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TITLE: Algal toxin profiles in Nigerian coastal waters (Gulf of Guinea) using passive sampling and liquid chromatography coupled to mass spectrometry

AUTHOR: ['Zita Zendong', 'Medina Omo Kadiri', 'Christine Herrenknecht', 'Élisabeth Nézan', 'Antonia Mazzeo', 'Philipp Heß']

ABSTRACT:

Algal toxins may accumulate in fish and shellfish and thus cause poisoning in consumers of seafood. Such toxins and the algae producing them are regularly surveyed in many countries, including Europe, North America, Japan and others. However, very little is known regards the occurrence of such algae and their toxins in most African countries. This paper reports on a survey of phytoplankton and algal toxins in Nigerian coastal waters. Seawater samples were obtained from four sites for phytoplankton identification, on three occasions between the middle of October 2014 and the end of February 2015 (Bar Beach and Lekki in Lagos State, Port Harcourt in Rivers State and Uyo in Akwa Ibom State). The phytoplankton community was generally dominated by diatoms and cyanobacteria; however several species of dinoflagellates were also identified: *Dinophysis caudata*, *Lingulodinium polyedrum* and two benthic species of *Prorocentrum*. Passive samplers (containing Diaion® HP-20 resin) were deployed for several 1-week periods on the same four sites to obtain profiles of algal toxins present in the seawater. Quantifiable amounts of okadaic acid (OA) and pectenotoxin 2 (PTX2), as well as traces of dinophysistoxin 1 (DTX1) were detected at several sites. Highest concentrations (60 ng OA g<sup>-1</sup> HP-20 resin) were found at Lekki and Bar Beach stations, which also had the highest salinities. Non-targeted analysis using full-scan high resolution mass spectrometry showed that algal metabolites differed from site to site and for different sampling occasions. Screening against a marine natural products database indicated the potential presence of cyanobacterial compounds in the water column, which was also consistent with phytoplankton analysis. During this study, the occurrence of the marine dinoflagellate toxins OA and PTX2 has been demonstrated in coastal waters of Nigeria, despite unfavourable environmental conditions, with regards to the low salinities measured. Hence shellfish samples should be monitored in future to assess the risk for public health through accumulation of such toxins in seafood.

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