

Exposure to bioaerosols in waste sorting plants

Pål Graff

Sampling strategy



Monday

Survey
Air samples
Blood samples

Tuesday

Air samples

Wednesday

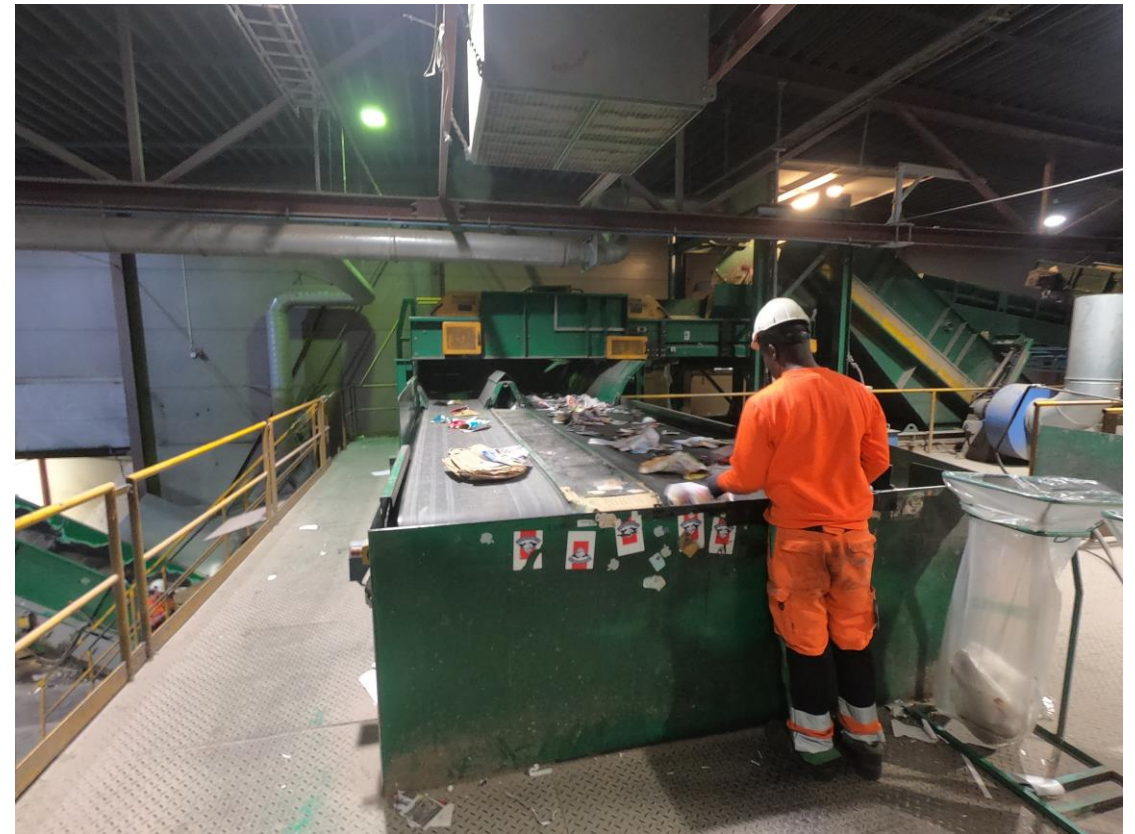
Blood samples
