

### Educational project summary

The aim of this study is to investigate the effect of herbicides, phenoxy-acid derivatives and triazines, on the construction and function of lipids of soil microscopic fungi and to determine the mechanisms developed by the tested microorganisms allowing them to counteract the toxic impact of pesticides. Selected microorganisms are an important component of soil ecosystems. The study on the impact of herbicides on modifications of lipid profiles of these microorganisms, including signaling lipids have an innovative character.

In the first stage of the study the effect of herbicides on growth of tested fungi and their biodegradation ability will be determined. Another part of the project will cover the analysis of the lipid profile of selected microorganisms treated with pesticides. Fatty acids, phospholipids and triacylglycerols will be identified. As part of this stage will be determined ergosterol. The research will also involve cardiolipins. Fungal dolichols will be also investigated. The aim of the next stage of research will be to examine permeability and fluidity of biological membranes of fungi. It is expected to observe the changes in the protein profile of microorganisms induced by the presence of toxic impurities. The last stage of the study will cover the examination of signaling lipids secreted by microorganisms, including oxylipins. Based on qualitative determinations, quantitative research dedicated to the oxylipins secreted to culture medium in the absence and presence of herbicides will be conducted. The changes in the quantity of oxylipins in fungi in contact with wheat seedlings will also be determined.

It is believed that only 0.1% active pesticides used in agriculture go straight into the target organisms, more than 99% are dispersed in the environment affecting the living organisms. Selected microbes play important roles in maintaining the balance of the ecosystem. The results concerning the impact of herbicides on microbial lipids obtained in this project will expand our knowledge of the ecology of fungi. Using advanced mass spectrometry techniques we expect to obtain new information on lipids that was unavailable to us a few years ago.