

DESCRIPTION FOR THE GENERAL PUBLIC (IN ENGLISH)

The main goal of the project is check whether and what extent the plants (for example: rape) and bacteria stimulate the growth of plants inhabiting in their root zone contribute to the acceleration of the process of degradation (bags, plastic wrap, etc.) from environmental.

Basic research will be carried out using microorganisms, which play an important role in the proper functioning of the soil ecosystem. These microorganisms produce enzymes that allow them to obtain energy from coal which is the main component of plastics there from the supposition that they can play a very important role in accelerating the decomposition of such waste. In addition, these bacteria have been classified into rhizobacteria that stimulate plant growth due to the ability to produce phytohormones. This means that they have the ability to support the development and improvement of the condition of the plant, which was previously tested in the rape plants with presents of heavy metals. In this project the research material will be rape that belong to energy plant which is used in the production of biofuels. The aim of the project is check whether used bacteria will stimulate rape to the growth in plastics contaminated areas (biodegradable - PLA foils and classic defaulting in the environment for many years - PET). Foils will be compared with a similar application in industry: PLA and PET (production packaging). Therefore, an additional objective of the study will be answer for the question whether so selected organisms and plant can contribute to the acceleration of decomposition of plastic waste.

The project will be conducted in several stages involving basic research carried out in the laboratory or greenhouse. The first step will be produce PLA and PET foil with similar thickness without any additives, e.g. dyes. Then, it will be checked ability to grow about 30 bacterial strains in the presence of PET. Similar studies have been carried out on PLA film. The activity of selected strains in a biodegradable foil will be tested in laboratory conditions. The most active bacteria will be be used for further research a. i. it is necessary to investigate the effect of bacteria on the process of seed germination, growth and development of rape in the presence of these factors. An important task will be to determine the relationships between the same organisms and their impact on defragmentation of the both foils. This test will be performed under controlled conditions in the laboratory. Similar research will be carried out under greenhouse in pots with soil containing relevant factors examined. After the end of the experiment will be checked number of bacteria, the condition of the plants, changing the structure of the foils. The results will be analyzed using the appropriate software to calculate the statistical significance.

Plastic waste remain in the natural environment for many years. As a result of continuous increase in demand for packaging and foils, rubbish dumps and other places of deposit of such materials occupy more and more areas in the environment. Many researchers taken up the search for microorganisms capable of plastics biodegradable, however, they often choose bacterial strains naturally present in environments with high temperatures a. i. thermophilic being active in composting conditions. It is necessary to find the mesophilic strains that would have been active in the environment for most part of the year of temperate climate. In addition, there aren't any research where use of bacteria that stimulate the growth of plants and plants that through interaction can contribute to the management of contaminated areas and their faster revitalization. The results obtained in this project will select bacterial strains, which in greatest extent improve condition of rape in areas contaminated by plastics waste, and among them those that have an influence on accelerating the decomposition of certain types of foil.