# PRELIMINARY STUDY ON MORPHOLOGY AND MOLECULAR ASPECT OF *Anabaena* spp. FROM SELECTED AQUACULTURE PONDS IN SERIAN, SARAWAK AND KOTA MARUDU, SABAH.

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## INTRODUCTION

*Anabaena* is a filamentous cyanobacteria (blue-green algae) with straight, flexuous or spirally coiled trichomes. Their cells are torulose, barrel-shaped or cylindrical. They also contain heterocysts (important in nitrogen fixation) and akinetes that function as resting stages whenever the condition is not suitable for surviving. There have been 110 species recorded thus far where most of them are described as planktonic (Prescott, 1982; Komarek *et al.*, 2003). Some of the *Anabaena* species are neurotoxin, anatoxin, microcystin and paralytic shellfish toxin producers which can be fatal to human being and animals if consumed directly and indirectly (Hunter, 1998; Ouellette and Wilhelm, 2003; Katirciolgu *et al.*, 2004; Carmicheal and Li, 2006). Examples of toxin-producing *Anabaena* are *A. flos-aquae* and *A. circinalis.* Classifications of *Anabaena* spp. were mostly done based on the morphological characters. However, identification of *Anabaena* spp. in the environment could be complicated due to their high similarity in morphology (Fergusson and Saint, 2000). Besides that, environmental factors such as growth condition could affect the morphological characters (Lyra *et al.*, 2001). The 16S rRNA gene is the most commonly used gene to study phylogenetic and taxonomy of cyanobacteria. It has a wide distribution within prokaryotes, consistent in function; contain both variable and conserved regions, large in size and high in information content (Woese, 1987; Ludwig and Klenk, 1997). The 16S rRNA gene could give better result in defining diversity of cyanobacteria rather than morphological approach alone (Lacap *et al.*, 2004). According to Baker et al. (2002), identification of cyanobacteria using microscopy was rapid and very sensitive. However, identification could be difficult sometimes even for skilled and experienced researchers. The PCR technique eventhough is time-consuming especially when it comes to optimizing the PCR reactions yet it could provide a degree of certainty and can be an aid to morphology data to confirm the presence of a particular species and provide a reliable identification for the cyanobacteria .

## MATERIALS AND METHODS

Sample collection and isolation of single-celled *Anabaena* spp.

Water samples from aquaculture ponds were collected from Indigenous Fisheries Research and Production Centre (IFRPC) Tarat, Serian and selected ponds in Kota Marudu, Sabah. The samples were sieved through 20μm plankton net, kept in cooler box and transported back to the laboratory for further analysis. A total of one milliliter of water sample was added to 1 ml of ASN3 medium, and then incubated under 12:12 h light dark photoperiod at 25°C for 1 week. Isolation of single-celled *Anabaena* was done in ASN3 medium as described by Rippka (1988). The unialgal *Anabaena* was