Maximize the Effects of Phytase with Zinpro Performance Minerals®

ZINPRO PERFORMANCE MINERALS®

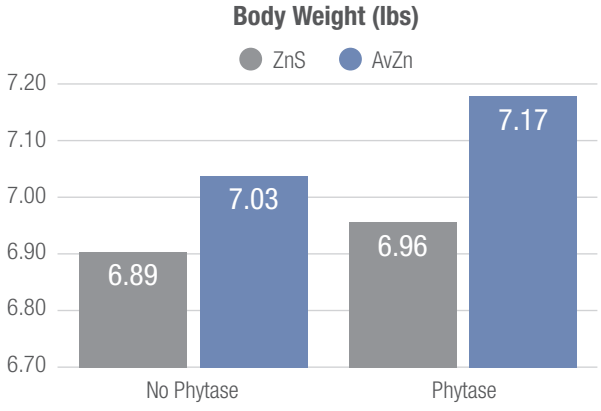
Several research studies have shown the benefits of adding of Zinpro Performance Minerals (ZPM) along with phytase supplementation to poultry diets.

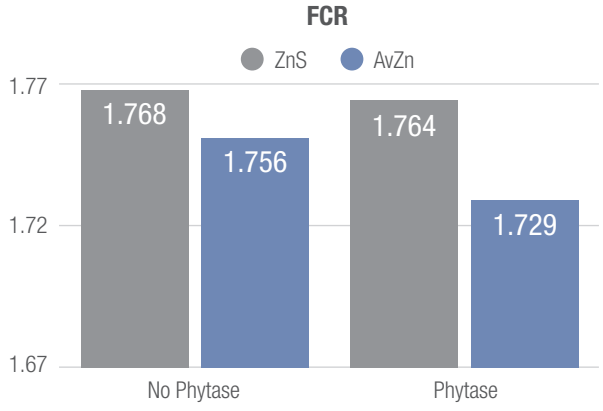
Phytate or phytic acid is a naturally occurring organic complex found in plants. Phytase, an enzyme that hydrolyzes phytate complexes, increases the availability of phosphorous that can be used by the bird to deliver improvements in growth performance, yield and other biological responses. Some studies have also suggested improvements in bioavailability of trace minerals contained in the fiber showing variable results.

Up to 70% phosphorous present in plant based raw materials used in poultry diets is in phytate form, which is unavailable for avian species. As a negatively charged molecule, phytic acid forms insoluble salts with divalent and trivalent inorganic minerals. These complexes are indigestible for monogastric species and lower the availability of microelements bound in phytate form.

Phytase + ZPM = Superior Growth Performance

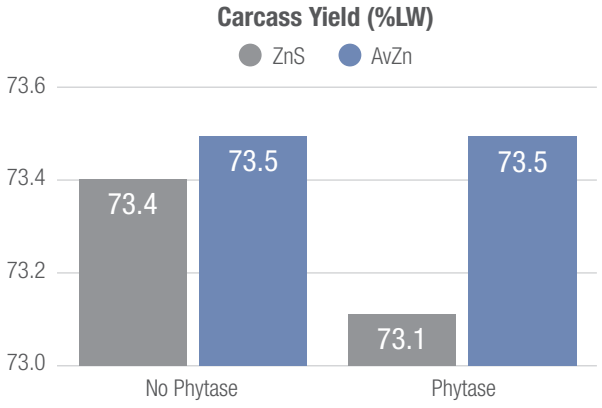
In a recent study, Ross 708 males were supplemented with 60 ppm Zn as Zn sulfate (ZnS) plus 40 ppm Zn as Availa®Zn (AvZn). This led to improvements of **2.0% BW and 1.2 pts FCR** at 49 days, compared to birds supplemented with 100 ppm Zn as ZnS. When Ronozyme P was added at 250 FTU/kg to both diets, these previously seen improvements had gone a step further and improved **2.9% BW and 3.5 pts FCR.** In another study with Axtra PHY supplemented at 500 FTU/kg, Ross 708 males supplemented with 60 ppm Zn as ZnS plus 40 ppm Zn as AvZn led to improvements of 1.9% BW at 49 days compared to birds supplemented with 100 ppm Zn as ZnS. When Axtra PHY was superdosed (1300 FTU/kg) to both diets, the improvement in BW jumped to 2.7%. The same effect was seen with the addition of Availa®Mn (AvMn) in the same manner (70 ppm Mn as Mn sulfate (MnS) plus 40 ppm Mn as AvMn) to AvZn supplementation, where increases of 0.4% BW and 5.4 pts FCR were seen with a standard addition of Axtra PHY (500 FTU/kg) to the diets, and 3.5% BW and 8.9 pts FCR with a superdosing approach, compared to a diet supplemented with 110 ppm Mn as MnS and 100 ppm Zn as ZnS.

