



#PRODUZIR SAÚDE

- *Benefícios da Saúde Ocupacional para a Saúde Pública*

15.º FÓRUM NACIONAL DE MEDICINA DO TRABALHO

21 - 22 NOV 2019

CULTURGEST LISBOA - PORTUGAL

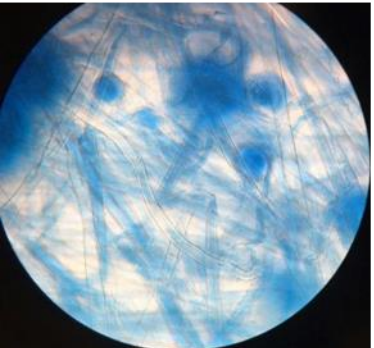
2nd LISBON INTERNATIONAL FORUM ON OCCUPATIONAL HEALTH

23 NOV 2019

Environmental Health: Environmental microbiology relevance for Occupational Health intervention

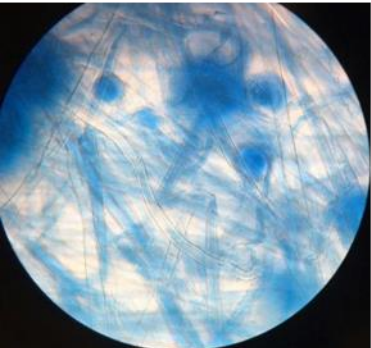
Carla Viegas, MsC, PhD

Marta Dias and Beatriz Almeida



Outline

1. Background
2. Materials and methods
3. Results
4. Main findings discussion
5. Next steps



1. Background

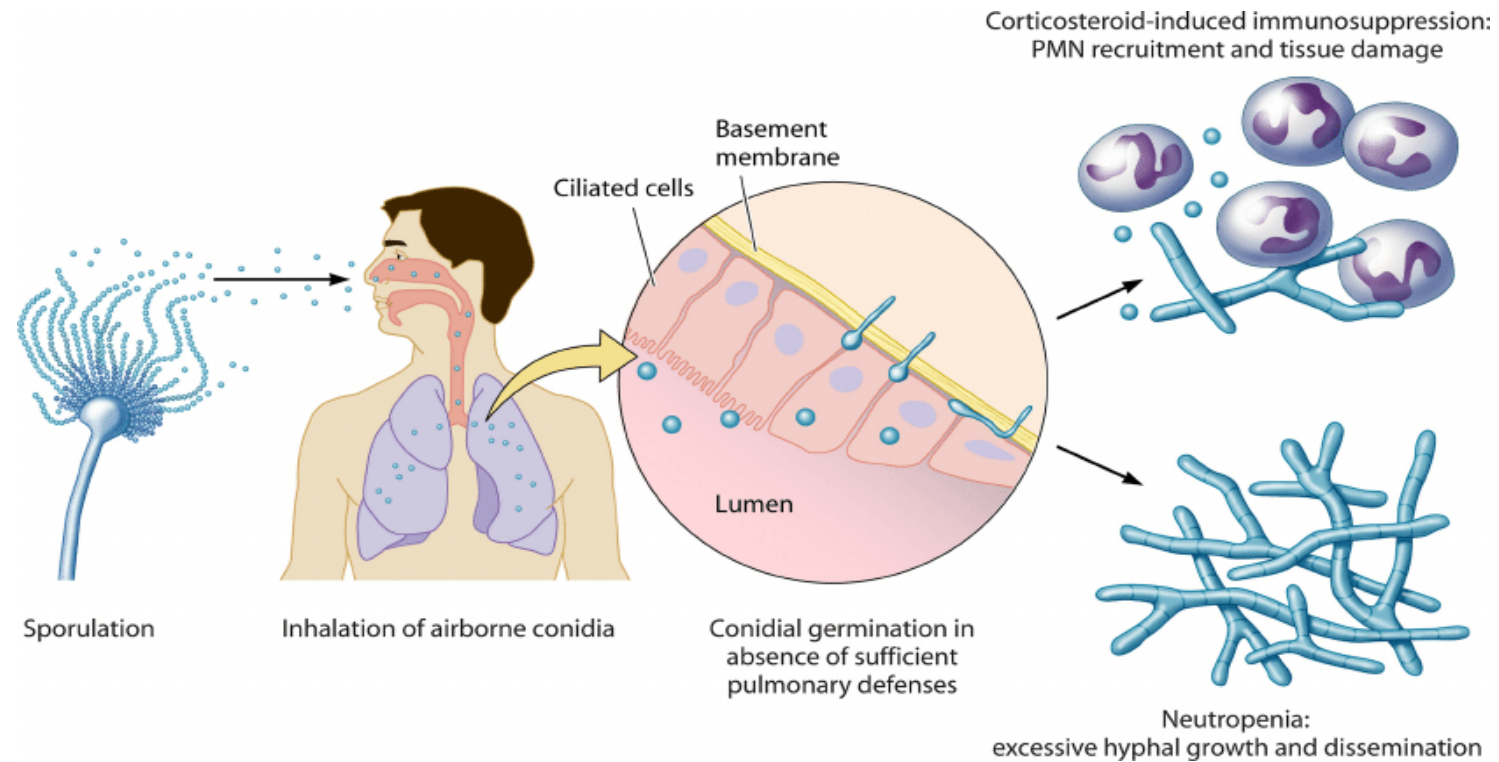
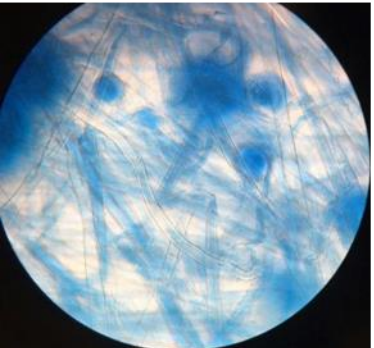
- Waste from non-biodegradable materials is sorted on waste sorting units to produce recyclable raw materials, leading to direct access to waste by workers.
- The organic residues present on waste serve as substrate for numerous microorganisms, increasing workers exposure to biological agents.
- Waste industry increase workers exposure to microbial contaminants, such as fungi and bacteria (bioburden) and previous studies reported health risks associated with such environments.
- Personal protective equipment (PPE), such as Filtering Respiratory Protective Devices (FRPD) and mechanical protection gloves are of mandatory use.

(Park et al. 2016; Černá et al. 2017)

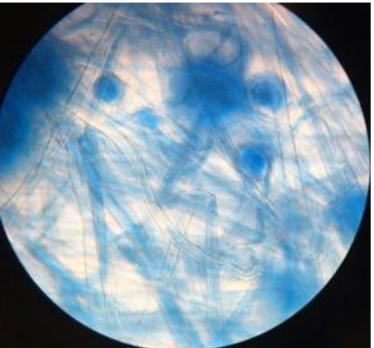


Aspergillus section *Fumigati* is an opportunistic pathogen of immunocompromised hosts and one of several *Aspergillus* species that cause a wide range of respiratory disorders.

