LIME CHEMICAL FACT SHEET

Formulations

Lime ($Ca(OH)_2$ or $CaCO_3$) is a nontoxic material that is typically applied to lawns, gardens, pastures and croplands to supply calcium and decrease soil acidity. The application of lime has been used in the management of waterbodies as a means of addressing acidification, as well as eutrophication to a lesser degree.

Aquatic Use and Considerations

Acid deposition (e.g., acid rain) can lower the pH of surface waters, particularly in waterbodies with low alkalinity. Many fish and invertebrate species are negatively impacted by low pH levels. Applying lime to acidic waterbodies can increase the pH to neutralize the water and create a buffer for pH fluctuations. Lime can be directly added in bulk to rivers, lakes, or catchments. It is most often added as ground limestone gravel or powder. Dolomite ($CaMgCO_3$) is also occasionally used.

To a lesser extent, lime has also been used to reduce the amount of the nutrient phosphorus in the water. The effects of liming on phosphorus sequestration tend not to persist without repeated treatment, suggesting this approach may not be appropriate as a long-term restoration tool. Additionally, liming is less effective at reducing phosphorus concentrations than alum treatments.

Liming may result in a short-term increase in turbidity and reduction in water clarity from suspended lime particles. Increases in pH are also expected following lime treatment, which may increase aquatic productivity. There is little scientific literature related to the use of lime for aquatic plant management.

Post-Treatment Water Use Restrictions

There are no post-treatment restrictions on treated water use for swimming, fishing, drinking water or irrigation.

Chemical Degradation, Persistence and Trace Contaminants

The application of lime to a waterbody saturates the water column with base cations (Ca^{2+}), which act as a buffer and increases the pH of the waterbody. Dosing should be calculated by modeling the amount of lime required to neutralize the waterbody. Application method, dissolution rate, waterbody temperature, waterbody size, waterbody type and waterbody pH should be considered when calculating the dosage. Lime may continue to increase the waterbody's pH once in the sediment, though at a lower rate. Repeated treatments may be required.

Lime may also reduce the amount of phosphorus in the water. The supersaturation of base cations results in the precipitation of phosphorus as hydroxyapatite. As the precipitate slowly settles, some phosphorus is removed from the water. As stated previously, lime is not as effective at removing phosphorus as other management options and repeated treatments are often necessary, meaning it may not be appropriate for use solely as a phosphorus reduction management tool.

Impacts on Fish and Other Aquatic Organisms

Over-application of lime can be toxic to aquatic life through pH alteration, so careful calculation is needed to maintain pH values within the waterbody's natural range. Liming may increase fish abundance.

Human Health

Short-term lime exposure risks are primarily limited to applicators. Concentrated lime can cause eye, nose and skin irritation. Wear personal protective equipment and follow label instructions while handling.

There are no long-term health effects associated with lime exposure. It does not cause cancer or reproductive harm. Calcium, magnesium and carbonate naturally occur in waterbodies and may even be beneficial to human health when present in drinking water.

For Additional Information

U.S. Environmental Protection Agency (EPA)
Office of Pesticide Programs
epa.gov/pesticides

Wisconsin Department of Agriculture, Trade, and Consumer Protection
datcp.wi.gov/Pages/Programs_Services/ACMOverview.aspx

Wisconsin Department of Natural Resources
608-266-2621
dnr.wi.gov/lakes/plants

Wisconsin Department of Health Services
dhs.wisconsin.gov

National Pesticide Information Center
1-800-858-7378
npic.orst.edu