HAMLET PROTEIN™

The use of *HP 300* for outstanding performance of nursery pigs: *better FCR, higher growth and reduced N excretion*

Feed costs represent as much as 70% of total production costs for swine producers. Ensuring that as much of the ingested protein as possible is used for performance is therefore crucial. The use of HP 300, our premium enzymatically treated soy protein product, in nursery diets for piglets results in better feed intake, strongly improved feed conversion ratios and higher body weight at the end of the nursery. This means a better protein efficiency and thus a reduction in total feed costs and more protein available to support life start. Additionally, this also results in a reduced nitrogen excretion into the environment.

ADG + 12 G/PIG/DAY*
ADFI + 9 G/PIG/DAY*
FCR - 3%*
NITROGEN RETENTION + 5%**

*Meta analyses on HP 300 vs SBM 2022 n=8
**Zhang et al., 2001

The unique production process of HP 300 results in *a premium product* with the lowest ANF's in the market

The unique composition and structure of HP 300 is key for the performance benefits observed. HP 300 is made from carefully sourced sustainable soybean meal (SBM). In a patented process the SBM is treated with enzymes to remove all anti-nutritional factors (ANF's) that are harmful for young animals such as trypsin inhibitors, the oligosaccharides stachyose and raffinose and the antigen beta-conglycinin. Since Hamlet Protein started to reduce the ANF's content of SBM using the enzyme activated technology, the process has been optimized and further developed resulting in the current offering of HP 300, a specialty soy protein with lowest levels of ANF's in the market (see table 1).

Table 1 Compositions of soybean meal (SBM) and HP 300.

Item	SBM	HP 300
Dry matter (%)	91.19	93.42
Small peptide (≤500 Da, % as-is)	3.66	18.35
Trypsin inhibitor activity (mg/g as-is)*	4.34	1.30
Soybean oligosaccharides		
Stachyose+Raffinose (% as-is)*	5.6	1.0
Sucrose (% as-is)*	4.5	trace
Beta-conglycinin (ppm)*	43,755	2.0

Adapted from Ma et al., 2019a, * HP database

The molecular structure of HP 300 contains a high proportion of small peptides, allowing for fast absorption and is *highly digestible*

The unique production process of HP 300 modulates the structure of the raw material resulting in a five times greater proportion of small peptides (≤500 Da) in HP 300 compared to conventional SBM (table 1).
The amino acids (AA's) from HP 300 are more digestible and faster absorbed than from SBM, which further reduces the risk of excess protein reaching the hindgut (figure 1). A higher digestibility and faster absorption of protein results in better protein efficiency which reduces the amount of nitrogen excreted into the environment (up to 5% reduction compared to soybean meal (Zhang et al., 2001)).

Total amino acid absorption from HP 300 is faster and reaches higher peak levels than from SBM

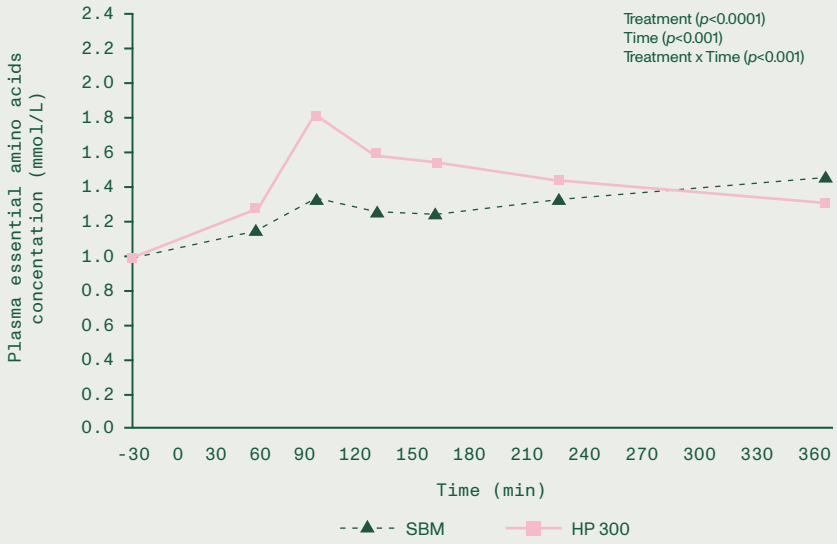

Figure 1 Plasma concentration of essential amino acids (mmol/L) in pigs fed SBM or HP 300 (n=5). Adapted from Nørgaard et al. (2021).