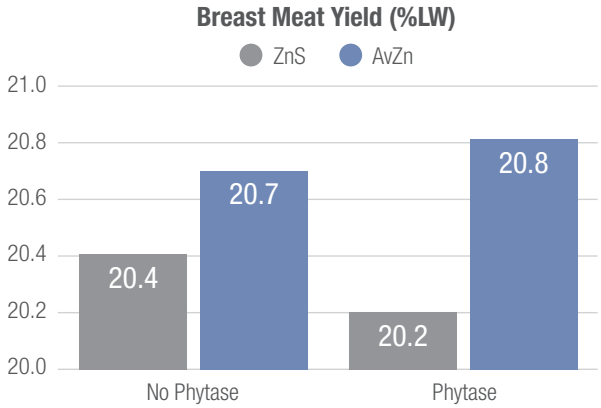




Phytase + ZPM = **Improved Processing Yield**

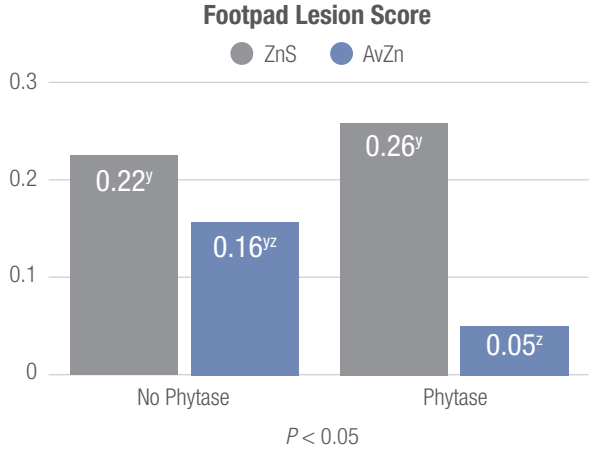
In the two previously mentioned studies, adding Ronozyme P at 250 FTU/kg to the diets enhanced the breast meat yield (BMY) from 0.3% to 0.4% in experiment 1, compared to the control diet with sulfate minerals, where the effect of superdosing phytase (Axtra PHY 1300 FTU/kg) versus its standard dosage (500 FTU/kg) tripled the BMY from 0.1% to 0.3% in experiment 2, in diets supplemented with ZnS plus AvZn compared to diets with solely ZnS, at 49 days of age. In a third experiment, Cobb 500 males supplemented with 40 ppm Zn as AvZn on top of 100 ppm ZnS, resulted in improvements of **0.1% carcass yield (CY) and 0.4% BMY** at 56 days, compared to a diet without AvZn supplementation. Once Phyzyme was added at 500 FTU/kg to both corn-soybean meal diets, these results went a step further and improved **0.4% CY and 0.6% BMY**, compared to the control diets.

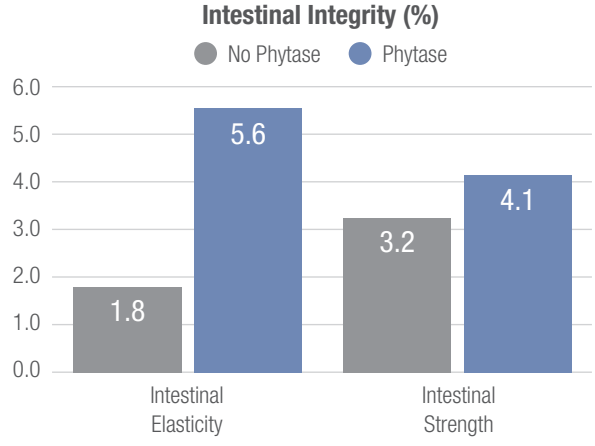




Phytase + ZPM = **Enhanced Epithelial Tissues**

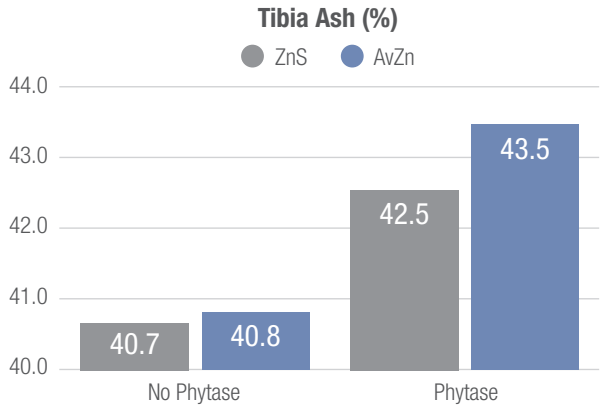
Another study in Ross 708 male broilers supplemented with 60 ppm Zn as ZnS plus 40 ppm Zn as AvZn, saw a **27% reduction in footpad lesion Score (FPS)** and a **1.8% increase in intestinal elasticity (IE) and 3.2% increase in intestinal strength (IS),** at 49 days, compared to birds supplemented with 100 ppm Zn as ZnS. However, when Ronozyme was added at 250 FTU/kg to both wheat-soybean meal diets, these previously seen improvements changed to a reduction of **81% in FPS** ($P<0.05$) and an increase of **5.6% IE and 4.1% IS.**

