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COMPARATIVE ANALYSIS OF SOIL DEGRADATION AND SOIL STRUCTURE IN CROPLANDS AFFECTED BY EROSION AND SOIL DEHYDRATION TREATED WITH A BIOLOGICAL SOIL CRUST FORMING ALGAL CULTURE

A talajpusztulás és talajszerkezet összehasonlító vizsgálata biológiai talajkérget képző alga tenyészettel kezelt erózió és talajszáradás sújtotta termőterületeken

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Climate-related land degradation and desertification threaten around half of EU member states. In Hungary, wind and water erosion affects 2.3 million hectares of land. One of the most important indicators of soil degradation is the water retention capacity of the soil. Therefore, the primary objective is to maintain or increase it. Due to their adaptation to extreme enviromental conditions, soil algae can survive in drought-stricken areas. With their contribution, biological soil crusts can be formed on the top layer of the soil. Soil crusts can stabilize the surface of the soils, enhance the water retainment, thus indirectly contributing to the settlement of higher order vegetation. Therefore, soil algal cultures can be applied to inoculate desert, steppe and eroded areas. The basis of our demonstrated soil crust-forming technology is the *Klebsormidium bilatum* filamentous green soil algae developed by Albitech Biotechnology Ltd. In 2020, we examined the impact of algal inoculation on brown forest soils in sloping arable land. We measured the extent of soil degradation by artificial rainfall simulation, carried out soil moisture, aggregate stability, macro- and microporosity, and soil crust structural tests. According to porosity tests and soil moisture measurements, the formed algae crusts on the soil surface had a beneficial effect on the soil structure. The more favourable micromorphological structure also caused the deeper layers of the soil more aerated, which had a positive effect on the hydrological properties of the soil. The established algae layer and the improvement in soil structure contributed to a reduction in soil losses caused by water erosion. As a result, we also experienced an increase in yields of corn and spring barley in sloping areas treated with soil algae.

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