Skinbiota samples

Manual Waste Sorting

Manual sorting of plastics



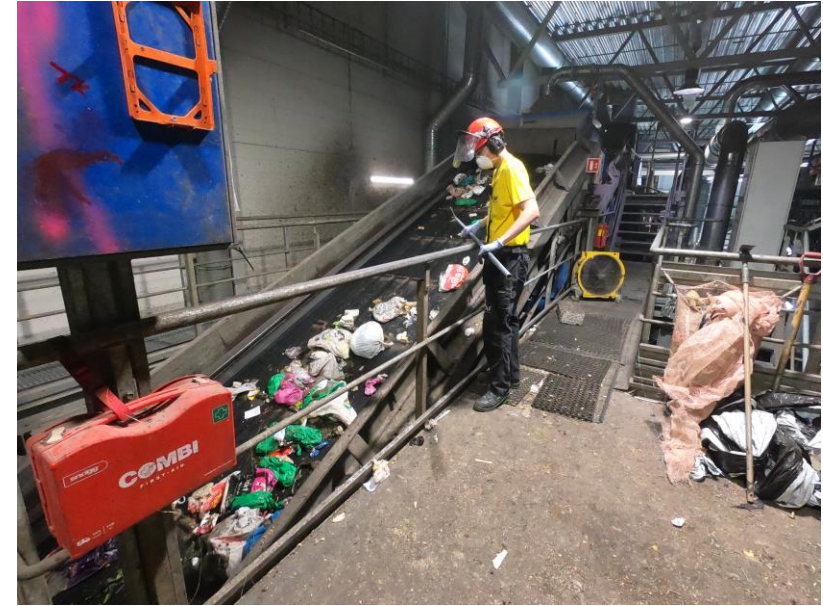
Manual sorting of paper / cardboard



Automated Waste Sorting



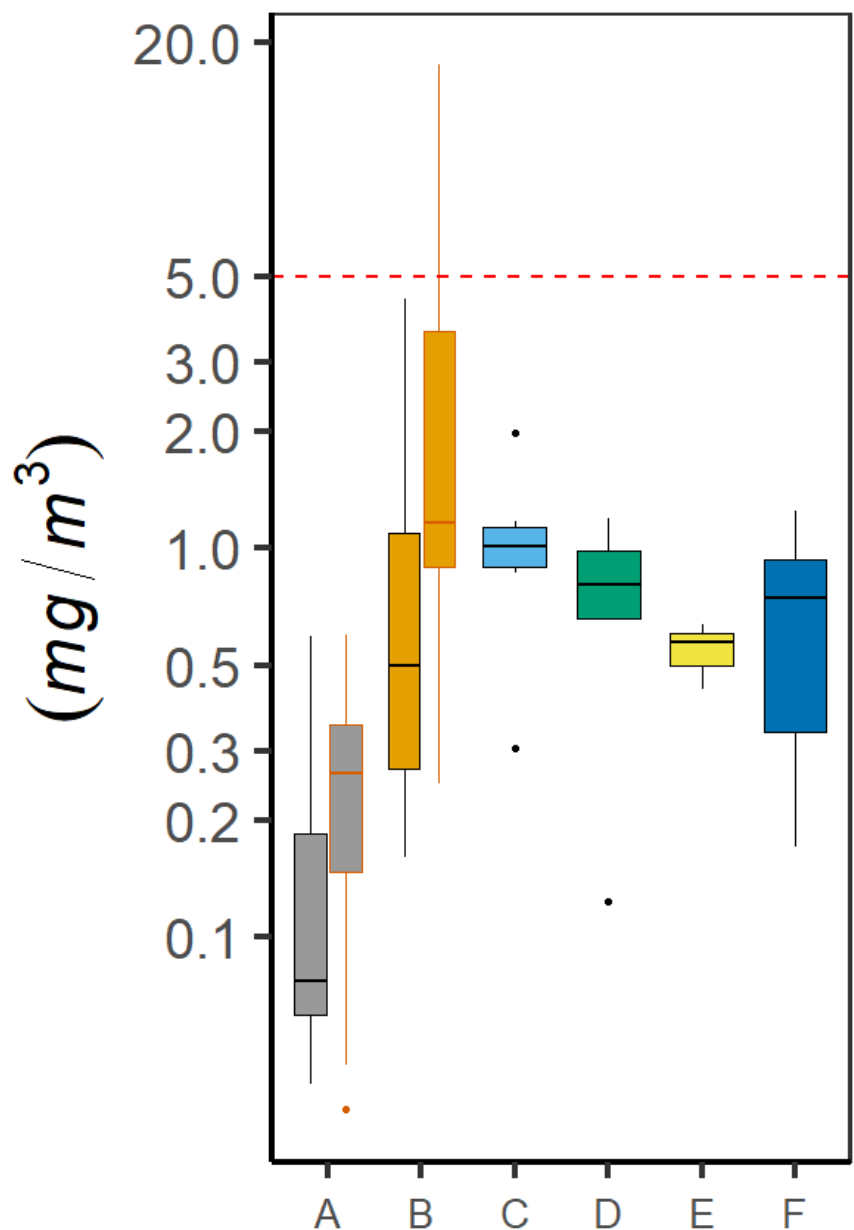
