# The Mass Culture of the Valuable Microalgae by Using the New-type Photobioreactor

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## Summary

A newly designed outdoor photobioreactor (named Bio-Dome) that can efficiently work to mass culture of the valuable microalge was developed and the mass cultivation of the two kind of microalgae (a fresh water algae and marine algae) was tested outdoors by using Bio-Dome.

Hitherto, microalgal mass production on a commercial baisis have been operated in a huge open pond with a paddle wheel. However, there are many technical problems (contamination, low density culture, no temperature control, etc.) in this conventional way of microalgal mass-production and it is not able to have a high productivity, high quality products and a low cost performance.

Moreover, there is a limit in the microalgal species that can be cultured in the open pond system, since only few species (such as Chlorella, Spirulina and Dunaliella) with special biological and physiological characters (tolerance to high pH, high salt concentration etc.) can be cultured in the open pond. At present, in order to resolve above problems, we developed a practical and useful photobioreactor outdoors that can efficiently operate to mono-culture in any kind of microalgae to resolve the above mentioned problems.

In this study, we tested the outdoor mass culture of two kind of valuable microalgae, that is a fresh water green-alga (PC) which is a snow alga and contains a lot of polyunsaturated fatty acid, Arachidonic acid in it's cell, and a marine alga, Nannochloropsis, which is served as a live feed for aquaculture by using Bio Dome System.

(1) The result in mass culture of PC by Bio Dome showed the possibility of high densiy culture (4-5 g/L) and high productivity in outdoor. And also the biomass of PC contained high content of Arachidonic acid in total fatty acid (30-40 %) and in the basis of dry weight (4-6.5 %) .

(2) The result in mass culture of marine alga (Nanno) by Bio dome showed the possibility of the stable productivity even in the winter season when is under very severe environmental conditions for this marine alga.

We are going to study the effects of culture conditions (medium etc.) and environmental conditions outdoor on the productivity and fatty acid composition of these valuable microalgae in next year.