NST 9/6/2011 A

The Versatile Algae: An organism of the future

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KOTA KINABALU: A new way to convert biomass into fuel using algae could lead to less expensive biofuel, the expert with an extensive experience in Phycology and Limnology at Borneo Marine Research Institute of University Malaysia Sabah (UMS), Prof. Datin Seri Panglima Dr. Ann Anton said yesterday.

"Algae are a miraculous gift on our Earth. It can produce the fuel we need to power our cars, trucks, jets, buses etc. The bi-product of processing algae-to-oil can be used as feedstock or nutraceuticals or fertilizer," she said at the inaugural lecture of "The Versatile Algae: An organism of the Future" held at the Recital Hall of UMS Kota Kinabalu. She added that growing algae-for-fuel can be quickly shifted to growing algae-for-food if ever there was a food-related catastrophe.

Algae are very simple, photosynthetic organisms ranging in size from microscopic unicellular forms to large seaweeds. Requiring only water, sunlight and carbon dioxide to grow, algae are generally aquatic and are found to grow in a variety of habitats. Reproduction in algae is asexual and sexual, where asexual reproduction takes place through binary fission, fragmentation or formation of spores. They are an incredible primitive life form that can thrive almost anywhere and generally more efficient converters of solar energy due to their simple cellular structure and have become versatile model organism.

The lecture described the multifaceted uses of algae in providing solutions to various problems. With the advent of industrialization and increasing human population, the requirements for water have increased together with greater demands for higher quality water. These growing demands for water place more emphasis on the need for aquatic resource protection and conservation, which in turn requires improved approaches for assessing the impacts on water resources.

In water resource management, algae are reliable bioindicators of river water quality, where local species were identified and found to inhabit only in pristine or polluted waters. Studies on the relationships between phytoplankton and its fluctuating environment in Pansoon Reservoir, Selangor and Kenyir Dam, Terengganu have resulted in an understanding of the main driving forces behind temporal and spatial patterns of its existence in lakes and reservoirs.

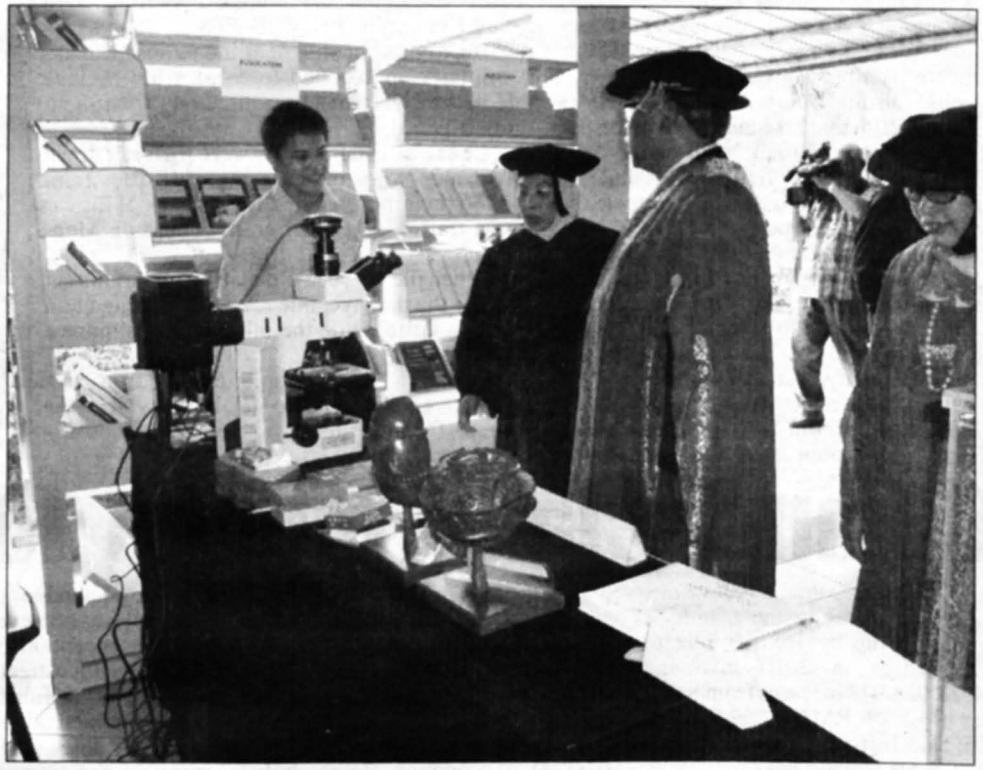
Cochlodinium polikrikoides and Pyrodinium bahamense var compressum are two causative dinoflagellates of harmful algal blooms (HAB) in Sabah, with the latter producing algal toxins.

Researches on HAB are concerned with understanding factors triggering bloom initiation for the management and control of red tides and characterization of algal toxins for the development of a biosensor for rapid identification of the toxin-producing species.

A molecular approach to the study of algae is taken to understand biogeographical distribution and dispersion of the species, to determine phylogenetic relationships between similar strains, to develop a species-specific molecular probe for rapid identification and for varietal identification of the commercial seaweed Eucheuma spp which are currently the most common cultivated seaweeds for commercial carrageenan production. Carrageenan is a group of closely related colloids derived from several other red algae, widely used as a thickening, stabilizing, emulsifying, or suspending agent in industrial, pharmaceutical, and food products.

Algae are dominant primary producers on the Earth and have a major impact on global primary productivity and ecosystem health. The importance of algae in providing solutions in the area of environmental preservation, health and energy will be further enhanced as new technologies and approaches are developed.

The research on the algae continue to focus on its use in ecology and the environment, understanding harmful algal bloom initiation for the management and control of HAB, characterization and purification of algal toxins for downstream applications, finding novel compounds and harnessing biofuel from local algal species.



UMS Vice Chancellor (in robe) accompanied by Prof. Ann Anton (second left) while visiting the exhibition booth at UMS