

## Rapid removal of pharmaceuticals from water by surfactin-enhanced coagulation-flotation method using sodium dodecyl sulfate

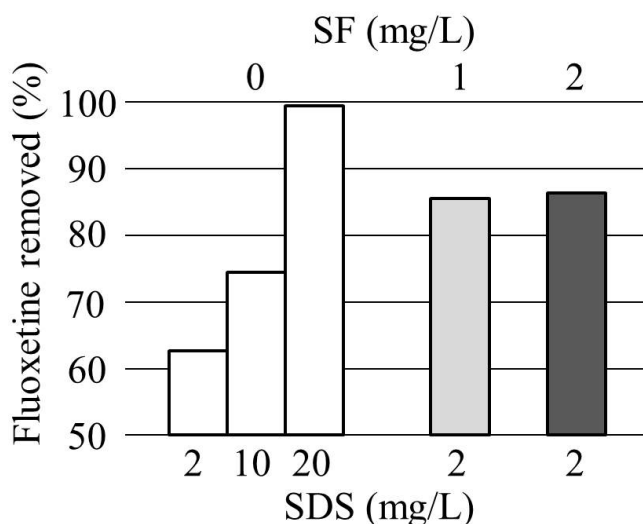
Kohei Fujimori<sup>1\*</sup>, Tohru Saitoh<sup>2</sup>

<sup>1</sup>Graduate School of Biotechnology and Environmental Chemistry, Kitami Institute of Technology, Koen-cho 165, Kitami 090-8507, Japan

<sup>2</sup>Department of Biotechnology and Environmental Chemistry, Kitami Institute of Technology, Koen-cho 165, Kitami 090-8507, Japan

\*e-mail: m1652500092@std.kitami-it.ac.jp

Recently, occurrence and fate of pharmaceuticals in aquatic environment has been significant concern in all over the world. However, these pharmaceuticals cannot efficiently be eliminated by current wastewater treatment techniques. In the present study, we designed a simple and efficient method to remove the pharmaceuticals from wastewater. The method was conducted by adding small amounts of anionic surfactant and polyelectrolyte after mixing for 10 seconds followed by feeding air bubbles on 0.3 L/min through a sintered glass filter by 5 minutes. Several pharmaceuticals examined were efficiently removed from water and incorporated into very small volume of formed coagulate. For example, the use of 20 mg/L sodium dodecyl sulfate (SDS) and 6.5 mg/L polyallylamine hydrochloride (PAH) allowed nearly complete (>99%) removal of 1 mg/L of an antidepressant, fluoxetine. However, its removal ratio decreased (ca. 60%) with decreasing the amount of SDS (2 mg/L). Combined use of 1 mg/L of a biosurfactant, surfactin (SF), improved the removal ratio to ca. 85% and was effective to reduce the amount of SDS required. The improvement may be ascribable to the high surface activity of SF. The behavior of some acidic and basic pharmaceuticals and the mechanism of the removal were investigated.



**Keywords:** Sodium dodecyl sulfate; Surfactin; Coagulation-flotation; Pharmaceuticals