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Is the enrichment of organic fertilizers with nitrogen-fixing microorganisms effective in soils ubiquitous in these microbes?

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Biofertilizers are fertilizing products containing living microorganisms that, when applied to the soil or directly to a seed, colonize the rhizosphere and/or the plant promoting growth by increasing the availability of nutrients. Biofertilizers may improve the bioavailability of nutrients through natural processes such as biological nitrogen fixation, phosphorus solubilization, or through the synthesis of growth promoting substances. Organic fertilizers enriched with heterotrophic free-living nitrogen-fixing microorganisms have recently appeared on the market, seeking to enhance nitrogen fixation by placing the microorganisms directly in the food substrate. However, these nitrogen-fixing microorganisms are ubiquitous in agricultural soils, which allow question of the usefulness of enriching the organic fertilizers in such microbes. Unless the placement of the microorganisms next to the food substrate can give them competitive advantages and increase the biological nitrogen fixation. Field and pot experiments were carried out to compare the performance of two organic fertilizers enriched with free-living nitrogen-fixing microorganisms with other organic and mineral fertilizers. A sequence of horticultural crops (Lettuce-Lettuce-Turnip) was repeated for two years in the same field plots and pots. In the third year, barley was grown without fertilization to assess the residual effect of the fertilizers. Anion exchange membranes were used to monitor nitrate-nitrogen in the soil and plant dry biomass and nitrogen concentration in plant tissues to assess plant nutrient uptake and nitrogen use efficiency. Biofertilizers displayed results lower than mineral fertilizers but higher than organic fertilizers without microorganisms' addition.

Biography

Margarida Arrobas has a bachelor degree in Agronomy, a MSc Degree in Crop Production and a PhD in Edaphic and Environmental Sciences. She has been a lecturer at the Polytechnic Institute of Bragança (IPB) since 1986. She teaches several curricular units in the scope of Soil Fertility and Fertilizers and Plant Nutrition. She guides several MSc and PhD students and also several foreign students in laboratory internship. She is a member of the Executive Committee of the Mountain Research Center of the Polytechnic Institute of Bragança. She is the coordinator of the Analytical Chemistry Unit - Laboratory of Soils and Plant Analysis of IPB. She is author/co-author of more than 100 published scientific and technical papers. She participated in the organization of two international congresses and participated in 17 international and national research projects.

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