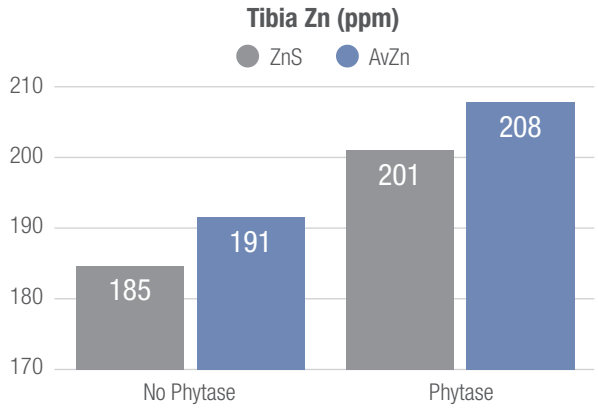




Phytase + ZPM = **Stronger Bone Development**

In a study published by Swiatkiewicz *et al.* (2001), male broilers were fed a basal diet supplemented with 10, 20 or 40 ppm Zn as ZnS or AvZn, with or without phytase, until 28 days of age. Birds fed a diet with 40 ppm Zn as AvZn had **0.1% higher tibia ash (TA) and 3.1% tibia Zn (TZn)** compared to birds supplemented 40 ppm Zn as ZnS. In the presence of Natuphos added at 750 FTU/kg, those same variables jumped to **0.9% TA and 3.4% TZn.**





Phytase + ZPM = **Boosted Relative Bioavailability**

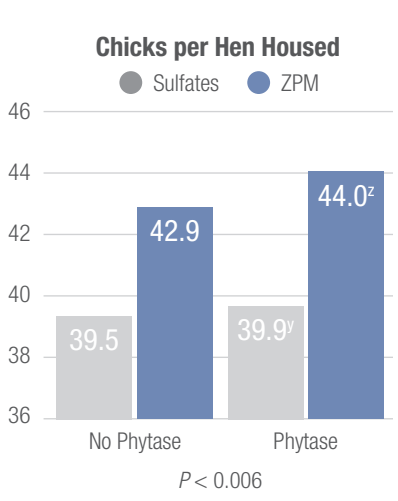
Swiatkiewicz's group also found that the relative bioavailability (RBV) of both sources of Zn differed dramatically. Birds fed increasing levels of AvZn (10, 20 and 40 ppm) had increased RBV of 21% in BW, 16% in FCR, 39% in TZn and 42% in Zn in BA compared to birds fed the same levels of ZnS. Conversely, when Natuphos was added at 750 FTU/kg to the diets, these improvements over the control treatment changed to 3% in BW, 4% in FCR, 14% in TZn and 14% in Zn in BA, respectively. These RBV results could suggest that in birds supplemented with deficient and/or low levels of trace minerals such as Zn, the supplementation of phytase releases minerals and other nutrients from phytic acid that are direly needed by the birds, thus mitigating the boosting effect of an organic mineral. However, in commercial diets, minerals are often provided at exceedingly high levels (eg. 80-120 ppm Zn) which complete the birds' mineral requirements and increase the negative interactions between nutrients and minerals, rendering them unavailable to the body. This effect is even more pronounced in superdosing phytase scenarios. It is in these situations, supplementing with Zinpro Performance Minerals can boost poultry production as seen in the previously described experiments.

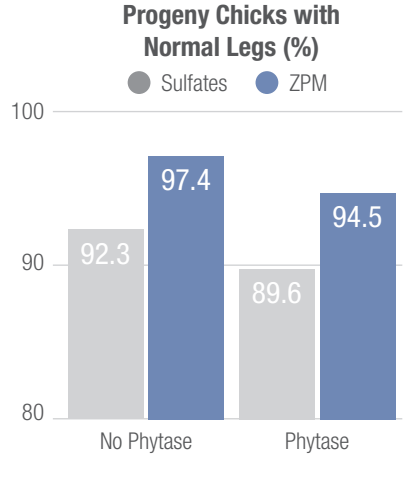
Relative Bioavailability of Zinc from ZnAA in Comparison to $ZnSO_4$ (multiple linear regression)