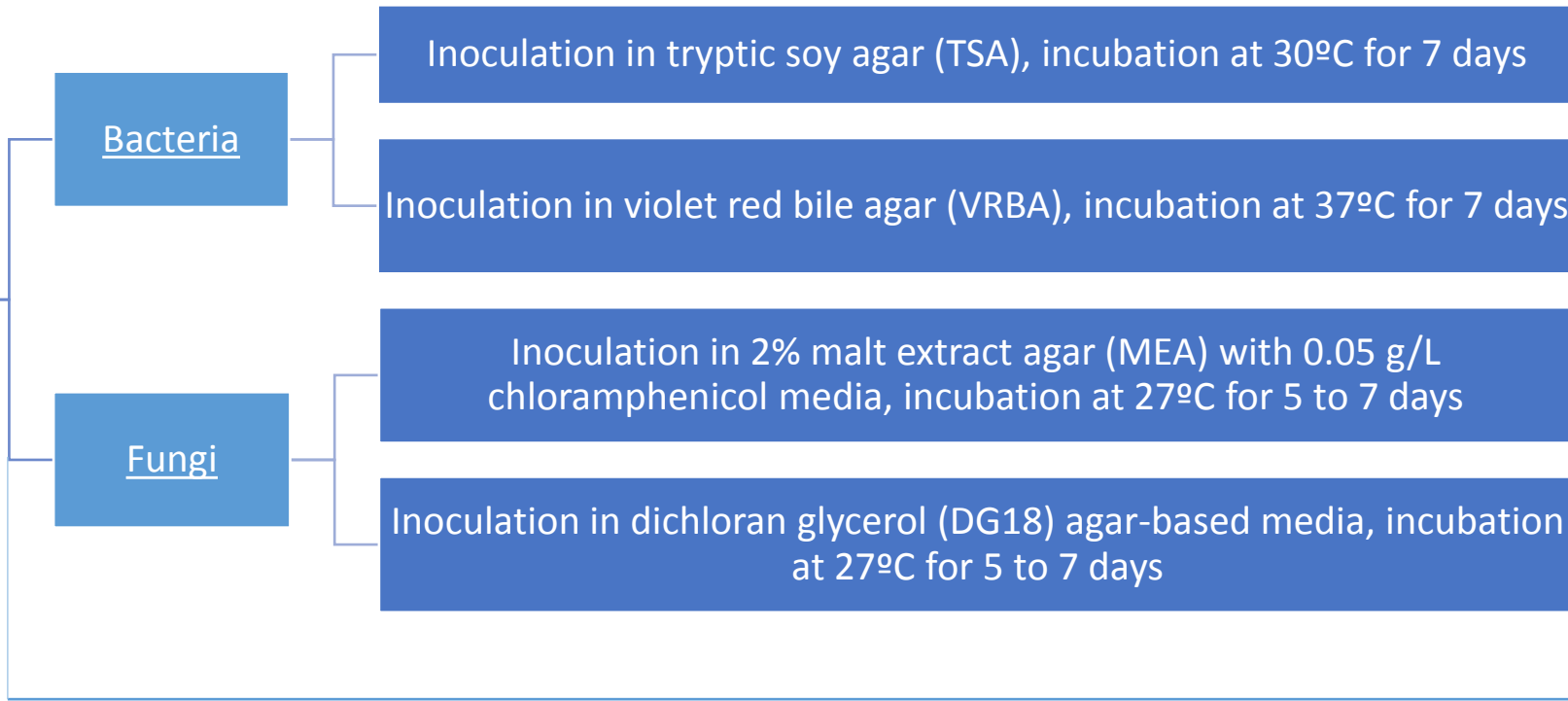
(Hope et al. 2008)



(Dagenais and Keller 2009)



