

Main constituents

Parameter	As fed	On DM	Unit	Other	Unit
Dry matter	88	100	%	-	
Crude protein	46.2	52.6	%	-	
Crude fibre	6	6.8	%	-	
Crude fat	1.5	1.8	%	-	
Ash	6.2	7.1	%	-	
Insoluble ash	0.5	0.6	%	-	
NDF	12.5	14.2	%	-	
ADF	7.4	8.4	%	-	
Lignin	0.6	0.6	%	-	
Water insoluble cell walls	18.5	21	%	-	
Starch	5	5.7	%	-	
Starch, enzymatic method	1.6	1.9	%	-	
Total sugars	8.1	9.2	%	-	
Gross energy (kcal)	4140	4710	kcal/kg	-	
Gross energy (MJ)	17.3	19.7	MJ/kg	-	

Mineral elements

Parameter	As fed	On DM	Unit	Other	Unit
Calcium	3.4	3.8	g/kg	-	
Phosphorus	6.2	7.1	g/kg	-	
Phytate phosphorus	3.7	4.2	g/kg	60 % P	
Magnesium	2.8	3.1	g/kg	-	
Potassium	20.9	23.8	g/kg	-	
Sodium	0.14	0.16	g/kg	-	
Chlorine	0.3	0.3	g/kg	-	
Sulfur	4	4.5	g/kg	-	
Dietary cation-anion difference	286	325	mEq/kg	-	
Electrolyte balance	534	607	mEq/kg	-	
Manganese	39	45	mg/kg	-	
Zinc	55	62	mg/kg	-	
Copper	17	19	mg/kg	-	
Iron	241	274	mg/kg	-	
Selenium	0.2	0.2	mg/kg	-	

Cobalt	0.3	0.3	mg/kg	-
Molybdenum		4	4 mg/kg	-
Iodine	0.1	0.2	mg/kg	-

Fatty acids

Parameter	As fed	On DM	Unit	Other	Unit
C6 + C8 + C10 fatty acids	0	0	g/kg	0	% FA
C12:0 lauric acid	0	0	g/kg	0	% FA
C14:0 myristic acid	0.03	0.03	g/kg	0.2	% FA
C16:0 palmitic acid	1.3	1.5	g/kg	11.2	% FA
C16:1 palmitoleic acid	0.01	0.01	g/kg	0.1	% FA
C18:0 stearic acid	0.4	0.5	g/kg	3.8	% FA
C18:1 oleic acid	2.7		3 g/kg	23.1	% FA
C18:2 linoleic acid	6.3	7.1	g/kg		54 % FA
C18:3 linolenic acid	0.8		1 g/kg	7.2	% FA
C18:4 stearidonic acid		0	0 g/kg		0 % FA
C20:0 arachidic acid	0.04	0.04	g/kg	0.3	% FA
C20:1 eicosenoic acid	0.02	0.02	g/kg	0.2	% FA
C20:4 arachidonic acid		0	0 g/kg		0 % FA
C20:5 eicosapentaenoic acid		0	0 g/kg		0 % FA
C22:0 behenic acid	0.05	0.06	g/kg	0.5	% FA
C22:1 erucic acid	0.02	0.02	g/kg	0.2	% FA
C22:5 docosapentaenoic acid		0	0 g/kg		0 % FA
C22:6 docosahexaenoic acid		0	0 g/kg		0 % FA
C24:0 lignoceric acid	0.02	0.03	g/kg	0.2	% FA
Fatty acids	1.2	1.3	%		75 % fat

Vitamins and pigments

Parameter	As fed	On DM	Unit	Other	Unit
Vitamin D		0	1000 IU/kg		-
Vitamin E	4.3	4.8	mg/kg		-
Vitamin B1 thiamin	5.9	6.7	mg/kg		-
Vitamin B2 riboflavin	2.9	3.3	mg/kg		-
Vitamin B6 pyridoxine	5.9	6.7	mg/kg		-
Niacin	38.8	44.1	mg/kg		-
Pantothenic acid	15.9	18.1	mg/kg		-

