The Effect of Elemental Chemistry on Quality of Water Reserves

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Opinion Article

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DESCRIPTION

A chemical element is a species of atom with a specific number of protons in its nucleus, including the pure substance made up entirely of that species. Unlike chemical compounds, chemical elements cannot be broken down into smaller molecules through any chemical reaction. The number of protons in an element's nucleus is its defining characteristic and it is known as its atomic number. Chemical elements make up nearly all of the universe baryonic stuff. When distinct elements undergo chemical reactions, atoms are rearranged into new compounds that are joined together by chemical bonds. Only a few elements, such as Silver (Ag) and Gold (Au) can be found in relatively pure native element minerals. Air is primarily composed of the elements Nitrogen (N), Oxygen (O) and Argon (Ar) but it also contains Carbon-dioxide (CO_2) and Water (H_2O).

Natural and anthropogenic sources such as agricultural fertilisers, sewage discharges, mining and atmospheric deposition all contribute to freshwater ecosystem pollution. The impact of methyl mercury bioaccumulation and biomagnification on freshwater contamination *via* trace elements and sediment discharge. Elevated Mercury (Hg) concentrations, as well as elements such as Cadmium (Cd), Lead (Pb), Nickel (Ni), Arsenic (As), Selenium (Se) and Zinc (Zn) were identified in fish, found in several lakes and new impoundment reservoirs. Atomic absorption spectrometry was used to assess Mercury, whereas inductively coupled plasma-optical emission spectrometry was used to determine the remaining elements.

Freshwater quality and quantity are critical for the world's population. The world's twenty-one largest lakes contain around two-thirds of all freshwater on the planet's surface. Natural lakes and reservoirs provide a variety of services including recreation, economic advantages, biodiversity support, flow regulation, water supply and energy generation. Pollution of freshwater environments is caused by both natural and artificial sources such as sewage discharges, agricultural fertilisers, mining and atmospheric deposition. Reservoirs contribute to global carbon cycle by serving as potential sinks for Nitrogen (N), Phosphorus (P), Silicon (Si), inorganic and organic pollutants. As worldwide reservoir and dam development ramps up to meet rising water demands, understanding the processes of lakes and reservoirs, particularly as they relate to climate change and eutrophication may become increasingly crucial. Lakes are frequently classified into trophic states based on their nutrient levels. Eutrophic, mesotrophic, and oligotrophic are the three trophic states.

Eutrophic lakes have high nitrogen concentrations, which leads to an abundance of algae and poor visibility. Oligotrophic lakes contain low nitrogen levels in their waters and so support less algae bloom, the water is normally clean and blue with a clear visibility. Mesotrophic lakes contain medium nutrient levels and are classified as tropically intermediate between eutrophic and oligotrophic lakes. However, the relative relevance of Phosphorus and Nitrogen as regulators in freshwater ecosystems has been debated for decades. However, it is demonstrated that the lakes and reservoirs share many characteristics, reservoir processes occasionally differ from those of natural lakes. The chemistry of each lake is unique. Because of the existence of trace elements carried from the catchment the watershed, atmosphere and lake bottom all have an impact on the chemistry of a lake. As a result, the chemical composition of a lake is influenced by its climate and basin geology.

Trace elements such as Cobalt (Co), Copper (Cu), Zinc (Zn), Iron (Fe), Selenium (Se), Mercury (Hg) and Manganese (Mn) are required in biological systems but occur in minute concentrations. Depending on the concentration, they can be useful or dangerous to the plant, animal and human life. Non-essential elements including Cadmium (Cd), Arsenic (As), Mercury (Hg) and Lead (Pb) are hazardous to species and people. Neurotoxin methylmercury (MeHg) bioaccumulation and biomagnification effects have resulted in high Mercury concentrations in fish, in some lakes and new impoundment reservoirs, because fish contain more Neurotoxin methylmercury than other dietary sources and they have become the primary Mercury exposure route for people.