

Supplementary material

Table S1: Compositions and chemical traits (expressed as % of DM) of the TMR for dry-cows and lactating cows of the 4 herds

Component	Herd							
	A		B		C		D	
	Dry-cows	Lactating cows	Dry-cows	Lactating cows	Dry-cows	Lactating cows	Dry-cows	Lactating cows
Ingredient, % of DM								
Grass hay	-	-	63.8	7.8	56.9	7.7	15.2	15.6
Alfalfa hay silage	-	-	-	4.6	-	4.7	-	-
Corn silage	23.7	34.5	28.2	30.9	-	23.7	-	30.5
Grass silage	-	-	-	-	-	5.0	39.3	4.6
Wheat straw	40.5	7.1	-	-	20.3	1.9	22.8	-
Ground shelled corn	11.2	17.6	-	26.1	-	28.3	-	-
Soybean meal	4.6	7.5	8.0	9.0	-	-	-	-
Corn grain	-	-	-	-	-	8.5	-	-
Soybean seed	-	-	-	5.7	-	-	-	-
Commercial concentrate	13.5	21.8	-	-	22.8	20.2	22.7	49.3
Flax pannell	-	-	-	3.8	-	-	-	-
Hydrogenated fat	-	-	-	1.3	-	-	-	-
Molasses	2.5	4.1	-	3.3	-	-	-	-
Corn meal	4.0	7.4	-	7.5	-	-	-	-
Chemical, % of DM								
CP	10.9	15.7	14.3	16.0	12.8	15.8	11.5	17.4
Lipid	3.1	3.9	2.8	5.6	2.5	3.3	2.2	3.1
NDF	49.7	32.3	52.8	28.0	58.2	34.0	56.4	34.6
NDFf	44.7	24.0	51.5	21.2	55.1	24.4	53.3	26.4
ADF	32.8	18.7	28.0	15.1	34.1	18.9	37.1	17.6
Starch+sugar	21.2	35.4	10.9	37.8	7.9	31.1	8.1	31.2
NEI (Mcal/kg DM)	1.39	1.65	1.29	1.62	1.17	1.66	1.22	1.68

Note: NDF = Neutral detergent fiber; NDFf = NDF from forage; ADF = Acid detergent fiber; NEI = Net energy lactation

Table S2: Descriptive statistics of hematological reference intervals (RIs) for cows at 3 ± 1 DIM. Number of observations, mean, standard deviation, median, minimum, maximum, RI, number of outliers, confidence intervals (CI) of the lower (LRL) and upper reference limits (URL) and distribution of data. All RIs were generated according to a nonparametric method.

Analyte	Unit	n	Mean	SD	Median	Min	Max	RI	Outliers	LRL 90% CI	URL 90% CI	Distribution
Erythrocytes	$10^{12}/L$	126	6.7	0.7	6.7	4.8	8.5	5.3-8.3	2S	4.8-5.7	7.8-8.5	G
Hemoglobin	g/L	126	114.7	11.0	114.5	87.0	141.0	93.3-137.8	0	87-96	133-141	G
Hematocrit	L/L	126	0.31	0.03	0.31	0.24	0.39	0.25-0.38	1S	0.24-0.27	0.37-0.39	G
MCV	μm^3	126	47.0	3.1	46.6	39.9	54.8	40.1-53.2	0	39.9-42.4	52.9-54.8	G
MCH	pg/cell	126	17.1	1.3	17.2	12.7	19.9	13.7-19.5	3S	12.7-14.7	19.3-19.9	G
MCHC	g/L	126	35.2	1.2	35.0	29.6	38.2	32.8-37.4	2S	29.6-33.6	37.1-38.2	NG
RDW	%	125	16.7	1.2	16.7	13.7	20.1	14.1-19.7	3S, 1R	13.7-15.1	18.9-20.1	NG
Leukocytes	$10^9/L$	126	9.4	2.6	9.4	3.4	17.1	4.7-13.9	0	3.4-5.4	13.2-17.1	G
Neutrophils	$10^9/L$	126	7.3	2.7	7.3	2.0	13.3	2.6-12.7	0	2.0-3.2	11.7-13.3	G
Lymphocytes	$10^9/L$	126	8.4	2.7	8.4	2.6	15.3	3.9-13.8	0	2.6-4.6	12.5-15.3	G
Monocytes	$10^9/L$	125	1.0	0.7	0.9	0.0	3.4	0.0-2.8	1S, 1R	0.0-0.0	2.1-3.4	NG
Eosinophils	$10^9/L$	125	0.3	0.4	0.2	0.0	1.8	0.0-1.6	1S, 1R	0.0-0.0	1.1-1.8	NG
Platelets	$10^9/L$	125	339	87	337	40	550	189-510	1S, 1R	40-218	474-550	G

