

Modification and Elimination of Ocean Pollutants with Marine Micro Algae

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To date, we have been investigated that the biotransformation (stereoselective reduction, regioselective glucosylation, acylation, hydrolysis, and so on) of various compounds with microorganisms such as yeast, thermophilic bacteria, fungi, and micro algae. Recently, we reported the functional modification of naturally occurring endocrine disruption related substances via enzymatic glucosylation. In this study, the functional modification and elimination of ocean pollutants, mainly synthetic endocrine disruption related substances, using marine micro algae was investigated as an improvement method of the ocean environment by the bioremediation.

The marine algae (*Chaetoceros gracilis*, *Chaetoceros* sp., *Nannochloropsis* sp., and *Pavlova lutheri*) were photoautotrophically cultivated in an artificial seawater (1 liter) for 2 weeks at 20°C with constant aeration by air with illumination by white fluorescent light (1000 lx). The substrate (dioctyl phthalate, *p*-*tert*-octylphenol, and *p*-*n*-octyloxyphenol; each 1.2 μmol) were added in the growing algal suspension (50 ml) and incubated at 20°C with gently shaking under white fluorescent light (1000 lx). The reaction mixtures were filtered on glass-filter to remove the algal cells. The used medium and the filtered algal cells were extracted respectively with diethyl ether, and then concentrated under reduced pressure. The remaining amounts of substrates in the used medium and the algal cells were determined by a GLC.

Dioctyl phthalate was accumulated in the algal cells in preference to the decomposition. Small amounts of *p*-*tert*-octylphenol and *p*-*n*-octyloxyphenol were detected in both the used medium and the algal cells. These results suggest that the pollutants were decomposed immediately after the incorporation into the cells.

Thus, it was found that the endocrine disruption related substances were decomposed or accumulated with marine micro algae.