Control
incoming
waste



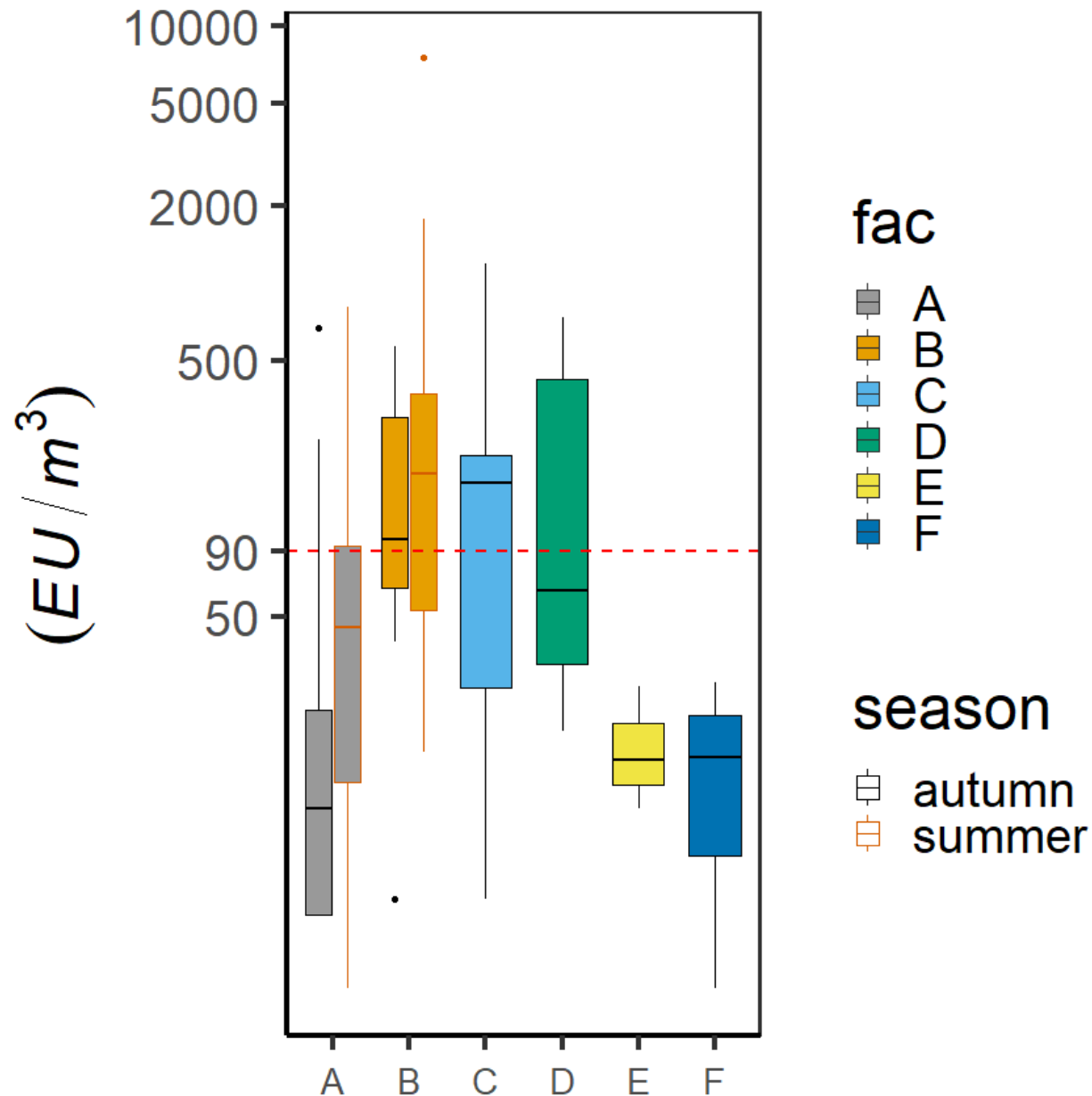
Cleaning and
maintenance



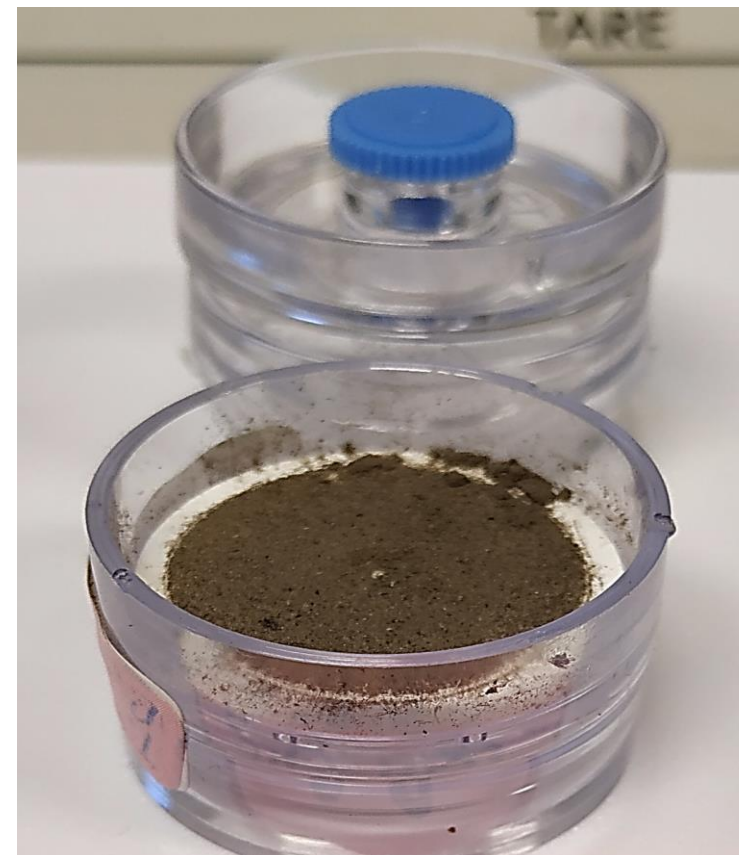
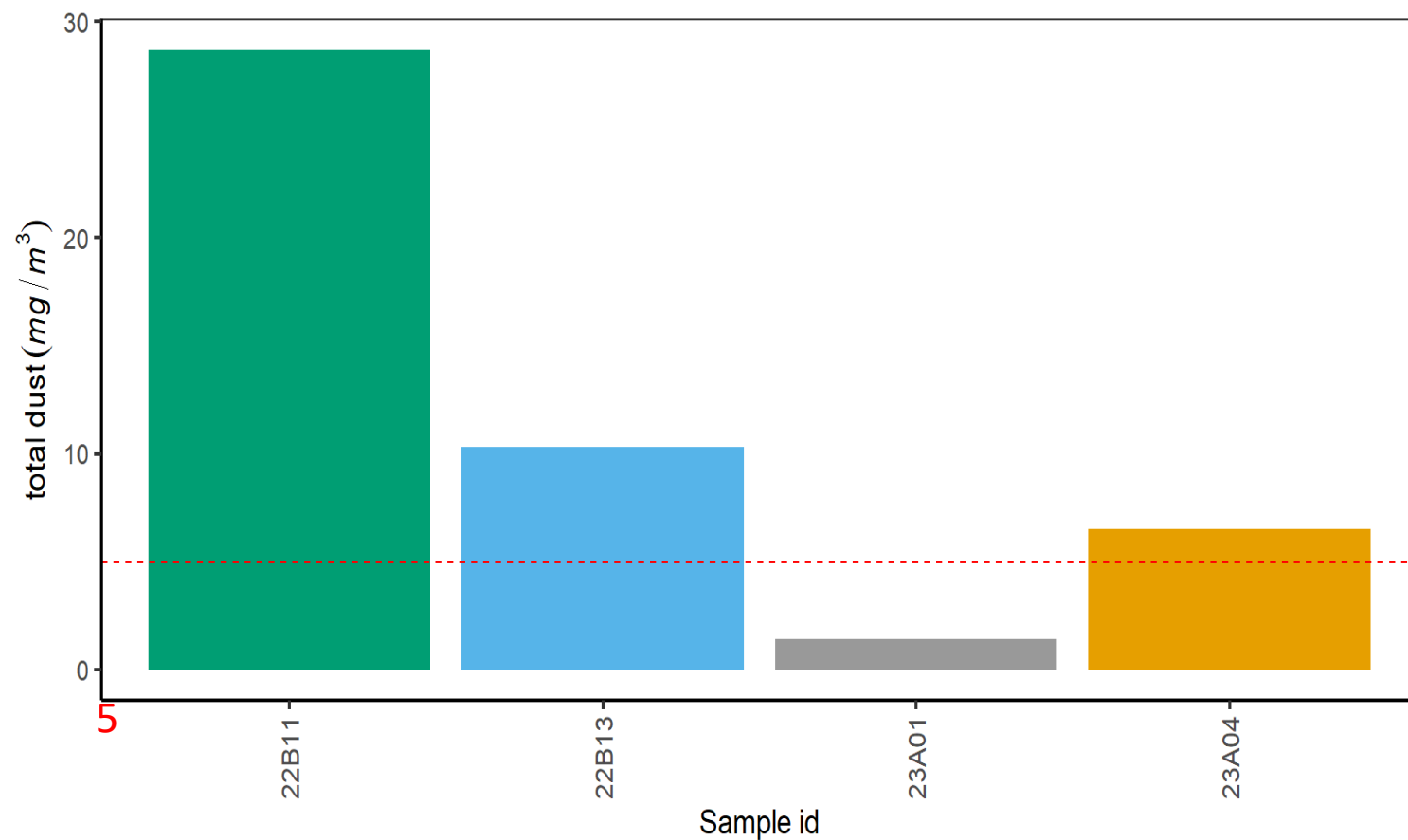
total dust (mg/m^3)



