

Microorganisms in the air within the Gdańsk-Szadółki landfill and adjacent area in 2015

The data collection contains the results of microbiological examination of air samples collected at Gdańsk Szadółki Landfill (Poland). The Gdańsk Szadółki Landfill is one of the biggest of facilities of this type in the country. It occupies an area of 75 hectares and serves around 500 thousand of local residents. The landfill receives around 250 million tons of waste yearly. The air samples for microbiological examination have been collected from May to November 2015. The range of examination included qualitative and quantitative assessment of selected species of bacteria and mold fungi, with particular focus on pathogenic and potentially pathogenic fungi and bacteria. The collected data can be a basis for evaluation of ranges in which microorganisms can disseminate in the air around the landfill site and adjacent areas, as well as assessment of the risk of infection with pathogenic microorganisms which occur in the air around the area of examination.

Methods

Air samples have been collected from 29.05.2015. do 26.11.2015 in a series of 7 studies and measurements. The air samples were collected by sediment method, with exposure time of 15 minutes. The Petri dishes with microbiological media were placed at 1 meter above ground. The contaminated media were incubated in appropriate time period and temperature, and the subsequently cultivated colonies were identified and counted.

In each series of studies, 7 samples were collected. Three of which (from sites 1, 2 and 3) were collected at the landfill area, one at the control point (site 16), and the remaining three were collected in accordance to the direction of the wind on a given day: with the wind coming from the west and northwest, the samples were collected at sites 5, 7 and 9; with the wind coming from the southwest - sites 6,8 and 10; with the wind coming from the north, east and northeast - sites 13, 14 and 15; with wind coming from the south and southeast - sites 4, 11, 12.

In each of the air samples the amount of the following microorganisms was assessed: psychrophilic bacteria, mesophilic bacteria, *Klebsiella pneumoniae*, *Citrobacter freundii*, *Enterobacter aerogenes / cloacae*, *Escherichia coli*, Mannitol (-) *Staphylococcus*, Mannitol (+) *Staphylococcus*, *Pseudomonas fluorescens*, *Pseudomonas aeruginosa*, *Actinomycetes*, mould fungi and yeastlike fungi.

Conclusions

The air quality in the examined area, measured by the number of mesophilic bacteria, was very differential in 2015. The Gdańsk Szadółki Landfill is a source of microbiological contamination, due to the nature of its operations. However, there are other sources of contamination in the examined area, such as agricultural activity and housing development.

In accordance to average annual amount of mold fungi and yeastlike fungi in individual sites, the air examined in 2015 can be assessed as averagely clean in terms of presence of mold fungi, which, considering the profile of operations at Gdańsk Szadółki Landfill, should be regarded as highly positive.

The potential risk to human health caused by the presence of microorganisms in the examined air (including the potentially harmful microorganisms) is observed mainly on the site of Gdańsk Szadółki Landfill.

The presence of microorganisms that are harmful to health on sites located in areas adjacent to Gdańsk Szadółki Landfill (sites 4, 5) can be a result of the flow of bioaerosol created in the process of landfill operations.