The potential of microorganisms in the face of soil salinisation and progressive climate change

INTRODUCTION

Drought and salinity are among the biggest problems for agriculture, with flooding/waterlogging causing significant changes in the microbiome and major crop losses. Over the last three decades, the number of extreme weather events, including hydrological events, has increased by 60% in Europe. Soil and water salinisation is increasing rapidly as a result of anthropogenic factors. It is estimated that about 5,500 ha of land in Poland is saline, particularly in the Kujawsko-Pomorskie and Silesian Voivodeships. Between 1995 and 2015, according to the Monitoring of the Chemistry of Arable Soils of Poland, an increase in the proportion of saline soils was observed in Poland. Globally, about 833 million ha (~9%) are affected by soil salinisation, mainly in Russia, Kazakhstan and Australia.

Ongoing climate change is forcing the search for new adaptation solutions in agriculture. Reducing the use of mineral fertilisers could help reduce soil salinity, but precipitation is required for real salt movement in the soil and leaching, and with climate change it is difficult to predict whether this will be sufficient.

OSMO-PROTECT

To meet the agricultural sector's demand for new solutions, we are implementing the OSMO-PROTECT project.

The main objective of the project is to develop an innovative microbial biopreparation to counteract the effects of osmotic stress in the soil environment and in plants as a result of climate change and human activities.

Based on the microorganism collection of the Department of Microbiology of the IUNG-PIB, strains with the ability to produce IAA, solubilise phosphorus, produce osmoprotectants and exopolymers, and be resistant to salt stress and temperature fluctuations have been selected as part of the research carried out so far. Initial tests have also been carried out, confirming the positive effect of these strains on plant germination under salt stress conditions. The selected bacteria will form the microbial component of the product to be developed as part of the OSMO-PROTECT project.

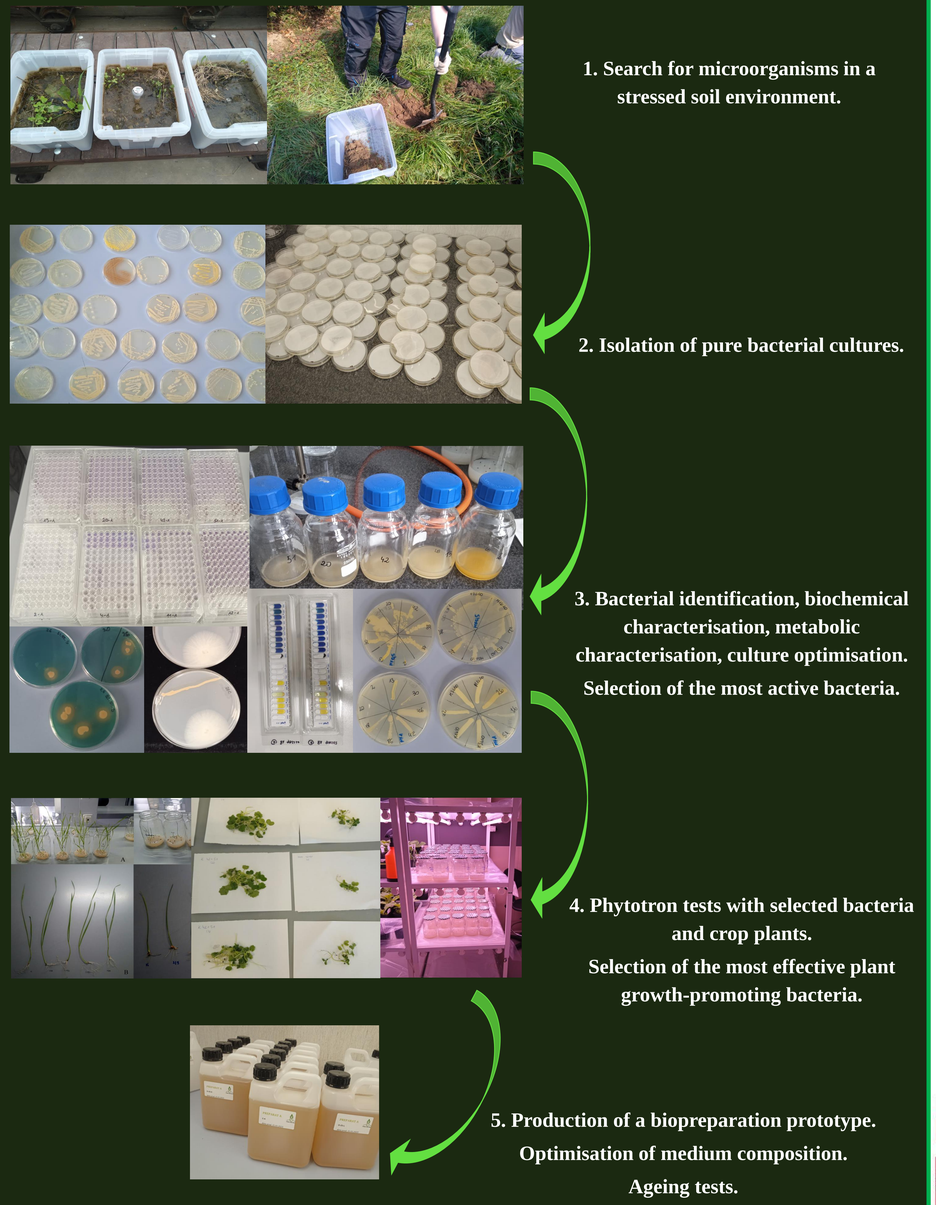

Figure 1. *Current project milestones*

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OSMO-PROTECT

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