · Beatriz Almeida [1] · Elisabete Carolino [1] · Anita Quintal Gomes [1,4] · Susana Viegas [1,2,3]

JOURNAL OF OCCUPATIONAL AND ENVIRONMENTAL HYGIENE
https://doi.org/10.1080/15459624.2020.1834113

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SHORT REPORT

Check for updates

***Aspergillus* spp. presence on mechanical protection gloves from the waste sorting industry**

Carla Viegas[a,b,c], Marta Dias[a], Beatriz Almeida[a], Elisabete Carolino[a], and Susana Viegas[a,b,c]

An assessment of Portuguese firefighters' ambulances identified hazardous levels of *Aspergillus* section *Fumigati* in ambulance air, which would be able to reach the alveoli (Viegas et al. 2021).

Environmental Research 197 (2021) 111125

Contents lists available at ScienceDirect

Environmental Research

journal homepage: www.elsevier.com/locate/envres

Bioburden contamination and *Staphylococcus aureus* colonization associated with firefighter's ambulances

Carla Viegas[a,b,c,*], Pedro Sousa[a], Marta Dias[a], Liliana Aranha Caetano[a,d], Edna Ribeiro[a], Elisabete Carolino[a], Magdalena Twarużek[e], Robert Kosicki[e], Susana Viegas[a,b,c]

There were other relevant findings, such as:

- toxigenic fungi with clinical relevance found in ambulance air
- contamination of surfaces increased after cleaning at some sites
- mycotoxins detected in mops and electrostatic dust cloths

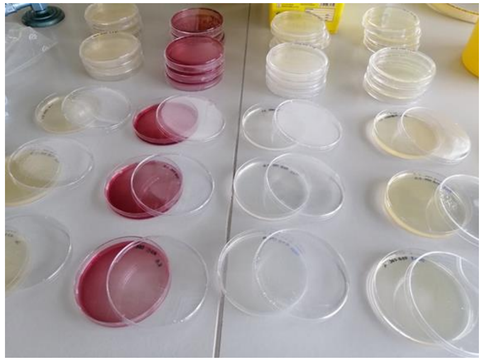
This study aimed to characterize the microbial contamination (bacteria and fungi focusing on *Aspergillus* section *Fumigati*) through passive sampling methods in 11 firefighters' headquarters of Lisbon.

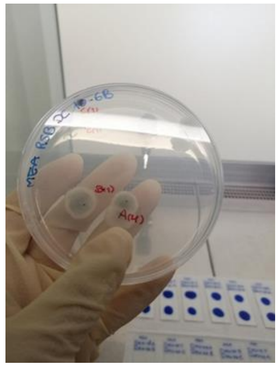
2. Methods

N = 14 mops

N = 25 cleaning cloths

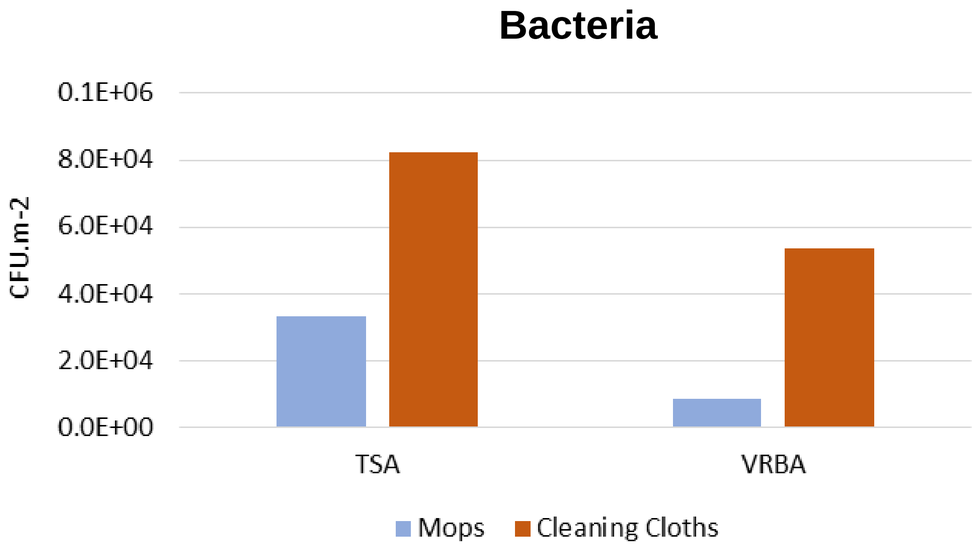
- Viable bioburden through culture-based methods and azole resistance profile were obtained.

