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Spatio-temporal variation in heavy metal concentration near mining sites using *Enhalus acoroides* as biomonitor

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In this study, *Enhalus acoroides* was used as a proxy in determining the spatial and temporal variations of heavy metal concentrations in Hinadkaban Bay, Claver Surigao del Norte (an area near mining activities). Heavy metal concentration in the leaves and rhizomes of the seagrass and the sediments of the area are quantified. Furthermore, the capability of E. acoroides as biomonitor was evaluated. More importantly, an attempt to reconstruct the levels of heavy metal for the past 10 years using lepidochronology technique was done. Given such, temporal trends can be elucidated. All heavy metal analysis will be performed using Agilent 7500 Inductively Coupled Plasma Mass Spectroscopy. Results showed that *Enhalus acoroides* is a good biomonitor. It was found that the levels of heavy metals in tissues of seagrass species in areas near mining discharge points are significantly higher than those that are away from it. The result of this study will give us an information on the condition of the area which could be used to assess whether the efforts of LGU towards Marine and Coastal Protection has been effective. In the given context, it might give an idea whether there is a need to review and/or amend some policy and guidelines with respect to Marine and Coastal Protection and Environmental Monitoring Strategies. The ability to reconstruct past heavy metal concentrations may serve as a quicker and cheaper tool in developing baseline and monitoring information, which serves to be significant in Environmental Impact Assessment (EIA).

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Novel tools for highly efficient detection of nucleic acids - Going beyond amplification

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Detection and studies of nucleic acids (DNA and RNA) are highly desirable in modern research, biotechnology and clinical assays. Owing to improved biological activity and stability artificial nucleic acids have much to offer as diagnostic and research tools. However, so far the detection of nucleic acids has been fully relied on enzymatic amplification of targets. In our research we aim at enzyme-free detection and studies of DNA and RNA. To do this, we develop novel design tools and synthesis of efficient fluorescent probes with improved properties for detection of nucleic acids. In my talk I will present our recent findings in the development of oligonucleotide probes and assays that allows to detect long natural DNA and RNA molecules at ultra-low concentrations. In particular, enzyme-free detection of EBOLA RNA using our new approach will be described. Naturally occurring nucleic acids are typically present as super-coiled molecules in complex biological media and often at very low concentrations. This makes them challenging objects for detection which require ultra-sensitive and specific oligonucleotide probes. The novel probes and assays which we develop could become a new approach to rapid, reliable and enzyme-free detection of viral and other nucleic acids. Importantly, stoichiometry of detected targets will be conserved in the enzyme-free assay, which allows for an accurate studies and estimation of e.g. mutation abundance when the detection limit requirement is met. Using fluorescence microscopy, this could become a new approach to detect and investigate DNA at single-molecule resolution and directly in the biological sample of choice.

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