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Arsenic behavior in different textured soils amended with farm yard manure

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Decreasing the bioavailability of arsenic (As) is one of the most significance factor for better crop growth as well as for human and animal consumption in As-contaminated soils. Application of organic based amendments may lower the uptake of As by the plant due to their immobilizing effect in As-contaminated soils. In present study, four levels of FYM (0, 5, 10 and 20%) and three levels of As (0, 60 and 120 mg Kg-1) were applied in three texturally different soils (clay, loam and sand) to investigate the effect of Farm Yard Manure (FYM) as an organic amendment on bioavailability, retention and uptake of As by the plant in texturally different soils artificially contaminated with As and to evaluate the ameliorating effect of FYM on growth of sunflower under As stress in texturally different soils. Results clearly showed that at both As levels the addition of FYM at 20% significantly reduced water soluble As-fraction in all three texturally different soils, with maximum was observed in clayey soil (31.2-36.2%) followed by loamy (29.98-35%) and sandy soil (22.78-26.1%) at both levels of As compared to As treatment without FYM. Retention of As (%) was increased with the addition of various FYM levels (maximum at 20%) at highest As level indicating maximum in clay texture (96.83%) and lowest in sandy textured soil (64.21%). Arsenic concentration in all plant parts (root, shoot, leaves and grain) was also significantly drop down with the addition of FYM at 20% at both As levels in all textured soils compared to plants where no FYM was applied and were in the order of roots>leaves>stem>grains. Due to immobilizing effect of applied FYM in As-contaminated soils, sunflower growth attributes were improved in all textured soils with the increase in level of FYM at both As levels. Lastly, addition of FYM, decreased bioaccumulation factor values in all textured soils under As stress. Our results clearly showed that by addition of FYM, the As was effectively immobilized from As-contaminated soils in all textured soils.

Biography

Muhammad Awais Piracha is working as PhD Scholar in the Department of Soil and Environmental Sciences at College of Agriculture, University of Sargodha. His research interest related to soil salinity and sodicity and their interaction with boron toxicity as well as soil biology and biogeochemistry especially arsenic and its phytoremediation.

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