Bioburden exposure assessment



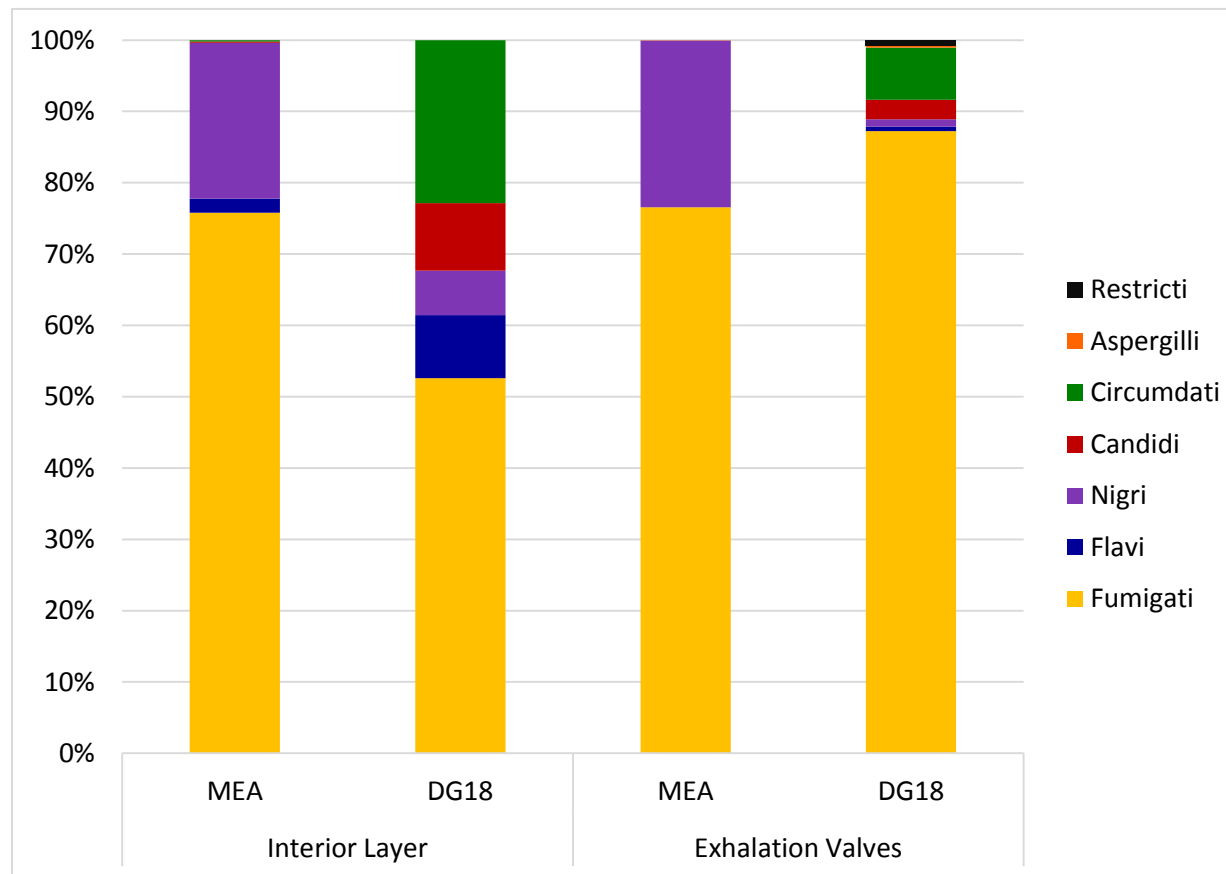
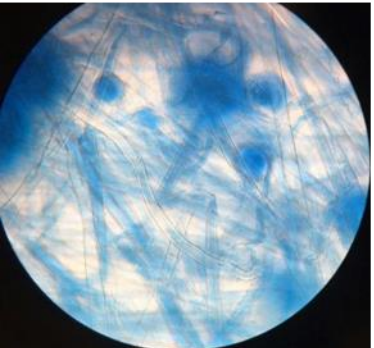
Assays performed

- Fungal biomass
- Toxigenic fungal strains (*Aspergillus* sections *Flavi* and *Fumigati*)
- Azole resistance
- **Mycotoxins**



