

Purpose

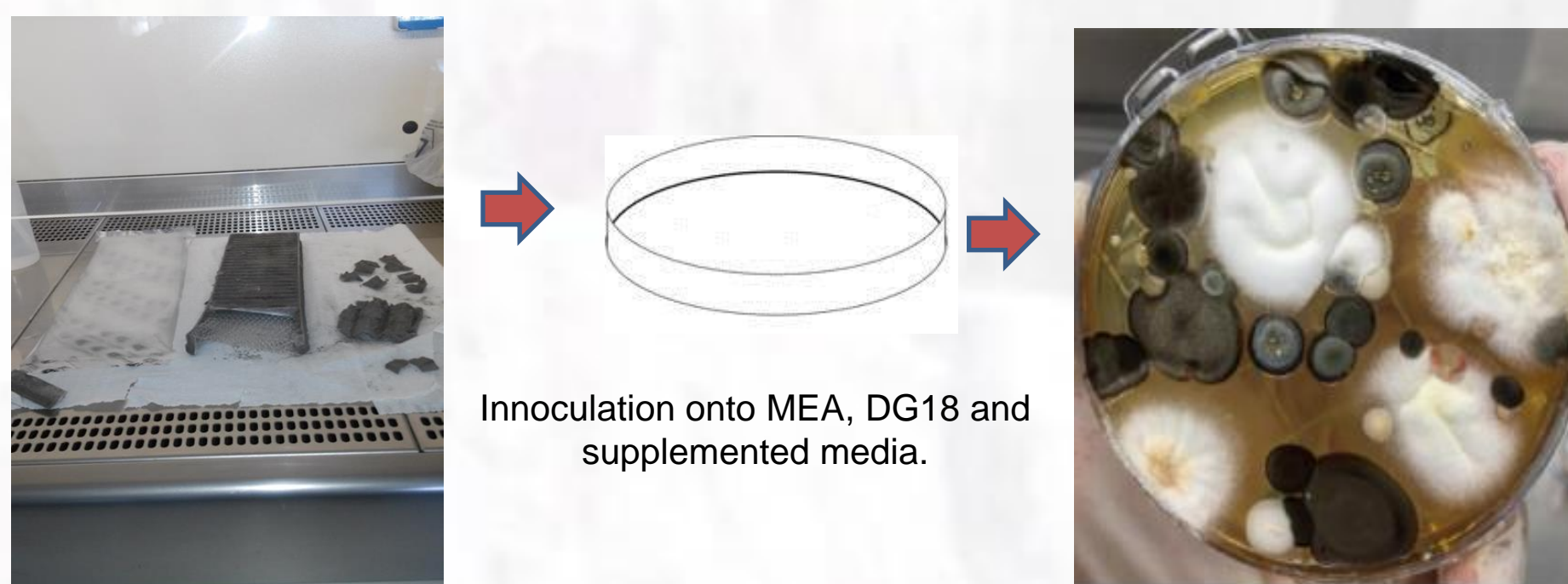
The genus *Aspergillus* is one of the most prevalent in several highly contaminated occupational environments, such as the waste sorting industry¹.

The identification and quantification of *Aspergillus* sections present on filters from the air-conditioning systems in fork lifters from waste industry was performed, including the screening of azole-resistance. In addition, toxigenic strains from *Aspergillus* spp. were detected.

Materials and Methods

Filter pieces from forklifts air conditioning system (n=17) and personal vehicles (n=28) were extracted and streaked onto MEA and DG18 and in screening agar plates containing Saboraud media supplemented with 4 mg/L itraconazole, 1 mg/L voriconazole, and 0.5 mg/L posaconazole, according to the EUCAST guidelines. These were incubated at 27 °C for 5 days.

Fig. 1 - Filter mycobiota extraction



The molecular detection of the *Aspergillus* sections *Circumdati*, *Fumigati* and *Flavi* (only the toxigenic strains) was performed by Real Time PCR (RT-PCR).

Results and discussion

FORKLIFTS

MEA: Fungal load ranged from 5×10^2 to 71×10^3 CFU/m²; *Aspergillus* spp. was the most prevalent (59.5%). *Aspergillus* sections *Nigri* (28.2%), *Fumigati* (26.6%) and *Circumdati* (26.2%) were the most frequent.

DG18: Fungal load ranged from 5×10^2 to 75×10^3 CFU/m² and *Aspergillus* spp. was also the most prevalent (47.5%). *Aspergillus* sections *Circumdati* (51.7%) and *Nigri* (22.8%) were the most frequent.

