First report of anatoxin-a encoding gene in isolated cyanobacterial strains from Malaysia

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Abstract

Aims: This study focus on the presence of cyanobacterial toxin in Malaysia and anatoxin-a-encoding gene was detected in this study and the status of cyanobacterial toxins in Malaysia can now be clarified.

Methodology and results: As part of status determination of cyanobacterial toxins in Malaysia, cyanobacterial strains have been isolated from different environments and identified using cyanobacterial 16S rRNA gene sequence. PCR assay was carried out to detect the presence of cyanobacterial toxin-encoding genes in these isolated strains by amplifying genes encoded for microcystin, anatoxin-a, cylindrospermopsin and saxitoxin. Using molecular identification of 16S rRNA gene sequences, a total of forty-two cyanobacterial strains were identified, which belongs to eighteen different genera of Synechococcus, Cyanobium, Synechocystis, Chroococcidiopsis,

Leptolyngbya, Nodosilinea, Limnothrix, Pseudanabaena, Cephalothrix, Aerosakkonema, Oscillatoria, Alkalinema, Pantanalinema, Planktolyngbya, Scytonema, Nostoc, Hapalosiphon and Symphyonemopsis. The toxicity of these strains was tested using PCR amplification of toxin-encoding genes using specific primers.

Conclusion, significance and impact of study: Anatoxin-a (ATX) gene, which involved in the biosynthesis of anatoxin-A was detected in two isolated strains namely Limnothrix sp. B15 and Leptolyngbya sp. D1C10. This study focus on the the presence of cyanobacterial toxin in Malaysia can now be determined as potential threat because anatoxin-a-encoding gene was detected in this study and the status of cyanobacterial toxins in Malaysia can now be clarified.

Keywords

Author Keywords: anatoxin-a; cyanobacterial 16S rRNA; cyanobacterial toxins; PCR amplification; toxin-encoding gene

KeyWords Plus: IDENTIFICATION; SYNTHETASE; GERMANY; PCR

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