

## **The progress report on Marine Toxins and Seafood Safety (MTSS) Project**

### **1. Introduction and justification**

Seafood poisoning from marine toxins produced by microalgae or bacteria is not brought to the attention, particularly in the tropics and subtropics. The risk is increasing because of several factors such as climate change, coral reef damage, and spread of toxic algal blooms. The rapid economic development and fast-growing population in the WESTPAC region have resulted in an increased demand for seafood. Expansion of poisoning episodes caused by toxin contamination in seafood brings about serious problems to aquaculture activities, as it causes significant economic losses and risks to human life including human casualty. Regional efforts have been done to improve awareness of local community on the natural biotoxins in marine organisms and its risks to human health as well as build up and strengthen the knowledge base and capacity for marine toxin detection through the development and operation of professional trainings and expertise exchanges within the WESTPAC region.

It is known that recent significant increasing of seafood poisonings is associating with the increase of occurrence and /or expansion of distribution of marine toxins in the region. But up to now, almost of researches was at country level, therefore, it is no information on occurrence and distribution of marine toxins associated to seafood poisoning in the region. On the other hand, the transboundary issue concerning the export of toxin contaminated seafood to neighbouring countries become emerging issues of common regional interest. In such situation, efforts need to be made to assess regional status on the occurrence of marine toxins related to seafood poisonings to serve a strategy on seafood security to minimize the risk of seafood poisoning to the public health. For that, the cooperation and conduct joint studies among WESTPAC scientists, institutions and countries as well as improvising and supporting toxin analysis capacity in member states are needed.

### **2. Timeframe and objectives**

MTSS project would be performed in 06 years (May 2023-April 2029) with the objective of assessment of regional status on occurrence of marine toxins related to seafood poisonings to serve a strategy on seafood security to minimize the risk of seafood poisoning to the public health.

### **3. Major activities, outputs & outcomes over the last intersessional period (May 2021-April 2023)**

The planned activities of TMSS could not conduct in March, 2019-April, 2023 and be modified to adapt a global effect from COVID-19. Using a protocol developed for ciguatoxin analysis in RTRC-MTSS, the project's participants have collected samples, screened for toxicity and verification of the toxins in suspected causative organism. The result was published in the scientific journals as the 1<sup>st</sup> report in Southeast Asia of the causative toxins.

#### **Activities**

- Standadizing protocol(s) for marine biotoxins' detection and analysis;
- Applying the standardized protocol (s) in the study on occurrence of toxin (s) response to seafood poisoning in the region.

#### **Outputs/outcomes**

- 02 practical protocols for biotoxins identification: tetrodotoxin (TTX) and ciguatoxin (CTX).
- 03 scientific papers in which developed protocols written in the method session (01 paper about CTX, 02 papers about TTX)

#### **4. A summary of key achievements since its establishment**

Since 2010, Japanese Funds in Trust (JFIT) has been supporting IOC/WESTPAC -Toxic Marine Organisms (now changed to Marine Toxins and Seafood Safety – MTSS) aimed to improve the awareness of local community on the natural biotoxins in marine organisms and its risks to human health within the Western Pacific Region through the identification of toxic marine organisms and dissemination of relevant scientific information to public. With the objectives of enhancing the regional efforts to build research and analytical capacity given the lack of expertise in toxin chemistry and in dealing emerging toxic organisms and their toxins; and strengthening the knowledge base and capacity on the research and analysis marine toxins for seafood safety in the region, several activities have especially on organizing capacity building activities on marine toxins analysis and providing technical assistance to WESTPAC member states in marine toxins analysis for seafood safety. In order to reach the objectives, a pack of key activities including technical assistance, education (train for trainers), the several training workshops were carried. MTSS project have developed outreach materials including posters flyers on dangerous puffers in Asian countries, Ciguatera guide book in 5 different languages (Vietnamese, Philippine, Malays, Thai, Chinese) for public awareness in member states. On the other hand, key persons on toxin analysis have regenerated. The protocols for chemical analysis on marine toxins causing Ciguatera and tetrodotoxin were also developed and used in RTRC. Using developed protocols, the project's participants have collected samples of poisonous fish and other toxic animals (crab, gastropod, fish), for toxicity screening and verification of the toxins in suspected causative species. The results were published in the scientific journal as the 1<sup>st</sup> finding in Southeast Asia of the causative toxins. Especially, Regional Research and Training center (RTRC) on marine toxins and seafood safety in IO, Viet Nam has been towards.

#### **5. Self-assessment on implementation against objectives**

Since 2010, MTSS project have carried a pack of activities to reach objectives, that are:

- ⇒ The awareness of local community on the natural biotoxins in marine organisms and its risks to human health within the Western Pacific Region has been enhanced by transferring scientific information to the local; message from scientists for public (posters, flyers, guide book, newspapers, TV news).
- ⇒ The capacity in the region for marine toxin detection, identification and analysis has been improved through the development and operation of professional trainings and expertise exchanges.
- ⇒ The cooperation on marine toxins research and seafood safety among WESTPAC scientists, institutions and countries have been promoted by joint-activities.

#### **6. Problems encountered and recommended actions**

As transboundary issue concerning the export of toxin contaminated seafood to neighbouring countries is now become emerging issues of common interest in the region, the regional research network on seafood safety among scientists has been established, but still need strengthening further by exchange information and sharing working environment. It is needed the support from member states to contribute of human resource and data sharing.

There is inequal knowledge base and capacity on marine toxin study and monitoring for seafood safety among member states (1/3 members could work well). Organizing capacity building

Restricted distribution

activities to lessen poisoning incidents; improvising and supporting toxin analysis capacity in member states are needed to minimize the risk of seafood poisoning to the public health.

In addition, it is needed for MTSS project to re-generate a steering committee for coming activities with supporting from member states in recommendation of appropriate members.

**7. Objectives to be achieved, if applicable, over the next intersessional period (May 2023- April 2025)**

- 1) Sharing environmental working condition on marine toxins' analysis and research using RTRC-MTSS in Viet Nam;
- 2) Strengthening the cooperation and conduct joint studies among WESTPAC scientists, institutions and countries.

**8. Planned activities for May 2023- April 2025**

[provide, in tabular form, the action items that should be included in the work plan and budget]

Program					Funding Required		Remark
	Activities	Objectives	Expected outputs/outcomes	Date and place	IOC	Other sources (i.e., from national or international)	
	1. Evaluation of RTRC	Providing and sharing working environment on marine toxins and seafood safety	-Regional serving on TTX, STX and CTX analysis and research; - Evaluated RTRC (MOU b/w IOC/UNESCO and IO).	Apr.-Sept. 2023, IO, VN	3 K USD	5 K USD (IO, VN)	
	2. Co-field research on “Case study in Viet Nam -Occurrence of ciguatoxin”	Strengthening regional collaboration on marine toxins study and collect evidence of Ciguatoxin occurrence in the environment	- Regional collaboration is strengthened; - Specimens collection (fishes, microalgae) for toxin analysis	Sept. 2023/Apr. 2024	30 K USD	10 K USD (IO, VN)	
	3. Expert sending for Confirmation of CTX by using advantaged technique	Strengthening capacity on toxin analysis	-02 trained persons who can work on CTX confirmation; -Scientific method on toxin study is improved to obtain more reliable data for high quality publications;	June/Sept. 2023, Hong Kong/Japan		6 K USD (IO, VN)	