The low level of ANF's in HP 300 has a *positive effect* on gut health

The low content of ANF's in HP 300 is the key to the above-mentioned success, ensuring pigs can easily digest and meet their nutritional requirements without losing nutrients in feed-induced inflammatory processes of the gut. Research shows that the use of HP 300 in nursery diets protects gut integrity, reduces oxidative stress and improves the microbial composition of the hindgut (figure 2).

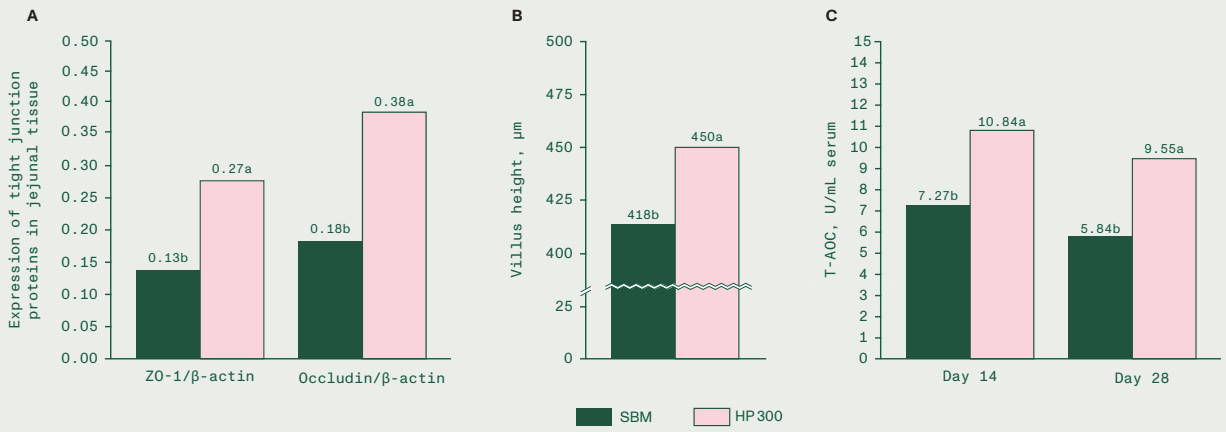

Figure 2 A) Expression of tight junction proteins (zonula-occludens 1 and occludin relative to beta-actin), B) villus height (µm) and C) serum total antioxidant capacity (T-AOC, U/mL) of pigs fed a nursery diet with soybean meal (SBM) or HP 300. a,b indicate significant difference ($p<0.05$). Adapted from Ma et al. (2019ab).

Product characteristics and inclusion

HP 300 is a specialty soy protein for nursery pigs. Recommended inclusion levels for nursery diets of piglets are 5-15%.

Product features

- Very low in ANF's
- Highly digestible and fast absorption
- Highly palatable

Benefits

- Stimulates feed intake and growth
- Improves FCR
- Safeguards gut health

Applications

- SBM replacement – better performance expected
- FM replacement – similar to/better performance
- SDP replacement – equal performance
- To keep high CP protein levels in nursery diets without ZnO in combination with HP FiberBoost

Ma, X.; Shang, Q.; Hu, J.; Liu, H.; Brøkner, C.; Piao, X., 2019a: Effects of replacing soybean meal, soy protein concentrate, fermented soybean meal or fish meal with enzyme-treated soybean meal on growth performance, nutrient digestibility, antioxidant capacity, immunity and intestinal morphology in weaned pigs. Livestock Science., 225, 39–46.

Ma, X. K.; Shang, Q. H.; Wang, Q. Q.; Hu, J. X.; Piao, X. S., 2019b: Comparative effects of enzymolytic soybean meal and antibiotics in diets on growth performance, antioxidant capacity, immunity, and intestinal barrier function in weaned pigs. Animal Feed Science and Technology., 248, 47–58.

Nørgaard, J.; Florescu, I. C.; Krogh, U.; Nielsen, T. S., 2021: Amino acid absorption profiles in growing pigs fed different protein sources. Animals., 11.

Zhang, L.; Li, D.; Qiao, S.; Wang, J.; Bai, L.; Wang, Z.; Han, I. K., 2001: The effect of soybean galactooligosaccharides on nutrient and energy digestibility and digesta transit time in weanling piglets. Asian-Australasian Journal of Animal Sciences., 14, 1598–1604.

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