



**OptiPhos<sup>®</sup>**  
The Advanced Phytase

The  
**FASTEST**  
PHYTASE





OptiPhos® is the best performing and fastest phytase on the market. OptiPhos® was developed by Cornell University (USA), which isolated an *E-coli* bacteria producing a very potent 6-phytase. This gene was transferred into *Pichia/Komagataella pastoris* in order to produce quantities of this phytase in a more effective way.

OptiPhos® is the best choice of phytase to be added to your feed, based on the following criteria:

1. PPS

OptiPhos®:

- has the ideal **pH** profile
  - is **pepsin** resistant
  - has the highest **speed** of action
2. OptiPhos® has a thermostability of at least 85°C due to a specific coating process
  3. OptiPhos® is the only phytase which can prove its matrix values scientifically
  4. OptiPhos® is the only phytase which demonstrates a superdosing effect even at double dose

It can be concluded that OptiPhos®

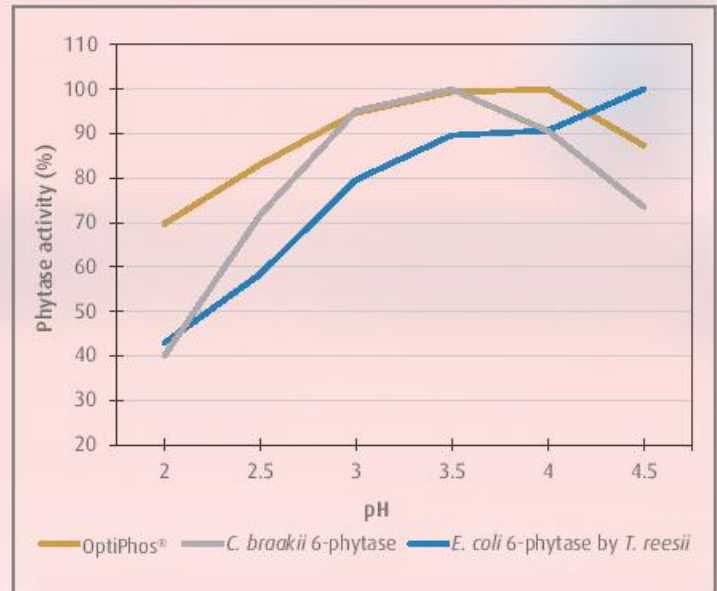
- **Is a fast phytase**  
early destruction of phytate (ANF) = **RESULT**
- **Leads to quick release of phosphorous**  
high matrix values = **HIGH SAVINGS**
- **Yields superdosing**  
release of nutrients = **BETTER PERFORMANCE**

# PPS: pH, pepsin and speed

## OptiPhos® has the ideal pH profile

Phytic acid, the substrate that is degraded by phytase, must be present in its soluble form in order to be degraded by a phytase. Only when the pH is below 4.0, the phytic acid is in its soluble form, which means that phytic acid breakdown takes place in the gastric area of the intestine (proventriculus/ gizzard/ stomach).

OptiPhos® has shown to be optimal and equally active at pH levels between 2 and 4. This means that whatever pH is present in the gastric area, the release of phosphorous from phytic acid will always be at its maximum. As other phytases do not have this wide pH range, the total phosphorus release by those phytases is expected to be lower.

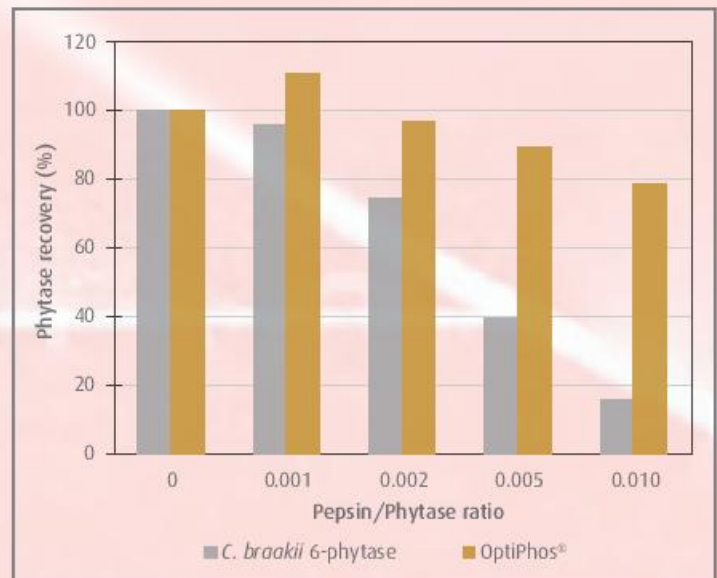


Relative phytase activity at different pH levels

## OptiPhos® is not sensitive to pepsin

Pepsin is a naturally present enzyme in the stomach/ gizzard of animals involved in the breakdown of proteins. As phytases, like any other enzymes, are proteins, they can be broken down by pepsin which obviously leads to the loss of their efficacy.