MCV: mean corpuscular volume; MCH: mean cellular hemoglobin; MCHC: mean corpuscular hemoglobin concentration; RDW: red cell distribution width; S: suspected outliers; R: removed outliers; G: Gaussian distribution of data; NG: non-gaussian distribution of data.

Table S3: Descriptive statistics of biochemical reference intervals (RIs) for cows at 3 ± 1 DIM. Number of observations, mean, standard deviation, median, minimum, maximum, RI, number of outliers, confidence intervals (CI) of the lower (LRL) and upper reference limits (URL) and distribution of data. All RIs were generated according to a nonparametric method.

Analyte	Unit	n	Mean	SD	Median	Min	Max	RI	Outliers	LRL 90% CI	URL 90% CI	Distribution
A/G-COL	ratio	130	1.14	0.28	1.05	0.53	2.13	0.71-1.9	7S, 3R	0.53-0.83	1.68-2.13	NG
Albumin-COL	g/L	130	34.6	2.4	34.8	28.3	40.2	29.2-39.5	1S	28.3-29.8	39-40.2	G
ALP	U/L	131	69	28	64	17	166	26-145	1S	17-35	121-166	NG
AST	U/L	129	86.7	20.4	82.0	52.0	164.0	58.8-150.5	5S, 2R	52.0-62.0	127.0-164.0	NG
β -hydroxybutyrate	mmol/L	129	0.75	0.31	0.71	0.31	1.76	0.38-1.71	7S, 2R	0.31-0.40	1.44-1.76	NG
Calcium	mmol/L	131	2.09	0.23	2.10	1.20	2.84	1.60-2.54	3S, 1R	1.20-1.70	2.40-2.84	NG
Chloride	mmol/L	129	95.9	3.7	96.0	85.0	104.0	87.0-102.8	5S, 2R	85-88	102-104	NG
Cholesterol	mmol/L	130	2.16	0.51	2.14	1.25	3.95	1.35-3.34	6S, 1R	1.25-1.38	3.22-3.95	NG
Creatinine	μ mol/L	130	96.7	14.3	97.2	70.7	132.6	70.7-130.2	3S, 1R	70.7-70.7	123.8-132.6	NG
Fructosamine	μ mol/L	131	182	22	179	119	244	135-228	3S	119-144	217-244	G
GGT	U/L	128	20.5	6.5	19.0	7.0	47.0	12.0-36.8	3S, 3R	7.0-12.0	33.0-47.0	NG
Globulin-COL	g/L	130	31.4	7.6	32.6	9.9	62.1	16.2-44.8	0	9.9-18.6	42-62.1	NG
Glucose	mmol/L	131	3.81	0.53	3.85	1.90	5.74	2.85-4.81	0	1.90-2.97	4.68-5.74	G
Magnesium	mmol/L	129	0.89	0.16	0.91	0.53	1.32	0.62-1.25	1S, 2R	0.53-0.62	1.11-1.32	G
NEFA	mmol/L	131	0.66	0.38	0.55	0.11	1.96	0.16-1.63	0	0.11-0.20	1.43-1.96	NG
Phosphorous	mmol/L	131	1.37	0.33	1.32	0.71	2.39	0.82-2.02	1S	0.71-0.90	1.97-2.39	NG
Potassium	mmol/L	131	3.7	0.5	3.6	2.5	5.0	2.7-4.7	0	2.5-2.9	4.6-5.0	NG
Sodium	mmol/L	128	137.7	4.1	139.0	125.0	146.0	126-144	6S, 3R	125.0-130.0	146.0-149.0	NG
Total bilirubin	μ mol/L	130	6.57	4.43	5.48	0.29	21.99	1.03-19.45	6S, 1R	0.29-1.86	15.57-21.99	NG
Total protein	g/L	131	67.4	8.4	68.0	46.0	97.0	48.3-83.4	1S	46.0-52.0	79.0-97.0	NG
Urea	mmol/L	131	2.91	0.75	2.83	1.50	5.00	1.67-4.45	0	1.50-1.83	4.16-5.00	NG
Zinc	μ mol/L	131	10.60	3.64	10.86	1.07	19.28	2.79-17.30	0	1.07-5.20	16.52-19.28	G

