

Fungal burden in filtering respiratory protective devices used in the waste sorting industry

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One of the solutions for reducing the workers' exposure to the effects of organic dust is the use of Filtering Respiratory Protective Devices (FRPD). During FFR use, water vapour and sweat are released increasing humidity of the material providing favourable conditions for fungal growth. The aim of this study is to characterize the fungal burden (fungi and mycotoxins) retained in FRPD used by workers from one waste sorting from Portugal.

Fifty-four FFRs (Protection FFP3) were collected after normal use (one work shift) from waste sorting workers. The exhalation valve and 2 cm² from the interior layer of the each FFR were extracted and seeded on two media: 2% malt extract agar (MEA) supplemented with 0.05 g/L chloramphenicol and dichloran-glycerol agar (DG18), following incubation at 27 °C for 5–7 days. All FFRs samples will be screened for mycotoxins presence.

The fungal contamination in the interior layer of the mask ranged from 0 to 25 CFU.cm⁻² in MEA, and from 0 to 26.4 CFU.cm⁻² in DG18. Six different fungal species were found in the interior layer in both MEA and DG18. The most common fungal genera found in MEA were *Lichtheima* (57.41%), *Penicillium* (27.10%) and *Aspergillus* (14.35%; including sections *Fumigati*, *Nigri*, *Flavi*, *Candidi* and *Cicumdati*). In DG18, the most common genera were *Penicillium* (85.37%), *Aspergillus* (14.29%; comprising sections *Fumigati*, *Circumdati*, *Candidi*, *Flavi*, *Nigri* and *Aspergilli*) and *Mucor* sp. (0.15%). In the exhalation valve, the fungal contamination ranged from 0 to 0.45 CFU.cm⁻² in MEA, and from 0 to 0.8 CFU.cm⁻² in DG18. In MEA, only two genera were found: *Penicillium* (60.53%) and *Aspergillus* (39.47%; including sections *Fumigati* and *Nigri*). But in DG18, seven different genera were found, of which the most found were *Penicillium* (68%), *Aspergillus* (25.33%; covering sections *Fumigati*, *Candidi*, *Nigri*, *Restricti* and *Aspergilli*) and *Mucor* (2.67%).

Our results point out for the need of intervention regarding the FFR replacement frequency due to quantitative and qualitative results (species with toxigenic potential).

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