

Surveillance study on microchemistry material in sewerage facilities(the3)

Whole term

1997.4 ~ 2003.3

(Purpose)

There is a wide range of chemical substances manufactured and used through the industrial activities and day-to-day living. Reports suggest that influences of some of the substances have been turned out to be unignorable even if the amount is extremely small.

As an international trend, social interest in the influences caused by chemical substances increase as PRTR (Pollutant Release & Transfer Register), compiling the data of the influence on environmental media cause by chemical substances and disclosing the result to the public, is institutionalized.

Six years since 1997 have been spent for this research to understand the current status of micro-chemical substances in the sewage facilities. TOX (Total Organic Halogenated) and THMEP (Trihalomethane Formation Potential) for 1997 and 1998, antimony, molybdenum, boron and nickel for 1999 and 2000, vanadium, selenium, barium, arsenic and aluminum for 2001 and 2002 are selected as the subjects of the research. This paper is to summarize the analysis of behaviors of each process based on the research result of 2002.

(Result)

(1) Selection of the substances

Vanadium, selenium, barium, arsenic and aluminum are chosen for the research subjects. This is because those substances are included in PRTR, likely to be contained in sewage and have little research case examples or, actual condition survey is required for those substances for efficient usage of sludge.

(2) Actual condition and detail surveys

An actual condition survey is carried out in summer (July and August) and a detail survey is in autumn (October and November). Samples are taken from inflowing sewage, final effluent, returned water, surplus sludge, early sediment, thickened sediment, digested sediment, dewatered sludge and incremented ash. The summary of density (50%) at each survey point is as follows.

- a. Vanadium: Inflowing sewage is 0.006mg/l and final effluent is 0.005mg/l. The results of many facilities are under the lower limit of the quantitative determination. Other results: early sediment is 0.040mg/l, surplus sludge is 0.030mg/l, dewatered sludge is 6.6mg/kg and incremented ash is 32.5mg/kg.
- b. Selenium: Inflowing sewage is <0.0003mg/l and final effluent is <0.0003mg/l. The results of many facilities are under the lower limit of the quantitative determination. Other results: early sediment is 0.0010mg/l, surplus sludge is 0.0030mg/l, dewatered sludge is 1.1mg/kg and incremented ash is 0.8mg/kg.
- c. Barium: Inflowing sewage is 0.161mg/l and all of the facilities have the values higher than the lower limit of the quantitative determination. On the other hand, final effluent is 0.02mg/l and all of the results of all the facilities are under the lower limit of the quantitative determination. Other results: early sediment is 4.97mg/l, surplus sludge is 3.20mg/l, dewatered sludge is 565mg/kg and incremented ash is 135mg/l.
- d. Arsenic: Inflowing sewage is 0.0008mg/l and final effluent is 0.0006mg/l. The results of many facilities are under the lower limit of the quantitative determination. Other results: early sediment is 0.0092mg/l, surplus sludge is 0.0134mg/l, dewatered sludge is 1.9mg/kg and incremented ash is 5.3mg/l.
- e. Aluminum: Inflowing sewage is 4.3mg/l and final effluent is 1.50mg/l. The results of all the facilities are under the lower limit of the quantitative determination. Other results: early sediment is 65.8mg/l, surplus sludge is 159.0mg/l, dewatered sludge is 18,500mg/kg and incremented ash is 72,000mg/kg.

(Summary)

It is found that all of the substances tend to be thickened as they transformed to the sludge system after the water treatment process.

Collaborators: Sewage Technical Development Meeting

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Keywords

Microchemistry material, PRTR, Selenium, Arsenic, Vanadium, Barium, Aluminum