Microbial Arsenic Character in the East China Sea

Tung-Ming Hsiung*, Meng-Jin Tsai, Bo-Ye Chen, Shi-Ming Lin,
Ching-An Jian, Heng-Yi Guo
Institute of Bioscience and Biotechnology, National Taiwan Ocean University

Abstract

An analysis of the arsenic species and phytoplankton pigments distribution collected from early summer of shelf hydrosphere in the East China Sea (OR1 756, June 9-17, 2005, and OR2, June 23-July 1,2006) were performed. The percentage of methylated arsenic (monomethylarsenic acid, MA + dimethylarsenic acid, DMA) relative to total arsenic ranges from an extremely low (< 5%) to a considerably high (> 70 %). The methylated arsenic were positive correlated to primary productivity. The high values of MA, DMA and arsenite (As^{III}) were observed in the Changjiang River mouth. In addition, As^{III}, MA and DMA were also showed the high values in a transect (31.5 ^{o}N and 122.8 ^{o}E to 30.3 ^{o}N and 126.8 ^{o}E), in which OR2 1360 represented about three times higher than OR1 756 of those three As species in this transect,. The dAs^{III} had been reported to preceding or coincident with the algal bloom were detected in all sample. The MA, and DMA, which were considered a bloom incident, appeared in most samples except the surface water located in northeastern Taiwan at OR2 1360, possibly influenced by the heavy rain of those samples.

The pigments of phytoplankton were measured by HPLC following the CHEMTAX estimation of algal taxa that contribute Chl*a*. Compared to dissolved organic arsenic, in which higher correlations are found for bacillariophyceae, dinophyceae, chrysophyceae and prymnesiophyceae. However, signature pigments for degradation algae were observed for those samples having high methylated arsenic. We propose both cruises were the season had been bloomed, and indeed the MA and DMA are released from the broken-algae rather than metabolic excretion from live-algae.