

JAN 2024 / BIL. 10 / 2024

EON

Epitome of Nature

K E S I H A T A N D A N K E S E J A H T E R A A N



MAJALAH PP BIOLOGI
UITMCNS

ISSN 2773-5869



ALGAE BLOOMS: HOW CAN THEY BE HARMFUL TO THE ECOSYSTEM?

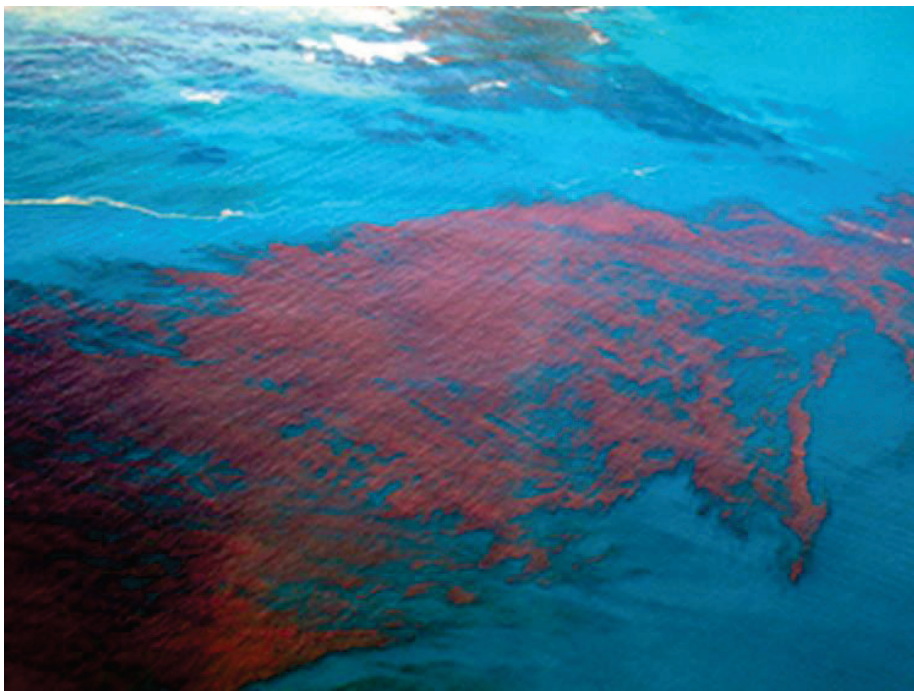
Nurshahirah Rahizar, Nur Syawanie Abdul Aziz, Siti Nur Syifaa Jamaludin, Siti Nur Shazwani Shukor, Alyssa Safiyah Abd Malek, Nur Hafizah Hisham, Aida Qasrina Noor Hisham, Sharir Aizat Kamaruddin, Aimie Rifhan Hashim
Fakulti Sains Gunaan, UiTM Cawangan Perlis, Kampus Arau, 02600 Arau, Perlis

shariraizat@uitm.edu.my

EDITOR: MUHAMMAD AIDIL IBRAHIM

Algae bloom or algal bloom is an excessive growth of microscopic algae or algae-like bacteria in fresh, salt, or brackish water (Image 1). Algal blooms come in a variety of colors, such as pink, red, brown, yellow, and blue-green (Image 2). A paint-like slick, foam, froth, or bad-smelling scum can result from an algal bloom and it depends on the kind of bacteria or algae that caused it (Denchak, 2019).

Not all algae blooms are toxic but a harmful algae bloom or HAB is a bloom that produces toxins. The toxin can be dangerous to humans and other organisms in aquatic ecosystems such as in oceans, ponds, lakes, and freshwater. According to the National Institute of Environmental Health Sciences (2023), certain blooms are easy to identify while others are difficult to identify because they grow



near the bottom of water bodies. Therefore, how did this harmful algae bloom occur and how does it influence human health and aquatic ecosystems?

Harmful algae blooms occur due to an excess of nitrogen and phosphate (United States Environmental Protection Agency, 2023). The sources of nutrients such as phosphorus and nitrogen increase in water are from the application of fertilizer, sewage from people and animals, and run-off from cities and industrial buildings (Centre for Disease Control and Prevention, 2022). The process by which these soluble nutrients are washed out of the soil and into streams, rivers, and eventually big ponds like oceans is facilitated by rain. Additionally, waterways also receive these nutrients from drainage systems. It is because of inadequate sewage treatment, untreated and raw sewage enter water bodies and it can generate an algal bloom due to its high nitrogen compounds, which include ammonia and nitrates.

Image 1: Algae can be found in all types of natural waters (Source: National Institute of Environmental Health Sciences, 2023)

Moreover, the factors for harmful algae bloom growth are slow-moving water and high temperature of water. The algae blooms need large quantities of water to grow. Their limited development in swift-moving streams and rivers can be attributed to the less concerning nature of their proliferation in these waterways. The algae growth becomes rapid when there is a drought because the water flow is low and flows slowly. Then, the water temperature increase is one of the main reasons for algae bloom's rapid growth. It requires a suitable temperature for some bacteria to survive both in and out of the water. Hence, algae blooms are more likely to occur in summer or fall.

Ingestion of contaminated fish or shellfish, swimming in contaminated waterways, or breathing airborne droplets of contaminated water can expose people to harmful algal bloom toxins (Denchak, 2019).

“Airborne harmful algae bloom toxins may cause breathing problems”



Image 2: Harmful algal blooms can be green, blue, red, or brown
(Source: United States Environmental Protection Agency, 2023)



Image 3: Algal blooms can reduce the survivability of fish and other aquatic life (Source: United States Environmental Protection Agency, 2023)

People can also be exposed to the algae bloom even if food is cooked because the algae toxin will remain. Airborne harmful algae bloom toxins may cause breathing problems. In some cases, it will trigger asthma attacks in susceptible individuals. Harmful algae blooms that occur in freshwater are dominated by the cyanobacteria *Microcystis* (National Institute of Environmental Health Sciences, 2023). This organism generates a liver toxin that can harm the liver and cause gastrointestinal disorders. Some types of algae can cause irritation and allergic reactions in direct contact with the algae bloom.

Furthermore, the toxins that are released by harmful algae blooms can affect animals and other living creatures that feed on grasses or fish tainted with toxins. Harmful algae blooms can also cause large-scale fish deaths (Image 3).

Besides, algae blooms have the potential to harm aquatic life by blocking sunlight and clogging fish gills. Algal blooms can cause "dead zones," which are areas of water with little or no oxygen where aquatic life cannot survive. Aquatic animals have to leave the affected area in order to survive, especially young fish and creatures that live at the bottom like crabs and clams (United States Environmental Protection Agency, 2023). As a result, an increase in the occurrence of harmful algal blooms can have a negative impact on the ecosystem. In keeping with the goals of SDG3, environmental preservation must be given top priority in order to prevent the spread of dangerous diseases such as those caused by harmful algae.