

# SPECIAL REPORT

## Chemicals and Drug Residues in Fish and Fish Products in Southeast Asia - Harmful Algal Blooms (HABs) in the ASEAN region

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At the 37<sup>th</sup> Meeting of SEAFDEC Program Committee and the 17<sup>th</sup> Meeting of the Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership (FCG/ASSP) in Ubon Ratchathani, Thailand in December 2014, a new project component on HABs in the ASEAN region was proposed and endorsed under the on-going project on “Chemicals and Drug Residues in Fish and Fish Products in Southeast Asia”. This project component can potentially help Member Countries to improve their knowledge and understanding on toxic HAB occurrences in the region, as well as enhance Member Countries’ capabilities for the identification of biotoxin-producing HAB species in their waters.

During the End-of-Project Seminar for the Biotoxins Monitoring Project in 2012, Member Countries pointed out the importance of identifying biotoxin-producing Harmful Algal Bloom (HAB) species to complement existing biotoxins monitoring programs and ensure that fish and shellfish are not contaminated with toxic algae or their toxins. Member Countries also suggested that MFRD consider undertaking a project on toxic HABs to enhance regional capabilities on the identification of biotoxin-producing HAB species. In response, MFRD has taken up this suggestion by including a new component on biotoxin-producing HAB species identification within its



Algal bloom on the beaches of Boracay Island, Philippines  
(Photo from Tumblr (Happy Dabbles))

### Box 1. Quick facts on HABs

#### What are HABs?

HABs are overgrowths of algae in water. Some produce dangerous toxins in fresh or marine water, but even non-toxic blooms hurt the environment and local economies.

#### What are the effects of HABs?

HABs can:

- Produce extremely dangerous toxins that can sicken or kill people and animals
- Create dead zones in the water
- Raise treatment costs for drinking water
- Hurt industries that depend on clean water

#### What causes HABs?

HABs need:

- Sunlight
- Slow-moving water
- Nutrients (nitrogen and phosphorous)

Note: Nutrient pollution from human activities makes the problem worse, leading to more severe blooms that occur more often.

#### Why are HABs a problem in ASEAN?

ASEAN is characterized by: 1) the highest production of aquaculture fish and shellfish in the globe, and thus the greatest impacts from HABs on these resources; 2) a diversity of harmful syndromes and causative organisms; 3) an apparent trend of increasing HABs throughout the region; and 4) an increasing trend toward regional eutrophication. The ecological and economic impacts of HABs in ASEAN are thus great and apparently increasing.

#### What are the key HAB species in ASEAN?

- *Cochlodinium polykrikoides* - a chain-forming dinoflagellate associated with massive fish kills.
- *Pyrodinium bahamense* var. *compressum* – chain-forming dinoflagellates that produce PSP toxins.
- *Alexandrium* - another dinoflagellate genus which contains PSP toxin-producing species.
- *Prorocentrum minimum* - causes mass mortality of aquaculture fish in Japan, Philippines, and Singapore.
- *Karenia mikimotoi* - forms red tides in western Japan and in other waters in Asia.
- *Phaeocystis globosa* - a prymnesiophyte which occasionally causes extensive blooms, leading to fish kills and mortality of the caged fish and lobsters in Chinese and Vietnamese waters.
- *Noctiluca* - a monospecific genus of large unarmoured heterotrophic dinoflagellates.



*Algal bloom by Noctiluca spp. in Nagasaki*

existing Japanese Trust Fund (JTF) project on “Chemicals and Drug Residues in Fish and Fish Products in Southeast Asia”.

Consumption of a variety of shellfish and fish which have been contaminated by marine biotoxins causes an increasing number of human intoxications and even deaths around the world. The current JTF project is an extension of the project on Biotoxins Monitoring in ASEAN and aims to address the needs of Member Countries and continue with capacity building on the identification of biotoxin-producing HAB species through the new component.

The key stakeholders and beneficiaries of this project are the relevant agencies in the fisheries department of ASEAN-SEAFDEC Member Countries responsible for ensuring the safety of fish and shellfish for consumption and for monitoring and testing of fish and shellfish, the aquaculture farmers and harvesters of fish and shellfish, as well as domestic and international consumers of fish and shellfish.

This project will be implemented by the Post-Harvest Technology Centre of the Agri-Food and Veterinary Authority of Singapore (PHTC/AVA) as SEAFDEC’s Collaborating Centre for MFRD programmes, with participation from the ASEAN-SEAFDEC Member Countries. The key project activities under this new component include a Regional Technical Consultation and a Regional Training Course in the identification of biotoxin-producing HABs. These activities, together with the current project activities on biotoxins monitoring in ASEAN, will culminate in a joint Technical Compilation publication and an End-of-Project Seminar. (See **Box 2** for more details). ❖

Box 2. Key activities of the new project component on HABs	
Regional Technical Consultation (RTC) on biotoxin-producing HAB species identification	A 2-day RTC will be held in Singapore in the 2 <sup>nd</sup> quarter of 2015 to initiate this component of the project and plan for the required activities. All ASEAN-SEAFDEC Member Countries will be invited to the meeting and to participate in the activities. ASEAN-SEAFDEC Member Countries will present country reports on toxic HAB occurrences and incidents in their waters, as well as their current methods of managing toxic HABs. The meeting will also initiate the process to establish a network or directory of responsible national authorities or HAB experts in the region.
Regional Training Course in biotoxin-producing HAB species identification	A 4-day training course will be conducted in Singapore in the 2 <sup>nd</sup> quarter of 2016. The training course will be conducted by invited expert trainers and it is envisaged that the methods for identifying biotoxin-producing HAB species will be taught during the course. Two participants from each Member Country will be invited to attend this course. After the training course, Member Countries are recommended to apply what they have learned to set up the appropriate methodologies in their own laboratories for identifying biotoxin-producing HAB species in their waters.
Technical Compilation	The Technical Compilation of the project will be prepared and published in 2017. The Technical Compilation will comprise of the biotoxins analytical methods and biotoxins monitoring survey reports of the Member Countries, the methodologies for the identification of biotoxin-producing HAB species, the country reports on toxic HAB occurrences, incident and management in their waters, and the list or directory of responsible national authorities and HAB experts in Member Countries.
End-of-Project Seminar	The End-of-Project Seminar will be held in the 3 <sup>rd</sup> quarter of 2017. At the seminar, reports and results of the biotoxins monitoring surveys conducted by Member Countries, as well as country reports on HABs, will be presented and discussed. Member Countries will also have the opportunity to discuss the challenges faced during the project implementation, share their plans for future projects or activities nationally and regionally, and finalize the Technical Compilation for publication.