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LAYMAN'S ABSTRACTS

Survival and Growth of Re-attached Storm-generated Coral Fragments Post Super-typhoon Haiyan (a.k.a. Yolanda)

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After super-typhoon Haiyan (a.k.a. Yolanda) hit Eastern Samar, many of the coral reefs in the area were devastated due the strong waves and current brought about by the storm. In fact, some of the shallow branching coral reefs were broken into pieces and in some areas vast expanse of reefs were transformed into coral rubble or fragments. To help revive and recover some of the dying coral fragments, we re-attached those that are still alive onto sturdy substrate (e.g., dead massive corals) using concrete nails and cable ties. We monitored the survival and growth of these re-attached coral fragments for about a year and we found that most of these fragments started to cement (i.e., bio-mineralize) themselves onto the substrate and survived. In addition, we found that many of the species that we re-attached showed fast growth rates. These results provide hope and affordable solution for active recovery of storm-devastated reefs. We recommend that Local Government Units invest in active recovery of degraded coral reefs using techniques demonstrated in this study in order to prevent the local extinction of many reef fishes that are dependent on live coral cover for food and habitat.

Short-term Assessment of Phytoplankton Composition and Abundance in Cebu and Subic Bay Ports, Philippines

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In May 2015 and July 2015, two major ports in the country were evaluated for composition and abundance of marine diatoms and dinoflagellates. For the May 2015 sampling, the diatoms *Pseudo-nitszchia* spp. and *Chaetoceros* spp. were the most abundant in Cebu International Port (CIP) and in the Naval Supply Depot (NSD), respectively. Moreover, diatoms like

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Thalassionema spp. and *Leptocylindrus* spp. also recorded high cell densities in NSD Terminal in July 2015. Other microalgae observed include diatoms like *Coscinodiscus* spp., *Nitzschia* spp., and *Pseudo-nitzschia* spp., and dinoflagellates, such as *Ceratium* spp., *Ceratium furca, Gonyaulax* spp., *Gymnodinium* spp., *Linguludinium* spp., *Phalacroma* spp., *Prorocentrum micans, Prorocentrum* spp. ,and *Dinophysis caudata*. The results of this study contribute to the establishment of baseline data for phytoplankton composition and abundance, which are necessary for the identification of potentially toxic/harmful microalgae which pose risks of ballast water inclusion and transport.

Polyelectrolyte Complex of Chitosan and κ-Carrageenan as Potential Scaffold for Tissue Engineering

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Scaffolds are supports that are expected to aid in cell growth inside the body to facilitate the healing process of fractured bones or any other ruptured tissue. They should be nontoxic, have sufficient space within (porous) to allow the cells to expand, and should not collapse during the growth of the cells. They should undergo degradation inside the body once optimal cell growth takes place.

In this study, two biopolymers, namely chitosan (can be extracted from the shell of crustaceans) and carrageenan (can be obtained from red seaweeds), were used to make the scaffolds. The two polymer chains were allowed to form a complex with each other, and their positions were locked by tethering (crosslinking) the carrageenan chains with calcium chloride. The scaffolds were further strengthened through the addition of nano-size hydroxyapatite (a fortifying component of bones). The resulting scaffolds were porous with desirable strength, and underwent very slow degradation under human physiological conditions while providing sufficient time for promoting cell growth. Overall, the system has the potential to heal bones and damaged tissues.

Fuzzy on Ideal Sets and a Fuzzy on Ideal Hahn-Banach Theorem

Lezel N. Mernilo-Tutanes and Randy L. Caga-anan

In set theory, an ideal is a collection of sets that are considered to be small or negligible. On the other hand, a fuzzy set is a class of objects that can be used to mathematically represent uncertainty and to provide a formal tool to deal with imprecisions present in many problems. We use ideals to define *fuzzy on ideal sets*, which can be seen as a generalization of the fuzzy sets. We establish some of the basic properties. We also state and prove an extension theorem involving *fuzzy on ideal sets*.

Preliminary Development of Thoron Exposure System in the Philippines

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The influence of ^{220}Rn (thoron) which is a gaseous radioisotope like ^{222}Rn (radon) has been the focus of attention of recent studies concerning the protection of the general public from natural radiation. Hence, it is necessary to investigate the possibility of exposure to thoron in the Philippines. Passive detectors, which do not need external power, are often used for measurements for thoron concentration in the environment. However, it is necessary to check if the passive detectors can appropriately work by being exposed to thoron at several thoron concentrations before conducting the investigation. In this study, a thoron exposure system was developed in the Philippines to validate the passive detectors for thoron measurement and to test its performance. The thoron exposure system in this study can control the thoron concentration at the range of 5.9 x 10^4 to 1.5 x 10^5 Bq m^{-3}. The thoron exposure system will be utilized to validate the passive detectors for the investigation of thoron exposure in the Philippines in the future.