

Insights of Portugal's Teaching Staff Microbial Occupational Exposure

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Introduction

EU strategies in education focus on risk factor awareness to promote a safe and healthy environment for the community (1). Health and safety promotion faces challenges due to the lack of adjusted policies for teaching staff (2). Teachers may be exposed to biohazards in schools, posing a health risk, which remains unexplored (3, 4, 5).

Effective preventive measures and risk management actions require a thorough risk assessment (6).

This study aims to conduct a microbial assessment regarding school staff personal exposure to bacterial and fungal load.

Methods



200L at a flow rate of 100L/min



SKC Button sampler with Polycarbonate filter (2h at 4L/min)

- Sampling during warm season (Jun 2023 to Oct. 2023)
- 10 schools around Lisbon Metropolitan Area, Portugal (Classroom, canteen, outdoor samples)
- 1 Teacher/school and 1 staff member/school recruited for personal sampling

Samples were inoculated onto:

- TSA (30°C for 7 days)
- VRBA (37°C for 7 days)
- MEA (27°C for 5-7 days)
- DG18 (27°C for 5-7 days)

- Bacterial and fungal quantification
- Fungal identification



Results

MAS-100 contamination results:

- Indoor/Outdoor ratio for bacterial contamination surpassed in 6 of the 10 schools.
- Only 1 of the 10 schools complied with the indoor/outdoor ratio for fungal contamination.
- Aspergillus* sections were identified in indoor environment in 9 of the 10 schools: *Aspergilli*, *Circumdati*, *Flavi*, *Fumigati*, *Nidulantes*, *Nigri* on MEA and *Aspergilli*, *Candidi*, *Circumdati*, *Flavi*, *Fumigati*, *Nidulantes* and *Nigri* on DG18.

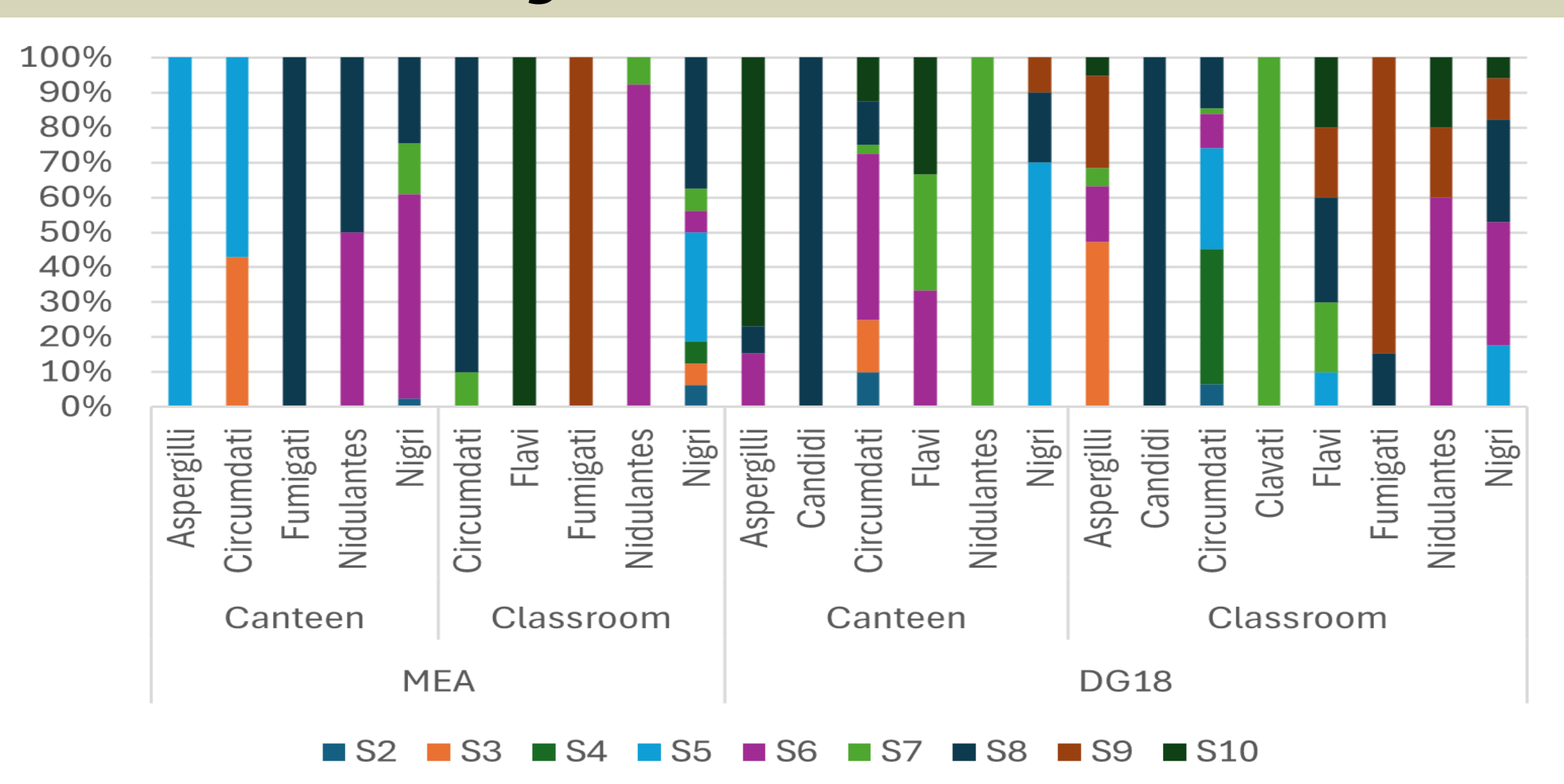


Figure 1 - *Aspergillus* section prevalence in MEA and DG18 in classroom and Canteen MAS-100 samples

