

# The Monitoring of Harmful Algae Blooms in Sabah, Malaysia

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**Abstract.** The first record of harmful algae bloom (HAB) in Sabah was in 1976 where 202 victims were reported to be suffering from Paralytic Shellfish Poisoning (PSP) and 7 deaths. The causative organism was *Pyrodinium bahamense*, a dinoflagellate which produces saxitoxin. Since then, Department of Fisheries Sabah has been doing monitoring to safeguard seafood safety, especially shellfish harvested for food consumption. *Cochlodinium polykrikoides* bloom for the first time in Sabah in year 2005 where Kota Kinabalu and Tuaran experienced fish kill. Since then, other HAB species such as *Gymnodinium catenatum*, *Gonyaulax polygramma* and *Noctiluca scintillans* were identified in waters of Sabah. Sabah is the only state in Malaysia in which the monitoring program is done consistently throughout the year since 1976. Samples were collected once or twice a month, according to high and low risks areas which have been identified, most of which are in the west coast. The collection frequency may be increased depending on the situation such as whether there is an outbreak of red tide or PSP in the area. Due to this effort, PSP cases involving the public have declined during the last 40 years without duly affecting the income of fishermen and the fisheries industry. After successfully implementing toxin monitoring between 1984 to 2013, it recurred back in 2013 when 3 deaths were reported. The purpose of this paper is to review all HABs incidences that occurred in Sabah over the last few years from January 2000 – December 2017.

## 1. Introduction

Harmful algal bloom (HAB) occur when there is an increase of phytoplankton abundances in natural marine or freshwater environments. It causes toxic or harmful effects on people, fish, shellfish, marine mammals and birds. Some microalgae species produces toxins and bioaccumulate in shellfish and cause harm to people who consume them. Other species of microalgae causes fish kill by clogging their gills and they die from lack of oxygen.

Paralytic shellfish poisoning (PSP) is caused by consuming bivalve mollusks (mussels, clams) which are contaminated with saxitoxins (STX). PSP toxins accumulated in shellfish because of filtration of toxic algae produced by several dinoflagellates (including *Alexandrium*, *Gymnodinium* and *Pyrodinium*). The first PSP case in Sabah caused by *Pyrodinium bahamense* was recorded in 1976 where 202 victims were reported to be suffering from PSP and seven deaths [1]. Paralytic shellfish poisoning was only confined to the west coast of Sabah until 1990. In early 1991, Peninsular Malaysia experienced the first recorded red tide event, where three people became ill after consuming farmed mussels from Sebatu, Malacca caused by *Alexandrium tamiyavanichii*. West coasts of Sabah have been experiencing HABs annually for the past four decades since then. The presence of HABs in Sabah occurs sporadically since 1976, but the pattern of occurrence was different from district to district. The east coast of the state is considered low risk area as no occurrence had happen before. The west coast is considered a high-risk area for HAB and PSP.

