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Evaluation of Organic Phosphorus Compounds in Long-term Fertilization Paddy Soil by ^{31}P NMR

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The changes of phosphorus distributionrelated to P transformation in the plow layer of long-term fertilized paddy soil were investigated by ^{31}P NMR, in relation to the continuousapplication of chemical fertilizers (NPK), straw based compost (Compost), and chemicalfertilizer and compost (NPK+Compost) for 31 years. Continuousfertilization and rice cultivation decreased continuously the ratio of organicP to total P in plow layers with the lapse of year. In particular, the combined application of chemical fertilizer and compost accelerated the decrease in the organic P fraction, presumably due to promoting microbial activity in the plow layer, even though a high amount of organic P was inputted by compost. In this paddy soil, moderatelylabile organic P (MLOP) was a main organic P compound, which occupied 70-90 % of organic P, and showed the same tendency with total organic P fraction during the test,irrespective with treatments. A most of organic P in NaOH+EDTA extract was monoester P compounds and the followed by diester P form.

Key word: Organic phosphorus, 31P NMR, Long term, Paddy soil