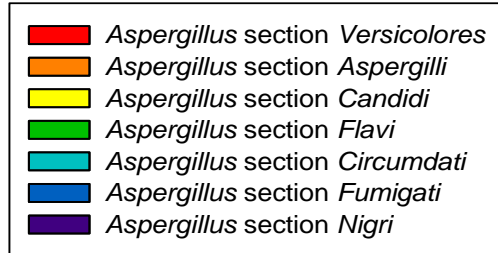
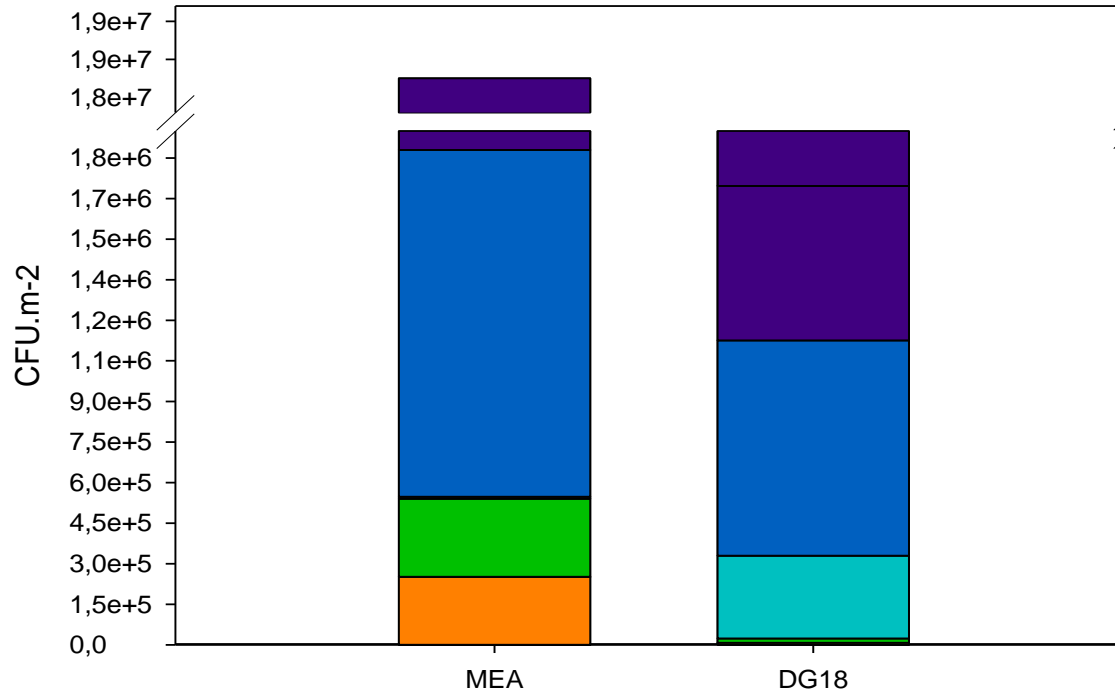
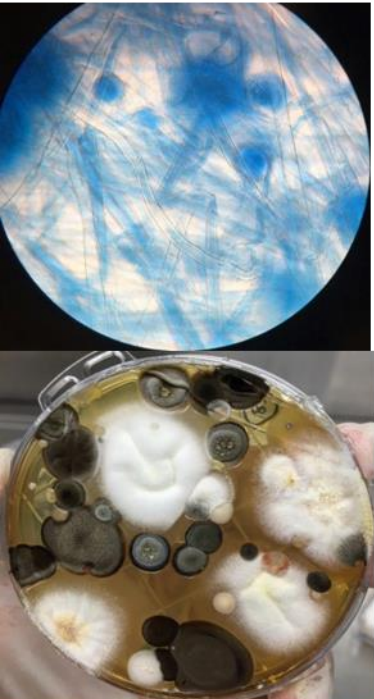
3. Results - Fungi contamination FRPD

- Valves presented *Aspergillus* spp. as the most prevalent genera on MEA media (44.4%) among all fungi.

