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Microbial contamination in spring at Otomeyama Park in Shinjuku Ward

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Spring water has been widely used for drinking, cleaning and agriculture because of its more stable supply than surface. Spring water is therefore, deeply linked to life of community residents. Springs are also valuable amenity spaces for local residents.

According to the national survey conducted by the Ministry of the Environment in 2008, 6.9% (295/4290) of groundwaters violated the environmental standards. It is also likely that spring water is contaminated. According to our groundwater quality in the central of Tokyo, we found that Escherichia coli (*E. coli*) was detected from 80% of spring water (4/5), 19% of unconfined ground water (11/58), and 5.2% of confined ground water (3/58). Since *E. coli* in spring water could be a major barrier to the usage of spring water for landscape and amenity microbial contamination of spring water is a matter of concern.

In this study, we surveyed microbial contamination of spring waters at Otomeyama Park in Shinjuku Ward, Tokyo. Shinjuku Ward is planning to extend Otomeyama Park, where spring water is expected to be used as amenity water. We measured water quality parameters on amenity use such as pH, odor, appearance, *E. coli*, turbidity, chromaticity, especially focusing on *E. coli* and total coliform (TC).

In order to understand recharge sources of spring water at Otomeyama Park, we collected topographical data based on boring explorations to infer the aquifer of spring water.

Then, we periodically investigated spring water quality at Otomeyama Park. Ground water samples in the same aquifer were also collected from surrounding wells, and were subjected to water quality analyses.

pH in spring water was in the range of 6.55-7.35, *E. coli* 1-4150 CFU/100-mL, TC 230-21000 CFU/100-mL, turbidity 0.2-20 degrees, and chromaticity 0.0-18.5 degrees. In particular, *E. coli* exceeded a guideline value for reclaimed water as amenity water. Turbidity and chromaticity also exceeded the guideline values during wet weather. *E. coli* and TC in ground water obtained from the wells near Otomeyama Park were 146-1100 CFU/100-mL, and 508-25650 CFU/100-mL, respectively, which were comparable to those in spring water. Ratios of TC to *E. coli* in spring water and ground water were higher than those in sewage, indicating TC was relatively abundant in spring water and ground water. We will investigate *E. coli* and TC in spring water during wet weather and those in the soils at Otomeyama Park to evaluate their sources.

Keywords: spring, urban groundwater, amenity use, *E. coli*, water quality standard