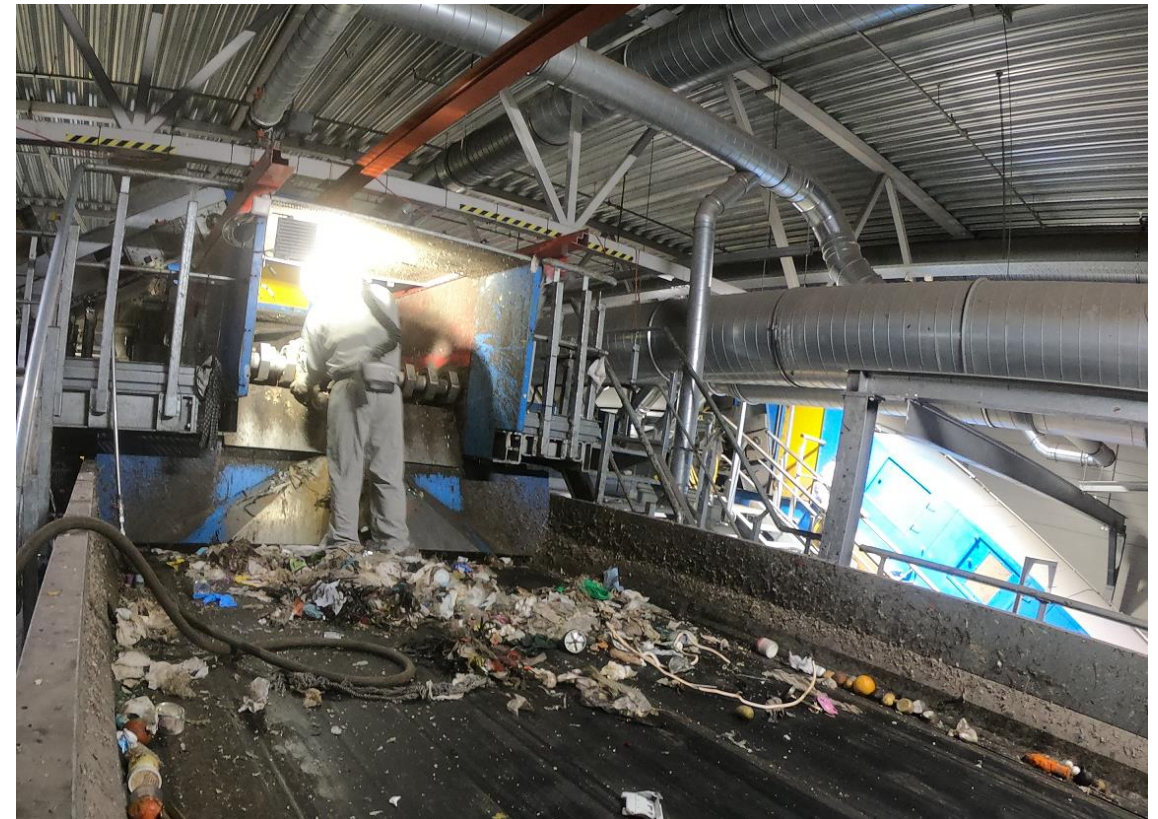
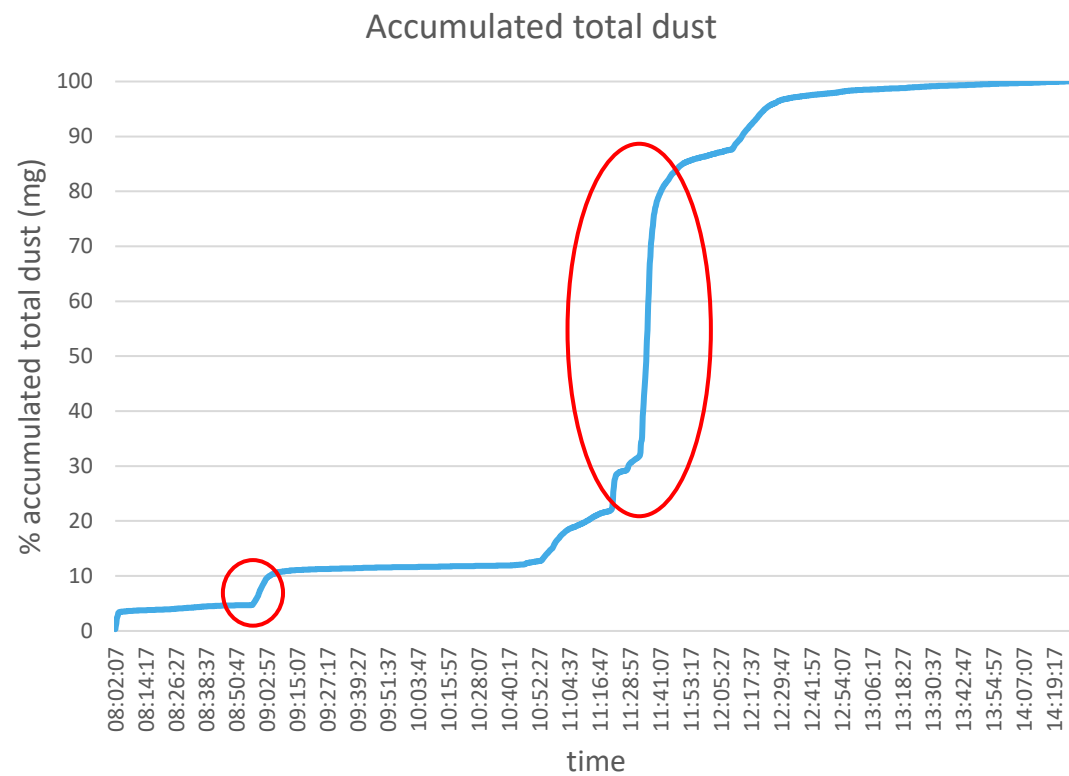
endotoxins (EU/m^3)



