

# Study on Occurrences of Perfluorinated Compounds and Impact of Industrial Wastewater on Water Environment

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## 1. BACKGROUND AND OBJECTIVES

Perfluorinated Compounds (PFCs) have widely been used as surface-active agents in industries and households. Some reports indicated that PFCs were not removed at the conventional treatment processes and were discharged into environment. Despite this fact, there is little knowledge of the PFCs found in industrial wastewater. Therefore, main objective of this study was set to examine the impact of industrial wastewater to water quality in the river.

## 2. METHOD OF SURVEYS AND EXPERIMENTS

(1) Survey for Behavior of PFCs in River : This survey was carried out at 5 rivers into Lake Biwa.

(2) Survey for Impact of Industrial Wastewater to Water Quality of River : This survey was carried out at Yasu River basin. Samples were collected from its mainstream, tributaries and industrial wastewater.

(3) Survey for Occurrences of PFCs in an Industrial Wastewater Treatment Plant : This survey was carried out at an industrial wastewater treatment plant which received wastewater from the factory producing fluorine contained resin.

(4) Analytical Methods : The samples were analyzed by using LC-MS/MS after pretreated with the method of accelerated solvent extraction and solid-phase extraction.

## 3. RESULTS AND DISCUSSIONS

Summary of the results is shown in **Fig.1**. In the first survey, the PFCs were detected in all of 5 rivers flowing

into Lake Biwa. The average concentration was 63 ng/L and the maximum concentration was 120 ng/L at the mouth of Yasu River. The results suggested that PFCs with longer carbon chain are attached to suspended solids easily compared to that with the shorter one. They also suggested that the concentration of liquid phase PFCs increases on the rainy day.

In the second survey, PFCs were not detected in upper area of Yasu River. However, PFCs concentration and their loading were increased after influx of Soma River. The contribution of PFCs loading from Soma River was about 80 %. In addition, PFCs were detected at all 9 points of industrial wastewater inflow and maximum concentration of PFOA was 190 ng/L. Moreover, the concentration of industrial wastewater was 3 times higher than river water. PFCs profile of river and industrial wastewater were similar. Therefore, this indicates that there is certain impact of PFCs pollution from industrial wastewater on river environment.

In the third survey, the highest concentration of dissolved PFOA in the treatment plant of industrial wastewater was 50000 ng/L in the biotreatment tank. PFCs concentration was decreased about 70 to 90 % in the powdered activated carbon treatment tank. After treated in aeration tank, the concentration in effluent water was 5000 ng/L.

## 4. CONCLUSION

As a result of this study, the occurrences of PFCs in river and industrial wastewater were examined and the impact of PFCs pollution from wastewater on river was indicated.

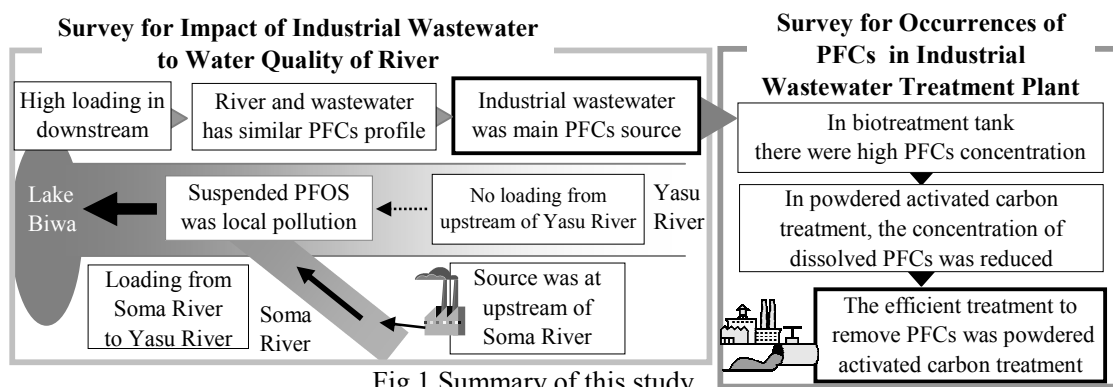


Fig.1 Summary of this study