SKC button sampler contamination results:

- Bacteria quantification was higher on teachers in S1 (6.88×10^1 CFU.m⁻³) on TSA. VRBA counts only on teachers in S1, S3, S4 and S8 (2.08×10^0 CFU.m⁻³).
- Fungal counts were higher on staff from S1 in MEA (2.92×10^1 CFU.m⁻³), and on S4 on DG18 (5.63×10^1 CFU.m⁻³).
- Aspergillus* sections identified in 9 of the 10 schools: *Candidi*, *Fumigati*, *Nidulantes*, *Nigri* on MEA and *Aspergilli*, *Circumdati*, *Flavi*, *Fumigati* and *Nidulantes* on DG18.

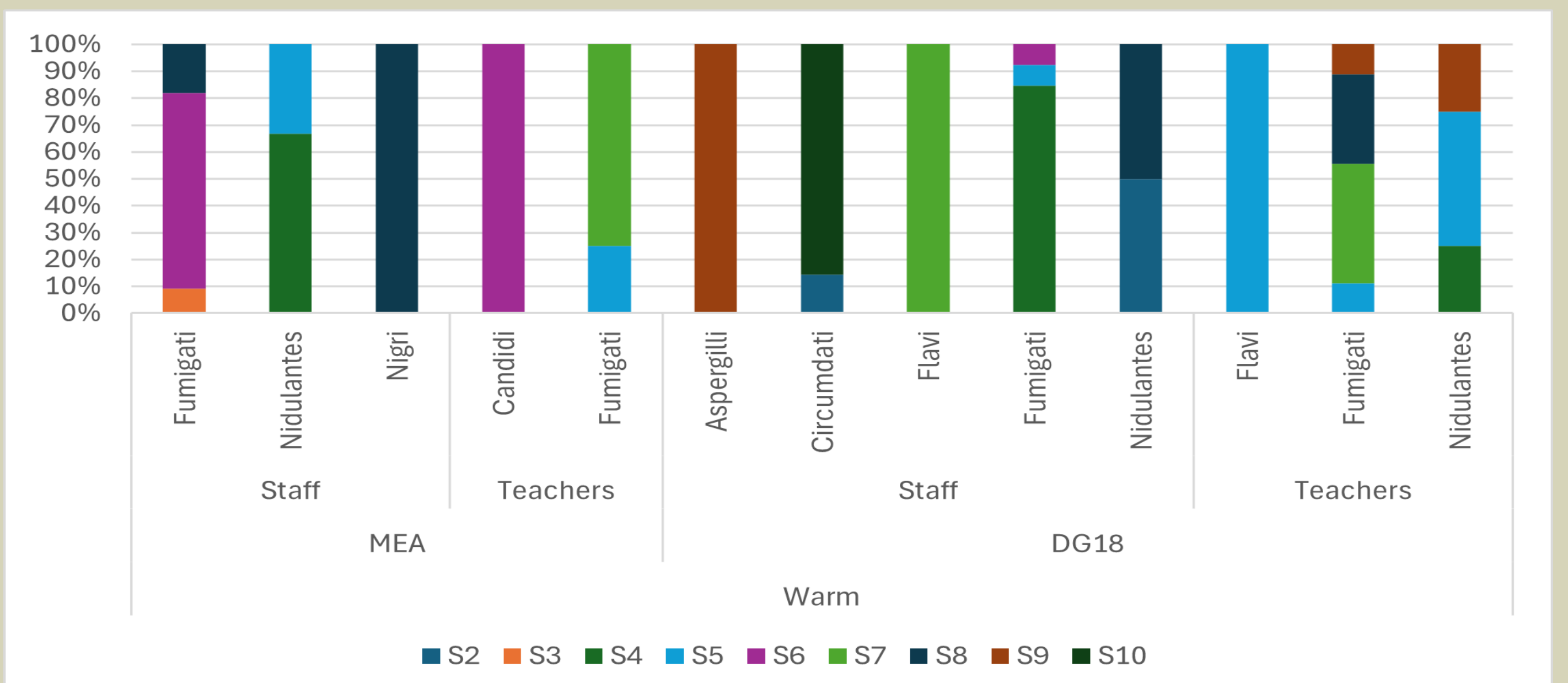


Figure 2 - *Aspergillus* section prevalence in MEA and DG18 of teachers and staff personal samples

Discussion

Although the indoor/outdoor cut-off complies with bacterial and fungal contamination in one school (S7), *Aspergillus* sections were identified in every school, including the S7. Regarding personal exposure, although bacterial and fungal contamination is relatively low, gram-negative bacteria and critical species such as *Aspergillus* sections *Circumdati*, *Flavi*, *Nidulantes*, *Nigri*, and *Fumigati* were identified [7].

Conclusion

The results from the applied sampling approach reinforce the need for public and occupational health interventions to reduce school staff pathogen exposure.

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