The rhizospheric effects of wheat (*Triticum aestivum* L.) on phosphorus availability and some biological properties in calcareous soils from Shahrekord plain

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Abstract

The chemical conditions of the rhizosphere are known to considerably differ from those of the bulk soil, as a consequence of a range of processes that are induced either directly by the activity of plant roots or by the activity of rhizosphere microflora. Plant species have involved various adaptive strategies to acquire P from soil pools. Therefore, the objective of this research was to evaluate the rhizospheric effects of wheat (*Triticum aestivum* L.) on phosphorus availability and biological properties in 10 calcareous soils under rhizobox conditions. Thus, wheat plant was planted in rhizoboxes as a completely randomized design with three replications. After the harvest, rhizoboxes were dismantled, and dissolved organic carbon (DOC), microbial biomass carbon (MBC), microbial biomass phosphorus (MBP) and metabolic quotient (qCO_2) were determined in the rhizosphere and bulk soils. Also, available phosphorus was measured by chemical extractants methods including Olsen, Mehlich I, Bray II and calcium chloride. The results showed that DOC, MBC and MBP were strongly increased and qCO_2 was strongly decreased in the most rhizosphere soils as compared with the bulk soils. Also, the amount of P extracted with different methods was lower in the rhizosphere soils as compared with the bulk soils. The correlation studies showed that dry yield and P uptake of wheat have positive relationship with extracted P by Olsen, $CaCl_2$, Mehlich I and Bray II methods and microbial biomass P in both the rhizosphere and bulk soils. The results of this research showed that Olsen, $CaCl_2$, Mehlich I and Bray II extractants could be used to estimate wheat-available P in the studied calcareous soils. Also, microbial biomass P could be used to estimate wheat-available P in the studied calcareous soils.

Keywords: Chemical extractants, DOC, qCO_2, MBC, MBP.

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