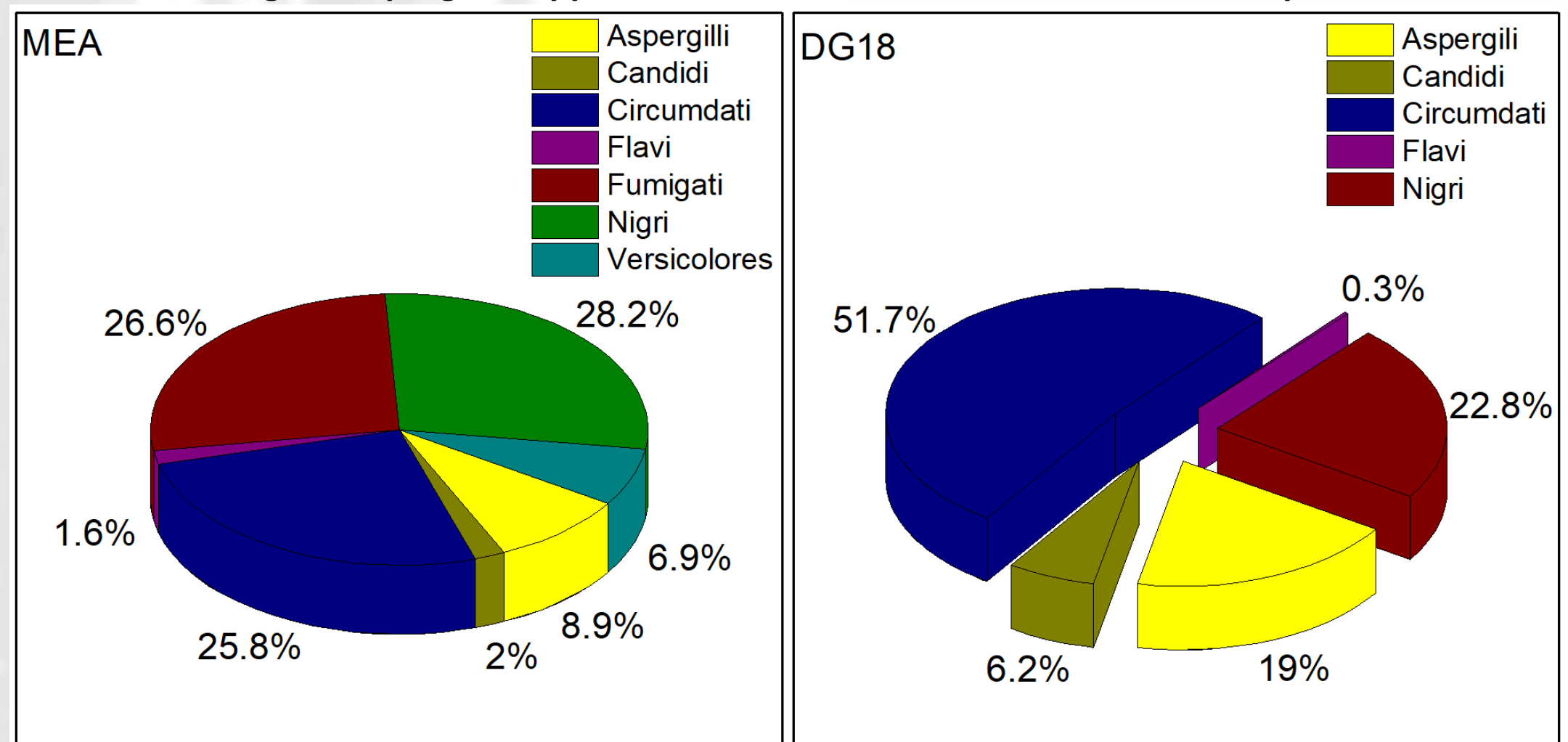
Azole-resistance screening: *Aspergillus* section *Nigri* was the most prevalent among azole-resistant species. Overall, the prevalence of azole-resistant *Aspergillus* section *Nigri* was 76% in 4 mg/L itraconazole, 43% in 1 mg/L voriconazole, and 0.33% in 0.05 mg/L posaconazole.

qPCR analysis: *Aspergillus* section *Fumigati* was detected in 47% of the fork filters. *Aspergillus* section *Versicolores* was detected in 11.8% of the filters.

Acknowledgments

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Fig. 2 - *Aspergillus* spp. sections distribution on forklifts filter samples



PERSONAL VEHICLES

MEA: Fungal load ranged from 0 to 82×10^3 CFU/m²; *Aspergillus* genus presented a prevalence of 1%; *Aspergillus* genus sections *Candidi* and *Nigri* (50%) were the only ones found.

DG18: Fungal load ranged from 0 to 28×10^3 CFU/m² with DG18. *Aspergillus* spp. was the second most prevalent (15.6%) and *A.* section *Versicolores* the only one found.

Azole-resistance screening: Azole-resistant *Aspergillus* section *Candidi* was approximately 71-fold higher in filters from personal vehicles than in fork lifters, with 40% being resistant to 4 mg/L itraconazole.

qPCR analysis: No amplification was detected in any of the control vehicles analysed.

Aspergillus species were widespread in filters from the air conditioning system of fork lift cabinets. Since under favorable selective conditions (e.g., high moisture levels, high temperature, presence of oxygen, azole pressure) resistant *Aspergillus* strains can develop², waste sorting units appear to be hot spots for the emergence of resistance to triazole fungicides.

The number of non-susceptible isolates belonging to the genus *Aspergillus* may be underestimated, in general and in our study, due to the dominance of other

Conclusions

The fungal assessment of the filters from the air-conditioning systems should be suggested as an approach to be followed in future for fork lifters working in waste sorting industry. **This study corroborates the complementarity of using culture based-methods (with selective and supplemented media) with molecular tools. Moreover, it reinforces the need to cover the azole-resistance surveillance also in this occupational environment.**

References

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