

Identification of *Alexandrium halim* (Dinophyceae) using EPI-fluorescence microscopy

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ABSTRACT

Alexandrium species is a group of dinoflagellates comprise of more than 20 different toxic and non toxic species More than half of them are capable in producing a type of neurotoxins called saxitoxins which act as a sodium channel blocker in mammalian nerve system. The occurrences of toxic *Alexandrium* blooms have increased tremendously over the past decade throughout the world. Lack of distinctive characteristic such as horn, spine or heavy ornamentation of the thecal plates caused the difficulty in identification of this species using ordinary light microscope. In this present paper, an epi-fluorescence microscopy with an image analysis system was applied to identify several species of *Alexandrium* found in the Straits of Malacca and South China Sea. Five species of *Alexandrium* viz. *Alexandrium tamarense*, *A. minutum*, *A. tamiyavanichii*, *A. leei* and *A. affine* have been identified based on the ultrastructure and thecal plate tabulation of the cells using calcofluor white staining. The observation of those fine morphological characteristics such as apical pore (P_o), anterior sulcal plate (S.a.), posterior sulcal plate (S.p.) and ventral pore (pv) were enhanced by using this method.

KEYWORDS: *Alexandrium*, Dinoflagellates, EPI-fluorescence microscopy.

INTRODUCTION

The genus *Alexandrium* comprises more than twenty species and more than half of them are capable to produce a group of neurotoxins called saxitoxins, which act as a sodium channel blocker in mammalian nerve system. Increased in cell number of these microalgae in the water column promote toxins accumulation in filter feeder organisms such as oyster and clam, and hence cause paralytic shellfish poisoning (PSP) through consumption of contaminated organisms. Recently harmful algal blooms events in Peninsula Malaysia [1, 2] that were caused by *Alexandrium* species have changed the perception of the HAB and PSP research in the country, which was only confined to the west coast of Sabah since the first events due to *Pyrodinium bahamense* var. *compressum* occurred in the 1976 [3].

Identification of *Alexandrium* is mainly based on the Kofoidan thecal plate tabulation as suggested by Kofoid [4] (Figure 1). However, morphological identification of this genus using normal light microscope had faced numerous problems, due to lack of distinctive characteristic in *Alexandrium* such as horn, spine or heavy ornamentation of the thecal plates. These include inability to recognize the ultrastructures such as the anterior and posterior sulcal plate, apical pore complex under light microscopy.

In this paper, we would like to present our data on the application of an epifluorescence approach coupled with image analysis system to examine the outer morphological characteristics of *Alexandrium* species found in various locations in Malaysia water.