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Long-term composting impact on SOC dynamics in a paddy field

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Rice residue has long been applied in Korean rice farming and it is also considered as a major management factor for improving soil productivity and its quality. Furthermore, managing soil organic carbon (SOC) is becoming a crucial issue for mitigating global warming. Few studies have conducted to identify the long-term composting effects on SOC dynamics in Korean paddy soils. The objective of this research was to evaluate soil organic carbon dynamics on a long-term single rice cropping system. Research was conducted in the research farm at NIAST-RDA, Suwon. Long-term P and K fertilization and lime application haven't significantly affected on SOC dynamics compared to control. We found that SOC contents were increased continually at the long-term composting plots and were enhanced in carbon storage rate. In conclusion, continuous returning of plant residues (i.e., composting) is recommended to sequester soil carbon for Korean paddy soils effectively. This results imply that continuous composting in a paddy field may contribute not only for increasing SOC in the soils but also for mitigating global warming through reducing carbon dioxide emission into atmosphere. Therefore, we recommend that continuous returning of plant residues in the paddy field has to be encouraged for producers, consumers, and policy makers.
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Soil quality dynamics in a long-term single rice cropping system

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Quantifying soil quality has been considered as an important procedure of evaluating environmental influences of cropping system. Korean paddy soils, single rice cropping system has long been managed, had not been evaluated soil quality and its dynamics. We evaluated soil quality of a 38-yrs continuous single rice cropping field using soil scoring techniques. Research was conducted on a coarse-loamy Gangseo soil (mixed, nonacid, mesic family of Fluvaquentic Eutrudepts) in Suwon, Korea. Treatments consist of combination of NPK fertilization, composting, lime, and silicate. Soil quality properties were included pH, soil organic matter, available phosphorus, exchangeable potassium, and available silicate. Soil quality indices were calculated the average of soil quality scores, which is response values of soil quality properties. We found that soil quality index in a long-term single rice cropping system tend to improve and showed over 0.9 out of 1.0. especially, composting treatment showed significant high in soil quality index. In conclusion, appropriate soil management may improve soil quality in a long-term single rice cropping system.
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