

One year follow up of microbial biodiversity in French waste sorting plant

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Waste sorting activities are source of occupational bioaerosol exposure that was associated with several health disorders as rhinitis, asthma and hypersensitivity pneumonitis. So far, the microbial biodiversity data published in this occupational environment were obtained by cultivation of microorganisms on nutrient media prior to identification. Due to the well-known limits of cultural methods, these biodiversity measurements underestimate the real microbial taxon richness. Recent advances in molecular biology provided powerful methods for biodiversity studies such as high-throughput sequencing. The aim of the study was to assess of bioaerosol biodiversity in a waste sorting plant (WSP) during one year and to investigate the main factors of variability of this biodiversity. Bioaerosol biodiversity was assessed in a French WSP sorting journal newspapers, papers, cardboards, food packaging and other sorting waste. The WSP employed about 50 workers mainly dedicated to manual sorting in two cabins. Every month during one year, static sampling was performed in five areas in the plant, using closed-face cassettes (10 L/min) with polycarbonate membranes. To compare the composition of related-task bioaerosols and control bioaerosols, two references were sampled: one indoor and another one in outdoor reference. Environmental data were measured (temperature, relative humidity) or collected (climatic conditions...). Microbial DNA was extracted and microbial biodiversity was performed using high-throughput sequencing (bacterial 16S, fungal ITS2). All bioaerosols were composed of four main phyla: Actinobacteria, Bacteroidetes, Firmicutes and Proteobacteria. The proportion of Actinobacteria and Firmicutes was higher in bioaerosol emitted in WSP (10% and 35 % respectively) than in reference bioaerosols (2% and 15% respectively). At the family rank, *Staphylococcaceae* was the family in the higher proportion in the WSP (10% to 20% depending on the sample). The first results showed that the composition of bioaerosols in WSP was different from the references. The composition of bioaerosols in WSP was also different from an area to another one. In the presentation, fungal biodiversity as well as the influence of environmental parameters will be discussed.