

HP 300 optimization data – *Piglets*

Chemical composition	%
Dry matter	93.0
Crude protein	56.0
Crude fat	3.0
Crude ash	7.0
Crude fiber	4.0
Other carbohydrates	23.0

Carbohydrates	%
Sugar	1.0
Starch	0.6
ADF	5.8
NDF	9.2
ADL	<1.5
Soluble NSP	5.7
Insoluble NSP	11.0

Minerals	g/kg	%
Calcium (Ca)	3.5	0.35
Phosphorous (P)	7.5	0.75
Phytic acid bound P	4.0	0.40
Magnesium (Mg)	3.5	0.35
Potassium (K)	25.0	2.50
Sodium (Na)	0.2	0.02
Chloride (Cl)	1.0	0.10
Sulphur (S)	4.5	0.45

Trace minerals	mg/kg	ppm
Iron (Fe)	200	200
Zinc (Zn)	60	60
Manganese (Mn)	40	40
Copper (Cu)	20	20
Selenium (Se)	0.10	0.10
Iodine (I)	0.20	0.20

Digestibility coefficients	%
EFOS _{total} /EFOS _i ¹	92.7/78.4
EFN _i <i>in-vitro</i> ¹	96.0
Phosphorous STTD ²	59.8

Amino acids	% of CP	Total aa	SID matrix value ³		Digestibles in product	
	%	g/kg	%	%	g/kg	%
CP	-	560	56.0	92.9	520.5	52.05
Lys	5.96	33.4	3.34	91.5	30.6	3.06
Met	1.32	7.4	0.74	94.8	7.0	0.70
Cys	1.34	7.5	0.75	86.4	6.5	0.65
Thr	3.84	21.5	2.15	90.5	19.5	1.95
Trp	1.33	7.4	0.74	91.5	6.8	0.68
Leu	7.55	42.3	4.23	93.4	39.5	3.95
Ile	4.57	25.6	2.56	94.8	24.3	2.43
Phe	5.09	28.5	2.85	95.5	27.2	2.72
Tyr	3.62	20.3	2.03	92.8	18.8	1.88
Val	4.76	26.7	2.67	93.1	24.8	2.48
His	2.54	14.2	1.42	93.1	13.2	1.32
Arg	7.00	39.2	3.92	98.4	38.6	3.86
Ala	4.29	24.0	2.40	92.5	22.2	2.22
Asp	11.11	62.2	6.22	90.4	56.2	5.62
Glu	17.95	100.5	10.05	93.3	93.7	9.37
Gly	4.16	23.3	2.33	97.8	22.8	2.28
Pro	4.92	27.5	2.75	93.5	25.7	2.57
Ser	4.75	26.6	2.66	92.2	24.5	2.45

Calculated energy values	MJ/kg	kcal/kg
GfE ME	16.15	3861
INRA ME/NE	16.34/9.51	3902/2271
NRC ME/NE	15.15/9.52	3617/2273

Anti-nutritional factors	
Trypsin inhibitor activity (mg/g)	1.3
Oligosaccharides (% of product)	1.0
β – conglycinin (ppm)	2.0
Lectines (ppm)	<1.0

1) EFOS: Enzyme digestible organic matter, EFN: Enzyme digestible nitrogen ileum. Boisen, S. 2007. A New Concept for Practical Feed Evaluation Systems. DJF Animal Science no. 79. 2) Goebel, K.P., Stein, H. H. 2011. Phosphorous digestibility and energy concentration of enzyme-treated and conventional soybean meal fed to weanling pigs. Journal of Animal Science. 89:764-772.

3) Matrix values: Recommended digestibility coefficients adapted from four peer-reviewed in-vivo SID studies to be used in least cost diet formulation for piglets.



Background research

Four experiments using weanling pigs were conducted to determine the standardized ileal digestibility (SID) of CP and AA in HP 300 and conventional SBM. The experiments were performed using weanling barrows (initial BW: 5.7 – 10.9 kg on average) fitted with a T-cannula in the distal ileum.

Matrix values were extrapolated to reflect digestibility in larger and more mature pigs. Current digestibility coefficients of most raw materials were derived from older pigs and matrix values allow for equal comparison among ingredients when using a least cost diet formulation program. Values are confirmed with 52 kg pigs in a separate experiment.

Standardized ileal digestibility coefficients measured in percent

Initial BW	5.86± 0.45 kg	5.7± 0.8 kg	10.9± 2.3 kg	9.29± 0.58 kg	5.7-10.9 on average		52 kg
Product	HP 300	HP 300	HP 300	HP 300	HP 300	SBM	HP 300
	Yang et al., 2007 ⁴	Urbaityte et al., 2009 ⁵	Cervantes- Pahm et al., 2010 ⁶	Navarro et al., 2017 ⁷	Average	Average	Report ILE 009, 1995 ⁸
CP	86.7	86	91.9	89.9	88.6	83.6	94.2
Lys	85.0	88	88.1	87.3	87.1	85.4	93.7
Met	86.5	91	92.1	92.9	90.6	87.4	96.8
Cys	84.8	-	85.1	82.3	84.1	82.2	92.2
Thr	84.3	82	85.7	87.5	85.1	80.6	91.8
Trp	-	84	87.5	93.3	88.6	86.8	93.5
Leu	84.2	89	89.2	91.7	88.8	84.3	95.0
Ile	82.8	88	89.7	91.7	88.3	82.8	95.2
Phe	86.6	88	91.8	92.6	89.8	84.1	95.3
Tyr	84.3	-	92.0	92.4	89.6	86.7	95.8
Val	86.2	88	89.4	90	88.7	83.0	93.4
His	82.3	89	88.8	93.4	88.4	86.1	96.7
Arg	90.5	94	98.1	96.9	95.1	90.5	97.9
Ala	85.8	-	88.5	88.3	87.5	81.0	92.3
Asp	87.0	-	88.1	88.5	87.9	85.8	95.1
Glu	88.1	-	93.5	90.1	90.6	87.3	96.4
Gly	91.2	-	94.4	86.6	90.7	78.3	93.5
Pro	91.2	-	-	-	91.2	89.2	-
Ser	91.7	-	89.2	92	91.0	88.1	94.6

Values left out are because of no available data or measured values above 100%.

4) Yang, Y. X., Kim, Y. G., Lohakare, J. D., Yun, J. H., Lee, J. K., Kwon, M. S., Park, J. I., Choi, J. Y., Chae, B. J. 2007. Comparative efficacy of different soy protein sources on growth performance, nutrient digestibility and intestinal morphology in weaned pigs. Asian-Aust. J. Anim. Science. 20(5):775-783. 5) Urbaityte, R.; Mosenthin, R.; Eklund, M.; Piepho, H. P.; Sauer, N.; Rademacher, M., 2009: Standardised ileal crude protein and amino acid digestibilities in protein supplements for piglets. Archives of Animal Nutrition., 63:5, 356–378. 6) Cervantes, S.K., Stein, H. H. 2010. Ileal digestibility of amino acids in conventional, fermented and enzyme-treated soybean meal and in soy protein isolate, fish meal, and casein fed to weanling pigs. Journal of Animal Science. 88:2674-2683. 7) Navarro, D.M.D.L., Liu, Y., Bruun, T.S., Stein, H.H. 2017. Amino acid digestibility by weanling pigs of processed ingredients originating from soybeans, 00-rape-seeds, or a fermented mixture of plant ingredients. Journal of Animal Science. 95:2658-2669.

8) Institut Technique des Cereales et des Fourrages. 1995. Ileal digestibility of protein and amino acids in soybean protein concentrate for pigs. Official report, Report ILE 009.