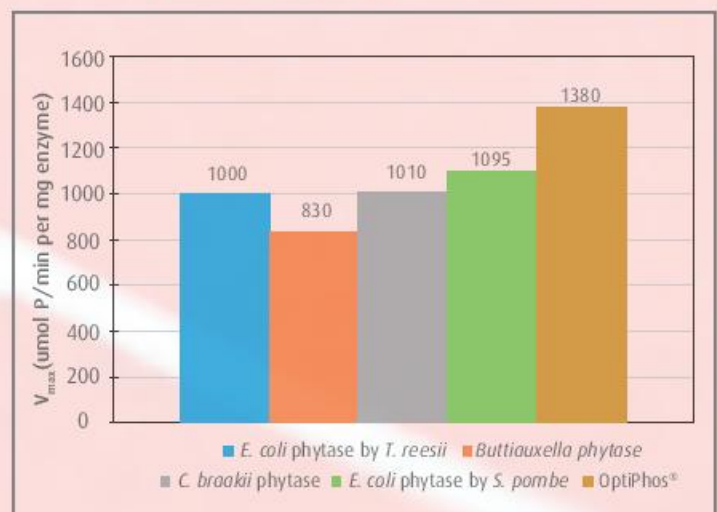
OptiPhos® is resistant to this degradation by pepsin, so no losses of efficacy due to the pepsin breakdown of OptiPhos® will happen and the full quantity of OptiPhos® dosed into the feed is effective!



Phytase recovery after prolonged exposure of different phytases at different low pepsin levels during 2 h

## OptiPhos® speeds up the breakdown of phytic acid

Transit time of the feed in the gastric area is very short. This calls for a very fast working phytase, as there is limited time to release phosphorus from phytic acid. The  $V_{max}$  the speed at which a phytase works at its maximum when phytic acid is abundantly present, is therefore an outmost important and determinative parameter of a phytase. In addition to releasing phosphorous it is also responsible for the reduction of the anti-nutritional factors (ANF) of phytic acid. OptiPhos® has shown in biochemical studies to be the enzyme with the highest  $V_{max}$ , which means it is the fastest phytase on the market.



$V_{max}$  of different phytases when incubated at pH 3



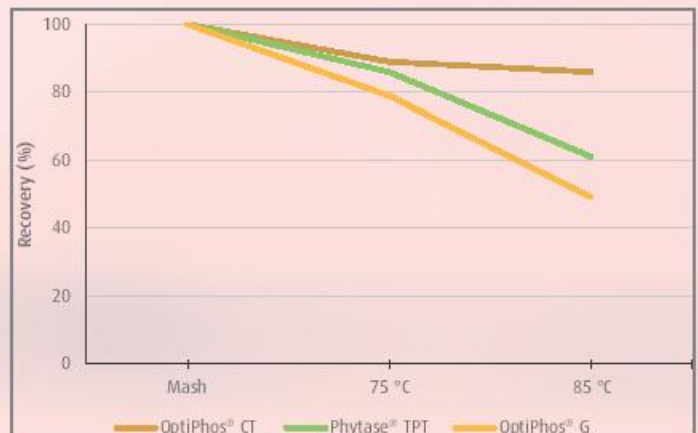
## OptiPhos® in different forms for stability

OptiPhos® granular is a granulated product, produced by the Huvepharma® patented micro-granulation process. In this process, the active ingredient, OptiPhos®, is fully embedded in a starch-matrix, which ensures that OptiPhos® can be dosed and mixed in well without any dust formation.

