



Superdosing OptiPhos®/Hostazym® P in feed containing Hostazym® X makes sense

Superdosing OptiPhos® / Hostazym® P to reduce the anti-nutritional effect of phytate and improve the technical and economic performance is a proven fact. However, is superdosing also valid when a xylanase is present in the feed?

In a recent broiler trial it was shown that the combination of Hostazym® X and OptiPhos® / Hostazym® P gives a substantial performance and economic benefit. The trial was set up with 6 treatments: Positive Control, Negative Control (Positive Control minus 100 kcal AME, 5 % dig. Protein, 0.16 % Ca and 0.16 % available P) and 4 treatments with Hostazym® X (1500 EPU/kg) and 1x, 2x, 4x or 6x the standard dose of OptiPhos®/Hostazym® P, as well as the Negative Control.

The trial results clearly show that:

- Supplementing Hostazym® X at 1500 EPU/kg and OptiPhos®/Hostazym® P at single dose restored performance to the level of the positive control = full compensation for 100 kcal, 5% dig. Protein, 0.16% Ca and 0.16 % avP (see Table 1)
- Doubling the phytase dose increased the final body weight by 43 g compared to the single dose and reduced the feed conversion by 0.02
- The economic calculation using actual feed prices and a broiler price varying between 0.8 and 1.2 €/kg showed that the highest gain was achieved when OptiPhos® /Hostazym® P was added at 4x single dose in addition to Hostazym® X at 1500 EPU/kg. This group yielded an economic benefit of up to 85 € per 1000 broilers produced. (see Table 2)

TABLE 1
Effect on body weight and feed conversion

Treatment	Body weight (g)	FCR2350**
Positive Control (PC)	2360	1.636
Negative Control (NC)*	2255	1.683
NC + 1500 EPU + single dose phytase	2362	1.644
NC + 1500 EPU + 2 x single dose phytase***	2405	1.624
NC + 1500 EPU + 4 x single dose phytase	2411	1.617
NC + 1500 EPU + 6 x single dose phytase	2406	1.623

* Positive Control minus 100 kcal AME, 5 % dig. Protein, 0.16 % Ca and 0.16 % avP
** feed conversion corrected for 2350 g end weight - *** single dose phytase is 250 OTU or 500 FTU

TABLE 2
Economics per 1000 broilers at different broiler prices

Treatment	Gain* (€/1000 birds) vs positive control at a broiler price (€/kg) of CR2350**		
	0,8	1	1,2
Positive Control (PC)			
Negative Control (NC)	-1	-22	-43
NC + 1500 EPU + single dose phytase	41	41	41
NC + 1500 EPU + 2 x single dose phytase	60	69	78
NC + 1500 EPU + 4 x single dose phytase	65	75	85
NC + 1500 EPU + 6 x single dose phytase	60	69	78

* broiler sales price minus feed cost

- Superdosing OptiPhos®/Hostazym® P makes sense even when Hostazym® X is included in the feed
- The combination Hostazym® X plus OptiPhos®/Hostazym® P at single dose can compensate for 100 kcal AME, 5% dig. Protein, 0.16% Ca and 0.16% avP
- An economical benefit of up to 85€ per 1000 broilers is achieved with OptiPhos®/Hostazym® P at 4x standard

key facts

1,500 EPU is equivalent to 50g of Hostazym X50 microGranulate per tonne of feed

Let's Talk About Enzymes...

OptiPhos® outcompetes Axtra® Phy in broilers

OptiPhos® has been proven to be a very efficient and the fastest working phytase. Recently, Axtra® Phy has entered the market claiming to be the fastest working phytase. However, the only true way of comparing phytases is to run competitive trials.

A 42-d broiler trial was set up, at the University of Poznan - Poland, using 54 pens distributed over 6 treatments. A 3-phase feeding regime was implemented, in which a control feed (Tr. 1) was reduced by 0.15 % in Ca and aP, in order to create a negative control feed (Tr. 2). The negative control feed was supplemented with either 250 OTU or 500 OTU OptiPhos® (Tr. 3 and 4), and 500 FTU or 1000 FTU of Axtra® Phy (Tr. 5 and 6) per kg of feed.