A/G: albumin:globulin ratio; COL: colorimetric method; ALP: alkaline phosphatase; AST: aspartate aminotransferase; GGT: γ -glutamyl transferase; NEFA: non-esterified fatty acid; S: suspected outliers; R: removed outliers; G: Gaussian distribution of data; NG: non-gaussian distribution of data.

Table S4: Descriptive statistics of reference intervals (RIs) for some markers of inflammation/oxidation and for serum protein electrophoresis (SPE) for cows at 3 ± 1 DIM. Number of observations, mean, standard deviation, median, minimum, maximum, RI, number of outliers, confidence intervals (CI) of the lower (LRL) and upper reference limits (URL) and distribution of data. All RIs were generated according to a nonparametric method.

Analyte	Unit	n	Mean	SD	Median	Min	Max	RI	Outliers	LRL 90% CI	URL 90% CI	Distribution
β -carotene	$\mu\text{mol/L}$	130	18.63	11.18	16.77	3.73	50.30	5.59-44.71	1R	3.73-7.45	40.99-50.30	NG
Ceruloplasmin	$\mu\text{mol/L}$	131	3.65	0.67	3.69	2.24	5.04	2.35-4.98	0	2.24-2.53	4.88-5.04	G
dROMs(H_2O_2)	mg/dL	131	15.3	3.9	14.5	7.7	25.9	9.4-24.2	1S	7.7-10.0	22.5-25.9	NG
Haptoglobin	$\mu\text{mol/L}$	131	8.5	5.4	7.8	0.1	23.6	0.8-21.8	2S	0.1-1.1	19.9-23.6	NG
Myeloperoxidase	U/L	131	476	99	469	237	808	262-742	3S	239-339	637-808	G
Paraoxonase-1	U/L	131	84.1	21.4	84.0	39.4	142.5	46.3-135	1S	39.4-53.6	128.4-142.5	G
Thiol groups	$\mu\text{mol/L}$	131	354	68	352	190	563	226-522	4S	190-244	474-563	G
Vitamin A	$\mu\text{mol/L}$	130	1.28	0.47	1.21	0.35	3.07	0.58-2.37	2S, 1R	0.35-0.59	2.17-3.07	NG
Vitamin E	$\mu\text{mol/L}$	130	3.51	1.88	3.18	0.46	10.17	0.84-9.10	5S, 1R	0.46-1.07	7.17-10.17	NG
Albumin-SPE	g/L	44	37.2	8.3	37.2	14.7	52.5	15.3-52.3	1S	14.7-25.1	48.7-52.5	G
Globulin-SPE	g/L	44	33.3	10.0	32.3	19.3	58.5	19.3-57.6	0	19.3-20.8	49.6-58.5	G
A/G-SPE	ratio	44	1.26	0.55	1.17	0.29	2.31	0.31-2.29	0	0.29-0.49	2.14-2.31	G
α 1-globulin	g/L	44	3.2	0.9	3.1	1.8	5.5	1.8-5.4	1S	1.8-2.0	5.1-5.5	NG
α 2-globulin	g/L	44	6.7	1.7	6.7	3.6	11.5	3.6-11.3	1S	3.6-4.6	9.2-11.5	NG
β 1-globulin	g/L	44	5.8	1.9	5.6	2.2	11.2	2.2-11.2	2S	2.2-2.9	8.9-11.2	NG
β 2-globulin	g/L	44	6.7	2.2	6.3	3.4	11.6	3.4-11.5	0	3.4-3.8	10.4-11.6	NG
γ -globulin	g/L	44	10.9	5.1	10.0	3.9	23.9	4.0-23.5	0	3.9-4.6	19.1-23.9	NG

