

A New Screening Method to Detect Environmental Pollutants in Coastal Seawater in Akita: Ecotoxicity Test Using Indian Medaka

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Summary

The potential adverse effects of environmental pollutants on aquatic ecosystems pose a serious global threat. Conventional studies on environmental pollutants employ the method of measuring the concentration of the environmental pollutants contained in water samples collected from the sites as well as the method of exposing aquatic organisms to environmental pollutants (ecotoxicity test). However, in the method of measuring the concentration of environmental pollutants, it is necessary to measure the concentration of each pollutant. This is because there is a high possibility of overlooking the detection of environmental pollutants other than the target. In addition, although the ecological effects of a target substance can be accurately evaluated by the ecotoxicity test method, a wide variety of pollutants discharged into the general environment cannot be detected in the aquatic environment by this method. Recently, our research group developed a new screening method to detect environmental pollutants in coastal seawater using marine medaka.

Therefore, the aim of this study was to more understand a new screening method using a bioassay that can comprehensively detect and evaluate the ecological effects of the environmental pollutants contained in aquatic environments.

Firstly, a bioassay employing the fish acute toxicity test was performed. Water was sampled from two sites, a coastal area where wastewater flows from a thermal power plant (site 1) and a fishing port near a paper mill (site 2). The results revealed that no ecological effects were observed at sites 1 and 2 in 2020, indicating the environmental pollutants that can adversely affect marine fish were not detected. Next, we estimated the lethal effects of 3-Chloroaniline, 3,4-Dichloroaniline, Triclosan, Fenitrothion, and Pyriproxyfen on *Oryzias melastigma* and *Oryzias latipes*. The results revealed that the lowest observed effect concentration (LOEC) values of 3-Chloroaniline and Fenitrothion for lethal effect were the same in *O. melastigma* and *O. latipes*. On the other hand, the LOEC values of 3,4-Dichloroaniline, Triclosan, and Pyriproxyfen for lethal effect in *O. melastigma* were lower than in *O. latipes*. These results highlight the importance of using marine organisms to evaluate the ecological effects of marine pollutants.