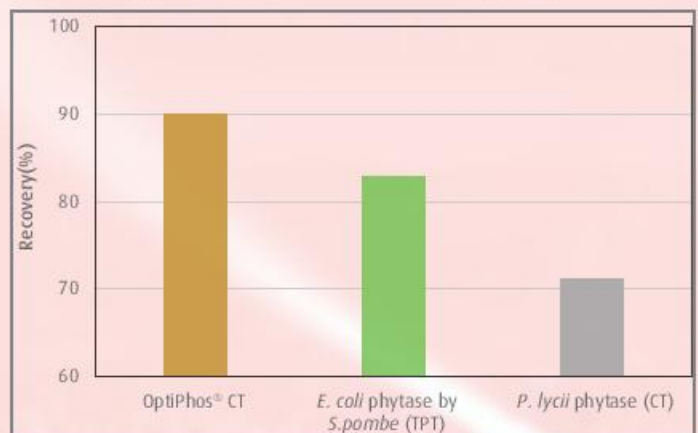
At pelleting temperatures of 75-85°C, important losses of phytase activity can occur. Therefore, it is recommended to use OptiPhos® coated. This form has a specially developed coating which protects the phytase against heat and moisture during the pelleting process. Independent research has shown that OptiPhos® coated is heat stable until at least 85°C.

In addition to a better heat stability, this form also gives a higher protection of its phytase activity in premixes compared to any other type of coating. Because of the unique characteristics of this coating, it also does not hinder the release of the phytase in the foregut of the animal.

When temperatures in processing clearly exceed 85°C, it is recommended to apply OptiPhos® in a liquid form (IBC), and add it to the feed via post pelleting application.



*Pelleting recoveries at different conditioning temperatures*



*Stability of different phytases in mineral-vitamine premix stored for 120 days at 23°C*

## The Huvematic® concept

### Innovation in liquid enzymes

In addition to using liquid OptiPhos® delivered in an IBC, Huvepharma® has developed an alternative and unique concept: the Huvematic® concept. In this concept, a small amount of liquid OptiPhos® is produced by a specialized equipment through dissolving a very concentrated, instant water soluble OptiPhos® in water, just before applying post pelleting. Based on its knowhow on enzyme production, Huvepharma® has developed a range of these enzyme powders, for instance OptiPhos® WSP.

The Huvematic concept allows nutritionists to produce liquid enzymes at any desired concentration just prior to their use in feed, thus preventing loss of activity during liquid enzyme storage. For the feed plant managers themselves, this concept saves transport, storage and handling of liquid enzymes in an IBC and thereby saves labour cost.



*The Huvematic® concepts uses OptiPhos® WSP to make liquid enzymes on site*



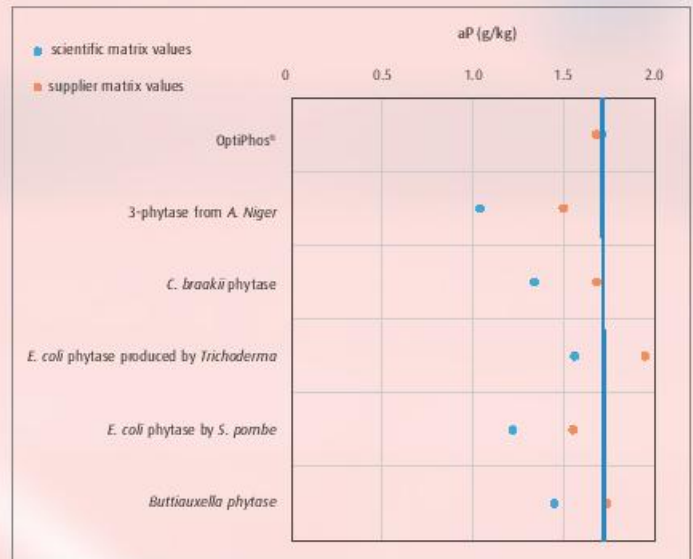
## The matrix values of OptiPhos® are based on science

Specific matrix values are provided by the manufacturer for each phytase. The higher these matrix values are, the more interesting the phytase becomes for the nutritionist when using least cost formulation. However, it is quite important to be sure these values are true and not overestimated.