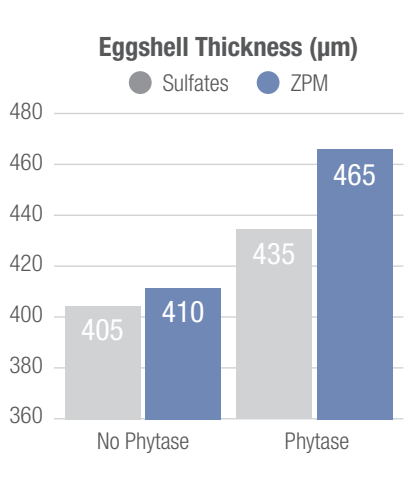
Zinc Source	Body Weight Gain		Feed Conversion		Zn Content in Dry, Fat Extracted Tibia Bones		Zn Content in Tibia Bones Ash		Total Amount of Zn in Tibia Bone	
	Phytase		Phytase		Phytase		Phytase		Phytase	
	-	+	-	+	-	+	-	+	-	+
$ZnSO_4$	100	100	100	100	100	100	100	100	100	100
ZnAA	121	103	116	104	139	114	142	114	117	108

Phytase + ZPM = **Positive Impact on Environmental Sustainability**

In broiler breeders, the use of phytase is often carefully approached and usually moderated since varying dosages are linked with fluctuating nutrient release. However, the nutrients that phytase is able to unlock from a diet should be considered from an environmental sustainability standpoint. Furthermore, the positive synergy between phytase application and Zinpro Performance Minerals®, compared with that of inorganic minerals, entice a further reduction in inorganic minerals from the diet while maintaining the supplementation of Zinpro Performance Minerals. In a study completed with broiler breeders from 40 to 51 weeks of age, birds were fed a basal diet supplemented with either 100 ppm ZnS, 100 ppm MnS, 20 ppm CuS, 60 ppm FeS, 0.35 ppm NaSe and 2 ppm KI, or with 60 ppm AvZn, 60 ppm AvMn, 12 ppm AvCu, 40 ppm AvFe, 0.20 ppm AvSe and 3 ppm AvI. This approach led to a **1.2% improvement in eggshell thickness (ST),** a 2.3% improvement in breaking strength (BS), **3.4 chicks/hen housed, a 5.2% enhanced progeny chick leg score for normal legs** and a 66% reduction in chick leg inflammation, further substantiating the benefits of supplementing with Zinpro Performance Minerals. When HiPhos was added at 1,000 FYT/kg to both treatments, these positive results were once again corroborated, with improvements of **6.5% ST,** 1.3% BS, **4.1 chicks/hen housed (P<0.006), 5.2% greater chick leg score for normal legs** and 47% reduction in chick leg inflammation. Taken together with the results observed in the studies with broilers, these results confirm the synergistic effect of Zinpro Performance Minerals and phytase supplementation potentiating a further reduction of the total mineral supplementation in the diet, reducing environmental mineral contamination while improving animal performance.

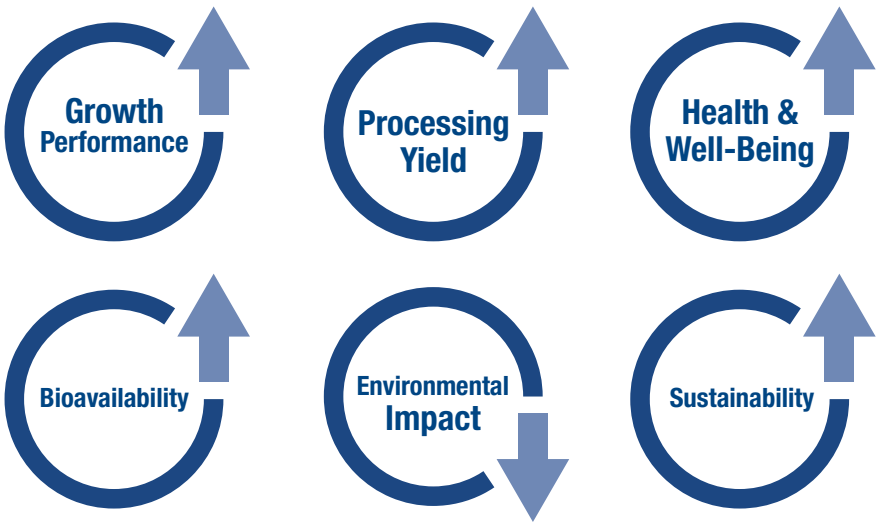






Conclusion - **It works!**

- Phytate contains significant amounts of phosphorous, which when released provide improvements in performance, processing yield, reproduction, health and well-being.
- Supplementing zinc in the form of metal-amino acid complex (Zinpro Performance Minerals®) can further increase all those responses.
- Even when some amount of zinc could be released by phytase from feed ingredients, the amount and/or availability is insufficient for attaining optimal performance in poultry.
- Combinations of phytase and Zinpro Performance Minerals can be used to reduce mineral environmental release in manure for sustainability purposes.



Contact your Zinpro Representative today to learn more or visit **zinpro.com**

P-7071

ZINPRO PERFORMANCE MINERALS®