

## **Project 8/2004 - Development of pre-bloom Fluorimetric Assays for the monitoring of harmful algal blooms**

### **Purpose**

This paper seeks Members' approval to fund the captioned application for ECF made by Hong Kong University of Science and Technology (HKUST).

### **Background**

2. The funding requested by this project is \$960,000. The project requires two research staff members including one Senior Research Assistant (PhD) and one Research Assistant. The staff cost for two research staff amounts to \$720,000 for 24 months. The remaining \$240,000 is for purchase of consumables including cell culture medium, molecular reagents and general chemicals. The project is expected to last for 24 months.

3. Harmful algal blooms (HABs) can have adverse effects on the economy and the environment. Outbreaks can result in mass mortalities of wild or farmed aquatic organisms. The massive mortalities of farmed fish caused by HABs created potential environmental problems for disposal.

4. The present proposal aims to develop an array of combinatory micro-fluorimetric assays, that are based on the detection of agents that modulate membrane potential, intracellular calcium and sodium ions. As the vast majority of algal toxins involved in HABs belong to such modulation agents, and their assays require only a small amount of algal materials and a short sample preparation time, a combinatory micro-fluorimetric assay will generate timely information before the actual bloom is formed. The present proposal will standardize a range of sodium-binding, calcium-binding and membrane potential fluorescence dyes for reporting the effects of algal toxins and toxic algal extracts on neuronal and non-neuronal cell lines. The standard response to the different agents can then be used as references for the routine monitoring

of HABs.

5. In addition to examination by AFCD, EPD and FEHD, two external expert reviewers have been invited to assess the proposal. All of them considered that the project worthy of support as it addresses an environmental problem that is of great concern to Hong Kong. One expert reviewer commented that the principal investigator proposes methods different from those currently used or under development in most countries. The other reviewer also remarked that the project is a novel approach to the detection of an array of algal toxins and should be given support to explore the approach. AFCD commented that more fish killing algal species found in Hong Kong should be included in the project as the combinatory assay methods aimed to screen for harmful algae. The applicant has agreed to it and suggested to include a minimal of five species, representing very different toxins to be tested. FEHD pointed out that if the research can successfully develop a technique which is capable of accurately detecting multiple biotoxins with quantitative results in a short period of time, the technique can be applied in HAB management issues. EPD has enquired on the amount of laboratory work and the budget and was subsequently convinced that the project involves a large amount of tasks requiring very different expertise and the budget is considered reasonable.

### **Advice sought**

6. Members are invited to advise whether the application for ECF should be supported with an approved grant of \$960,000 as detailed in paragraphs 2 to 4 above.

Secretariat, ECF Research Projects Vetting Subcommittee  
November 2004