The Role of Feed Phosphates in Modern Livestock and Aquaculture Management

NON-FERTILIZER USES OF PHOSPHORUS – SERIES

JULY 2025

OPTIMISING LIVESTOCK & AQUACULTURE NUTRITION

Phosphorus is an essential nutrient in the diets of animals, playing a critical role in growth, bone development, and overall productivity. As livestock producers aim for efficiency and sustainability, feed phosphates have become a vital tool for maintaining animal health and optimizing performance.

PHOSPHORUS IN ANIMAL NUTRITION

Phosphorus is indispensable for animals raised for meat, milk, or egg production. It supports:

- **Bone and Skeletal Growth:** Phosphorus is a major component of bones and teeth, crucial during the growth phase of animals.
- **Metabolic Functions:** It aids in energy transfer and cellular processes essential for performance.

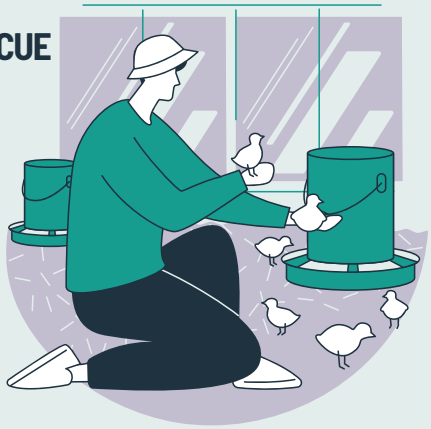
Since animals continuously excrete phosphorus, they require a consistent dietary supply to maintain equilibrium.

CHALLENGES WITH PHYTIC ACID IN FEED

Many plant-based feeds, such as grains, contain phosphorus in the form of phytic acid. Unfortunately, this form is largely indigestible by non-ruminant animals like poultry and swine. The inability to utilize this natural phosphorus leads to inefficiencies and waste.

PHYTASE TO THE RESCUE

Phytase, an enzyme added to feed, can unlock the phosphorus bound in phytic acid, making it bioavailable for digestion. This approach reduces the need for supplemental phosphorus, lowering feed costs and minimizing environmental phosphorus runoff.



SUPPLEMENTAL FEED PHOSPHATES

When the inclusion of phytase is impractical or insufficient, supplemental feed phosphates are used to meet nutritional requirements. These ensure animals receive the phosphorus they need without overloading their systems.

KEY TYPES OF FEED PHOSPHATES

Supplemental phosphates are a cornerstone of modern animal nutrition. The two primary calcium phosphate options are:

1. DICALCIUM PHOSPHATE (DCP)

- Historically the most used phosphate supplement.
- Digestibility is limited to 75-80%, leading to inefficiencies compared to newer alternatives.

2. MONOCALCIUM PHOSPHATE (MCP)

- Currently the dominant choice in the market due to superior digestibility.
- MCP and MCP-DCP blends are increasingly preferred for maximizing nutrient uptake while minimizing feed costs.

For aquaculture, ammonium phosphates are frequently used due to their solubility and compatibility with fish diets.

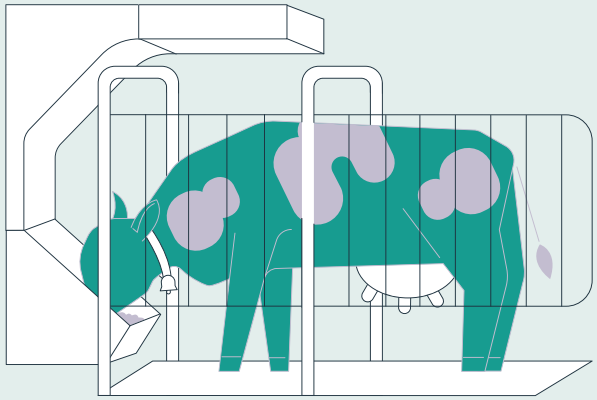
PURITY AND SAFETY IN FEED PHOSPHATES

Feed phosphates must meet stringent quality standards. Fertilizer-grade phosphoric acid, commonly used in agricultural fertilizers, contains harmful impurities like cadmium, fluoride, and arsenic, making it unsuitable for animal consumption.

To ensure safety, the phosphoric acid used in feed-grade phosphates undergoes a rigorous purification process. This step removes contaminants and guarantees the product meets the strict nutritional and safety requirements of livestock operations.

FEED PHOSPHATES IN THE GLOBAL CONTEXT

Though feed phosphates represent only about 5% of global phosphate use, their impact on livestock and aquaculture efficiency is significant. By improving nutrient absorption, they help producers optimize feed conversion ratios, reduce waste, and maintain sustainable production systems.



THE FUTURE OF FEED PHOSPHATES

With a growing focus on sustainability, the use of enzymes like phytase and high-quality phosphate supplements will continue to play a central role in animal agriculture. Innovations in feed formulations aim to maximize nutrient utilization while minimizing environmental impacts, helping producers meet the challenges of feeding a growing global population.

Feed phosphates are more than just an ingredient; they're a key component in building healthier animals, more productive farms, and a more sustainable agricultural future.

REFERENCES

This factsheet is based on insights from the GPI report : **Non-Fertilizer Uses of Phosphorus, an Overview**, prepared by *Willem Schipper Consulting*.

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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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