Folic acid		0.6	0.7	mg/kg		-
Biotin		0.3	0.3	mg/kg		-
Vitamin C			0	0 mg/kg		-
Choline			2551	2899 mg/kg		-
		Other parameters				
	Parameter	As fed	On DM	Unit	Other	Unit
Phytase activity		20	20	IU/kg		-
		Ruminants				
	Parameter	As fed	On DM	Unit	Other	Unit
UFL INRA 2018		1.11	1.27	per kg		-
UFV INRA 2018		1.13	1.28	per kg		-
PDIA INRA 2018			152	172 g/kg		-
PDI INRA 2018			200	227 g/kg		-
Rumen protein balance INRA 2018			215	244 g/kg		-
Fill Unit ruminants INRA 2018		0.223	0.253	per kg		-
ME ruminants INRA 2018 (kcal)			2930	3330 kcal/kg		-
NE lactation ruminants INRA 2018 (kcal)			1960	2230 kcal/kg		-
NE meat production ruminants INRA 2018 (kcal)			1980	2250 kcal/kg		-
ME ruminants INRA 2018 (MJ)		12.3		14 MJ/kg		-
NE lactation ruminants INRA 2018 (MJ)		8.3	9.4	MJ/kg		-
NE meat production ruminants INRA 2018 (MJ)		8.4	9.5	MJ/kg		-
OM digestibility ruminants INRA 2018				-		89 %
Energy digestibility ruminants INRA 2018				-	89.4	%
N degradability ruminants INRA 2018				-		65 %
Starch degradability ruminants INRA 2018				-		82 %
DM degradability ruminants INRA 2018				-		67 %
Lysine ruminants INRA 2018				-	6.9	% PDI
Threonine ruminants INRA 2018				-	4.5	% PDI
Methionine ruminants INRA 2018				-	1.6	% PDI
Isoleucine ruminants INRA 2018				-	4.8	% PDI
Valine ruminants INRA 2018				-	5.2	% PDI
Leucine ruminants INRA 2018				-	8.5	% PDI
Phenylalanine ruminants INRA 2018				-	5.2	% PDI
Histidine ruminants INRA 2018				-	2.5	% PDI
Arginine ruminants INRA 2018				-	5.7	% PDI

UFL FL1 INRA 2018	1.13	1.29	per kg	-	
UFV FL1 INRA 2018	1.15	1.31	per kg	-	
PDIA FL1 INRA 2018		127	144 g/kg	-	
PDI FL1 INRA 2018		178	202 g/kg	-	
Rumen protein balance FL1 INRA 2018		237	270 g/kg	-	
UFL FL4 INRA 2018	1.07	1.22	per kg	-	
UFV FL4 INRA 2018	1.07	1.22	per kg	-	
PDIA FL4 INRA 2018		184	210 g/kg	-	
PDI FL4 INRA 2018		231	262 g/kg	-	
Rumen protein balance FL4 INRA 2018		183	208 g/kg	-	
UFL INRA 2007	1.04	1.18	per kg	-	
UFV INRA 2007	1.03	1.17	per kg	-	
PDIA INRA 2007		181	206 g/kg	-	
PDIN INRA 2007		338	384 g/kg	-	
PDIE INRA 2007		233	264 g/kg	-	
ME ruminants INRA 2007 (kcal)		2800	3180 kcal/kg	-	
ME ruminants INRA 2007 (MJ)	11.7	13.3	MJ/kg	-	
OM digestibility ruminants INRA 2007			-	90.3	%
Energy digestibility ruminants INRA 2007			-	90.7	%
N digestibility ruminants			-	80.2	%
N digestibility, intestinal, ruminants			-		95 %
NDF digestibility ruminants			-		85 %
N degradability ruminants (k=0.06)			-		63 %
Immediately degradable N (a)			-		13 %
Potentially degradable N (b)			-		85 %
Degradation rate of particles N (c)			-	0.085	h-1
Starch degradability, ruminants (k=0.06)			-		80 %
DM degradability ruminants (k=0.06)			-		67 %
Immediately degradable DM (a)			-		26 %
Potentially degradable DM (b)			-		71 %
Degradation rate of particles DM (c)			-	0.08	h-1
Fatty acids digestibility ruminants			-	63.3	%
Absorbable P ruminants	4.3	4.9	g/kg		70 % P
Absorbable Ca ruminants	1.9	2.1	g/kg		55 % Ca
Lysine ruminants INRA 2007			-	6.9	% PDIE