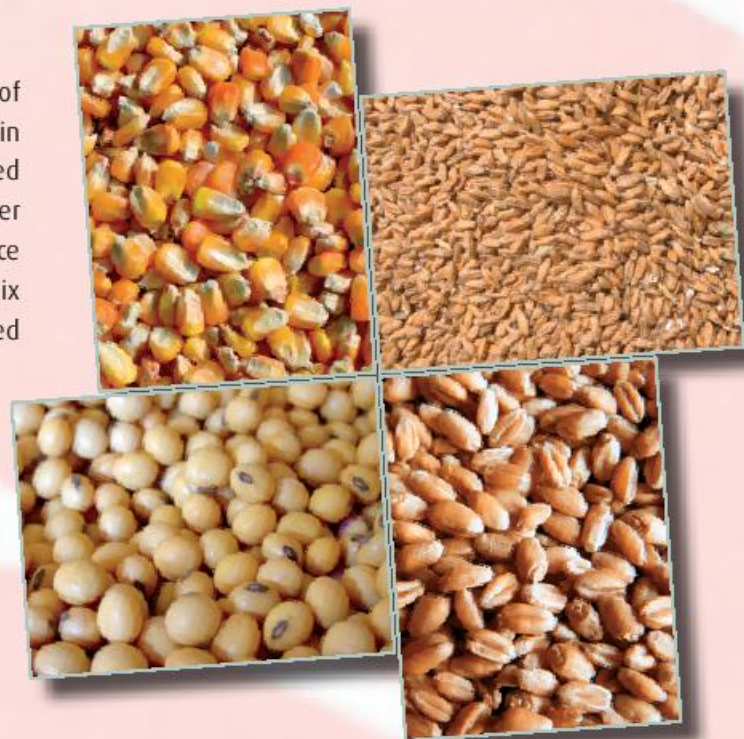
To build reliable matrix values, many trials need to be conducted in a scientific way. Trials conducted by independent research institutes, which are published in scientific peer reviewed journals form an adequate and solid base for determining (and comparing) matrix values. These can be referred to as “scientific matrix values” and might differ largely to the matrix values which are claimed by the supplier (‘supplier matrix values’).

Based on the review of independent peer reviewed journals and published papers of the last 15 years, OptiPhos® has shown to have reliable matrix values. Our claimed matrix values meet the scientific matrix values published in scientific papers. Other phytases have claimed values which are sometimes 20% above the scientific matrix values. At the same time, this research shows that the scientific matrix values of OptiPhos® are still the highest of all phytases present in the field.

Research has also shown that the matrix values of OptiPhos® are independent of the type of cereal or protein source which is used in the diet. It could even be concluded that on diets where soybean meal is replaced with other protein sources with a higher phytate content (for instance sunflower and rapeseed meal), the phosphorous matrix values of OptiPhos® also applies and can even be declared higher.



Scientific vs supplier claimed matrix values for broilers for double dose of different phytases

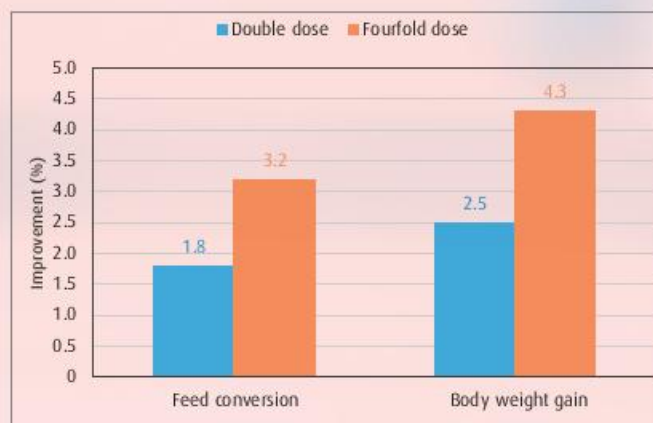




## OptiPhos® exhibits superdosing effect

Phytate is an anti-nutritional factor (ANF). It binds to positively charged minerals, amino acids, fatty acids and even starch, which then all become inaccessible to the animal. High phytate contents in feeds therefore act negatively on the zootechnical performance of animals. When OptiPhos® breaks down the phytate molecules, the phytate molecule loses its ability to bind these nutrients, and OptiPhos® consequently enhances growth performance.

As OptiPhos® is the fastest phytase on the market, due to having the right pH profile and a high pepsin resistance, OptiPhos® has been shown that at double dose it has superdosing effects, while most competitors need 3 to 4 times the single dose to achieve this goal.



*The effect of superdosing OptiPhos® in broilers on improvement of technical performance*

## Product information

OptiPhos® is available in micro-granulated, pelleting stable coated, liquid and instant water soluble (WSP) formulations for application in animal feed at different concentrations.

Product	Concentration (OTU per g)	Product form
OptiPhos® G	2500 and 5000	Microgranulate
OptiPhos® CT	2500 and 5000	Coated
OptiPhos® L	2500 and 5000	Liquid
OptiPhos® WSP	350000	Water soluble powder

## Conclusion

**OptiPhos® is the fastest phytase on the market. This gives you:**

**1. The highest phosphorous matrix values per unit of phytase:**

- highest savings of inorganic phosphates (MCP and DCP)
- bigger reduction in feed costs than any other phytase

**2. The fastest degradation of phytate resulting in:**

- a faster elimination of the anti-nutritional factor phytate
- bigger effects on improvement of technical performance
- superdosing effects even at double dose