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แพลงก์ตอนพืชและคุณภาพน้ำในหนองหญ้าไซและหนองไฮ มหาวิทยาลัยราชภัฏสกลนคร จังหวัดสกลนคร

Phytoplanktons and Water Quality in Nong Yasai and Nong Hai Reservoirs, Sakon Nakhon Rajabhat University, Sakon Nakhon Province

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Abstract

Nong Yasai and Nong Hai are the important water supplied reservoirs for human consumption in Sakon Nakhon Rajabhat University and surrounding areas. The blooming of *Euglena* sp. and polluted water quality were reported in Nong Yasai Reservoir in June 2013. In this research study, the diversity of phytoplanktons as well as the water quality of Nong Yasai and Nong Hai Reservoirs located in Sakon Nakhon Rajabhat University were investigated between June 2014 - May 2015. Seven divisions comprised of 35 genera of 56 species of phytoplanktons in Nong Yasai reservoir were found and the dominant species were identified as *Cylindrospermopsis raciborskii* (Woloszyńska) Seenayya & Subba Raju, *Scenedesmus* sp.1 and *Planktolyngbya contorta* (Lemmermann) Anagnostidis & Komárek. An examination of the diversity of phytoplanktons in Nong Hai Reservoir found 6 divisions of 27 genera and 37 species with the dominant species being *Monoraphidium contortum* (Thuret) Komárková-Legnerová, *Dinobryon divergens* O.E. Imhof and *Staurastrum tetracerum* Ralfs ex Ralfs. An assessment of the water quality using AARL-PC Score found it to be classified in the mesotrophic status (moderate water quality) in the Nong Yasai Reservoir and oligotrophic-mesotrophic status (clean-moderate water quality) in the Nong Hai Reservoir. It was determined

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that the water could be used for household consumption after being properly treated. Additionally, algae blooms were not found to occur throughout the monitoring period.

Keywords: phytoplanktons, water quality, algal diversity, AARL-PC Score

1. Introduction

Two important reservoirs are located on the grounds of Sakon Nakhon Rajabhat University, Sakon Nakhon Province; Nong Yasai and Nong Hai Reservoirs. Both reservoirs were constructed to store rainfall for human water supply and use in the university and the surrounding areas. In June 2013, algal blooms occurred in the Nong Yasai Reservoir and caused a yellow-green scum on the surface of the water, which was visible to the naked eyes. These algae were euglenoids and specifically identified as *Euglena* sp. Euglenoids are generally found in water that is rich in organic matter and are known to cause eutrophication in water bodies [1, 2, 3]. The euglenoid blooms were found to be present for 3-4 weeks and disappeared after water turbines were installed.

It is important to monitor the water quality of the Nong Yasai and Nong Hai Reservoirs in order to confirm its suitability for human consumption. The assessment of water quality is examined through a combination of the physical, chemical and biological parameters. Each parameter has different advantages in terms of the physical-chemical properties that can be easily defined, vary continuously and offer immediate results. While the advantages of biological monitoring to assess water quality are reflected in the overall ecosystem; integrating the effects of different stress factors overtime is both a reliable and an inexpensive method [2]. The monitoring of the phytoplankton community is the one of the useful biological parameters for water quality assessment. Many species of planktons have different ranges of tolerance within the environment and they tend to be good bioindicators for water quality monitoring [4]. Besides, phytoplankton analysis is the basis of a broad categorization of reservoirs in relation to water quality, particularly those in the trophic state [2].

The main objective of this research is to study the diversity of phytoplanktons and the physico-chemical parameters of water quality in the Nong Yasai and Nong Hai Reservoirs. The results of this study can be used to help assess water quality in terms of the suitability of water supply resources for human consumption.

2. Materials and Experiment

Four replicate water samples were collected from two water sources, the Nong Yasai and Nong Hai Reservoirs located on the grounds of Sakon Nakhon Rajabhat University (Fig. 1). Some physical and chemical parameters of water quality were analyzed at the sampling site. The water temperature, pH and conductivity were measured with an electrode kit that was manufactured by the WTW Company. Dissolved oxygen (DO) and