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USE OF RHIZOSFERIC MICROORGANISMS TO IMPROVE PLANT RESPONSE TO DROUGHT STRESS AND PRODUCE QUALITY

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Intensive agriculture and climate change have induced worldwide a progressive soil depletion and biodiversity erosion, leading to rising crops needs for fertilization and plant protection, accompanied by a gradual loss of effectiveness of chemical fertilizers and phytosanitary products. The resilience of plant/soil systems to abiotic stresses can be strongly dependent from soil biologic fertility and biodiversity. Soil microorganisms can modify the physiological plant response to biotic and abiotic stresses, and several microbial strains have already been selected and made commercially available as biofertilizers. Plants can be supported by soil microorganisms to tolerate drought by several direct or indirect mechanisms. Drought stress drastically reduces plant growth and crop yield, mainly by reducing the plant photosynthetic activity due to stomatal closure or by structural and

functional changes in the photosynthetic apparatus. The physiological behavior of plants in response to drought can be significantly different when they are inoculated with rhizospheric selected microbial strains or consortia; in particular, gas exchange parameters are affected, and an improved stomatal conductance allows to maintain a good photosynthetic activity even under low water availability. Produce yield and quality can be strongly affected, relying on microorganisms and plant species. Therefore, a proper soil management, respecting the micro biotic components and making use of selected microorganisms as inoculants, can both support agricultural activities in drought seasons and optimize the use of the water source.

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