

Characteristics of microorganisms in PM_{2.5} measured in Seoul and Beijing using NGS (Next Generation Sequencing)

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Particulate matter (PM), especially fine particles defined as particles less than 2.5 μm in aerodynamic diameter (PM_{2.5}) have significant effects on human health. Because of the very small particle size, PM_{2.5} generally has a long lifetime in the atmosphere varying from a few days to weeks and tends to spread over a much larger geographic region.

Microorganisms such as bacteria were found in mineral dust or other aerosol particles often (Iwasaka et al., 2009). Similar to the aerosol particles, bacteria and other microorganisms could be transported. They could move the continents due to their long enough residence time from days to weeks. Most windborne bacteria are transported less than 1 km from their sources, but the bacteria which are associated with dust can be transported more than 5000 km (Griffin et al., 2003; Iwasaka et al., 2009).

This study explores the groups of bacteria on the PM_{2.5}, their diversity, and their long-range transportation in the East Asia using Next Generation Sequencing (NGS). Air samples were collected in Seoul and Beijing. The sampling site in Seoul was located on the roof of the School of Public Health building at Seoul National University in Korea. The measurements of Beijing were made on the roof of Department of Occupational and Environmental Health Science, Peking University School of Public Health in China.

Through 16S rRNA PCR (Polymerase Chain Reaction) the library was constructed for the NGS, and the samples were titrate with real-time polymerase chain reaction (qPCR). The titrated samples were operated by the Illumina Miseq platform using 2*300 running kit.

A total of 559,507 reads were obtained and 7,665 reads were obtained per samples. For alpha diversity to see quantitative diversity of microorganisms, reads were standardized as 3,000 reads and for beta diversity to see the construction of communities of microorganisms, reads were standardized as 1,000 reads.

Characteristics of microorganisms in Seoul and Beijing which were analyzed as phylum and genus level will be discussed in the presentation.

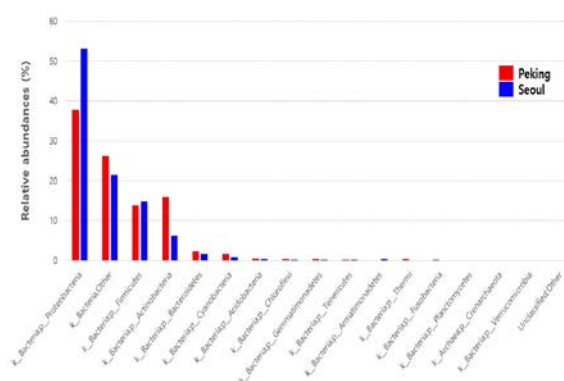


Figure 1. The relative composition of microorganisms in Seoul and Beijing.

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