

## **Experiments on Purification of Sedimentary Sludge by Micro-Bubble and Microorganism Activation**

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### ABSTRACT

Sludge gives a very big environmental load to the local sea area. Here, attention was paid to micro-bubble technology for application to the purification of sludge. The important point in this technique is to activate the bacteria existing in the area by micro-bubbles. In this study, our objects are to develop a new powerful purification system for sedimentary sludge using a micro-bubble device and liquid for microorganism activation. As the results of our experiments, we succeeded in reducing time to purify the sludge.

**KEY WORDS:** Micro-bubble, Microorganism Activator, Purification, Sludge.

### INTRODUCTION

It is very important to reduce sedimentary sludge in the ocean. Plans to reduce the sludge are usually dredging or sand covering. Dredging is a simple way and aims to cut off the sludge. But after cutting off, treating the dredged sludge takes much more time and, of course, cost. Sand covering, in general, gives a big load to living organisms and the ecological system. Here, a more efficient way is needed to reduce the sludge while not imparting environmental load in the local sea area. Now, we have micro-bubble technology. Micro-bubbles can change conditions into an aerobic state. If the bubbling stops, the situation changes into anaerobic state, according to recent research. So, we selected a method for decomposing the sludge by microorganisms. Therefore, our research targets purification experiments on oceanic sedimentary sludge by micro-bubbles and microorganism activator.

### EXPERIMENT

#### **Experimental Devices**

The experimental apparatus consists of two parts, shown in Fig. 1 and 2. The water circulates through two tanks. One tank generates micro-bubbles. The micro-bubbles have micro-size diameter and high solubility.

The other part is the experimental tank. The sludge is put in this tank. The two tanks are separated due to the high flow velocity created by the bubble generating pump.

We used sludge sampled from the ocean, as shown in Fig 3. Microorganism activator is used; this is liquid and mainly comprises Kelp and also includes nutrients and some enzymes.

Our used activator is reported to show effective results in purification for grease trap.

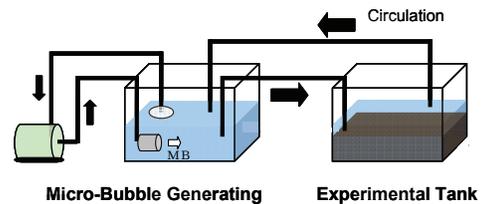


Fig. 1 Experimental Apparatus



Fig. 2 Experimental Apparatus



Fig.3 Catching Sludge