

## **FePO<sub>4</sub> nanoparticles as a source of nutrients: effects on plant transcriptome and on soil microbial communities and functions**

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Nanomaterials that can provide one or more macro/micro-nutrient to the plant are commonly referred as nanofertilizers. It has been shown that iron phosphate (FePO<sub>4</sub>) nanoparticles (NPs) can provide either iron or phosphate to plants grown in hydroponic (Sega D, PhD thesis 2018) though with a different plant-based efficacy. The present study is aimed to investigate the mechanisms of action of FePO<sub>4</sub> NPs in the plant-soil system. In order to get a deeper understanding of plant early responses to FePO<sub>4</sub> NPs exposure, microarray expression analyses have been performed in maize and cucumber plants grown in hydroponic for 24 hours. Considering the lack of knowledge concerning the impact of NPs on soil environment, two different soils (a silty and a clay one) were treated with FePO<sub>4</sub> NPs. Soil enzyme activities and respiration, together with DGGE analyses, showed that there was no impact on microbial community and metabolic functions, neither toxic effects. Moreover, FePO<sub>4</sub> NPs can provide available P in a competitive way in bare soils, with respect to triple superphosphate (TSP). The evaluation of the FePO<sub>4</sub> nanofertilization effects on plants grown in soil(s) is in progress.