The results obtained indicate that:

- OptiPhos® outcompetes Axtra® Phy at single and at double dose on final body weight (+ 8 g extra at single dose and + 16 g at double dose) and on feed conversion (-0.03 at single dose and - 0.04 at double dose) (see Figure 1)
- Assuming an equal inclusion cost of both phytases at single and double doses, and a broiler price between 0.8 and 1.2 €/kg live weight, a net financial profit of OptiPhos® versus Axtra® Phy was calculated. The profit, calculated per 1000 broilers produced, varied from 19 to 22 €

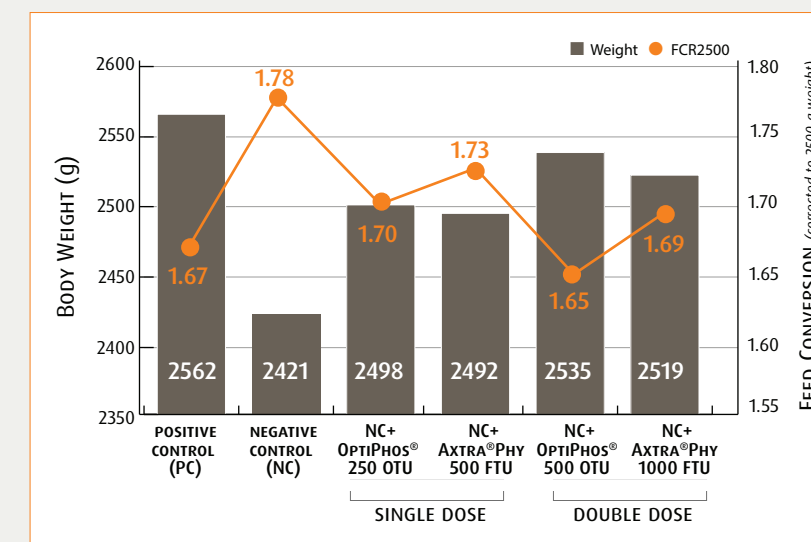


FIGURE 1
Effect of OptiPhos® and Axtra® Phy at single and double dose on technical performance

key facts

- OptiPhos® outperforms Axtra® Phy on technical performance at single dose leading to an extra benefit of up to 22 € per 1000 broilers
- OptiPhos® outperforms Axtra® Phy on technical performance at double inclusion dose leading to an extra benefit of up to 19 € per 1000 broilers produced



Is the release of Phosphorus by OptiPhos® influenced by protein source?

Protein source(s) used in animal feeding account for more than 70 % of the total phytate present in feed. Soybean meal is the main used protein source but others, such as rapeseed meal and sunflower meal have higher contents of phytate. Besides this, the phytate molecules are located at other places in the plant cells making them more, or sometimes less, accessible for the phytase.

To investigate the influence of the origin of the phytate on the efficacy of OptiPhos® Huvepharma set up two studies:

1. A broiler study to evaluate the effect of single or double dose of OptiPhos® in feeds formulated with soybean meal or rapeseed meal. The outcome of the study was:

- OptiPhos® gives better performance on a rapeseed meal diet
- Ileal P digestibility was strongly improved by OptiPhos® in both diets; however the relative and absolute improvement was higher in the rapeseed meal diet (see Figure 1)

2. A study conducted with an *in vitro* model to investigate the degradation of phytate from soybean meal, rapeseed meal, sunflower meal and peas by OptiPhos®.

Each feed ingredient was incubated with OptiPhos® in simulated stomach conditions (37°C, 1.5 h in a pepsin-HCl solution at pH 2) followed by an ileal simulation (37°C, 4 h in an acetate buffer solution at pH 5.5).

The outcome of this study confirmed the findings of the broiler trial:

- Irrespective of the protein source, more than 80 % of the P release was due to the breakdown of phytate in the stomach phase
- The release of P (%) from phytate by OptiPhos® was higher for soybean meal and peas and lower for sunflower meal and rapeseed meal
- The total P released by OptiPhos® from phytate-P, expressed in g/kg, showed that the highest P release was obtained with rapeseed meal (4.33 g/kg), followed by sunflower meal (4.21 g/kg), soybean meal (2.77 g/kg) and peas (1.26 g/kg). (see Table 1)

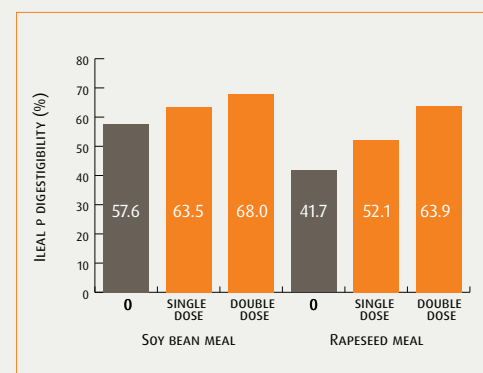


FIGURE 1
Effect of OptiPhos® at single and double dose on P digestibility (P deficient diets containing only soybean meal or up to 22.5 % rapeseed meal)

