

PF-MA-02 Impact of beneficial microorganisms on strawberry growth, fruit production, nutritional quality and volatilome

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Arbuscular mycorrhizal fungi (AMF) colonize the roots of most terrestrial plant species, improving plant growth, nutrient uptake and biotic/abiotic stress tolerance. Similarly, plant growth promoting bacteria (PGPB) enhance plant fitness and production. In our study three different AMF (*Funneliformis mosseae*, *Septoglomus viscosum* and *Rhizophagus irregularis*) were used in combination with three different strains of *Pseudomonas* sp. (19Fv1t, 5vm1K and Pf4) to inoculate plantlets of *Fragaria x ananassa* Duch var. Eliana F1. The effects of the different fungus/bacterium combinations were assessed on plant growth parameters, fruit production and quality, including health-promoting compounds. Uninoculated plants were kept as controls. At harvest, fresh and dry weights of roots and shoots, mycorrhizal colonization and concentration of leaf photosynthetic pigments were measured in each plant. Many fruit parameters were recorded: pH, titratable acids, concentration of organic acids, soluble sugars, ascorbic acids and anthocyanidins; volatile and elemental composition were also evaluated. Data were analyzed with standard statistical methods (ANOVA) and the data obtained from all analyzed parameters were subjected to multivariate statistical methods (PCA and PCA-DA). In general, AMF mostly affected the parameters associated with the vegetative portion of the plant, while the PGPB were especially relevant for fruit yield and quality. The plant physiological status was differentially affected by inoculations, resulting in enhanced root and shoot biomass. Inoculations affected fruit nutritional quality, increasing sugar and anthocyanin concentrations, and modulated pH, malic acid, volatile compounds and elements. In our study, we show for the first time that strawberry fruit concentration of some elements and/or volatiles can be affected by the presence of specific beneficial soil microorganisms. In addition, our results indicated that it is possible to select the best plant-microorganism combination for field applications, reducing chemical inputs, and improving fruit production and quality, also in terms of health promoting properties.

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