

Introduction

Dairy industry workers are engaged in activities including feeding and milking of cows and cleaning up manure on a daily basis, being exposed to organic dust known to cause respiratory diseases¹. This study describes an updated protocol for the assessment of occupational exposure to organic dust, to unveil an accurate exposure scenario.

Methodology

- The particle size distribution was characterized regarding mass concentration in five different size ranges (PM0.5, PM1, PM2.5, PM5, PM10). Particles counts were also assessed in six different size ranges.
- Bioburden (fungi and bacteria) was assessed by air, surfaces swabs and feed samples.



Fig. 1 - Equipment used for particle measurements



Fig. 2 - Equipment used for air samples collection

Results and discussion

- Smaller size range particles (0.3µm) exhibited the highest counts in all the locations.
- Final product room showed the highest values for particles mass and counts.
- Total and gram-negative bacteria loads didn't exceeded 10000 and 1000 CFU/m³ respectively², although the values were higher than outdoor for almost all samples.
- The limit values suggested for fungal load (150 CFU/m³)³ were surpassed in 87.5% (7 out of 8) of samples.
- Among *Aspergillus* genera, section *Fumigati* was the most prevalent (83.1%) on malt extract agar (MEA) and *Circumdati* the most identified (44.4%) on dichloran glycerol (DG18).
- Different fungal species were found in the samples collected (air, surface swabs and feed) corroborating the need for a multi-approach on sampling methods^{4,5}.

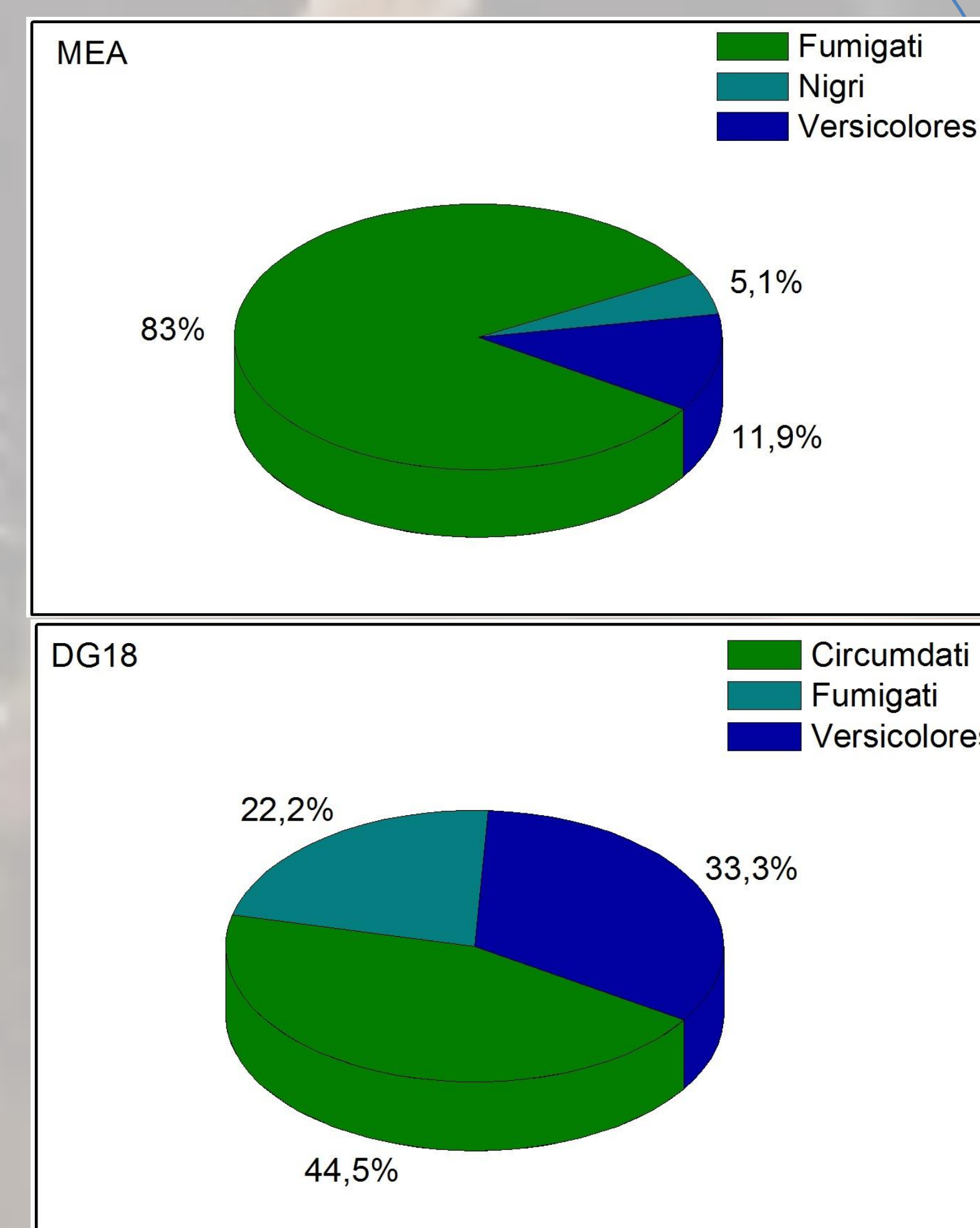


Fig. 3 - *Aspergillus* spp. sections distribution

Conclusions

A broader characterization of the organic dust content was done. This information allowed to define priorities concerning preventive and control measures to apply.

The sampling approach should be adopted as a protocol to be followed in future exposure assessments in this occupational environment. Additionally, molecular tools should be applied to target fungal toxigenic strains.

References

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