Protein source	Phytate-P (g/kg)	P release by OptiPhos® (g/kg)	% P release of Phytate-P
Soybean meal	3.4	2.77	81.5%
Sunflower meal	6.1	4.21	69.0%
Rapeseed meal	7.0	4.33	61.9%
Peas	1.5	1.26	84.0%

TABLE 1
Effect of OptiPhos® on P release of different protein sources

key facts

- OptiPhos® releases relatively more P from protein sources high in phytate-P
- Ileal P digestibility is strongly improved by OptiPhos® in rapeseed meal based diets

Rapeseed meal versus soybean meal: differences in OptiPhos® efficacy?

Nowadays, there is a strong tendency in the market to replace soybean meal by rapeseed meal in broiler diets. The reasons behind this trend are the search for more sustainable diets, using locally produced proteins, instead of importing them from the other side of the world, as well as the production of feeds with non GMO ingredients.

However, rapeseed meal contains much higher levels of phosphorous, most of which is bound as phytate. The replacement of soybean meal by rapeseed meal will increase the phosphorous content and the phytate content of the diet which results in lower digestibility of the feed and more output of phosphorus to the environment.

Huvepharma, together with Wageningen University, tested whether OptiPhos® was able to release phosphorous from rapeseed meal as efficiently as from soya bean meal. The results, using an *in vitro* developed method, are shown in Table 1.

In addition, an animal trial was set up. The trial was done applying the full matrix values of OptiPhos® for P and Ca in both the soybean meal and the rapeseed meal diets (Matrix for 250 OTU -1.45 aP, 500 OTU -1.68 aP and 750 OTU -1.82 aP). Final performance results are shown in Figure 1.

TABLE 1
Testing the amount of phosphorus (g/kg) that can be dissolved by OptiPhos® in soybean meal and rapeseed meal

	total P in feedstuff	natural dissolved P in feedstuff	extra dissolved P by OptiPhos®	total dissolved P (natural + OptiPhos®)
Rapeseed meal	11.4 (100 %)	2.0 (18 %)	4.3 (38 %)	6.3 (55 %)
Soybean meal	6.4 (100 %)	0.9 (14 %)	2.8 (44 %)	3.7 (58 %)

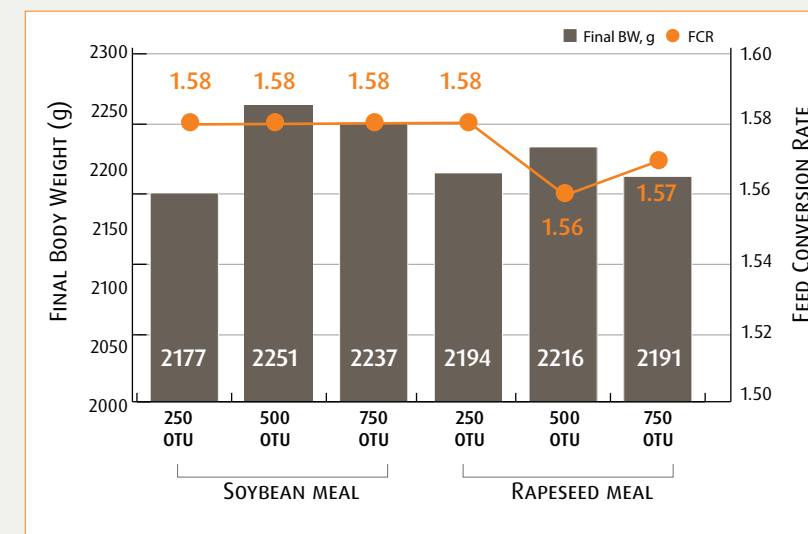


FIGURE 1
Testing 3 different levels of OptiPhos® in broilers using soybean meal or rapeseed meal based diet with applied matrix values of 1.45 aP, 1.68 aP and 1.82 aP/kg of feed, respectively

key facts

- OptiPhos® works as efficiently in soybean meal as in rapeseed meal feeds
- Current OptiPhos® matrix values can be applied independently of the protein source used in the feed formulation