SPE = serum protein electrophoresis; A/G: albumin:globulin ratio; dROMs: derivatives of reactive oxygen metabolites; S: suspected outliers; R: removed outliers; G: Gaussian distribution of data; NG: non-gaussian distribution of data.

Table S5: Descriptive statistics of hematological reference intervals (RIs) for cows at 30 ± 3 DIM. Number of observations, mean, standard deviation, median, minimum, maximum, RI, number of outliers, confidence intervals (CI) of the lower (LRL) and upper reference limits (URL) and distribution of data. All RIs were generated according to a nonparametric method.

Analyte	Units	n	Mean	SD	Median	Min	Max	RI	Outliers	LRL 90% CI	URL 90% CI	Distribution
Erythrocytes	$10^{12}/L$	121	6.1	0.8	6.1	3.6	9.0	4.1-7.8	3S	3.7-4.8	7.5-9.0	G
Hemoglobin	g/L	121	103.5	11.5	103.0	69.0	131.0	75.2-127.9	1S	69.0-83.0	120-131	G
Hematocrit	L/L	121	0.28	0.03	0.28	0.14	0.36	0.20-0.34	2S	0.14-0.22	0.32-0.36	G
MCV	μm^3	121	45.7	3.1	45.3	37.9	54.2	38.9-53.1	2S	37.9-41.3	51.5-54.2	NG
MCH	pg/cell	120	17.0	1.1	16.9	14.1	19.7	15.0-19.1	1R	14.1-15.2	18.9-19.7	G
MCHC	g/L	120	35.7	1.0	35.7	32.8	38.8	33.5-37.9	4S,1R	32.8-34.1	37.2-38.8	G
RDW	%	120	16.8	1.0	16.7	12.8	19.4	14.4-19.0	4S,1R	12.8-15.2	18.6-19.4	NG
Leukocytes	$10^9/L$	121	9.3	2.1	9.1	4.2	17.0	5.4-14.0	2S	4.2-6.7	13.2-17.0	NG
Neutrophils	$10^9/L$	120	4.5	1.7	4.3	1.0	9.5	1.5-9.0	4S,1R	1.0-2.2	7.6-9.5	NG
Lymphocytes	$10^9/L$	120	4.1	1.4	4.1	1.4	9.8	1.6-7.7	2S,1R	1.4-1.9	6.4-9.8	NG
Monocyte	$10^9/L$	120	0.4	0.3	0.3	0.0	1.3	0.0-1.1	1R	0.0-0.0	1.0-1.3	NG
Eosinophils	$10^9/L$	119	0.2	0.3	0.2	0.0	1.4	0.0-1.3	4S,2R	0.0-0.0	0.9-1.4	NG
Platelets	$10^9/L$	121	474	127	441	195	908	285-752	2S	195-319	692-908	NG

MCV: mean corpuscular volume; MCH: mean cellular hemoglobin; MCHC: mean corpuscular hemoglobin concentration; RDW: red cell distribution width; S: suspected outliers; R: removed outliers; G: Gaussian distribution of data; NG: non-gaussian distribution of data.

