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**PRZEŻYWALNOŚĆ MIKROORGANIZMÓW BAKTERYJNYCH
I GRZYBOWYCH W POWIETRZU I JEJ WPŁYW NA STRUKTURĘ
BIOAEROSZU**

Rozprawa doktorska

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ABSTRACT

The term bioaerosol defines a group of airborne particles, viable and dead biological origin, i.e. bacteria, fungal spores, their fragments and compounds, mycotoxins, peptidoglycans, viruses and all kinds of antigens and pollen. The necessity of controlling and measuring concentration of those pollutants is justified, due to the multiple adverse health effects they can cause. It is believed, that the most serious health problems caused by bioaerosols (infections) are related to exposure to metabolically active forms of bacterial and fungal aerosol. The concentration levels of bioaerosols in the atmosphere strongly undergo the seasonal variability, as well as the influence of particular meteorological parameters. In presented study, focused on measurements of the viable bacterial and fungal aerosol, present in the atmospheric environment in Gliwice, Poland, in different seasons. Also correlated the variability of concentration levels with primary meteorological parameters. Furthermore, investigated the sensitivity of both forms of biological aerosols towards the sterilization phenomenon in the atmospheric air, strongly associated with solar radiation, as well as the interaction of tropospheric ozone. Determined also the concentration of total bioaerosol, including viable, non-viable and dead forms of bacterial aerosol. The results shown, that concentrations of viable bacterial aerosol during winter were 6-times lower than during the spring-summer season. In case of fungal aerosol, concentration level was 12-times lower in winter, compared to summer season. Evidenced also the seasonal changes in size distributions of investigated bioaerosols, as well as the prevalence of dominant forms of bacteria and identified species. Among the analyzed meteorological factors, the ambient air temperature mostly affect changes in bioaerosols concentration. Then, determined the critical points, visualizing changes of profile in stimulant effect of temperature, appeared to 7.5 °C in case of bacterial aerosol and 16.5 °C in case of airborne fungi. The sterilization phenomenon, essentially affecting the survival of viable airborne bacteria and fungi is strongly associated with synergistic effect of solar UV radiation and concentration of tropospheric ozone has also been studied. Furthermore, determined the sterilization factors, showing the susceptibility of the analyzed biological aerosols onto solar UV radiation, which appeared respectively: 9.2 cm²/Ws in case of airborne bacteria and 7.31 cm²/Ws in case of fungal aerosol. Also observed the diurnal fluctuations of bioaerosol concentrations, indicating the decrease of concentrations of both bioaerosol forms under the influence of solar UV and ozone.