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INDUCTION OF REACTIVE OXYGEN SPECIES IN HIGH LIGHT CONDITION AND ITS EFFECT ON MICROALGAL GROWTH

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Acclimation to light environments is one of the most important responses in photosynthetic organisms to optimize the cell growth. One of the typical response to high light is induction of protecting enzymes such as superoxide dismutase and catalase.

Protecting enzymes are induced to protect against reactive oxygen species (ROS), which can be generated by recombination of excess excitation or excess reducing equivalents with oxygen at the donor side of photosystem II.

The acclimation of *Prorocentrum minimum*, a major bloom-causing microalga in the southern ocean of the Korean peninsula, to high light was investigated by detection of ROS and assay of protecting enzymes. Actively growing cultures of the microalga under the normal growth condition were transferred to a growth chamber under condition of high light. Growth rate of the microalga under high light was decreased contrast with the microalga under condition of normal light. Burst of superoxide was detected at 4 day after inoculation and superoxide dismutase was activated at 5 day, followed by induction of catalase. Activation of lipid peroxidation, suggestive of cell death, occurred at 8 day. When inhibitor of superoxide dismutase was added in culture medium, cell death was facilitated. These results showed that superoxide dismutase and catalase is induced for the removal of ROS and this is part of the survival strategies of microalga under the high light condition.