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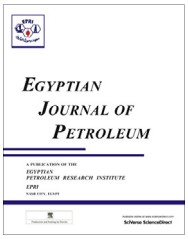

FULL LENGTH ARTICLE

Algae personification toxicity by GC–MASS and treatment by using material potassium permanganate in exposed basin

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KEYWORDS

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Abstract This study was conducted to address algal toxins using potassium permanganate through the control of biomass growth of algae under following conditions value 25 ± 1 °C illumination intensity value 245 microeinstein/m^2/s, using the culture media Chu-10 Modified for the purpose of development algae. We treated algal toxins belonging to groups of Neurotoxins, Hepatotoxins, Pyriproxyfen, Emodin, Brevetoxins-10 (A) and Cytotoxins using concentrations of potassium permanganate represented by 2, 4, 8 and 16 mg/l with alum concentration for each concentration of 30 mg/l, as the removal rate reached to 100% of the toxin blooms in concentrations of 8 and 16 mg/l respectively, through the examination of algal toxins mediated by GC–MASS compared to the standard, which diagnosed a range of algal toxins with $C_2H_3C_{12}NO$ formulas of synthetic $C_9H_{13}NO_2$, $C_{18}H_{27}NO_3$, $C_{11}H_{12}N_2O_6$, $C_{11}H_{17}N_3O$, $C_{10}H_{17}N_3O$, $C_9H_{15}Br_2NO$, $CH_4N_2O_2$, $C_{11}H_{17}NO_2$, $C_{13}H_9BrN_2O_3$, $C_3H_7NO_4S$, $C_{20}H_{29}NO_3$, $C_{15}H_{10}O_5$, $C_4H_8O_2$ and $C_2H_2C_{13}NO$ the concentrations 2 and 4 mg/l turned toxic compounds into non-toxic compounds represented by $C_7H_6O_2$, $C_5H_6N_2O$, $C_{12}H_{11}ClO_4$, $C_6H_6O_2$, $C_{12}H_{10}O_4$, $C_{10}H_{17}N$, $C_4H_6O_2$ and $C_5H_6N_2O$. The results showed reduced primary productivity of algae chlorophyll a result of substance to stop chloroplast for vital activity through the influence of the concentration of potassium permanganate values 0.571, 1.142, 0.583 and 1.713 mg/l respectively, compared to the standard of 114.2 mg/l. As diagnosed types of Algae producing toxins are represented by *Microcystis aeruginosa, Microcystis flosaquae, Oscillatoria amoena, Oscillatoria amphibian, Oscillatoria boryana, Oscillatoria limnetica, Oscillatoria perornata, Phormidium ambiguum, Lyngbya digueti, Lyngbya major, Lyngbya nordgaa-*

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dii, Lyngbya spirulinoides, Nostoc carneum, Nostoc spongiforme, Anabaena augstumalis, Chroococcus indicus and *Chroococcus minor*, as the dry weight of live Algae producing toxins is 17.342 g/l.

1. Introduction

Algae are very different and can be found everywhere on the earth. They play a necessary role in many of ecosystems levels, including providing the basis for the hydrous food supply chains supporting all fisher men in the seas, oceans and inland, as well as making about 70% of all the air we breathe [1]. The word Algae represents a big large group of different creatures from different phylogenetic groups, representing many systematic divisions. In general Algae can be referred to as plant-like organisms that are usually photosynthetic and hydrous, but do not have true leaves, roots, trunk, vascular tissue and have simple reproductive formation [2].

Algae are distributed worldwide in the sea, in freshwater and in wet situations on land. Most are microscopic algae, but some of them are so large, also some marine seaweeds that can exceed 50 m in length. The algae have chlorophyll and can make their own food through the steps of photosynthesis.

Recently they are classified in the kingdom of protiste, which include a variety of unicellular and some basic multinuclear and multicellular eukaryotic organisms that have cells with a diaphragm-bound nucleus. Algal poisoning is an intense, often lethal condition caused by high concentrations of toxic blue-green algae (more commonly known as cyanobacteria—literally blue-green bacteria) in drinking water as well as in water used for recreation, agriculture and aquaculture. Severe illness of livestock and Fatalities, birds, pets, fish and wildlife from high growths of cyanobacteria water blooms occur almost in all of the countries in the world. Severe deadly poisonings have also been notarized in people. Poisoning usually comes during warm seasons when the water blossom are more acute and of longer duration. Almost poisonings come among animals drinking cyanobacteria-infested freshwater, but aquatic animals, mostly mariculture fish and prawn, are also affected. The toxins of cyanobacteria comprise six special chemical classes collectively called cyanotoxins [3]. Toxic algae, micro-algal blooms, phytoplankton blooms, red tides, or harmful algae, are all terms for normally occurring phenomena. Around 300 species of micro algae are notify at times to form mass appearance, so called blooms. About one fourth of these species are recognized to produce toxins. The scientific society points out to these events with a generic term, 'Harmful Algal Bloom' (HAB), understanding that, because a wide range of organisms are implicated and some species have toxic impacts at low cell intensity, not all HABs are 'algal' and not all occur as 'blooms' [4]. Many of the organisms in charge for red tides are closely distributed and, in recent years, the organisms appear to be markedly spreading. Natural events such as hurricanes can spread over organisms, and it is doubtful that some organisms may be moved long distances in ship ballast waters. Another factor that may motivate algal proliferation in both freshwater and marine systems is augmentation nutrient loading. Certain algae occur more usually in some areas than others and it is useful to know which ones are problems in particular locations. Good sources of information about algal blooms are the State public health department or the State division of marine resources or marine fisheries [5]. Studies have confirmed the use of UV for removal of all types of microbiology but it is expensive, making it difficult to use on an ongoing basis, while potassium permanganate are a sterile material and removes the microorganisms in addition to not hurting the outer wall of the algae or stopping the process of photosynthesis, causing the need to hold the vital events of moss energy disabled blastids of them, including the reduction in the productivity of material chlorophyll and all pigments in addition to this, it prevents algae toxins out to the outside center 18,6]. So study aims to address the algal toxins using material Potassium Permanganate in the open docks.

2. Materials and methods

2.1. Diagnosis of algae

The non-diatom algae were isolated and diagnosed by microscopic examination, depending on the number of references to classify of non-diatom algae [7–9].

2.2. Method of extract algae toxins Depending on the Reference of WHO [10]

For dried field algae samples certain amount of dry algae powder was added into extracting solution.

2.3. Method of chlorophyll extraction Depending on the Reference of Vollenweider [12]

In order to quantify the amount of chlorophyll in a particular species, the intracellular chlorophyll must first be extracted.

2.4. Examination of algal toxins using GC–MASS Depending on the Reference of Toshihiro et al. [11]

Examination of toxin algal is carried out using Shimadzu-2010 GC–MS.

- Column: 30 m length and 0.25 mm ID.
- Initial temperature: 85 °C.
- Post time: 2 min.
- Ramp: 10 °C/min.
- Final temperature: 340 °C.

2.5. Preparation of potassium permanganate and alum

The proper concentration of potassium permanganate was carried out by dissolving 1 g high purity $KMnO_4$ (99.5% purity)