Threonine ruminants INRA 2007			-	4.7	% PDIE
Methionine ruminants INRA 2007			-	1.5	% PDIE
Isoleucine ruminants INRA 2007			-	5.1	% PDIE
Valine ruminants INRA 2007			-	5.3	% PDIE
Leucine ruminants INRA 2007			-	8.4	% PDIE
Phenylalanine ruminants INRA 2007			-	5.2	% PDIE
Histidine ruminants INRA 2007			-	2.4	% PDIE
Arginine ruminants INRA 2007			-	5.6	% PDIE
VEM CVB 2018	1037	1178	per kg		-
VEVI CVB 2018	1122	1275	per kg		-
DVE CVB 1991	226	257	g/kg		-
OEB CVB 1991	191	217	g/kg		-
DVLYS CVB 1991	5.7	6.5	g/kg		-
DVMET CVB 1991	1.7	1.9	g/kg		-
TDN 1x ruminants NRC 2001	71.7	81.5	%		-
DE 1x ruminants NRC 2001	3.64	4.14	Mcal/kg		-
NE Lactation 3x ruminants NRC 2001	1.93	2.19	Mcal/kg		-
NE Lactation 4x ruminants NRC 2001	1.82	2.07	Mcal/kg		-
NE Maintenance 3x ruminants NRC 2001	2.07	2.35	Mcal/kg		-
NE Gain 3x ruminants NRC 2001	1.45	1.64	Mcal/kg		-
Rumen Undegradable Protein (diet 25% concentrate) NRC 2001			-		34 %
Rumen Undegradable Protein (diet 50% concentrate) NRC 2001			-		42 %
EN Lactation ruminants GfE	7.3	8.3	MJ/kg		-
nxP ruminants GfE	287	326	g/kg		-
RNB ruminants GfE	28	32	g/kg		-

Pigs

Parameter	As fed	On DM	Unit	Other	Unit
DE growing pig (kcal)	3520	4000	kcal/kg		-
ME growing pig (kcal)	3220	3660	kcal/kg		-
NE growing pig (kcal)	1980	2250	kcal/kg		-
DE adult pig (kcal)	3740	4250	kcal/kg		-
ME adult pig (kcal)	3390	3850	kcal/kg		-
NE adult pig (kcal)	2120	2410	kcal/kg		-
DE growing pig (MJ)	14.7	16.8	MJ/kg		-
ME growing pig (MJ)	13.5	15.3	MJ/kg		-

NE growing pig (MJ)	8.3	9.4	MJ/kg	-
DE adult pig (MJ)	15.7	17.8	MJ/kg	-
ME adult pig (MJ)	14.2	16.1	MJ/kg	-
NE adult pig (MJ)	8.9	10.1	MJ/kg	-
Energy digestibility growing pig			-	85 %
Energy digestibility adult pig			-	90.4 %
OM digestibility growing pig			-	85.9 %
OM digestibility adult pig			-	91.3 %
N digestibility growing pig			-	86.7 %
N digestibility adult pig			-	89.6 %
N digestibility ileal standardised pig			-	87.5 %
Crude fat digestibility pig			-	26 %
Digestible P pig (no phytase)		2 2.3	g/kg	32 %
Digestible P pig (with phytase)		3 3.4	g/kg	48 %

Poultry

Parameter	As fed	On DM	Unit	Other	Unit
AMEn cockerel (kcal)	2300	2610	kcal/kg	-	-
AMEn broiler (kcal)	2260	2560	kcal/kg	-	-
AMEn cockerel (MJ)	9.6	10.9	MJ/kg	-	-
AMEn broiler (MJ)	9.4	10.7	MJ/kg	-	-
Available P cockerel	1.4	1.6	g/kg	22 %	P
Available P broiler	1.4	1.6	g/kg	22 %	P

