Correlation between BHB and NEFA concentration in early lactation period

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Early post-partum cows suffer from negative energy balance because of sudden huge demand of mammary gland for high milk production. Especially high-yielding cows suffer from NEB during the first week of lactation due to discrepancy of feed intake and real energy need. NEFA and BHB concentration, with many other metabolites and substrates have been used as a markers to diagnose metabolic disorders. The objective of this study was to find out is the correlation of the most common used energy parameters, NEFA and BHB, useful tool as a predictor of risk for metabolic diseases.
Blood concentration data for a package of biochemical parameters collected from 32 multiparous Holstein cows first 14 days after calving (Group 1) and after 28 days in lactation (Group 2) were used in this study. Cows were fed by TMR with 6.75 MJ/kg NEL.
Glucose concentration was significantly (P<0.05) lower, urea higher and NEFA lower in Group 1. BHB concentration did not differ between groups (Table 1). The correlation coefficient between NEFA and BHB was strong and high significant in Group 1, according to BCS and milk yield. Contrary, after four weeks in lactation, relationship is week and not significant, according to milk yield even negative (P>0.05). In the Group 1 higher level of NEFA (>0.7 mEq/L) was determined in 62.5% and BHB (>1.2 mmol/L) in 8.3% of cows, while in Group 2 values were not higher. It is important to notice that there was difference in the average body condition score (Group 1: Group 2 =3.25: 2.75).
Conclusion: The correlation between the commonly used markers of NEB is strong and significant in the first two weeks after parturition. After 1 month this is not relevant tool for monitoring and evaluation risk for metabolic disturbances and their consequences. In that case, it is necessary to take other parameters into consideration.

Table1. Biochemical parameters in cows' blood

	Glucose $\bar{X}$ ± SEM	Urea $\bar{X}$ ± SEM	TP $\bar{X}$ ± SEM	ALB $\bar{X}$ ± SEM	NEFA $\bar{X}$ ± SEM	BHB $\bar{X}$ ± SEM
Group 1	3.28±0.07	2.39±0.09	74.35±1.44	28.75±0.66	0.94±0.11	0.65±0.07
Group 2	2.92±0.1*	4.37±0.25**	68.45± 1.97	29.07±1.35	0.14±0.04**	0.40±0.02

TP-total protein, ALB-albumin, NEFA-non-esterified fatty acid, BHB-beta- hydroxybutyrate; **P<0.01; *P<0.05; SEM-standard error of mean

Table 2. Correlation between NEFA and BHB according to BCS and milk production

	BCS	r	Milk yield	r
Group 1	< 3	0.85**	< 30 L	0.99*
	> 3	0.77**	> 30 L	0.79*
Group 2	< 3	0.15	< 30 L	-0.38
	> 3	-0.23	> 30 L	-0.48

BCS-body condition score

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