

## CONTAMINANTS IN ARCTIC ECOSYSTEM- PERSISTENT ORGANIC POLLUTANTS AND HEAVY METALS IN ABIOTIC (SOIL) AND BIOTIC (BIRDS TISSUES) SAMPLES DERIVED FROM SVALBARD

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### ABSTRACT

Since Industrial Revolution anthropogenic activity caused severe changes in natural environment. Pollutants may pose serious environmental problem when introduced to the sensitive ecosystem. The introduction of compounds, like heavy metals or persistent organic pollutants may disrupt natural homeostatic mechanisms which in longer perspective may lead to the collapse of ecological balance. Their presence in Arctic environment may have a big impact on unique fauna and flora. Although such remote and isolated places like Svalbard should be unpolluted, some amounts of contaminants are transferred from lower latitudes with sea currents and air masses. Also because natural regeneration processes are slow, contamination may have a significant impact on the quality of the environment for a longer time compare to midlatitudes.

The main purpose of our study was to determine levels of chosen persistent organic pollutants in soil samples as well as persistent organic pollutants and heavy metals in samples derived from arctic birds. Heavy metal effect on biota is currently intensively investigated especially in sensitive environments, as well as persistent organic pollutants like DDT and they metabolites.

Soil may accumulate elements necessary for proper plant development, as well as toxic compounds, therefore could be a good indicator for changes occurring in Arctic. 30 samples from Longyearbyen areas were collected in 2015. Analysis done with GC-MS confirms the presence of 14 polycyclic aromatic hydrocarbons in soil samples from arctic tundra. PAHs are highly toxic, persistent and may bioaccumulate in the food chain. Source of those compounds could be both natural (volcanic eruption, forest fires) and anthropogenic (industry), and based on their origin three main groups could be differentiated (biogenic, petrogenic and pyrogenic). Distinguishing polycyclic aromatic hydrocarbons by source is a complex task and is based on individual analytes concentration.

Also biota is under bigger anthropopressure. In samples taken from arctic birds (Little auk) several persistent organic pollutants and heavy metals were detected in trace amounts. Although detected levels were low, pollutants may have significant impact on biota in longer time perspective, even in very small amounts. Special attention was addressed to mercury determination, as this metal is highly toxic and influence is currently well known for many species. Birds are ubiquitous, migrate long-distances and are usually high in the food chain network therefore are eagerly used as sentinel species.

Interdisciplinary work should be performed to fully understand changes occurring currently in Arctic. Svalbard ecosystem is a subject to continuous changes, therefore it is highly important to conserve its unique nature. Analysis performed on both soil samples and samples derived from Little Auk confirm the presence of several persistent organic pollutants and heavy metals.