10th World Congress and Expo on Applied Microbiology November

November 21-22, 2022

Webinar

Sas Paszt L et al., Appli Microbiol Open Access 2022, Volume 08

Innovative biofertilizers improving yielding of horticultural crops and soil fertility

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To obtain high yields in intensive horticultural and agricultural production, high levels of mineral fertilization combined with the application of chemical plant protection products are commonly used. This results in a loss of the biological potential and erosion of soils, which leads to deterioration in the quality and fertility of cultivated soils. An alternative to such production is the use of microbially-enriched biofertilizers, biostimulators and composts. The aim of the study was to evaluate the effects of the applied microbial biofertilizers on the growth and yield and develop innovative technologies for improving the quality of soils of selected species of horticultural plants. We have developed innovative consortia of beneficial microorganisms on the basis of the resources collected in SYMBIO BANK of the Department of Microbiology and Rhizosphere, National Institute of Horticulture Research in Skierniewice. The results of the experiments demonstrated a positive influence of the microbial method of cultivating fruit and vegetable crops with the use of beneficial microorganisms and mineral fertilizers enriched microbiologically on the vegetative growth and yielding of plants and the occurrence of beneficial groups of microorganisms in the rhizosphere of those plants. Moreover, the application of beneficial microorganisms and biofertilizers positively affected the germination of vegetable seeds and seedlings emergence. Due to vegetable seeds treatments with beneficial microorganisms, the dynamics of root and hypocotyl growth at the early stages of plant development was improved, as well as further growth of plants was stimulated. The application of beneficial microorganisms and biofertilizers also positively influenced photosynthetic activity monitored by chlorophyll a fluorescence in leaves. As a result of the application of beneficial microorganisms and biofertilizers in cultivation significantly higher yields of the tested fruit species were achieved, with better storage and processing qualities, compared to conventional production with standard NPK fertilization. The use of beneficial microorganisms and biofertilizers in cultivation of horticultural plants will multiply their positive impact on the yield potential of horticultural plants and improve the quality of soils. Widespread use of the innovative bioproducts in cultivation of horticultural crops will help improve the quality of soils and increase the profitability of horticultural farms by reducing production costs.

Biography

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Received: September 01, 2022; Accepted: September 09, 2022; Published: November 22, 2022