Table S6: Descriptive statistics of biochemical reference intervals (RIs) for cows at 30 ± 3 DIM. Number of observations, mean, standard deviation, median, minimum, maximum, RI, number of outliers, confidence intervals (CI) of the lower (LRL) and upper reference limits (URL) and distribution of data. All RIs were generated according to a nonparametric method.

Analyte	Units	n	Mean	SD	Median	Min	Max	RI	Outliers	LRL	90% CI	URL	90% CI	Distribution
A/G-COL	ratio	129	0.89	0.24	0.85	0.37	1.6	0.46-1.52	11S, 1R	0.37-0.57		1.42-1.60		NG
Albumin-COL	g/L	130	36.1	2.7	36.6	27.1	41.3	29-40.9	3S	27.1-31.3		39.5-41.3		NG
ALP	U/L	129	52	24	48	13	144	16-132	5S, 2R	13-22		95-144		NG
AST	U/L	129	74.4	14.5	73.0	35.0	130.0	52.3-111.8	5S, 2R	35-56		102-130		NG
β -hydroxybutyrate	mmol/L	126	0.54	0.22	0.49	0.21	1.31	0.26-1.12	8S, 5R	0.21-0.30		1.02-1.31		NG
Calcium	mmol/L	130	2.26	0.18	2.27	1.60	2.79	1.92-2.70	4S, 1R	1.60-1.97		2.59-2.79		NG
Chloride	mmol/L	129	93	5	93	74	103	81-103	3S, 2R	74-84		100-103		NG
Cholesterol	mmol/L	131	4.47	1.01	4.31	2.12	7.83	2.67-6.90	2S	2.12-3.14		6.31-7.83		NG
Creatinine	μ mol/L	129	83.7	11.1	79.6	61.9	114.9	61.9-106.1	13S, 2R	61.9-70.7		106.1-114.9		NG
Fructosamine	μ mol/L	131	168	24	172	97	220	113-210	2S	97-126		201-220		NG
GGT	U/L	126	26.4	8.0	25.0	10.0	54	13.2-48.0	7S, 5R	10.0-16.0		44-54		NG
Globulin-COL	g/L	129	42.7	9.5	42.7	21.1	72.9	24.8-62.7	1S	21.1-26.1		58.6-72.9		G
Glucose	mmol/L	127	4.00	0.40	4.00	2.83	5.30	3.18-4.90	4S, 4R	2.83-3.38		4.57-5.30		NG
Magnesium	mmol/L	130	1.01	0.17	1.03	0.70	1.60	0.71-1.35	1S, 1R	0.70-0.74		1.32-1.60		NG
NEFA	mmol/L	131	0.33	0.20	0.30	0.07	1.07	0.09-0.89	5S	0.07-0.11		0.72-1.07		NG
Phosphorous	mmol/L	130	1.57	0.31	1.55	0.77	2.65	0.98-2.29	2S, 1R	0.77-1.00		2.13-2.65		NG
Potassium	mmol/L	130	3.7	0.6	3.7	2.4	5.4	2.5-5.0	5S, 1R	2.4-2.9		4.7-5.4		NG
Sodium	mmol/L	127	135.2	4.5	136.0	122.0	144.0	123.2-143.0	4S, 4R	122.0-126.0		142-146		NG
Total bilirubin	μ mol/L	131	2.37	1.40	1.97	0.35	7.64	0.51-6.10	6S	0.35-0.66		5.29-7.64		NG
Total protein	g/L	130	78.9	9.0	80.0	58.0	100.0	59.8-95.7	1R	58.0-63.0		93-100		NG
Urea	mmol/L	130	4.33	1.16	4.33	1.83	7.33	2.21-6.95	1S, 1R	1.83-2.50		6.66-7.33		G
Zinc	μ mol/L	127	11.88	3.56	11.47	3.67	20.96	5.35-19.12	2R	3.67-5.97		18.05-20.96		G

A/G: albumin:globulin ratio; COL: colorimetric method; ALP: alkaline phosphatase; AST: aspartate aminotransferase; GGT: γ -glutamyl transferase; NEFA: non-esterified fatty acid; S: suspected outliers; R: removed outliers; G: Gaussian distribution of data; NG: non-gaussian distribution of data.

