Bisphenol F and S (BPs) are increasingly frequent pollutions of the environment. Due to the lack of efficient systems of BPs removal in wastewater treatment plants, they may contaminate drinking water. BPs have harmful effects on both human beings and other organisms. Hence they have become one of the significant environmental concerns. Thus, there is a need to establish technologies to treat waters polluted with BPs. Many plants can uptake and decompose organic compounds in their tissues. Besides plants, bacteria are also helpful in removing toxic compounds from the environment. Some bacteria use a wide range of enzymes which cause the compounds to be more degradable or assimilable to plants. Additionally, some bacteria use various mechanisms responsible for easier removal of compounds and increased plant biomass, thus increasing pollution uptake (their "clean-up system"). These mechanisms involve, i.e., the production of siderophores or nitrogen fixation. Our project will focus on cooperation between bacteria with the "clean-up system," and plants introduced to the wastewater contaminated with BPs and study their effectiveness in BPs removal. Therefore, **the main aim of our project is to study the interactions between bacteria and plants and their cooperation during the removal of BPs from wastewater**. On the one hand, we will monitor the concentration of BPs in wastewater and plant tissues. We will also assess the interaction of BPs with other pollutants present in the wastewater and changes in the wastewater microbiome under the influence of BPs and bacteria having a 'clean-up system.' On the other hand, we will study the interactions between bacteria and plants. These studies will involve a global analysis of the gene expression (RNA-Seq) of the tested plants exposed to BPs stress in both water systems – with and without introduced bacteria and in control plants without contaminants. Moreover, we planned to evaluate the plant's morphological, physiological, and biochemical responses to the BPs and introduced bacteria. We will monitor bacteria survival during BPs degradation and analyze the transcription level of the microbial genes encoding the "clean-up system."
Such a comprehensive analysis will enrich our understanding of the plant-bacteria interactions during contaminant removal from the aquatic environment. The expected results may contribute to the future development of new, highly needed strategies for water purification.