

MEI 2024 / BIL. 11 / 2024

EON

Epitome of Nature

KESIHATAN DAN KESEJAHTERAAN



MAJALAH PP BIOLOGI
UITMCNS

ISSN 2773-5869



THE REPERCUSSIONS OF THE EUTROPHICATION PHENOMENON ON HUMAN HEALTH AND WELFARE

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

shariraizat@uitm.edu.my

EDITOR: DR. MU'ADZ AHMAD MAZIAN

Eutrophication of water bodies is a peculiar environmental phenomenon and has become more prevalent, primarily because excessive input of nutrients into a watershed. Agriculture runoff treated wastewater discharge from sewage treatment facilities, lawn fertilizers, and any other organic wastes, all contribute to this problem. In most cases, it encourages the growth of algae and other aquatic plants, resulting in harmful algae blooms (HABs), leading to a deterioration of quality and condition of natural waters, mostly in marine or coastal ecosystems.

Figure 1 revealed the eutrophication phenomenon in Pahokee Marina on Lake Okeechobee, Florida, where a lot of thick blue-green algae was developing on the surface of the water. *How does this phenomenon happen?* The gradual increase of concentration in nutrients such as phosphorus and nitrogen runoff from the



Figure 1: Algae blooming found in Pahokee Marina on Lake Okeechobee, Florida.
(Source: Brasileiro, 2021)

soil, entering the water bodies and influencing the growth of algae (NOAA, 2023). The abundant growth of algae on the surface of water blocks the sunlight from entering the bottom and uses the oxygen. However, when algae die, microorganisms start decomposing the leftovers, consuming oxygen for respiration. The breakdown eventually depletes the oxygen in the water. This causes the water to transport

less oxygen over time. Hence, this has become a global environmental issue in recent decades as this vicious cycle continues. Society may take this problem as lightly as possible because they do not know how terrific eutrophication is to human health and marine ecosystems. In general, the main effect of water eutrophication is that it can disrupt the natural equilibrium of species within an aquatic

ecosystem. Some species thrive in nutrient-rich environments, whereas others struggle. This imbalance can cause an overall decline in biodiversity, resulting in ecosystem degradation and the gradual impairment of critical ecological functions. Furthermore, nutrients such as phosphorus and nitrogen feed the rapid growth of algae, resulting in harmful algal blooms (HABs). This causes water to lose clarity and prevents sunlight from penetrating, which impedes photosynthesis and causes the death of submerged aquatic plants. Moreover, these also lead to a depletion of oxygen caused by algae, cyanobacteria, and weed decomposition that use up oxygen in the water, creating hypoxic or anoxic conditions (Hwang, 2020). These conditions result in the death of fish, seashell, and other marine organisms that rely on oxygen for survival. Figure 2 shows the discovery of thousands of dead fish in the lake of Universiti Sultan Zainal Abidin (UniSZA), due to oxygen depletion. On top of that, the consequences of eutrophication on human health can be both direct and indirect. Toxins such as microcystins and saxitoxins, which are responsible for acute deadly poisoning in people and animals, are produced by hazardous algal blooms (Yang et al., 2008). When toxic algal blooms develop, water bodies are rendered unfit for municipal drinking water and recreational use.



Figure 2: Thousands of dead fish because of oxygen depletion on the lake of UniSZA.

(Source: The News, 2023)

Consumption of polluted drinking water containing these pollutants can cause gastrointestinal disease, liver damage, and neurological consequences. It can also cause skin rashes, respiratory issues, and eye irritation if humans come into contact with polluted water when swimming, boating, or fishing. Furthermore, declining highly valuable fish species can have serious economic consequences for fishing industries and coastal communities. In a nutshell, eutrophication endangers both marine ecosystems and human health. Excess nutrient enrichment disrupts the delicate balance of marine ecosystems, resulting in algae blooms, oxygen depletion, and biodiversity loss. Furthermore, the pollution of drinking water sources, as well as the detrimental influence on recreational activities and local economy, show the direct impact on human health and welfare. To alleviate these negative impacts and preserve the

sustainability of both marine ecosystems and human well-being, it is critical to address the root causes of eutrophication, such as lowering nutrient runoff from agricultural and industrial operations. The local authorities and health government can also take a measure by doing a routine check-up on water bodies to make sure the water quality is in the best condition. If the eutrophication phenomenon occurs, implementing mitigating measures is the best action for the fishing business. In accordance with Sustainable Development Goals (SDG 3), environmental preservation must be given top priority to impede the spread of harmful diseases.

References