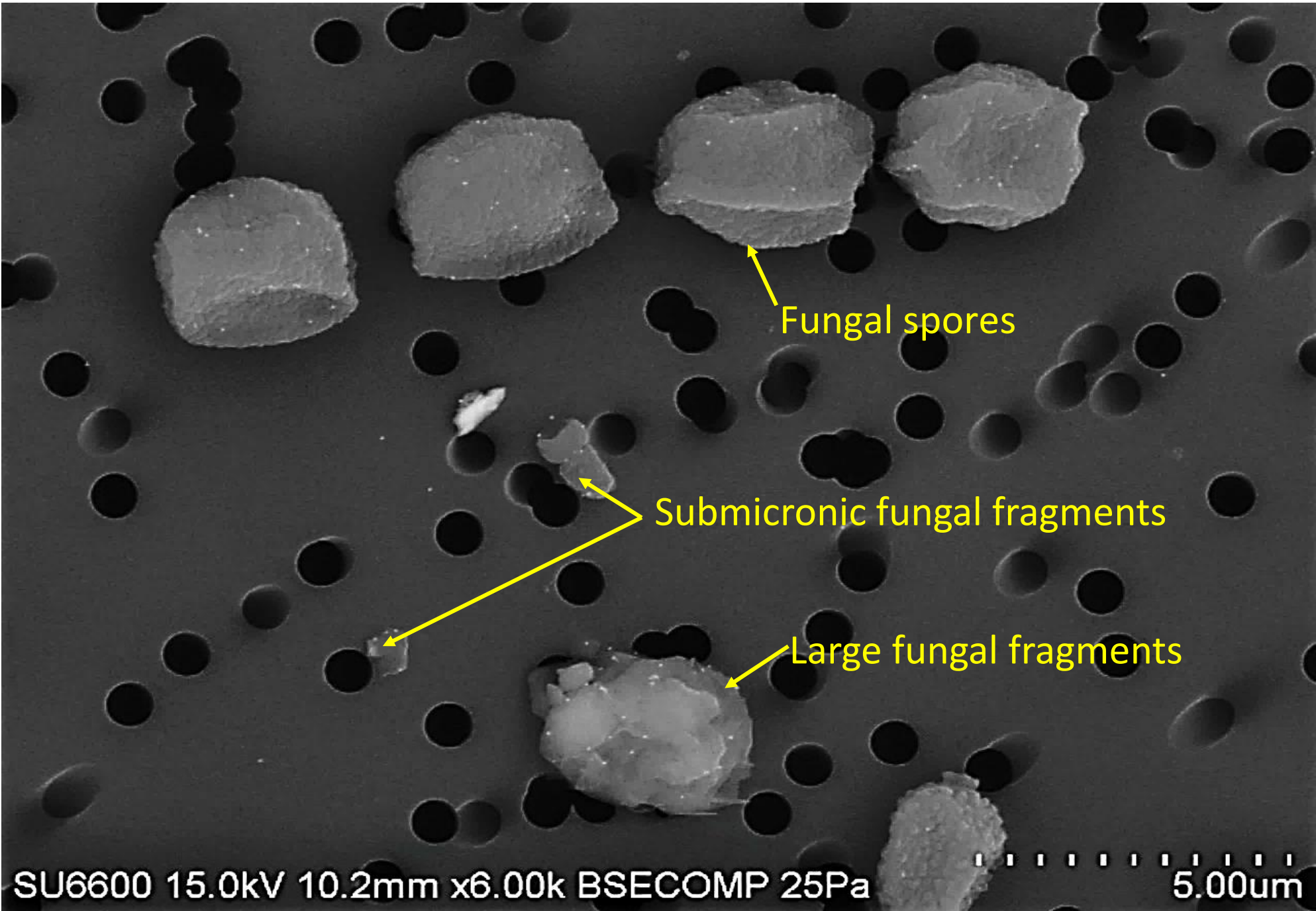
Peak exposure during cleaning



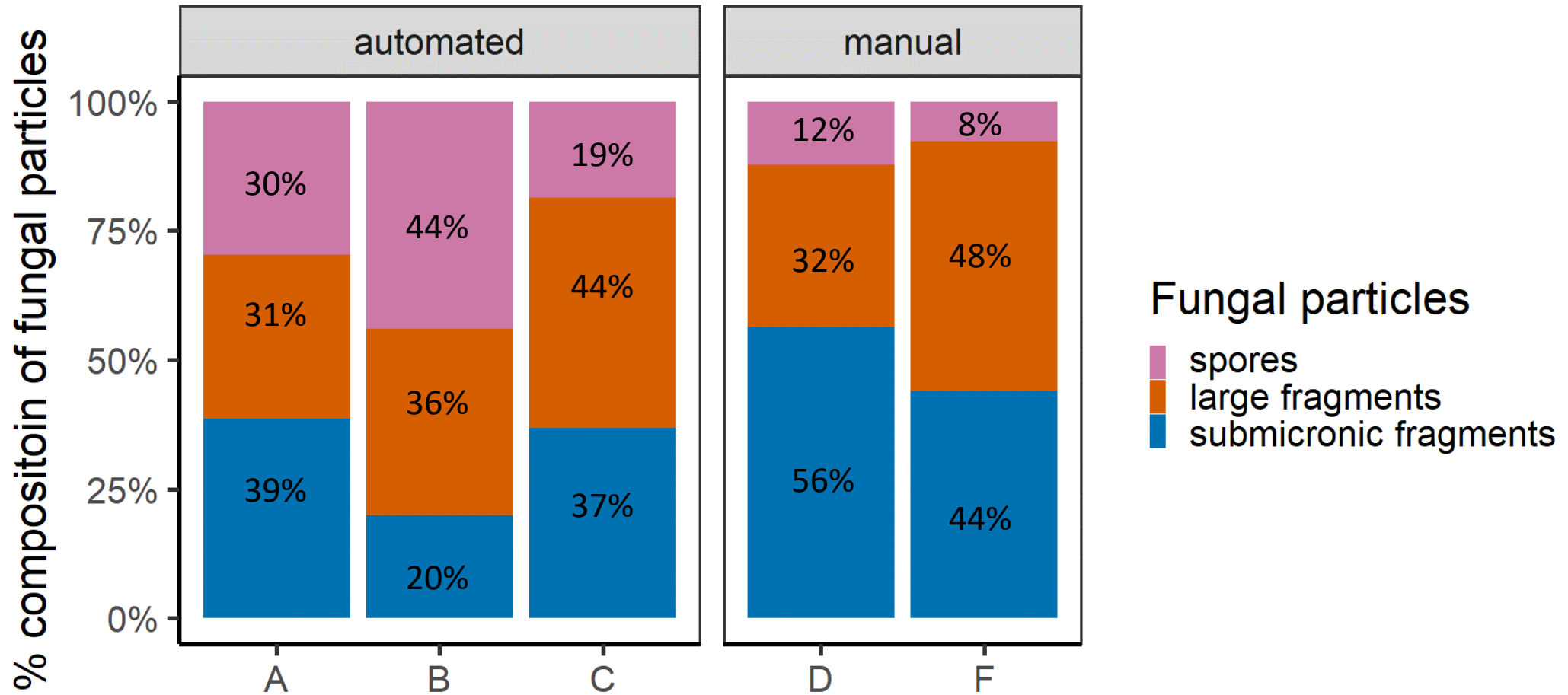
Dust Trak



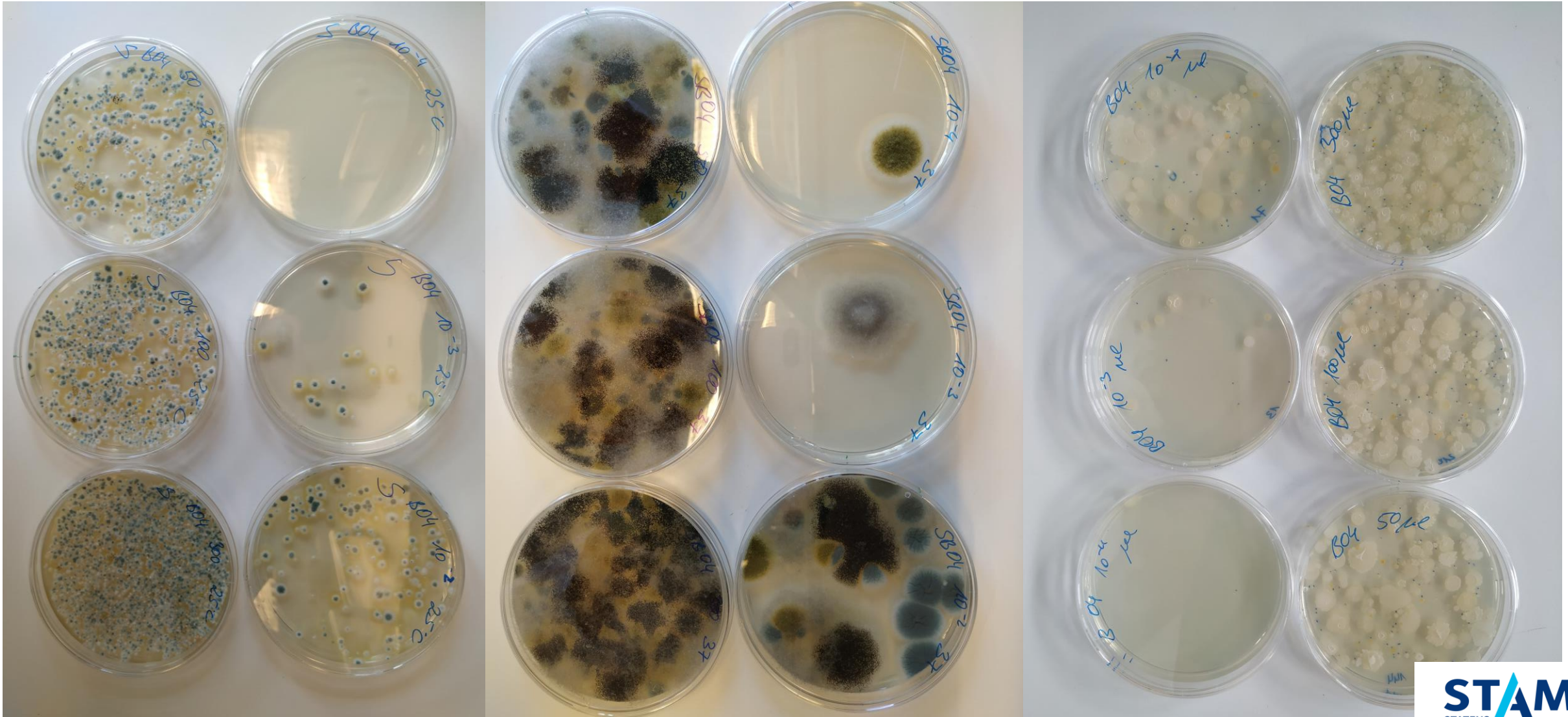
FESEM



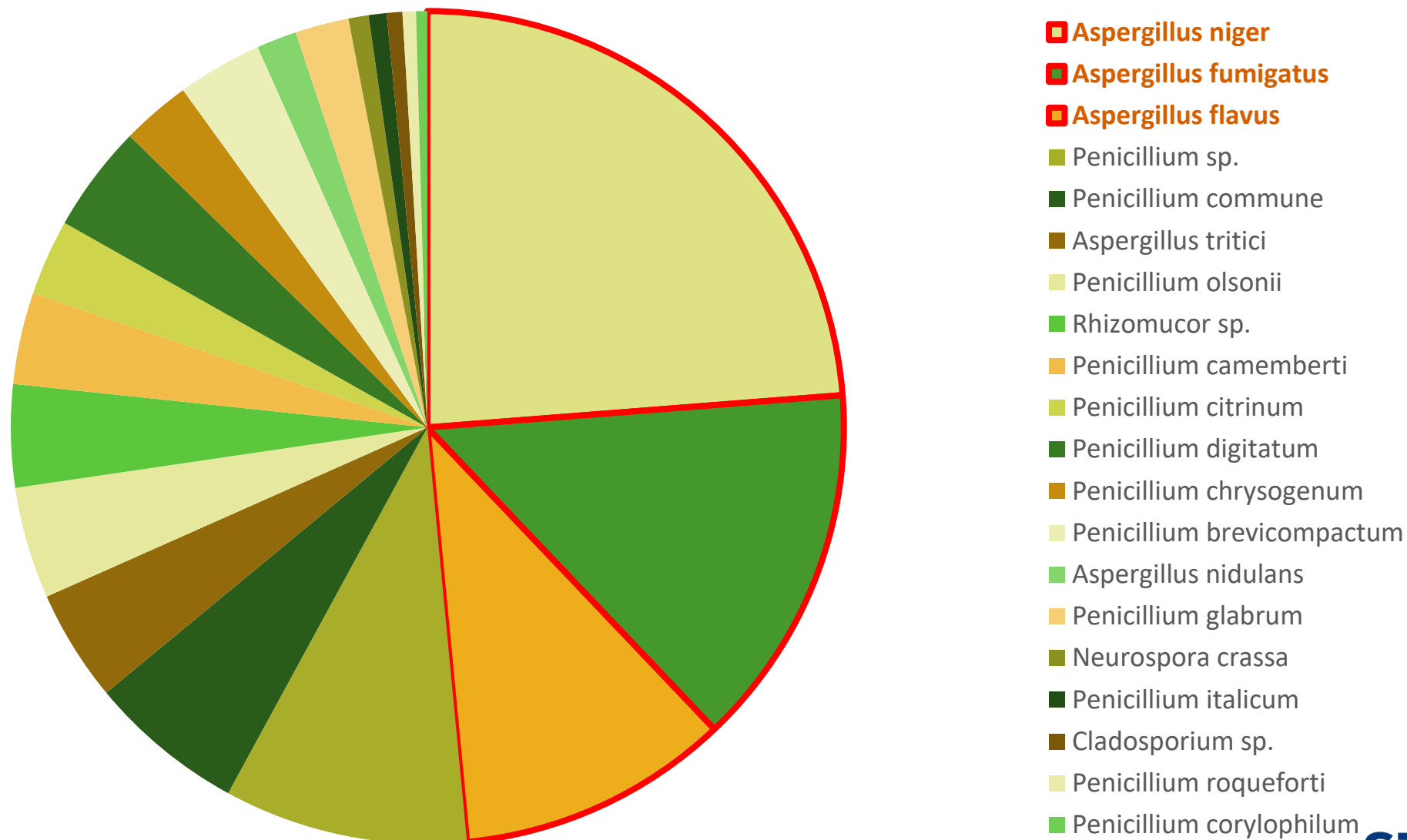
Composition of fungal particles



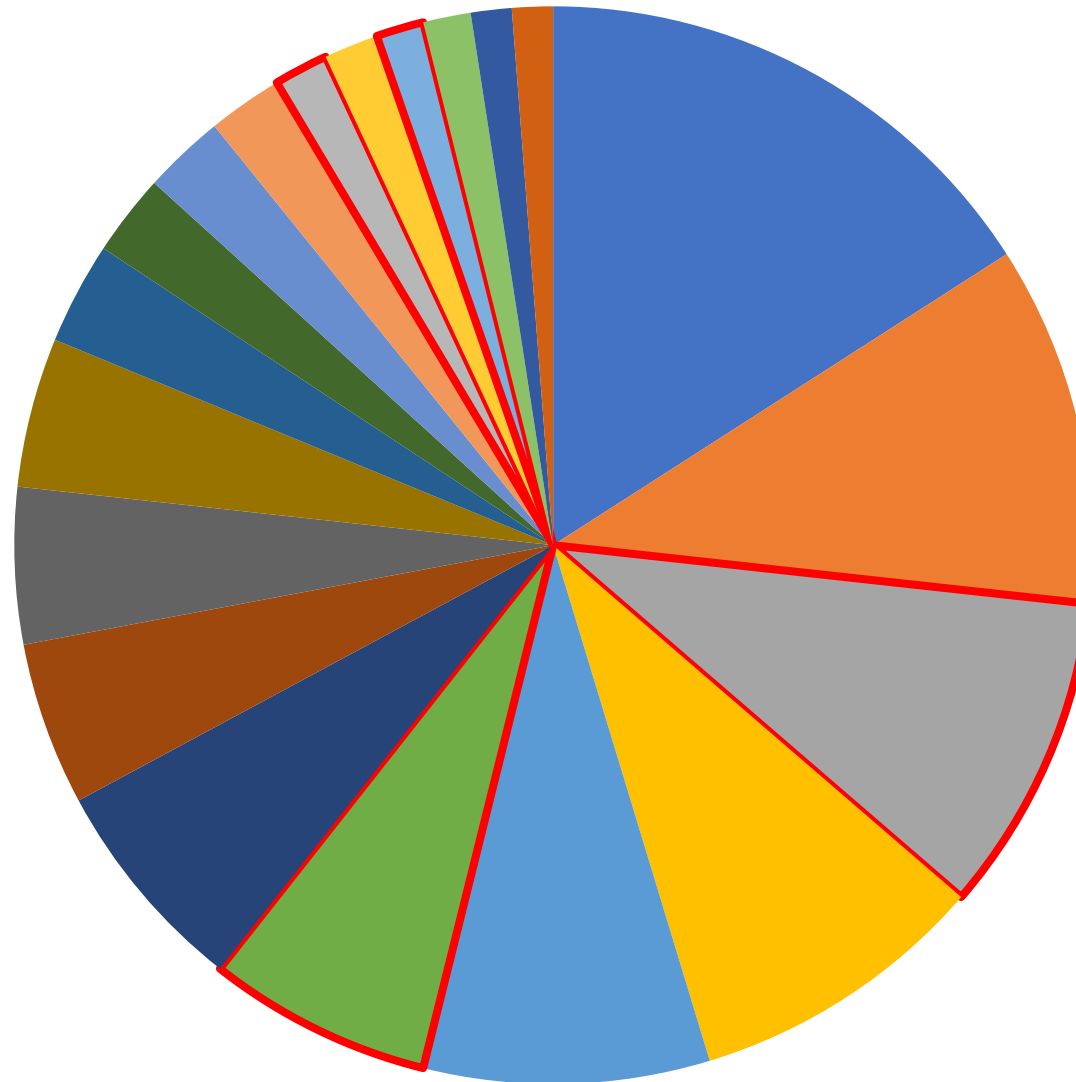
Cultivable/viable fungi and bacteria – MALDI-TOF



Top 20 fungal species in personal samples



Top 20 bacterial species in personal samples



- Bacillus pumilus
- Staphylococcus equorum
- Bacillus subtilis**
- Streptomyces albidoflavus
- Staphylococcus saprophyticus
- Enterobacter cloacae**
- Staphylococcus xylosum
- Bacillus altitudinis
- Bacillus cereus
- Bacillus amyloliquefaciens
- Lysinibacillus sp[2]
- Stenotrophomonas maltophilia
- Streptomyces rutgersensis
- Micrococcus luteus
- Aerococcus viridans**
- Enterococcus casseliflavus
- Enterobacter bugandensis**
- Streptomyces badius
- Bacillus licheniformis
- Brevibacillus borstelensis

Conclusion

- Large variation within and between waste sorting plants
- Seasonal variation
- Potentially high exposure to microorganisms
- Presence of human pathogens