

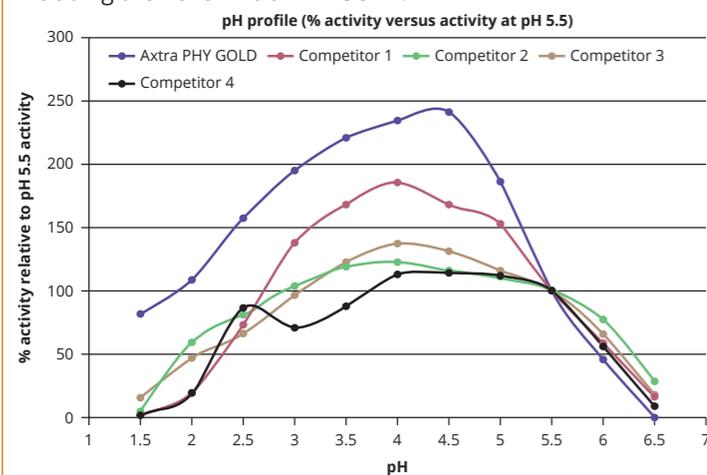
Improved phytase efficacy unlocks extra potential

Phytases are extensively used in broiler feeds as they increase amino acid and phosphorus availability during the digestive process, thereby improving growth performance. But can phytases keep up with the continuous demand for increasingly sustainable and cost-effective broiler production?

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Broiler production has been continuously expanding to meet the growing global demand for chickens as a primary source of animal protein. To meet the nutritional needs of this steadily growing industry, high-energy diets have been formulated using grain (corn or wheat) and soybean meals. Although these ingredients are rich in phosphorus, it is present in the form of phytate which has limited availability to monogastric animals, such as broilers, due to the low levels of endogenous phytase. This has led to feed phosphorus supplementation to minimise carcass rejection and subsequent economic losses driven by skeletal deformities, bone fractures and mortality. Supplementing broiler feeds with inorganic phosphorus is costly, however, leading to reduced profitability and excess phosphorus excretion.

Figure 1 - Comparative pH profile with five different phytases, including the novel Axta PHY GOLD.



The importance of a good start

Early development and growth are particularly fast in chicks. During this starter phase large quantities of minerals are deposited in the bones, especially phosphorus and calcium, along with magnesium, potassium and zinc. It is vital that bone density increases swiftly to support rapid weight gain. Failure to deliver key elements during the starter phase often has negative carryover health and performance effects during the following grower and finisher phases. To tackle developmental and performance concerns related to phosphorus deficiency, phytases are added to broilers' diets. By increasing phosphorus availability in the gut, phytases reduce the need for expensive inorganic phosphorus supplementation. Improved phosphorus digestibility also ensures a reduction in the phosphorus load in manure, thereby reducing phosphorus contamination of soil, surface water and groundwater. Phytases are also key in counteracting the anti-nutritional effects of phytate, particularly removing the growth-impairing binding of phytate with protein and soluble calcium in the gut. Such benefits associated with the use of phytases have encouraged the further development of the enzyme options available on the market.

Phytase improves phytate breakdown but the extent of the enzymatic response largely depends on its concentration in the feed and the properties of the phytase used. Distinct commercial phytases exhibit different biochemical and catalytic properties which can produce different results when added to broiler feeds. Enzymes with a superior profile in a low and wide pH range ensure that most of the phytate is hydrolysed and available in the early stages of digestion. Fast phytate hydrolysis in the early sections of the intestinal tract helps to minimise the anti-nutritional effects of phytate.

Small upgrades can go a long way

Phytases are continuously evolving to bring more value to broiler feed formulations and to cope with the demands of an ever-growing industry. From the first commercial phytase extracted from fungi, to more effective microbial bacterial phytases, the journey to find new alternatives and to improve existing phytases continues, with positive breakthroughs. A novel phytase, Axta PHY GOLD, showed remarkable results in releasing phosphorus *in vitro* and *in vivo*, particularly in further improving feed-use efficiency and boosting growth performance in broilers' early life stages.

In vitro trials were conducted using five different phytases



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Broilers fed diets supplemented with 2000 FTU/kg of the novel phytase showed higher final body weights and improved FCR.

and enzymatic activity over a range of pH values was evaluated. The broader the functional pH range the better, as this ensures superior bio-efficacy in the different pH environments throughout the broiler's gut, including the very acidic early sections (gizzard and proventriculus). The recently-developed phytase showed an improved pH profile when compared to competitors, performing better than all other phytases, even at very low pH levels (>2) (see Figure 1). Its thermostability and phosphorus releasing ability were also enhanced when compared to other phytases currently available on the market, thus anticipating the outcomes obtained in the *in vivo* tests. The novel phytase and a competitor phytase were tested *in vivo* in broilers fed a corn- soybean meal-based diet. Broilers fed diets supplemented with 2000 FTU/kg of the novel phytase showed higher final body weights and an improved bodyweight-corrected feed conversion ratio (FCR) when compared to a direct competitor (Figure 2). Phosphorus digestibility, an indicator of how successfully an enzyme can make phosphorus available, was also highest for the novel enzyme. The phytase was tested at different doses – 250, 500 and 1,000 FTU/kg – and presented the best results for each and all of the supplementation concentrations, especially in the starter/grower phase of broiler's development (Figure 3).

Improved performance

Axta PHY GOLD's superior bio-efficacy when compared to competitor phytases has earned it top ranking among in-feed phytases. The novel enzyme displays a superior functional pH range, exhibits better thermostability, with improved growth performance in broilers and reduced phosphorus excretion. These benefits all work together to unlock extra potential in broiler production which is more efficient and sustainable.

Figure 2 - FCRc levels for broilers supplemented with two different phytases at 2000 FTU/kg.

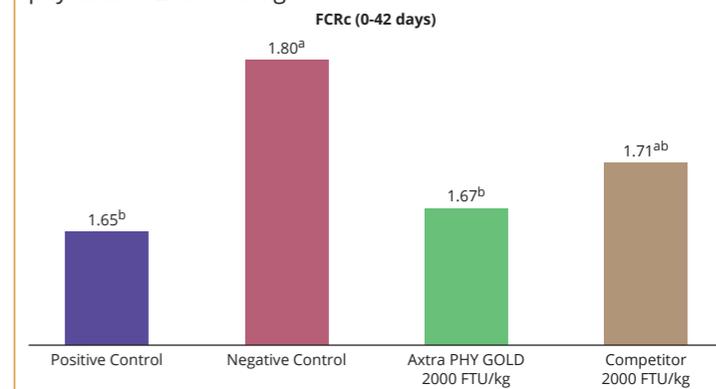


Figure 3 - Effect of increasing phytase doses from 250 to 1000 FTU/kg on ileal digestible of phosphorus in young broilers.