Horses

Parameter	As fed	On DM	Unit	Other	Unit
OM digestibility horse			-	84.7	%
Energy digestibility horse			-	81.4	%
Horse Forage Unit	0.84	0.95	per kg	-	-
Digestible crude protein horse	381	433	g/kg	-	-

Rabbits

Parameter	As fed	On DM	Unit	Other	Unit
DE rabbit (kcal)	3440	3910	kcal/kg	-	-
ME rabbit (kcal)	2990	3390	kcal/kg	-	-
DE rabbit (MJ)	14.4	16.4	MJ/kg	-	-
ME rabbit (MJ)	12.5	14.2	MJ/kg	-	-
Energy digestibility rabbit			-	83.1	%

N digestibility rabbit - 82.8 %

Parameter	Fish			Other	Unit
	As fed	On DM	Unit		
DE salmonids (kcal)	3110	3530	kcal/kg	-	-
DE salmonids (MJ)	13	14.8	MJ/kg	-	-
Energy digestibility, salmonids				-	75 %
N digestibility salmonids				-	86.1 %
Digestible P salmonids	1.6	1.8	g/kg		26 %

Parameter	Amino acids			Other	Unit
	As fed	On DM	Unit		
Lysine	28.8	32.7	g/kg	6.2	g/16g N
Threonine	17.7	20.1	g/kg	3.8	g/16g N
Methionine	6.6	7.5	g/kg	1.4	g/16g N
Cystine	7.3	8.2	g/kg	1.6	g/16g N
Methionine + cystine	13.9	15.7	g/kg	3	g/16g N
Tryptophan	6.4	7.3	g/kg	1.4	g/16g N
Isoleucine	21.1		24 g/kg	4.6	g/16g N
Valine	22.3	25.3	g/kg	4.8	g/16g N
Leucine	35.3	40.2	g/kg	7.6	g/16g N
Phenylalanine	23.4	26.6	g/kg	5.1	g/16g N
Tyrosine	16.3	18.5	g/kg	3.5	g/16g N
Phenylalanine + tyrosine	39.6	45.1	g/kg	8.6	g/16g N
Histidine	12.4	14.1	g/kg	2.7	g/16g N
Arginine	33.8	38.4	g/kg	7.3	g/16g N
Alanine	20.1	22.9	g/kg	4.4	g/16g N
Aspartic acid	52.2	59.3	g/kg	11.3	g/16g N
Glutamic acid	82.5	93.8	g/kg	17.8	g/16g N
Glycine	19.4		22 g/kg	4.2	g/16g N
Serine	21.7	24.7	g/kg	4.7	g/16g N
Proline		23	26.1 g/kg		5 g/16g N

Parameter	Pigs, amino acids			Other	Unit
	As fed	On DM	Unit		
Lysine, ileal standardised, pig	25.8	29.4	g/kg	90	%
Threonine, ileal standardised, pig	15.3	17.4	g/kg	87	%
Methionine, ileal standardised, pig		6	6.9 g/kg	91	%

Cystine, ileal standardised, pig	6.3	7.1	g/kg	86 %
Methionine + cystine, ileal standardised, pig	12.3		14 g/kg	89 %
Tryptophan, ileal standardised, pig	5.7	6.5	g/kg	89 %
Isoleucine, ileal standardised, pig	18.9	21.5	g/kg	89 %
Valine, ileal standardised, pig	19.7	22.4	g/kg	88 %
Leucine, ileal standardised, pig	31.5	35.8	g/kg	89 %
Phenylalanine, ileal standardised, pig	21.2		24 g/kg	90 %
Tyrosine, ileal standardised, pig	14.9	16.9	g/kg	91 %
Phenylalanine + tyrosine, ileal standardised, pig		36 40.9	g/kg	91 %
Histidine, ileal standardised, pig	11.2	12.7	g/kg	91 %
Arginine, ileal standardised, pig	31.8	36.1	g/kg	94 %
Alanine, ileal standardised, pig	17.3	19.6	g/kg	86 %
Aspartic acid, ileal standardised, pig	46.7	53.1	g/kg	89 %
Glutamic acid, ileal standardised, pig	74.2	84.3	g/kg	90 %
Glycine, ileal standardised, pig	16.4	18.6	g/kg	84 %
Serine, ileal standardised, pig	19.3		22 g/kg	89 %
Proline, ileal standardised, pig	20.6	23.5	g/kg	90 %

