

1 **Fourier transform infrared spectroscopy of milk samples as a tool to estimate energy balance,**
2 **energy- and dry matter intake in lactating dairy cows**

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6 **SUPPLEMENTARY FILE**

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26 **Figure legends:**

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28 **Figure 1:**

29 Profile of energy balance (EB) from day 5 to 105 in milk (DIM) with an average trend line.

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31 **Figure 2:**

32 Profile of dry matter intake (DMI) from day 5 to 105 in milk (DIM).

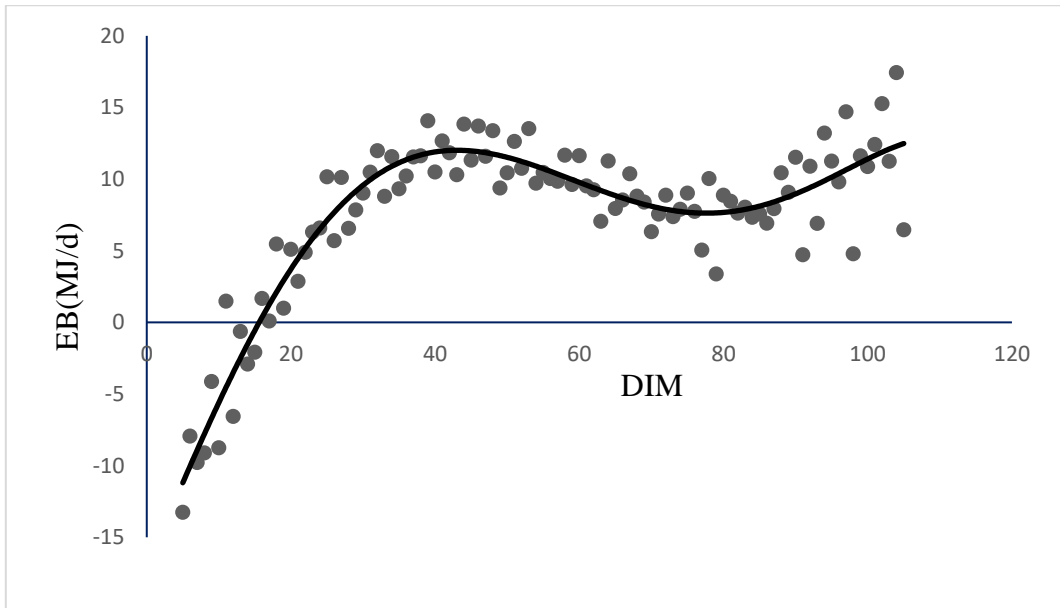
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36 **Figure 1:**

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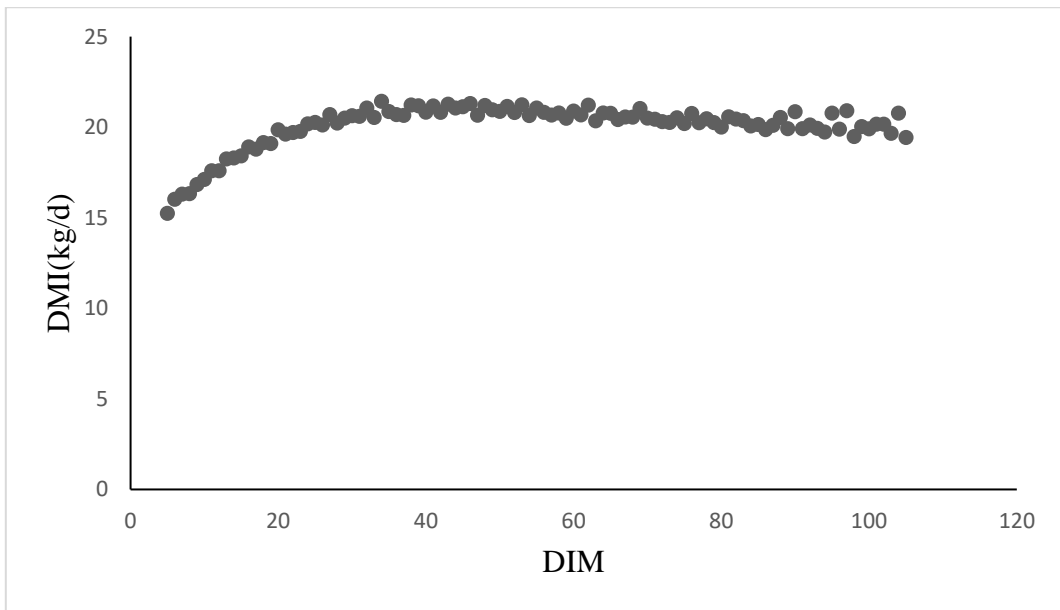
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41 **Figure 2:**

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55 Supplementary Table S1. Nutritional values of feeds used (\pm SD). All units in g/kg dry matter
 56 if not otherwise specified

	Early harvest	Normal harvest	Concentrate
Dry matter (g/kg feed)	261 \pm 23.5	359 \pm 10.2	878
Ash	75 \pm 2.5	62 \pm 1.9	78
Crude protein	151 \pm 6.9	127 \pm 5.8	277
Crude fat	31 \pm 1.9	27 \pm 1.9	65
aNDFom ¹	579 \pm 7.1	614 \pm 7.6	179
iNDF ² (g/kg NDF)	134 \pm 59	206 \pm 32	206
Starch			289
OMD ³ (%)	80.3 \pm 1.6	71.9 \pm 5.6	
NEL20 ⁴ (MJ/kg DM)	6.75 \pm 0.0	6.18 \pm 0.0	7.53
AAT20	80.5 \pm 2.1	77.0 \pm 2.8	163
PBV20	42.5 \pm 2.1	9.0 \pm 24.0	41

