

Evaluation of Seawater Quality in Fuel Bioremediation Field Experiment by AGP Test

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Hyogo prefecture has two types of shores; the north rim of the prefecture faces the Sea of Japan and the other side does the Seto Inland Sea which has several large industrial areas. The Sea of Japan is often stormy in winter. On the 2nd of January 1997, a great tanker accident occurred in the Sea of Japan. Approximately 6,200 kl of viscous heavy oil was spilled from a Russian tanker *Nakhodka* into the ocean. The spilled heavy oil greatly contaminated the north shorelines of Hyogo prefecture.

The oil-contaminated shores were cleaned up mainly by enormous human efforts including many volunteers and the local fishery people. However, some shorelines still remain to be cleaned up because the areas are difficult for people to access. Bioremediation is expected to be effective for cleanup of the residual oil from the shorelines, but there are few case-experiments of spilled oil bioremediation in Japan.

National Institute for Environmental Studies and The Hyogo Prefectural Institute of Environmental Science have been conducting some case-experiments of spilled oil bioremediation in a coastal area of the Sea of Japan in Hyogo prefecture. To conserve the ecosystem, evaluation of water quality in the biological respect has become important recently. Algal growth potential (AGP) test has been used to evaluate water quality in this respect.

Therefore, we carried out AGP tests using a diatom, *Skeletonema costatum* to evaluate the qualities of seawaters sampled from the maritime field where fuel oil bioremediation experiments were conducted. We carried out three types of AGP tests. (1) The first one employed the unfiltered seawater to evaluate the influence of the heavy oil spilled from *Nakhodka*. The results showed no adverse effect of the heavy oil on the phytoplankton growth. (2) The second one employed the seawater filtered with polycarbonate membrane (pore size 0.8 μm) to evaluate the influence of oil degradation by indigenous bacteria. Bacteria gave no significant influence on the phytoplankton growth. (3) The third one was performed to evaluate the effects of fertilizers used to stimulate microbial degradation of the heavy oil. Seawater filtered with polycarbonate membrane (pore size 0.2 μm) was subjected to AGP test to evaluate the influence of fertilizers on the growth of phytoplankton. No significant influence of fertilizers on the phytoplankton growth was found.

From these results, the bioremediation of the heavy oil conducted in the northern coastal area of Hyogo prefecture didn't influence the phytoplankton growth.