CONSUMERS AND PHOSPHORUS

Phosphorus is one of the most common elements in our environment and is essential to human, animal and plant life. Phosphorus is present naturally in food, water and even human bodies. In your body, phosphorus is present in your genes, teeth, and bones. Your muscles work because of the phosphorus in adenosine triphosphate, a compound found in all living tissue that stores the energy we need to do just about everything.

Today, phosphorus is an important part of many of the products that are indispensable to modern living and good health. A single phosphorus compound can be used in a broad range of applications, including pharmaceuticals, personal care products, industrial and institutional cleaners, and other technical uses, such as in fire extinguishers.

Depending on the application, different forms of the ingredient can be used. For example, a technical grade form of sodium tripolyphosphate functions as a critical ingredient in industrial and institutional detergents while a higher, food-grade form is used as a plaque control agent in toothpaste and mouthwash. Likewise, a food-grade form of tricalcium phosphate is used to provide the essential elements calcium and phosphorus in dietary supplements, while a pharmaceutical-grade form is used as inert ingredients in prescription and over-the-counter drugs.

When calcium is added to phosphorus compounds, we get products such as dicalcium phosphate, which is used as a polishing agent in toothpaste, and tricalcium phosphate, which is the conditioning agent in salt that keeps it flowing freely out of the tube.

As you can see from these examples, phosphate products are a significant part of everyday living. In addition to their versatility, government authorities also recognize them as safe for worker exposure and handling, and for use in the home. This combination of versatility and safety for use and consumption has made phosphorus-containing products nearly indispensable. However, we still need to be using these valuable compounds responsibly, as they can affect our environment.

In many bodies of water, phosphorus is a limiting nutrient, and controlling its level is an important step in preventing eutrophication, or an overabundance of nutrients. In most areas, a majority of the phosphorus comes from the environment itself and only a fraction, about a third, comes from consumer products.

Public water systems (PWS) commonly add phosphates to the drinking water as a corrosion inhibitor to prevent the leaching of lead and copper from pipes and fixtures. Inorganic phosphates (e.g., phosphoric acid, zinc phosphate and sodium phosphate) are added to the water to create orthophosphate, which forms a protective coating of insoluble mineral scale on the inside of service lines and household plumbing. The coating serves as a

liner that keeps corrosion elements in water from dissolving some of the metal in the drinking water. As a result, lead and copper levels in the water will remain low. The key to ensuring that orthophosphate reduces lead and copper levels is for PWS to maintain proper orthophosphate levels.

Sources:

http://phosphatesfacts.org/what-are-phosphates/

https://phosphatesfacts.org/wp-content/uploads/2015/09/The-Use-of-Phosphates-For-Potable-Water-Treatment.pdf

http://phosphatesfacts.org/wp-content/uploads/2020/03/SD-328-IFAC-Phosphates-Infographic-V7.pdf

Read the information at the sites below:

- Stormwater Pollution Solutions
  https://www.fraserriverkeeper.ca/stormwater_pollution_solutions
- Top 5 Stormwater Stories from 2020
  https://www.watercanada.net/feature/top-five-stormwater-stories-of-2020/
- A Greener World
  https://fertilizercanada.ca/wp-content/uploads/2017/06/Greenerworld.pdf
- Urban Runoff and Green Infrastructure
  https://sustainabletechnologies.ca/home/urban-runoff-green-infrastructure/
- Working Together to Protect our Drinking Water
  https://ctcswp.ca/

Reflection:

1. Of the phosphorus-containing products listed, which surprised you the most?

2. What practical steps can you take to limit your phosphorus contribution?

3. Explore the list of other resources provided. What are other key takeaways related to consumers, phosphorus and water quality?