Research Trends in the Treatability of Trace Substances and Evaluating Their Impact on the Environment

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Our modern life involves use of diverse natural and man-made substances. Because our conventional wastewater treatment systems have not typically been designed to remove all kinds of substances, the wastewater effluent and its discharging water bodies, such as rivers and lakes, contain diverse range of trace substances or “micropollutants”; they include endocrine disrupting chemicals (EDCs), pharmaceuticals and personal care products (PPCPs), antibiotics, disinfection by-products (DBPs), and their transformation products. Some of them even end up in our tap water. Then, what happens to humans and aquatic life when they are exposed to those chemicals in the waters? How can we manage real and potential risks posed by the trace substances in water and wastewater treatment plants? These are one of the biggest challenges for our water systems.

My talk provides recent topics on the management of the risk posed by various trace substances in water are discussed. A focus is on the control of trace substances in environmental and processed waters. In developed countries, effluents from municipal or industrial wastewater treatment plants are the major source of trace substances in aquatic environment, thus the reduction at the treatment plants are critical. Various post-treatments have been developed to enhance the removal of trace substances from wastewater, such as activated carbon, ozonation and UV. Alternatively, source control, such as on-site treatment of hospital effluents, is also a promising option. In my talk, a strategy of micropollutant reduction in Switzerland will be introduced. In developing countries, piped water supplied by municipal water treatment plants are not always safe, and the locals tend to use various point-of-use (POU) water treatment device for an additional treatment to ensure a clean drinking water supply. However, it is unclear if such POU water treatment systems are effective to remove pollutants. In my talk, a household survey in Vietnam regarding the removal efficiency of a poisonous trace metal, arsenic, by those POU water treatment systems will be introduced.

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