57 ¹aNDFom=ash corrected and amylase treated NDF; ²iNDF=indigestible aNDFom;
 58 ³OMD=Apparent digestibility of organic matter; ⁴NEL20, AAT20, PBV20 = Standard feed
 59 values for net energy lactation (NEL), amino acids absorbed (AAT) and protein balance in the
 60 rumen (PBV) at 20 kg dry matter intake (DMI) as calculated by the NorFor system (Volden *et*
 61 *al.*, 2011)

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72 Supplementary Table S2. Body energy status and milk-component variables within the entire
73 first 105 days in milk (DIM) for cows included in the study. Values presented are means,
74 standard deviations (SD), minimum (Min) and maximum (Max).

Variable ¹	Mean	SD	Min	Max
Daily milk yield (kg)	29.53	6.96	10.1	48.8
Milk fat content (%)	3.95	0.43	2.4	5.3
Milk protein content (%)	3.40	0.25	2.8	4.6
Milk lactose content (%)	4.84	0.14	4.3	5.2
Daily DMI (kg of DM/d)	20.02	3.07	9.5	28.5
EB (MJ/d)	7.32	15.68	-56.9	46.2
Efficient energy intake (MJ NEI/d)	137.75	22.05	61	200.8
Concentrate (MJ NEI/d)	56.31	17.97	3.31	91.8

75 ¹DMI = dry matter intake; EB = energy balance; NEI= Net energy lactation.

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88 Supplementary Table S3. Body energy status and milk-component variables in first strata
 89 ($5 \leq \text{DIM} \leq 55$) and second strata ($55 < \text{DIM} \leq 105$) for cows included in the study. Values
 90 presented are means, standard deviations (SD), minimum (Min) and maximum (Max).

Variable ¹	Mean	SD	Min	Max
<i>5 ≤ DIM ≤ 55</i>				
Daily milk yield (kg)	29.93	6.74	11.3	48.7
Milk fat content (%)	3.87	0.43	2.7	5.3
Milk protein content (%)	3.41	0.29	2.8	4.6
Milk lactose content (%)	4.88	0.13	4.5	5.2
Daily DMI (kg of DM/d)	19.74	3.14	9.51	27
EB (MJ/d)	5.61	16.12	-56.94	41.97
Efficient energy intake (MJ NEI/d)	136.33	22.48	61.03	192
Concentrate (MJ NEI/d)	59.23	16.37	8.59	91.9
<i>55 < DIM ≤ 105</i>				
Daily milk yield (kg)	29.10	7.17	10.1	48.8
Milk fat content (%)	4.03	0.41	2.4	5
Milk protein content (%)	3.40	0.2	3	4
Milk lactose content (%)	4.8	0.14	4.3	5.2
Daily DMI (kg of DM/d)	20.32	2.98	14.73	28.5
EB (MJ/d)	9.14	15	-54.33	46.27
Efficient energy intake (MJ NEI/d)	139.26	21.51	96.36	200.9
Concentrate (MJ NEI/d)	53.23	19.1	3.3	91.9

91 ¹DMI = dry matter intake; EB = energy balance; NEI= Net energy lactation.

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99 Supplementary Table S4. Body energy status and milk-component variables for different
100 parities (PAR) (PAR1=parity 1, PAR2=parity 2 and PAR>2=parities>2) in first strata
101 (5≤DIM≤ 55) for cows
102 included in the study. Values presented are means, standard deviations (SD), minimum (Min)
103 and maximum (Max).

Variable ¹	Mean	SD	Min	Max
<i>PAR1</i>				
Daily milk yield (kg)	24.01	5.39	11.3	36.6
Milk fat content (%)	3.73	0.37	3	5
Milk protein content (%)	3.41	0.29	3	4.3
Milk lactose content (%)	4.94	0.1	4.6	5.1
Daily DMI (kg of DM/d)	17.29	2.26	9.51	21.26
EB (MJ/d)	10.25	15.28	-31.95	41.97
Efficient energy intake (MJ NEI/d)	118.84	14.99	61.03	146
Concentrate (MJ NEI/d)	49.12	13.34	8.59	83.3
<i>PAR2</i>				
Daily milk yield (kg)	32.38	4.04	19.6	39.4
Milk fat content (%)	3.8	0.41	2.7	4.8
Milk protein content (%)	3.4	0.25	3	4.6
Milk lactose content (%)	4.86	0.12	4.6	5.2
Daily DMI (kg of DM/d)	20.72	2.59	9.86	25.82
EB (MJ/d)	6.45	13.52	-36.35	32.7
Efficient energy intake (MJ NEI/d)	143.58	19.28	64.7	182.32
Concentrate (MJ NEI/d)	64.86	14.85	23.8	90.57
<i>PAR>2</i>				
Daily milk yield (kg)	34.38	4.75	18.9	48.7
Milk fat content (%)	4.08	0.44	3	5.3
Milk protein content (%)	3.41	0.32	2.8	4.5
Milk lactose content (%)	4.83	0.12	4.5	5.1
Daily DMI (kg of DM/d)	21.62	2.56	12.10	27
EB (MJ/d)	0.13	17.04	-56.94	31.51
Efficient energy intake (MJ NEI/d)	149.5	19.08	83.26	191.9
Concentrate (MJ NEI/d)	65.83	14.97	15.86	91.9

104 ¹DMI = dry matter intake; EB = energy balance; NEI= Net energy lactation.

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