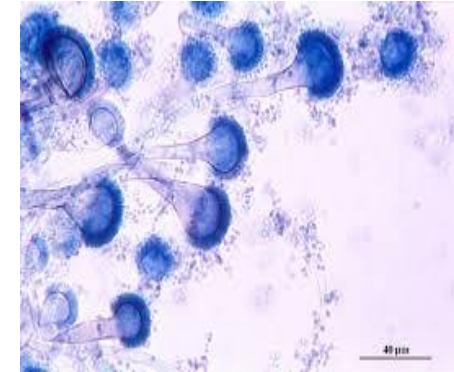
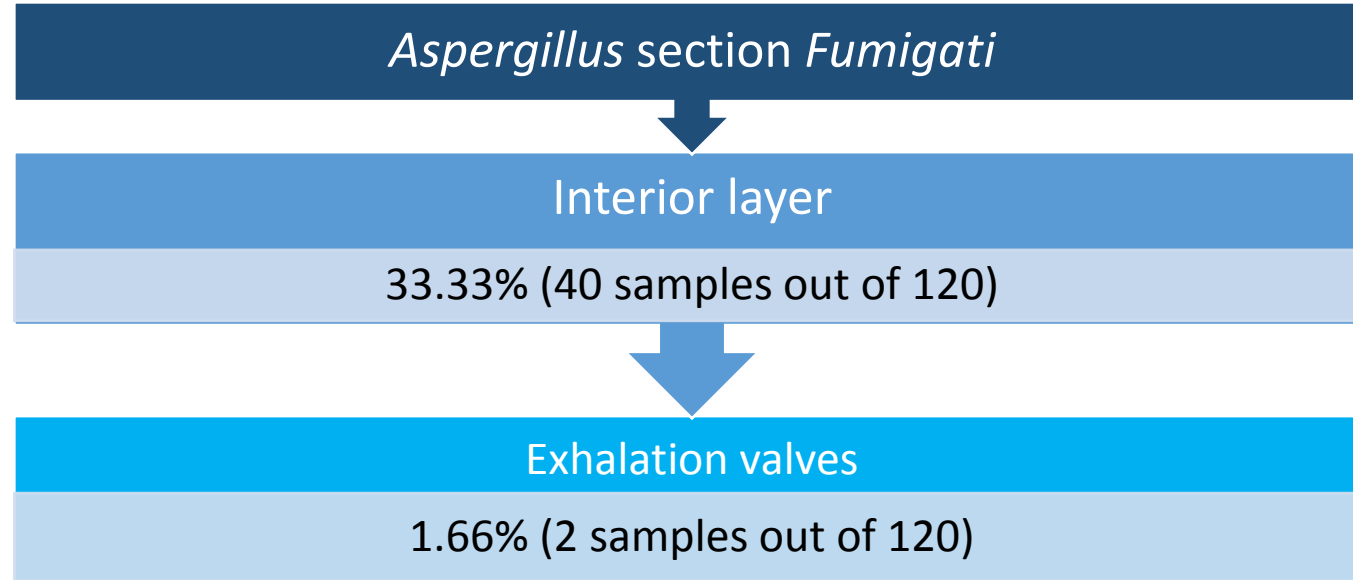
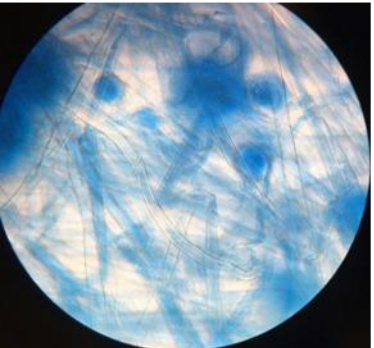


- Aspergillus* section *Fumigati* was the one with highest prevalence, both in exhalation valves (76.57% MEA; 87.24% DG18) and interior layer (75.81% MEA; 51.22% DG18).
- Nigri* section was the second more observed on MEA.
- In DG18, besides *Fumigati* and *Nigri*, *Flavi*, *Circumdati* and *Candidi* were also detected with a relevant prevalence

3. Results - Fungi contamination Gloves



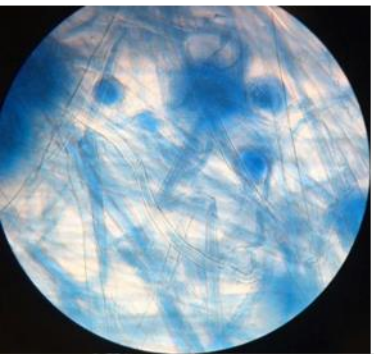
- The most commonly found was *Aspergillus* sp. (50.46%) in MEA, whereas in DG18 was *Penicillium* sp. (75.58%).
- In both culture media section *Nigri* was the most prevalent (89.97% MEA; 32.24% DG18).



