

The Important Role of Food Phosphates in Everyday Products

NON-FERTILIZER USES OF PHOSPHORUS – SERIES

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SUPPORTING FOOD QUALITY, TEXTURE, AND SAFETY IN MODERN PROCESSING

Phosphates are widely known as key ingredients in fertilizers, but they also play an essential role in the food industry. These compounds, technically known as salts of phosphoric acid, are crucial in food processing, helping to improve texture, appearance, and even taste. While the term "phosphate" might sound complicated, these ingredients are common and safe, found in many foods you eat daily.



WHAT ARE FOOD PHOSPHATES?

Food phosphates come in several different forms, including sodium, potassium, and calcium phosphates. They are created from purified phosphoric acid combined with minerals like sodium, potassium, or calcium. It's important to note that phosphoric acid used in food must go through a thorough purification process to remove impurities found in fertilizer-grade acid.

Food phosphates can vary in their chemical structure. Some consist of a single phosphate unit (called orthophosphates), while others have two or more phosphate units linked together (known as pyrophosphates or polyphosphates). These compounds are typically white powders, and most dissolve easily in water, although some calcium phosphates are not water-soluble. Despite the differences, they all have similar functions in food.



HOW DO FOOD PHOSPHATES WORK?

Phosphates are used in food processing in small amounts, usually **less than 1% of the total product**. Despite this, they play multiple crucial roles in improving the quality of food.

One major function of polyphosphates is their ability to **"capture" metal ions in food**. For instance, in cheese spread production, phosphates like sodium hexametaphosphate prevent calcium ions from forming small lumps, which helps keep the cheese smooth and spreadable. Another example is their use in treating potatoes. Sodium acid pyrophosphate binds to iron in the water used to rinse potato slices, stopping the potatoes from turning an unappetizing blue-purple color.

Phosphates are also useful in **regulating acidity**. They can **make water solutions acidic, neutral, or alkaline**, depending on the type of phosphate used. This is important because keeping the right pH level in food helps maintain its taste and appearance. For instance, phosphoric acid is added to soft drinks, like cola, to provide a slight tartness that balances out the sweetness.

OTHER IMPORTANT ROLES IN FOOD PROCESSING

Phosphates help in many ways beyond just pH control. In industrial baking, for example, sodium acid pyrophosphate acts as a solid acid in baking powders, **helping dough rise without the need for yeast**. This makes baking faster and more consistent.

Phosphates also play a role in retaining moisture in meats like ham, sausages, and seafood during cooking. By adding phosphates to the cooking liquid, the meat stays juicy and flavorful, **preventing it from drying out**. Even when cooking shrimp, phosphates make peeling easier by loosening the shells slightly.

In some products, calcium and potassium phosphates are used instead of sodium-based phosphates to reduce sodium content or add minerals. Potassium phosphates, which are more soluble than sodium ones, are often used when a higher concentration is needed. Calcium phosphates are also common in toothpaste as a mild abrasive and in livestock feed as a supplement.



REFERENCES

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WHY FOOD PHOSPHATES ARE HARD TO REPLACE

Food phosphates are unique because they perform multiple roles at once, such as **stabilizing pH levels** and **capturing metal ions**. They're also **tasteless**, making them ideal for foods where any change in flavor could be noticeable. Most alternatives have distinct flavors, which could alter the taste of the final product.



GLOBAL USE OF FOOD PHOSPHATES

Globally, the food industry uses around 1 million tons of phosphates each year. This number is growing, particularly in regions like East Asia, where the demand for processed foods is increasing. This includes phosphoric acid used in beverages, such as sodas.

Food phosphates may not be well-known to consumers, but they are vital for keeping food looking, tasting, and performing as expected.



ABOUT THE GLOBAL PHOSPHORUS INSTITUTE (GPI)

The Global Phosphorus Institute (GPI) is a global organization dedicated to ensuring the responsible use of phosphorus through cutting-edge science and stakeholder dialogue. With a holistic vision and worldwide participation, GPI fosters sustainable practices to advance phosphorus-related technologies and applications.

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