Poultry, amino acids

Parameter	As fed	On DM	Unit	Other	Unit
Lysine, ileal standardized, poultry	25.3	28.8	g/kg	88 %	
Threonine, ileal standardized, poultry	14.7	16.7	g/kg	83 %	
Methionine, ileal standardized, poultry	5.9	6.8	g/kg	90 %	
Cystine, ileal standardized, poultry	5.4	6.2	g/kg	75 %	
Methionine + cystine, ileal standardized, poultry	11.4	12.9	g/kg	82 %	
Tryptophan, ileal standardized, poultry	5.7	6.5	g/kg	89 %	
Isoleucine, ileal standardized, poultry	18.4	20.9	g/kg	87 %	
Valine, ileal standardized, poultry	19.2	21.8	g/kg	86 %	
Leucine, ileal standardized, poultry	30.7	34.9	g/kg	87 %	
Phenylalanine, ileal standardized, poultry	20.3	23.1	g/kg	87 %	
Tyrosine, ileal standardized, poultry	14.3	16.3	g/kg	88 %	
Phenylalanine + tyrosine, ileal standardized, poultry	34.7	39.4	g/kg	87 %	
Histidine, ileal standardized, poultry	10.8	12.2	g/kg	87 %	
Arginine, ileal standardized, poultry	30.4	34.6	g/kg	90 %	
Alanine, ileal standardized, poultry	17.3	19.7	g/kg	86 %	
Aspartic acid, ileal standardized, poultry	43.8	49.8	g/kg	84 %	

Glutamic acid, ileal standardized, poultry	73.5	83.5	g/kg	89 %
Glycine, ileal standardized, poultry	16.3	18.5	g/kg	84 %
Serine, ileal standardized, poultry	18.7	21.2	g/kg	86 %
Proline, ileal standardized, poultry	19.8	22.5	g/kg	86 %

Origin Brazil, processed in Brazil, associated to deforestation, ex factory

Environmental impact

Parameter	As fed	On DM	Unit	Other	Unit
Cumulative energy demand (non-renewable: fossil+nuclear)	7.45	8.46	MJ/kg	-	
Phosphorus consumption	14.91	16.94	g P/kg	-	
Climate change (ILCD)	1628	1850	g CO2eq/kg	-	
Acidification (ILCD)	0.0063	0.0071	mol H+eq/kg	-	
Eutrophication (CML baseline)	23.13	26.29	g PO4---eq/kg	-	
Land competition (CML non baseline)	0.0006	0.0006	m ² yr/kg	-	

Origin Brazil, processed in Brazil, associated to deforestation, ex port of delivery (Brest, France)

Environmental impact

Parameter	As fed	On DM	Unit	Other	Unit
Cumulative energy demand (non-renewable: fossil+nuclear)	9	10.23	MJ/kg	-	
Phosphorus consumption	14.91	16.94	g P/kg	-	
Climate change (ILCD)	1731	1967	g CO2eq/kg	-	
Acidification (ILCD)	0.0089	0.0101	mol H+eq/kg	-	
Eutrophication (CML baseline)	28.83	32.77	g PO4---eq/kg	-	
Land competition (CML non baseline)	0.0006	0.0007	m ² yr/kg	-	

Origin Brazil, processed in Brazil, average deforestation, ex factory

Environmental impact

Parameter	As fed	On DM	Unit	Other	Unit
Cumulative energy demand (non-renewable: fossil+nuclear)	7.08	8.04	MJ/kg	-	
Phosphorus consumption	13.64	15.51	g P/kg	-	