- The presence of this section was not identified by culture based methods in the exhalation valves.
- In 25 of the interior layers where it was detected by qPCR it was not identified by culture-based methods.
- It was observed in more samples with culture based-methods (35.83% interior layers - 43 out of 120 samples; 30% in exhalation valves - 36 out of 120 samples).



3. Results – Toxigenic strains on Gloves



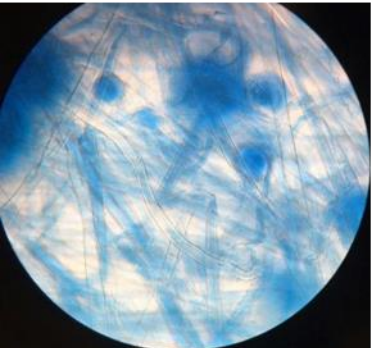
<i>Aspergillus</i> sections detected	Detection methods			
	Culture-based		Molecular	
	Number of samples	%	Number of samples	%
<i>Circumdati</i>	9	13.43	22	32.84
<i>Flavi</i>	22	32.84	6	8.96
<i>Fumigati</i>	19	28.36	59	88.06
<i>Versicolores</i>	1	1.49	61	91.05

4. Main findings and discussion

The results highlight the occupational concern regarding the exposure to microbiologic agents, more specifically to *Aspergillus*.

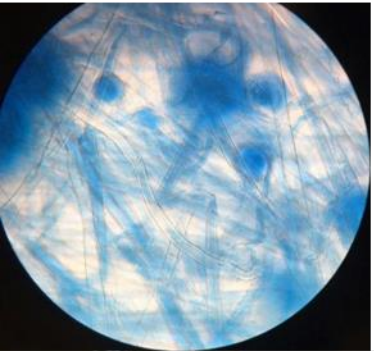
- Employers are obliged to assess and control the risks due to biological agent's exposure.
- Among the measures that can minimize exposure is the use of appropriate personal protective equipment.

(Directive 2000/54/EC)



FRPD and Gloves fungal contamination is mimicking the environment contamination

- Applied as a passive sampling method to assess occupational exposure



Mycotoxins Res (2017) 3:285–295
DOI 10.1007/s12550-017-0288-8



ORIGINAL ARTICLE

A new approach to assess occupational exposure to airborne fungal contamination and mycotoxins of forklift drivers in waste sorting facilities

Carla Viegas^{1,2} · Tiago Faria¹ · Ana Cabrita de Oliveira¹ · Liliana Aranha Caetano^{1,2} ·
Elisabete Carolina¹ · Anita Quintal-Gomes^{1,4} · Magdalena Twaruzek⁴ ·
Robert Kasicki⁴ · Ewelina Saszczyńska⁴ · Susana Viegas^{1,2}

5. Next steps

- Inform workers about the fungal burden on the equipment to easier behavior changes for hygienic measures

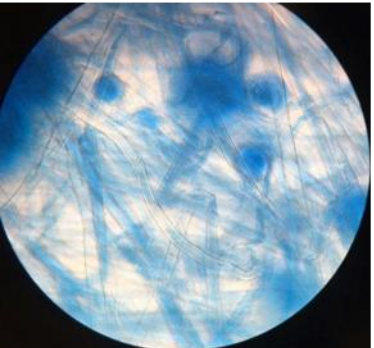
Ann. Occup. Hyg., 2016, Vol. 60, No. 7, 812–824
doi:10.1093/annhyg/mew032
Advance Access publication 31 May 2016

BOHS
The Chartered Society for
Worker Health Protection



Feedback on Measured Dust Concentrations Reduces Exposure Levels Among Farmers

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