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## An Analysis of Soils in Various Type of Urban Green Spaces Based on the Soil Organic Matter Quality

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Urban soil is the foundation of ecosystem functioning in urban green spaces, which plays an important role in sustainable urbanization. To maintain the ecosystem services provided by urban green space, it is important to manage and monitor the urban soil using appropriate evaluation parameters. Given that the urban soil is under direct and indirect influence of anthropogenic factors, the characteristics of urban ecosystem should be considered when assessing the soil quality. My research group already suggested a new soil quality parameter set for urban roadside soils, which is composed of soil penetration resistance (PR), pH, the C/H ratio of particulate organic matter (POM-C/H), POM-N, and soil microbial respiration (RES). This parameter set indicated that the urban soil has very unique quality of soil organic matter (SOM) and it should be considered as well as SOM quantity when assessing the urban soil status. In this study, we aimed at assessing the SOM quality in various types of urban green space using the C/H ratio and N of POM and analyzing the relationship between SOM quality and soil RES. Soil RES was regarded as a representative parameter for overall soil health and used as a dependent variable. The study was conducted in three different types of urban green spaces, which are roadside, urban park, and riverside green in Seoul, Korea. In each type of green space, three sites were selected varying in the degree of human disturbance. Soil samples were collected from the 0-15 cm depth, passed through 2mm sieve and dried before analysis. The POM was separated after wet sieving using 53 um screen and the C, N, and H contents of POM were measured using combustion analysis using the Carlo Erba NS Analyzer Carlo Erba, Milan, Italy). We calculated the POM-C/H as a proxy for aromaticity, which increases with high non-degradable OM. To trace the source of SOM, we measured the N stable isotope ratio of POM (POM- $\delta^{15}\text{N}$ ). On the same day of soil sampling, soil RES was measured on-site using the EGM CO<sub>2</sub> Gas Analyzer PP Systems, MA, USA). We performed multiple regression to analyze the relationship between SOM quality and soil RES. The POM C/H was higher in roadside soil than urban park, which means the urban roadside soil has a significantly higher amount of non-biodegradable compounds such as PAH. This further implies that OM quality is significantly different among types of urban green spaces. Using the POM delta N value, we found that OM in the roadside soils was originated from sewage sludge, animal urine/feces as well as atmospheric deposition. Analysis of OM source tracing in the urban park and riverside soil will be conducted. There was a negative correlation between POM C/H ratio and

soil RES, which indicates the poor soil health condition partly due to low OM quality. In conclusion, this study clarifies the importance of OM quality for assessing the soil in urban green spaces affected by anthropogenic factors and indicates that the SOM quality management needs to be established.