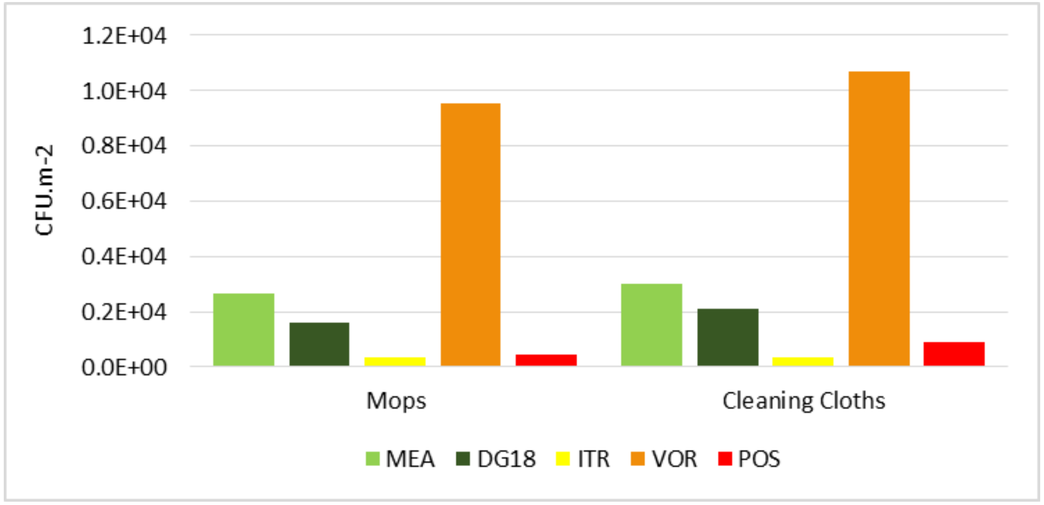




- Molecular tools (qPCR) were used for detection of *Aspergillus* sections, namely *Aspergillus* sections *Fumigati* and *Nidulantes*.

3. Results





Mops:

- bacteria ranged from 500 to $1.9x10^5$ CFU.m² on TSA and from 0 to $5.5x10^4$ CFU.m² on VRBA.
- fungi ranged from $1.0x10^3$ to $1.2x10^4$ CFU.m² on MEA and from $3.0x10^3$ to $1.2x10^4$ in DG18.

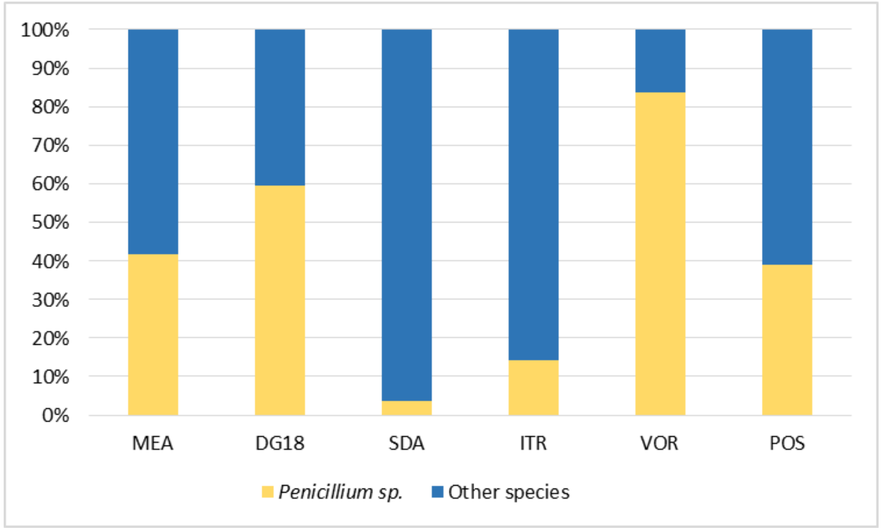
Cleaning cloths:

- bacteria ranged from $5.0x10^2$ to $5.4x10^5$ CFU.m² on TSA and from 0 to $4.2x10^5$ CFU.m² on VRBA.
- fungi ranged from $3.0x10^3$ to $1.2 x10^4$ on MEA and from $1.0x10^3$ to $5.0x10^3$ on DG18.

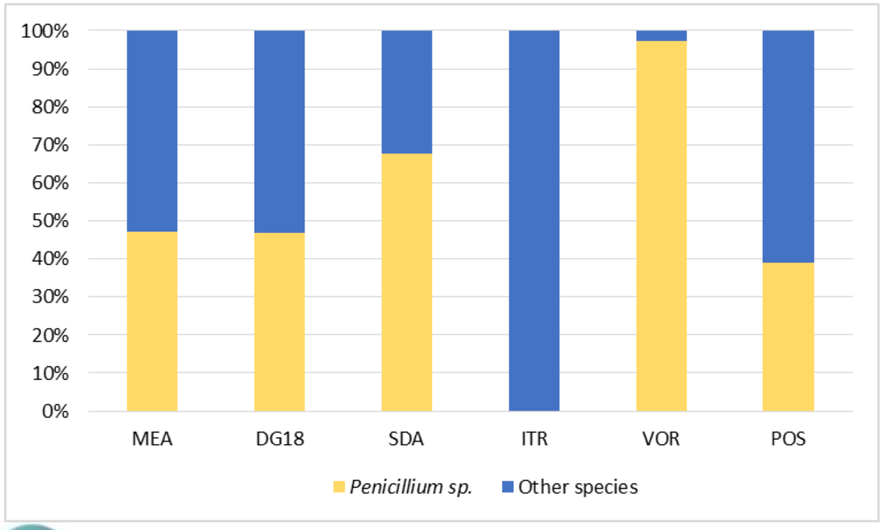
- Mops presented higher bacterial contamination than cleaning cloths while the cleaning cloths presented higher fungal contamination than mops.
- Voriconazole was the supplemented media with higher fungal contamination.

3. Results

Mops



Cleaning cloths



- *Penicillium* sp. was the predominant genera in MEA, DG18 and in the azole resistance screening.

- *Aspergillus* section *Fumigati* was detected by qPCR:

  - Mops: 50% samples (n=14)

  - Cleaning Cloths: 60% samples (n=25).

4. Take home messages

The contamination found in mops and cleaning cloths suggest that :

- Cleaning procedures might be leading to cross-contamination through mops and cleaning cloths.

- The presence of fungi non-susceptible to azole drugs and detection of toxigenic *Aspergillus* section *Fumigati* might represent a health risk and must be further investigated.

Thank you for your attention

Acknowledgments

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