Table S7: Descriptive statistics of reference intervals (RIs) for some markers of inflammation/oxidation and for serum protein electrophoresis for cows at 30 ± 3 DIM. Number of observations, mean, standard deviation, median, minimum, maximum, RI, number of outliers, confidence intervals (CI) of the lower (LRL) and upper reference limits (URL) and distribution of data. All RIs were generated according to a nonparametric method.

Analyte	Units	n	Mean	SD	Median	Min	Max	RI	Outliers	LRL 90% CI	URL 90% CI	Distribution
β -carotene	$\mu\text{mol/L}$	131	24.22	11.18	22.36	1.86	61.48	9.32-50.30	2S	1.86-11.18	42.85-61.48	NG
Ceruloplasmin	$\mu\text{mol/L}$	131	3.01	0.80	3.01	1.10	5.71	1.35-5.23	8S	1.10-1.71	4.47-5.71	NG
dROMs (H_2O_2)	mg/dL	131	13.2	3.4	13.1	4.4	24.7	7.0-21.5	1S	4.4-8.3	19.3-24.7	NG
Haptoglobin	$\mu\text{mol/L}$	119	1.4	1.1	1.2	0.1	5.5	0.1-4.4	6S, 12R	0.1-0.2	3.8-5.5	NG
Myeloperoxidase	U/L	130	461	70	462	294	689	310-634	8S, 1R	294-341	584-689	NG
Paraoxonase-1	U/L	131	110.7	27.3	110.7	54.7	204.5	63.2-183.9	4S	54.8-69.9	164.5-204.5	NG
Thiol groups	$\mu\text{mol/L}$	131	356	60	357	218	555	240-517	3S	218-270	445-555	G
Vitamin A	$\mu\text{mol/L}$	131	2.07	0.52	2.12	0.52	2.21	0.80-3.05	3S	0.51-1.25	2.84-3.28	G
Vitamin E	$\mu\text{mol/L}$	131	7.08	2.83	6.76	0.42	15.91	2.37-13.61	2S	0.42-3.13	12.72-15.91	G
Albumin-SPE	g/L	47	40.2	10.1	40.4	13.7	62.4	14.1-61.7	0	13.7-25.3	53.7-72.4	G
Globulin-SPE	g/L	47	39.7	13.5	37.6	20.6	76.3	20.6-75.7	0	20.6-25.7	57.1-76.3	G
A/G-SPE	ratio	47	1.18	0.56	1.14	0.18	2.30	0.19-2.26	0	0.18-0.48	2.04-2.30	G
α 1-globulin	g/L	47	3.3	1.0	3.1	1.7	5.8	1.7-5.7	1S	1.7-2.1	5.4-5.8	NG
α 2-globulin	g/L	47	7.4	1.5	7.5	3.8	10.3	3.9-10.2	0	3.8-4.9	9.7-10.3	G
β 1-globulin	g/L	47	5.7	1.6	5.5	3.1	10.2	3.1-9.9	0	3.1-3.6	8.2-10.2	G
β 2-globulin	g/L	47	9.9	4.3	9.0	2.5	21.5	3.0-21.0	0	2.5-5.4	18.2-21.5	NG
γ -globulin	g/L	47	13.5	6.7	11.3	5.4	34.8	5.6-34.6	2S	5.4-6.5	25.0-34.8	NG

SPE = serum protein electrophoresis; A/G: albumin:globulin ratio; dROMs: derivates of reactive oxygen metabolites; S: suspected outliers; R: removed outliers; G: Gaussian distribution of data; NG: non-gaussian distribution of data.