Current state concerning microchemistry material in sewerage facilities and surveillance studies on measures (the2)

Whole term	1997.4 ～ 2003.3	

(Purpose)

Quite a variety of chemical substances are produced and used in industrial activities and daily life. There are a lot of chemicals among them which have lately turned out to be harmful and whose influence cannot be neglected even though the quantity is small. As one of international activities, the PRTR (Pollutant Release & Transfer Register) which grasps the influence of chemical substances upon environmental media and puts information in order with the aim of performing the risk management of hazardous chemical substances has been institutionalized, and in Japan, too, the "Law Concerning Promotion of Grasp and Improvement of Management of the Amount of Specified Chemical Substances Discharged to Environment" has been established. Social attention to the environment is getting so high.

The purpose of this examination is to grasp the status quo of infinitesimal chemicals in sewerage and take environmental preservation measures against chemical substances, and the examination is to be implemented for six years from 1997. In two examinations carried out in 1999 through 2000, we selected four substances, antimony, molybdenum, boron and nickel, and conducted a fact-finding survey in sewage treatment plants throughout the country to grasp the in-coming state and behavior of these substances.

(Result)

(1) Results of the fact-finding survey

We examined the detection degree of the above four substances in in-coming sewage in 96 sewage treatment plants all over the country, selected sewage treatment plants to be examined nation-wide based on the values obtained therefrom, and carried out a fact-finding survey of, in principle, five kinds of water, i.e. in-coming sewage, in-coming water and flowing-out water in a first settling reservoir, discharged water and overall returned water, in summer, autumn and winter (three times in total). In the autumn examination, we additionally selected three more sewage treatment plants to increase the number of samples of sludge treatment system.

a. Boron: With regard to the change in concentration in the treatment process at the value of 50% (the median) which is considered to be a standard concentration of the examination results, the concentration of boron was 0.26mg/lit. in in-coming water, 0.22 mg/lit. in in-coming water in the first settling reservoir, 0.26 mg/lit. in flowing-out water in the first settling reservoir, and 0.20 mg/lit. in discharged water. In two sewage treatment plants which receive hot-spring wastewater, the concentration of boron was about ten times as high as that of other sewage treatment plants.

b. Molybdenum: Molybdenum was not detected in about 60% or more of the examination results, and even if it was detected, the quantity was very small. After all, the concentration of molybdenum in the sewers was very low.

c. Nickel: The concentration of nickel was 0.023 mg/lit. in in-coming sewage, 0.024 mg/lit. in in-coming water in the first settling reservoir, 0.019 mg/lit. in flowing-out water in the first settling reservoir, and 0.008 mg/lit. in discharged water.

d. Antimony: The concentration of antimony was 0.0011 mg/lit. in in-coming sewage, 0.0011 mg/lit. in in-coming water in the first settling reservoir, 0.0009 mg/lit. in flowing-out water in the first settling reservoir, and 0.0007 mg/lit. in discharged water. The ratio of reduction of antimony was 18.2% in the first settling reservoir, 22.2% in the reaction tank and 36.3% in the process from in-coming water to discharged water.

(2) Calculation of the ratio of load quantity

We calculated the ratio of load quantity for in-coming water in each treatment process by obtaining the load quantity of each substance from the water-quality concentration results. As a result, the reduction of boron in discharged water was the lowest among the four kinds of substances used in this examination, and we came to know that it was difficult to remove boron in the sewage treatment process. The reduction of molybdenum in discharged water was 50%, that of nickel in discharged water was 70%, and that of antimony in discharged water was about 35%.

(3) Grasp of behavior of these substances by exhaust gas

We also examined exhaust gas. We detected nickel in a part of sewage treatment plants , but no other substances were detected in exhaust gas.

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