Development of simultaneous analytical method for cyanotoxins, microcystins, cylindrospermopsin, anatoxin-a and saxitoxins

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Abstract

Toxic cyanobacterial blooms are often occurred on the surface of eutrophicated water body around the world. Cyanobacteria produce many kinds of toxic compounds, such as microcystins, cylindrospermopsins, anatoxin-a and saxitoxins (paralytic shellfish poisons), *etc*. Microcystins, cylindrospermopsin, anatoxin-a and saxitoxins are the frequently detected from freshwater cyanobacteria around the world. WHO recommended a guideline value of microcystin-LR that the dosage should be below 1 $\mu g \cdot L^{-1}$ in drinking water. To monitor these cyanotoxins in water, LC-MS/MS has been used, because of the sensitivity and selectivity. However, effective condensation method for these cyanotoxins, especially saxitoxins, are not yet established. In order to analyze the low levels of cyanotoxins including saxitoxins, the concentration procedure using solid phase extraction cartridges and the separation condition with HILIC column have been developed. To improve the accuracy of the cyanotoxins analysis, we had developed precise method using stable isotope (^{15}N)-labeled microcystins and cylindrospermopsin. Additionally, we have developed a new internal standard for anatoxin-a. The limit of quantification was around 0.1 $\mu g \cdot L^{-1}$ depended on the instrument sensitivity. This method is useful for simultaneous analysis and monitoring of these cyanotoxins.