Dissolved Organic Phosphorus as a Possible Cause of Recent Harmful Dinoflagellate Blooms in Hiroshima Bay

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Shellfish poisoning has frequently occurred in Hiroshima Bay in recent years, and has damaged the intensive oyster culture in the bay significantly. In the case of A. tamarense and G. catenatum, we used in the present study, apparent utilization of dissolved organic phosphorus (DOP) rather than dissolved inorganic phosphorus (DIP) is was observed. There are similar reports on the studies carried out with other dinoflagellates. Dinoflagellates appear to utilize DOP compounds not only as a phosphorus source, but also as a source of carbon to gain energy for swimming. Recently, decrease in DIP concentration of the Ohta River, which is the major source contributing 90010 of total freshwater discharge into Hiroshima Bay, is reported. This is probably due to the directive of reduction of phosphorus load by the Japanese government since 1980. This might have promoted the species succession from diatoms which preferentially use DIP to dinoflagellates which have an ability to utilize DOP. Our study revealed that the proportion of DOP and DIP in the Hiroshima Bay was similar and a significant part of the DOP could be utilized by dinoflagellates, although the kinds of DOP compounds contained in the natural seawater are not well understood so far.