# Technology development for dewatering dredged sediments and its application for building artificial tidal flat in Ago Bay, Japan

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**Abstract**

The main target of this research is to restore the environmental quality of the ecosystem in Ago Bay, which has been deteriorated as a result of the continuation of pearl oyster culture for almost 110 years. Dredging the accumulated sediments which is rich with organic matters is one of the important ways to help ecosystem to achieve this objective. This work has been aggressively carried out in order to restore the environmental situation in Ago Bay which is supported by Japan Science and Technology Agency.

One of the main obstacles when treating dredged sediments is the very high content of water. In order to overcome this problem, treatment by coagulant is necessary to harden the dredged sediments and therefore dewatering can be performed easily.

Recently a new technology was developed in our project to perform this operation. This technology was given the name of High Biah System (HBS). Main components of HBS are: main stock tank, coagulant chamber, reactor, and dewatering system. Furthermore, continuous flow system operation can be achieved through full automatic system.

Different coagulants were tested to check their abilities to form bigger and stable flocks, after coagulation, water content was reduced from 90% to 60%. Treated sediments were applied for building different artificial tidal flats.

Bivalves are widely used as bio-indicators of heavy metals and other pollutants in the coastal areas, since bivalves are well known to concentrate these contaminants, providing a time integrated indication of environmental contamination. Therefore, safety of treated sediments with different coagulant was checked through deployment of the short necked clams in the prepared artificial tidal flats.

Five different experimental tidal flats were prepared; ARP, PELLETS, GYPSANDER, ECORTON, and SAND ONLY as a control flat. In each flat, 200 short necked clams were deployed inside stainless steel cages covered with nylon net. After 3 months of deployment sampling was carried out; mortality, length, height, growth, and heavy metals in the clam tissues were monitored. Maximum mortality was obtained with control flat (16%), whereas minimum mortality was with PELLETS (0%). Reasonable growth was recorded for the clams in different flats which exceeds 50% from the original values. Heavy metals were measured by ICP-MS. Although heavy metals in general show a little increase after 3 months of deployment, the concentrations were below the level of international harmful standards. Now HBS technology will be presented. This technolgy will be the backbone for building the artificial tidal flats which will support in the future restoration of detoriortaed environment.

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