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Marine bioremediation of port sediment: Investigation of tributyltin degradation using Active Nautical Depth

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Abstract

Active Nautical Depth (AND) is a promising method to fight against siltation in ports and harbours by mixing the sediment in situ, turning it into a navigable fluid mud. The implementation of AND allows a reduction of dredging need and thus has the potential, among other benefits, to decrease carbon emission associated with sediment transportation. Moreover, by changing the physicochemical properties of sediment, AND could also stimulate the biodegradation of harmful contaminants commonly found in ports and harbours, such as the previously widely used antifouling compound called tributyltin (TBT). This study therefore aims to better understand the factors controlling tributyltin biodegradation in sediment in order to optimize the implementation of AND. This is done by conducting microcosm experiments under different environmental scenarios and comparing TBT degradation rates. We also aim at obtaining a better comprehension of the microbial community implicated by the use of a new approach for bacterial isolation, the iChip. Results will be obtained by February 2020, we expect higher degradation rates under higher temperature, aeration exposure and agitation frequency (which will influence aeration) as TBT degradation is known to be performed aerobically and as increasing temperature is known to increase microbial activities.

Biography:

Amélie Polrot is a PhD student in the School of Natural Sciences and Psychology at Liverpool John Moores University. Her current research in the field of marine bioremediation involves Microbiology, Chemistry and Sedimentology. Her work focuses on assessing environmental factors controlling tributyltin biodegradation activity in sediment in order to optimize the implementation.

Speaker Publications:

1. Polrot, Amélie & Kirby, Jason & George, Sharples & Birkett, Jason. (2018).Marine bioremediation of port sediment: investigation of tributyltin degradation using Active Nautical Depth.

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