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## THE HEALTH AND SAFETY OF DIATOM BLOOMS

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Plankton is a collection of drifting and floating organisms in water that cannot move against currents or winds (Britannica, 2023). There are several types of plankton. Usually, plankton can be identified based on its size, type, and duration of drifting. It can be observed under the microscope. There are two basic groups of plankton which are phytoplankton (plants) and zooplankton (animals). Phytoplankton are microscopic marine algae. This phytoplankton has chlorophyll and needs light for its growth development. Diatoms are a type of phytoplankton which is the most common plankton



Image 1: Diatom is one of the types of phytoplankton

type, and it is shown in Image 1. These diatoms are found in freshwater and ocean (Boothe, 2020). Diatoms are also known as 'pearls of the ocean'. It is a primary food source in the food chain, such as invertebrates and small fish. It is important for the energy and nutrient cycles of water resources. Diatoms have a cell wall called frustules and it is composed of silica. Nutrient cycling resulting from the high concentrations of nitrogen and phosphorus levels causes the bloom of diatoms. Diatoms can be seen often in the tank cycle.

Some diatom blooms are beneficial, but some are not. In Image 2, diatoms are algal toxins that can inhibit neural development, and cause illness, paralysis, and even death. According to Jennifer Doll, *Pseudo-nitzschai* genus is the most harmful diatom species (Doll, 2023). This diatom can produce harmful neurotoxins which are called domoic acid (DA). Domoic acid can be ingested by larger marine animals and humans. For larger marine animals, they can get infected with this toxin by eating smaller fish that are already exposed to the domoic acid.

Domoic acid causes amnesic shellfish poisoning (ASP), and it can develop into neurological damage or death within hours to days of swimming in unsafe water or eating food that contains toxins. Other than that, toxins can build up in seafoods, affecting human as well. Humans are exposed to domoic acid by eating fish that contain the toxin, or by swimming or engaging in activities in affected water. People who breathe in tiny drops of diatom may experience irritation of the nose and nasal passages. What happens if we breathe in a large number of diatoms? Inhaling a large amount of diatom can lead to shortness of breath and coughing. On the other hand, these diatoms also can affect human skin, causing itchiness and dryness. The presence of diatomaceous earth can cause irritation and eye irritation.

Diatom blooms are part of natural ecological processes and may disappear on their own. By analyzing the specific conditions of their aquatic environment and monitoring factors such as water quality, nutrient levels, and ecosystem health, we can determine



Image 2: Diatom blooms (Source: Seaside Signal, 2020)

whether interventions are needed to guide decisions.

There are several ways to get rid of diatom blooms, which are to adjust the lighting, use filtration, and introduce eating organisms. Diatoms tend to grow in the presence of light since it is a phytoplankton and contain chlorophyll. Modifying the lighting level in the water system helps to reduce the exposure time of light. Indirectly, it can control the diatom growth. Next, diatoms consume dissolved organic compounds, phosphate, and nitrates, to prevent the diatom from blooming, filter the water through a Reverse Osmosis Deionized water (RODI) unit. RODI will help to remove contaminants, including silicate and nitrate. The other way to reduce diatom growth is to introduce marine organisms like nerite snails, and fishes like suckermouth catfish (Image 3) to eat diatom bloom.

In conclusion, diatoms are an important food source for marine life. Some diatoms release oxygen to the environment, and some are harmful to humans and other marine environments. Diatoms release a toxin called domoic acid. Domoic acid can affect marine animals and humans. Ways to reduce diatom bloom are to adjust the lighting, use filtration like RODI, and let the

Diatom be eaten by marine organisms.

#### References



Image 3: Suckermouth catfish that eats the diatom (Source: the spruce pets, 2020)