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NADP-based colorimetric method for the determination of marine heavy metal pollution using sea urchin (*Tripneustes gratilla*) egg extract

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A simple, convenient and sensitive method for the detection of the presence of heavy metals in seawater was developed using an enzyme preparation that catalyzes NADP and MTT reduction yielding a colorimetric response, measured using UV-Vis spectrophotometer. This method which was based upon the protocol provided by Sigma Aldrich and Zhu et al (2011) used crude extract of the *Tripneustes gratilla* eggs as source of enzymes such as glucose-6-phosphate dehydrogenase (G6PD), the enzyme responsible for the reduction of NADP. The pH was optimized to ensure maximum NADP-reducing activity and the applicability of the method to seawater was determined. It was found that the NADP-reducing activity increased up until 50mM of NaCl indicating that enzymes such as G6PD in the sea urchin are tolerant to certain concentrations of NaCl. The effect of heavy metals was determined and the potency of heavy metals as inhibitors of NADP-reducing activity was found as follows: $Hg^{+2} > Zn^{+2} > Pb^{+2}$. The qualitative assessment of sea water quality was also performed using the developed method. Of the five sites selected in Manila Bay, three sites showed percent inhibition less than 10% that is not significantly different from the control (artificial seawater). Two sites were found to exceed 10% inhibition, significantly different from the control ($p < 0.05$). This newly developed method may also be used for the detection of pesticides and toxic industrial effluents that would inhibit G6PD, thus, offers means of detecting marine pollution in general.

Biography

Lirazan Marcelina has obtained her PhD in Molecular Biology and Biotechnology from the University of the Philippines. She has completed her dissertation at the University of Utah (USA) under the Overseas Fellowship Program of the Department of Science and Technology (DOST) in the Philippines. She is currently the Chairperson in her Department. She has published 11 papers in reputed journals.

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