https://doi.org/10.17221/124/2025-CJAS

Using milk components to estimate the risk of energy imbalance in Holstein cows by means of receiver operating characteristic (ROC) analysis

Magdaléna Štolcová[1], Luděk Bartoň[1], Eva Kašná[2]*

[1]Department of Cattle Breeding, Institute of Animal Science, Prague, Czech Republic
[2]Department of Genetics and Breeding of Farm Animals, Institute of Animal Science, Prague, Czech Republic

**Corresponding author: stolcova.magdalena@vuzv.cz*

The authors are fully responsible for both the content and the formal aspects of the electronic supplementary material. No editorial adjustments were made.

Electronic Supplementary Material (ESM)

Table S1. Least square means (LSM) and standard errors (SE) for serum NEFA, afternoon milk yield, milk composition, and fatty acid composition recorded in participating farms from 5 to 35 days in milk

https://doi.org/10.17221/124/2025-CJAS

Table S1. Least square means (LSM) and standard errors (SE) for serum NEFA, afternoon milk yield, milk composition, and fatty acid composition recorded in participating farms from 5 to 35 days in milk

Variable	Farm 1 n = 80	Farm 2 n = 192	Farm 3 n = 165	Farm 4 n = 46	Farm 5 n = 209	P-value
	LSM ± SE	LSM ± SE	LSM ± SE	LSM ± SE	LSM ± SE	
NEFA (mmol/l)	0.45 ± 0.05	0.32 ± 0.02	0.33 ± 0.03	0.39 ± 0.04	0.36 ± 0.02	0.056
Milk yield (kg/afternoon milking)	13.3 ± 0.60^{c}	18.2 ± 0.24^{b}	19.2 ± 0.35^{a}	19.0 ± 0.57^{a}	17.5 ± 0.25^{b}	<0.001
Fat (%)	4.2 ± 0.13^{a}	3.7 ± 0.05^{b}	4.4 ± 0.08^{a}	4.2 ± 0.12^{a}	4.4 ± 0.05^{a}	<0.001
Protein (%)	3.3 ± 0.05	3.3 ± 0.02	3.4 ± 0.03	3.4 ± 0.05	3.3 ± 0.02	0.418
FPR	1.22 ± 0.03^{b}	1.12 ± 0.02^{c}	1.34 ± 0.02^{a}	1.28 ± 0.03^{ab}	1.32 ± 0.02^{a}	<0.001
Lactose (%)	5.01 ± 0.03^{a}	5.01 ± 0.01^{a}	4.95 ± 0.02^{ab}	4.91 ± 0.03^{b}	4.98 ± 0.01^{a}	<0.001
MUN (mg/100 ml)	20.9 ± 1.02^{b}	23.7 ± 0.41^{a}	23.6 ± 0.59^{a}	18.5 ± 0.96^{c}	22.8 ± 0.42^{ab}	<0.011
Citrate (%)	0.14 ± 0.01^{b}	0.13 ± 0.00^{c}	0.13 ± 0.00^{c}	0.10 ± 0.01^{d}	0.16 ± 0.00^{a}	<0.001
C14:0 (g/100 g fat)	9.08 ± 0.24^{b}	9.15 ± 0.09^{b}	9.83 ± 0.14^{a}	7.72 ± 0.22^{c}	7.97 ± 0.10^{c}	<0.001
C16:0 (g/100 g fat)	24.9 ± 0.58^{b}	26.0 ± 0.23^{b}	27.9 ± 0.33^{a}	25.9 ± 0.53^{b}	22.1 ± 0.23^{c}	<0.001
C18:0 (g/100 g fat)	11.1 ± 0.28^{bc}	10.6 ± 0.11^{c}	11.2 ± 0.16^{b}	10.6 ± 0.26^{c}	14.5 ± 0.11^{a}	<0.001
C18:1 (g/100 g fat)	27.4 ± 0.72^{b}	28.8 ± 0.28^{b}	28.2 ± 0.42^{b}	38.5 ± 0.66^{a}	28.6 ± 0.29^{b}	<0.001
SCFA (g/100 g fat)	11.0 ± 0.28^{c}	11.3 ± 0.11^{c}	12.2 ± 0.16^{b}	13.8 ± 0.27^{a}	10.2 ± 0.12^{d}	<0.001
MCFA (g/100 g fat)	34.7 ± 0.97^{c}	37.0 ± 0.38^{b}	38.3 ± 0.56^{a}	36.1 ± 0.89^{bc}	30.1 ± 0.39^{d}	<0.001
LCFA (g/100 g fat)	37.1 ± 0.61^{c}	37.7 ± 0.36^{c}	39.0 ± 0.40^{b}	43.2 ± 0.74^{a}	42.5 ± 0.35^{a}	<0.001
SFA (g/100 g fat)	60.8 ± 0.78^{b}	61.4 ± 0.31^{b}	65.0 ± 0.45^{a}	66.3 ± 0.72^{a}	57.5 ± 0.32^{c}	<0.001
MUFA (g/100 g fat)	29.4 ± 0.69^{c}	29.6 ± 0.27^{c}	29.4 ± 0.40^{c}	35.7 ± 0.64^{a}	30.8 ± 0.28^{b}	<0.001
PUFA (g/100 g fat)	2.61 ± 0.11^{c}	3.02 ± 0.04^{b}	3.13 ± 0.06^{b}	2.70 ± 0.10^{c}	3.29 ± 0.05^{a}	<0.001
tUFA (g/100 g fat)	34.2 ± 0.78^{b}	33.7 ± 0.31^{b}	30.0 ± 0.45^{c}	28.7 ± 0.72^{c}	37.5 ± 0.32^{a}	<0.001

$^{a–d}$Values with different manuscripts differ at $P < 0.05$

NEFA = non-esterified fatty acids; FPR = fat to protein ratio; LCFA = long-chain fatty acids; MCFA = medium-chain fatty acids; MUFA = monounsaturated fatty acids; MUN = milk urea nitrogen; PUFA = polyunsaturated fatty acids; SCFA = short-chain fatty acids; SFA = saturated fatty acids; tUFA = total unsaturated fatty acids