

## POPULAR SCIENCE ABSTRACT

Bioaerosols are organisms or their fragments that occur in the atmosphere. These organisms include bacteria, viruses, plant cell debris, fungi, as well as cyanobacteria (blue-green algae) and algae. Previous research more often focused on bacteria, viruses, and fungi, which caused that the cyanobacteria and algae present in the air are the least recognized organisms in both aerobiology and phycology.

Blue-green algae and algae are emitted to the atmosphere primarily from water areas, although their presence was also found in the soil, on the surface of plants or buildings. For the first time, these organisms were recorded in the air in 1844 by the father of evolution - Charles Darwin. Since then, scientists from around the world have demonstrated their significant influence on both the environment and human health. So far, it was demonstrated, that cyanobacteria and algae in the air can play a role in the formation of clouds, and also like atmospheric aerosols can absorb and scatter solar radiation, which means that they play a role in climate change. Importantly, cyanobacteria and algae can be inhaled by humans and can accumulate depending on the diameter in various sections of the respiratory system. At the same time, they cause among other allergies, rhinitis, dermatitis, and fever. In addition, they can transport harmful substances to the human respiratory system.

In connection with the above, **the objective** of this project is to determine the amount and species composition of algae and cyanobacteria in atmospheric air in the area of the Gulf of Gdansk. The composition and quantity of algae and cyanobacteria can change depending on the time of day, but also the season. Therefore, both of the above-mentioned parameters will be measured for 24 hours divided into day and night 4 times a month throughout the year. The collector used for sampling has six cascades whose nozzles have diameters adjusted to reflect the human respiratory system. As a result, we will be able to determine how many and what algae and cyanobacteria are present in the smallest size particles and can be transported up to the human lungs, which means that they are particularly dangerous to human health. In addition, the surface layer of the sea will be taken in parallel, in which the composition and quantity of algae and cyanobacteria will also be determined. From collected from the air the samples, the authors of the project want to create a Culture Collection of Airborne Algae, so that in the future they can be used for further scientific experiments such as the transfer of toxic substances.

The studied region is particularly important because it is visited by thousands of tourists throughout the year, who are particularly eager to spend time on the sea. On the other hand, on the Baltic Sea, highly toxic blooms of cyanobacteria that can be emitted into the atmosphere and inhaled by people, causing later negative health effects are recorded every year. Therefore, prohibitions on bathing or practicing water sports during this period do not protect against the negative effects of cyanobacteria and algae. In addition, the period of activity of algae and cyanobacteria in the sea is not limited to the summer, because the Baltic Sea usually does not freeze during the winter. Therefore, this research is planned for the entire calendar year.

The results of the project will provide valuable knowledge on the amount and species composition of bioaerosols, which is important both in terms of biogeography and biodiversity of microorganisms. They will allow to determine the size distribution of cyanobacteria and microalgae in the atmosphere, thanks to which it will be possible to conclude about their harmfulness. These results may also shed new light on the use of coastal recreation areas, especially during the summer, when toxic phytoplanktonic blooms occur regularly around the Gulf of Gdansk. The unique collection of cultures created will allow you to learn about the survival of algae and cyanobacteria from the atmospheric environment. In addition, these organisms may be used in the future for further laboratory experiments and the development of genetic methods