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The Effect of Laundry Detergents on Algae Growth

One of the active ingredients in many laundry detergents is phosphate, which contains the mineral phosphorous. Phosphates are binding agents that suspend dirt in wash water, so that the dirt rinses away. Phosphorous is also a food source for algae and other plant life and is necessary for their growth.



While there are many phosphate-free detergents on the market, others still contain phosphates. According to a 1994 paper released by the University of Colorado, secondary wastewater treatment only removes a small amount of the phosphates from wastewater, so the bulk of the phosphates in detergent remain in the treated water released into the environment. Since 1 lb. of phosphorous can grow 700 lbs. of algae, a small amount of phosphorous can have huge effects.

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History

In the 1960s, nearly all of the detergents used in the United States contained high levels of phosphates. These phosphates entered freshwater sources, such as lakes and streams, and created a super-rich nutrient concentration. The amount of phosphorous directly limits the amount of algae that can grow, so the more phosphorous a body of water contains, the more algae it can support. By the end of the 1960s, algae had overrun freshwater lakes such as Lake Erie.

Significance

Algae are necessary to a healthy freshwater ecosystem and form the basis of the food chain. However, excessive algae growth is dangerous to freshwater ecosystems, because it causes a reduction of light and oxygen and, as a result, changes the water pH, making it more acidic. When aquatic plants do not get the light they need in order to complete photosynthesis, they begin to die. Fish that feed on those plants lose a food source, and they are killed by the lack of oxygen in the water. At one point, the heavy mats of algae that covered the surface in Lake Erie were so bad that there was no oxygen within 10 feet of the bottom of the lake. This severely affected the population of walleye, blue pike and whitefish in the lake.

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Considerations

While all excessive algae growth is detrimental, phosphates encourage the growth of blue-green algae, which can release toxins that poison the water and the animals that come into contact with it. It is very difficult to test the toxicity of this algae, so groups like the Washington State Department of Ecology recommend that people and pets stay away from any potential blue-green surface scum. In addition, blue-green algae produce noxious odors when decomposing. They are not edible to most life forms and serve no real positive function within an aquatic ecosystem.

Effects

Algae contribute to eutrophication by speeding it up. Eutrophication is the process by which freshwater sources dry up over time. Some algae, such as didymo, clog up the flow of water, preventing the free movement of excess sediment. As lakes and streams fill up with dead algae along with other organic matter and soil, they begin to dry up and turn back into land.

Prevention/Solution

Since the 1970s, the federal government, many states and municipalities have enacted legislation banning or limiting the use of phosphates in laundry detergent. Some areas do not have any additional legislation to that enacted by the federal government, or they have legislation that only addresses phosphates in laundry detergent, but not other cleaners that contain high levels of phosphates such as dishwashing detergent. Water pollution due to phosphates still continues in those areas. Diligence by consumers when purchasing cleaning products can reduce the use of phosphate-based detergents and the negative effects of algae even more.

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References

[University of Colorado: Historical Perspective of the Phosphate Detergent](#)

[The Effects of Laundry Detergent on Bean Plant Growth](#)

[How to Make Laundry Detergent With Borax](#)

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Macon County Conservation District: Green Tip #34-Phosphate-Free Laundry Detergents

Lenntech: Detergents Occurring in Freshwater

Washington State Department of Ecology: General Algae Information

University of Massachusetts: Total Phosphorous

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