

**THE INFLUENCE OF ENVIRONMENT MODIFICATION ASSOCIATED WITH THE VARIABILITY OF CHEMICAL PARAMETERS ON BACTERIAL ABUNDANCE IN THE AREA OF THE REVELVA CATCHMENT (SOUTHWEST SPITSBERGEN, SVALBARD)**

Klaudia Kosek<sup>1</sup>, Katarzyna Kozak<sup>1</sup>, Katarzyna Jankowska<sup>2</sup> and Żaneta Polkowska<sup>1</sup>

1. *Gdansk University of Technology, Department of Analytical Chemistry, Faculty of Chemistry, 11/12 Narutowicza St., Gdańsk 80-233, Poland; klaudia\_kosek@wp.pl, katarzynakozak.gda@o2.pl, zanpolko@pg.gda.pl*
2. *Gdansk University of Technology, Department of Water and Waste-Water Technology, Faculty of Civil and Environmental Engineering, 11/12 Narutowicza St., Gdańsk 80-233, Poland; kjank@pg.gda.pl*

**ABSTRACT**

Environmental pollution by organic compounds and metals became extensive as mining and industrial activities increased. Environmental pollutants originating from diverse anthropogenic sources have been known to possess values capable of degrading the ecological integrity of all environmental elements. The Arctic has undergone dramatic change during the past two decades. The phenomenon of Arctic pollution (besides small local sources) arises from a combination of long-range transport of pollutants and the Arctic haze phenomenon—locking contaminated air in the area for months. The most common group of contaminants in Arctic are persistent organic pollutants (POPs), characterised by durability and resistance to degradation. The residence time of those pollutants is long enough for them to be transported thousands of kilometers by the air and finally to be deposited in the Arctic.

The surface water samples were collected from the Revelva catchment located in the Wedel-Jarlsberg Land, in southwestern part of Spitsbergen in summer 2015. The main river (Revelva) is fed both directly by atmospheric precipitation, snow melt water streams and a river originating from the Arie glacier. Revelva drains into the bay of Ariebukta in the south, forming an estuary. In the upper part of the catchment, the main streams originate from the slopes of Eimfjellet and Skålfjellet. The catchment is characterised by an asymmetry, with a dominance of left tributaries, of which the proglacial Ariebekken is the largest. The Revelva catchment has only one small glacierised part but past glacial activity has left traces in its upper part. The bottom part of the Revelva valley is an elevated marine terrace, with abrasion stacks. The diversity of the catchment landscape provides an ideal setting for a comprehensive study of processes of pollutants deposition in different parts of the abiotic environment.

The main purpose of conducted research was to determine selected xenobiotics (e.g. PAHs, phenolic compounds, formaldehyde). Additionally, the total number of bacteria, size and biomass were checked. Chemical and microbiological analyses have been conducted using selected techniques, for example: gas chromatography coupled with mass spectrometry and spectrophotometry for detection of some chemical compounds. Average concentrations of sum of PAHs, sum of phenols and formaldehyde were 634 ng/L, 0.13 mg/L and 0.12 mg/L, respectively. Furthermore, parameters such as dissolved organic carbon, electrical conductivity and pH have been measured. Microbiological analyses have been conducted using epifluorescence microscope to estimate the impact of chemical compounds presence on the microbiological abundance. To understand all bacterial strategies, further metagenomic studies should be undertaken. Obtained results may serve as early warning signal of expected

environmental changes because even low pollutants concentration levels in polar regions may suggest a significant contamination of studied area.

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