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Master and PhD Students
«Actual Environmental Problems»

The use of feed energy in bulls during the feeding period with different levels of metabolizable protein in the diet



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Рационы кормления бычков

Feed, kg	Feeding periods and age of bulls (months)		
	1 (start) 9-10 months	2 (middle) 10-11 months	3 (end) 11-12 months
	live weight of bulls, kg		
	369±18	405±18	443±17
Compound feed	5.5	5.5	6.5
Soy cake	–	0.5	0.75
Haylage	10	10	10
Hay	1	1	1
The diet contains:			
Metabolizable energy (ME), MJ	85.1	91.7	104.0
Dry matter (DM), kg	9.3	9.8	10.9
Concentration of metabolizable energy, MJ/kg DM	9.19	9.34	9.51
Crude protein, g	1419	1644	1976
Degradable protein, g	762	771	891
Metabolizable protein (MP), g	659	787	936
Crude fiber, g	1780	1814	1887

Consumption and digestibility of dry matter ($M \pm m$, $n = 2$)

Index		Units	Feeding periods		
			1 (start)	2 (middle)	3 (end)
Consumed	all	kg	9.26 $\pm$ 0.04	9.82 $\pm$ 0.01*	10.94 $\pm$ 0.03**
	per 100 kg of LW	kg	2.52 $\pm$ 0.13	2.43 $\pm$ 0.11	2.48 $\pm$ 0.11
Allocated		kg	3.05 $\pm$ 0.04	3.13 $\pm$ 0.03	3.33 $\pm$ 0.08
		%	32.94 $\pm$ 0.29	31.84 $\pm$ 0.27	30.45 $\pm$ 0.82
Assimilated		kg	6.21 $\pm$ 0	6.69 $\pm$ 0.03*	7.61 $\pm$ 0.11*
		%	67.06 $\pm$ 0.29	68.16 $\pm$ 0.27	69.55 $\pm$ 0.82

* $p < 0.05$, ** $p < 0.01$ when compared with periods 2 and 3 of the experiment

Energy balance in bulls, MJ/day ($M \pm m$, $n = 2$)

Index	Feeding periods		
	1 (start)	2 (middle)	3 (end)
Gross feed energy consumption	157.9 $\pm$ 0.3	168.5 $\pm$ 0.2*	188.3 $\pm$ 0.1**
Contains energy in feces	51.9 $\pm$ 0.5	53.6 $\pm$ 0.4	57.1 $\pm$ 0.7*
Energy loss with methane and heat of fermentation	17.3 $\pm$ 0.1	18.7 $\pm$ 0.1*	21.3 $\pm$ 0.1*
Energy of assimilated substrates	106.0 $\pm$ 0.2	114.9 $\pm$ 0.2*	131.2 $\pm$ 0.7*
Energy in urine	3.7 $\pm$ 0.1	4.6 $\pm$ 0.5	5.8 $\pm$ 0.2*
Metabolizable energy of rations	85.1 $\pm$ 0.3	91.7 $\pm$ 0.3*	104.0 $\pm$ 0.4*
Heat production	54.1 $\pm$ 0.9	59.3 $\pm$ 1.2	68.7 $\pm$ 1.4*
Energy deposition in growth	31.0 $\pm$ 0.7	32.4 $\pm$ 1.5	35.4 $\pm$ 1.0

Average daily gain in live weight of calves and the content of metabolizable energy in the gain ($M \pm m$, $n = 2$)

Index	Feeding periods		
	1 (start)	2 (middle)	3 (end)
MP/ME, g/MJ	8.2	8.6	9.0
Average daily gain, g	1388 $\pm$ 3	1427 $\pm$ 19	1548 $\pm$ 24*
Energy deposition in increment, MJ/day	31.0 $\pm$ 0.6	32.4 $\pm$ 1.5	35.4 $\pm$ 1.1
Energy 1 kg growth, MJ	22.3 $\pm$ 0.4	22.7 $\pm$ 0.8	22.9 $\pm$ 0.4

Partial fraction of metabolizable energy and amino acids in the formation of live weight gain of calves, % (n = 2)

Index	Feeding periods		
	1 (start)	2 (middle)	3 (end)
Metabolizable energy	36,43	35,45	34,85
Aminoacids	38,69	36,17	31,58

Conclusion

- when testing 3 rations with different levels of metabolizable protein, higher average daily gains were obtained in the 2nd and 3rd periods of feeding on rations with a ratio of metabolizable protein to metabolizable energy of 8.6 and 9.0 g/MJ
- when the concentration of metabolizable protein in rations is from 8.2 to 8.6 g/MJ, the most efficient use of feed energy is observed, and additional research is required to clarify this indicator.

**Thanks
for
attention!**