Climate change (ILCD)	1282	1457	^g CO2eq/kg	-	
Acidification (ILCD)	0.0055	0.0063	mol H+eq/kg	-	
Eutrophication (CML baseline)	20.23	22.99	g PO4 ⁻⁻⁻ eq/kg	-	
Land competition (CML non baseline)	0.0005	0.0006	m ² yr/kg	-	
Origin Brazil, processed in Brazil, average deforestation, ex port of delivery (Brest, France)					
	Environmental impact				
	As fed	On DM	Unit	Other	Unit
Cumulative energy demand (non-renewable: fossil+nuclear)	8.63	9.81	MJ/kg	-	
Phosphorus consumption	13.64	15.51	g P/kg	-	
Climate change (ILCD)	1385	1574	^g CO2eq/kg	-	
Acidification (ILCD)	0.0081	0.0093	mol H+eq/kg	-	
Eutrophication (CML baseline)	25.93	29.47	g PO4 ⁻⁻⁻ eq/kg	-	
Land competition (CML non baseline)	0.0006	0.0006	m ² yr/kg	-	
Origin Brazil, processed in Brazil, not associated to deforestation, ex factory					
	Environmental impact				
	As fed	On DM	Unit	Other	Unit
Cumulative energy demand (non-renewable: fossil+nuclear)	6.22	7.07	MJ/kg	-	
Phosphorus consumption	10.71	12.17	g P/kg	-	
Climate change (ILCD)	480	545	^g CO2eq/kg	-	
Acidification (ILCD)	0.0038	0.0044	mol H+eq/kg	-	
Eutrophication (CML baseline)	13.5	15.34	g PO4 ⁻⁻⁻ eq/kg	-	
Land competition (CML non baseline)	0.0005	0.0005	m ² yr/kg	-	
Origin Brazil, processed in Brazil, not associated to deforestation, ex port of delivery (Brest, France)					

		Environmental impact				
	Parameter	As fed	On DM	Unit	Other	Unit
	Cumulative energy demand (non-renewable: fossil+nuclear)	7.78	8.84	MJ/kg		-
	Phosphorus consumption	10.71	12.17	g P/kg		-
	Climate change (ILCD)	582	661	^g CO2eq/kg		-
	Acidification (ILCD)	0.0064	0.0073	mol H+eq/kg		-
	Eutrophication (CML baseline)	19.2	21.82	g PO4--- eq/kg		-
	Land competition (CML non baseline)	0.0005	0.0006	m ² yr/kg		-
	Origin Brazil, processed in France, associated to deforestation, ex factory					

		Environmental impact				
	Parameter	As fed	On DM	Unit	Other	Unit
	Cumulative energy demand (non-renewable: fossil+nuclear)	9.26	10.52	MJ/kg		-
	Phosphorus consumption	14.91	16.94	g P/kg		-
	Climate change (ILCD)	1690	1920	^g CO2eq/kg		-
	Acidification (ILCD)	0.0081	0.0092	mol H+eq/kg		-
	Eutrophication (CML baseline)	27.33	31.05	g PO4--- eq/kg		-
	Land competition (CML non baseline)	0.0006	0.0006	m ² yr/kg		-
	Origin Brazil, processed in France, average deforestation, ex factory					

		Environmental impact				
	Parameter	As fed	On DM	Unit	Other	Unit
	Cumulative energy demand (non-renewable: fossil+nuclear)	8.67	9.85	MJ/kg		-
	Phosphorus consumption	12.89	14.65	g P/kg		-
	Climate change (ILCD)	1138	1294	^g CO2eq/kg		-
	Acidification (ILCD)	0.0069	0.0078	mol H+eq/kg		-

		Environmental impact				
	Parameter	As fed	On DM	Unit	Other	Unit
	Eutrophication (CML baseline)	22.7	25.8	g PO4 ⁻⁻⁻ eq/kg	-	-
	Land competition (CML non baseline)	0.0005	0.0006	m ² yr/kg	-	-
	Origin Brazil, processed in France, not associated to deforestation, ex factory					
	Cumulative energy demand (non-renewable: fossil+nuclear)	8.03	9.13	MJ/kg	-	-
	Phosphorus consumption	10.71	12.17	g P/kg	-	-
	Climate change (ILCD)	541	615	g CO2eq/kg	-	-
	Acidification (ILCD)	0.0056	0.0064	mol H ⁺ eq/kg	-	-
	Eutrophication (CML baseline)	17.69	20.1	g PO4 ⁻⁻⁻ eq/kg	-	-
	Land competition (CML non baseline)	0.0005	0.0005	m ² yr/kg	-	-