

Study on Seasonal Variation of Primary Production in Jinju Bay, Korea

Sang-Man Cho^o · Woo-Geon Jeong · Sang-Jun Lee
College of Marine Science and Institute of Marine Industry
Gyeongsang National University

Introduction

Phytoplankton is one of primary preys for marine organisms, especially for bivalves such as oyster and mussel. The production of these bivalves, therefore, are controlled by the phytoplankton production, called primary production, a result of photosynthesis by phytoplankton. Since complex cross connection of various parameters, it is hard to estimate the primary production from environmental parameters. So far, there are several way to measure primary production: light-dark bottle method, C¹⁴ method and estimation from standing crop. In the present study, we estimated the primary production by estimation from standing chlorophyll-a.

Materials and Methods

For the estimation of primary production, several environmental parameters were achieved respectively: ① Daily radiation, ② Water temperature, ③ Depth, ④ Chlorophyll-a (Parsons et al., 1984).

Photosynthetically available radiation (PAR) were collected by LI-190SA quantum sensor with LI-1000 DataLogger (LI-COR, Nebraska, USA) installed on the roof at our college.

In situ PAR extinction coefficient (k) were collected by Quantum sensor (LI-193SA) and calculated by exponential function. The photic zone with active photosynthesis were considered as the depth of approximately 1% of surface light intensity (Steemann Nielsen, 1975).

Primary production were estimated by the function of Steemann Nielsen(1975) with consideration of PAR and water temperature as variables.

Result and Summary

Chlorophyll-a ranged from 0.6-16.5 mgChl/m³ with highest value in October and lowest in May. No trend in spatial distribution were observed. Chlorophyll-a in top layer was mostly higher than bottom layer in water column. Water temperature ranged from 16.0 to 26.6°C. *k* ranged from 0.111 to 0.9961. Integrated time of daily PAR were estimated as 13-15 hours a day during the period.

From the parameters above, estimated daily primary production ranged from 0.16 to 1.79 gC/m³/day reaching highest monthly mean value of 0.91 ± 0.5 gC/m³/day.

References

- Steemann Nielsen, E., 1975. Marine photosynthesis with special emphasis on the ecological aspects. Elsevier Scientific Publishing Company. Amsterdam-Oxford-NewYork. 141pp.
- Parson, T.R., Y. Maita, and C.M. Lalli, 1984. A manual of chemical and biological methods for seawater analysis. Pergamon Press, 173pp.