

HiPhorius™

Adding a little wins a lot



Mediterranean Marine Fish

Expand your opportunities with a new generation phytase.

Aquaculture Issues

1. Replacement of fish meal with plant-protein meals leads to an increase in the amount of Phytate (antinutrient) in modern fish diets
2. Phytate binds amino acids and other minerals reducing their digestibility
3. Phosphorus is an important nutrient for growth and performance, and it is supplemented in inorganic form in fish diets
4. Undigested Phosphorus and Nitrogen are excreted, leading to culture water pollution and eutrophication

HiPhorius™ advanced phytase solution



1. HiPhorius™ releases faster and more efficiently Phosphate from Phytate, increasing available Phosphorus, as well as other minerals and amino acids



2. HiPhorius™ enables higher use of plant-origin feed raw materials, resulting to fish-feed cost reduction



3. Supplemental inorganic Phosphorus can be reduced or even eliminated, contributing to additional feed cost reduction



4. Fecal excretion of nutrients (Phosphorus, Nitrogen, minerals) is reduced and so is the ecological footprint of fish farming

5. Culture water quality is improved

Recommendations for use

For pelleted fish feed (up to 95°C), HiPhorius™ is recommended. If higher pelleting temperatures or longer conditioning are used during the fish feed manufacturing process, then HiPhorius™20 L is recommended to be used at Post Pelleting Liquid Application (PPLA).

For extruded fish feed only HiPhorius™20 L should be used (PPLA).

HiPhorius™ nutrient release can be found in dsm-firmenich's Phytase web-tool (phytases.dsm.com). The web-tool is adopting the **Intelligent Phytase Nutrition** concept for optimum dose of HiPhorius™ and maximum benefits.

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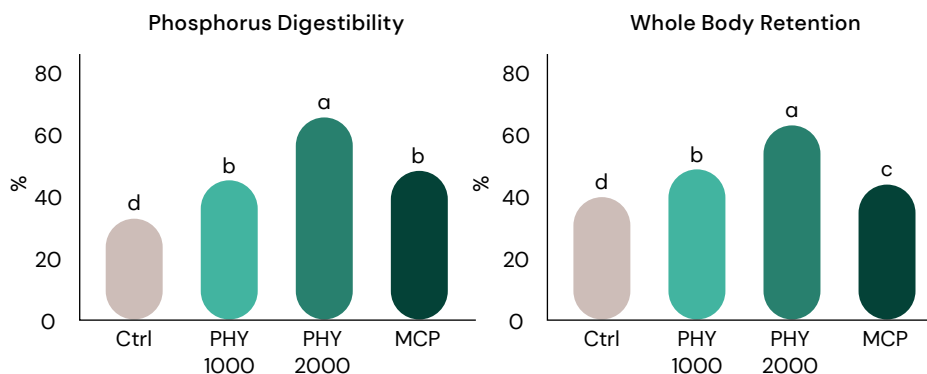
HiPhorius™ treatments:

- PHY1000 – 1000 FYT/Kg of feed
- PHY2000 – 2000 FYT/Kg of feed

Other treatments:

- Ctrl – Control diet with no phytase and without inorganic phosphate (MCP). Phosphorus level in the diets: 0.7% (Seabass) and 0.78% (Seabream)
- MCP – with inorganic phosphate (MCP) supplementation. Phosphorus level in diets: 0.93% (Seabass) and 1.12% (Seabream)

Seabass Trial, Portugal, 2021



HiPhorius™ added in seabass feed at two dose levels improved significantly

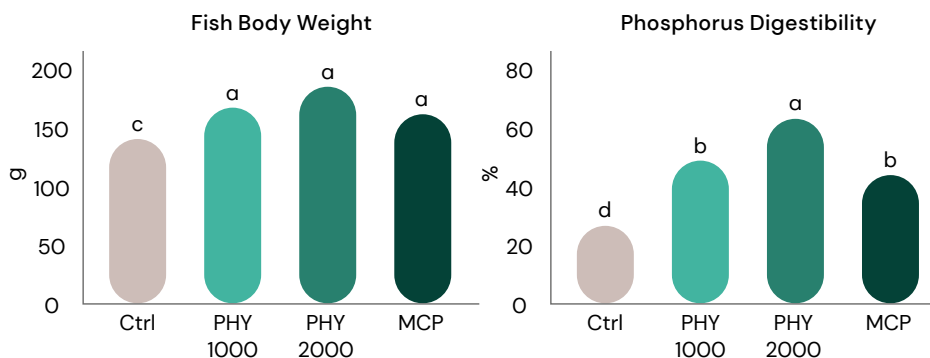
- Phosphorus digestibility
- Whole body Phosphorus retention

HiPhorius™ in the same trial also improved fish growth.

Additional trial details :

- Extruded feed, 45.7% Crude Protein, 17.1% Crude Fat
- Plant-protein based diets (10% fish products & by-products)
- Water temperature = 22.1 °C +/- 0.4

Seabream Trial, Portugal, 2021



HiPhorius™ added in seabream feed at two dose levels improved significantly

- Fish growth
- Phosphorus digestibility

HiPhorius™ in the same trial also improved whole body Phosphorus retention.

Additional trial details :

- Extruded feed, 44.6% Crude Protein, 16.0% Crude Fat & 0.78% Total Phosphorus
- Plant-protein based diets (10% fish products & by-products)
- Water temperature = 22.4 °C +/- 0.4

Product forms	Standard Dose in g/MT (1,000 FYT/kg of feed)	Maximum dose in g/MT (3,000 FYT/kg of feed)	Formulation
HiPhorius™10	100	300	Granulated
HiPhorius™20 L	50	150	Liquid

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