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Characterization of Soil Chemical and Microbial Properties from Soybean Cultivation at Paddy Field

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[Introduction]

Paddy field is the largest agricultural land in Korea. As rice consumption has been reduced for years, farmers tried to cultivate upland crops in paddy fields. There has been not much information about converting paddy field which has anaerobic condition during rice cultivation to aerobic condition during soybean cultivation. This study investigated soil chemical properties and microbial community from paddy field soils with soybean cultivation.

[Materials and Methods]

Soils were sampled from paddy fields with continuous soybean cultivation over different duration: 1~3 year, 4~6 year and over 10 year. Ten sites from each year category were selected in Andong, Gyeongsangbuk and Gimje, Jeonbuk area in Korea. All samples were analyzed for chemical properties such as available P₂O₅, NO₃, etc. Microbial community was analyzed by NGS(Next Generation Sequencing, Chunlab corp.).

[Results and Discussion]

As duration of soybean cultivation increased, nitrogen related properties decreased and cations and phosphate related properties increased. Since chemical fertilizer and manure were applied every year, most cations accumulated in soil, while nitrogen ions easily eluviated through soil particles. After analysis of soil microbial community, soil with over 10 year cultivation had significantly different microbial groups than other soils. soils with less than 6 year cultivation had no different in microbial community or groups. This result may indicate that it require at least 6 years or more to change soil microbial community after converting anaerobic condition to aerobic condition or change rice to soybean cultivation.

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