



All-Russian research Institute of Physiology, Biochemistry and Nutrition of animals – branch of the Federal Research Center for Animal Husbandry named after Academy Member L. K. Ernst

PHYSIOLOGICAL, BIOCHEMICAL AND MICROBIOLOGICAL INDICATORS OF THE CONTENTS OF THE RUMEN IN BULLS WITH DIFFERENT SUPPLY OF METABOLIZABLE PROTEIN

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RELEVANCE

In intensively growing bulls, one of the factors **limiting the intensity of the processes of biosynthesis of meat components**, as well as in cows, is ***the amount of glucose and amino acids*** entering the metabolic pool from the gastrointestinal tract.

Thus, the development and implementation into practice of a nutrition system for reared and fattened dairy bulls will make a significant contribution to the fight against rumen pathologies and increase productivity.

RESEARCH OBJECTIVE

- development of the optimal calculation of the consumption of protected protein, which allows to fully provide the growing animal body with protein, with the laying of the future potential of health and productivity and prevent the development of rumen pathologies.

MATERIALS AND RESEARCH METHODS

- ***Bulls of the Kholmogory breed*** from 40 days of age to 14 months.
- ***Physiological experiments*** – on bulls operated on with the imposition of a scar fistula (Aliiev A.A., 1998).
- ***Protein degradability*** according to GOST 28075-89.
- In ***the rumen fluid*** was determined: *pH*; *total and residual nitrogen* (Kjeldahl method), *protein*; *the total amount of VFA* (steam distillation method in the Markgam apparatus); *ammonia* (microdiffusion method in Conway cups); *number of ciliates* (counting in a 4-mesh Goryaev chamber).

**Feed intake and
nutritional
value of rations
(actual
consumption)**

Index	age		
	4 months	9.5 months	13 months
	weight gain 1300g	weight gain 1340g	weight gain 1420g
Hay, kg	1	0,5	1,0
Compound feed, kg	4,5	4,25	5,4
Silage grassy, kg	-	6,0	12
The diet contains:			
Metabolizable energy, MJ	55	60,9	89
Dry matter, kg	5,1	6,1	9,9
Crude protein, g	950	924	1343
Degradable protein, g	705	655	921
Non-degradable protein, g	258	269	422
Metabolizable protein, g	480	502	728
Crude fat, g	155	194	285
Crude fiber, g	470	923	1815
Nitrogen-free extractive substances, g	3270	4059	5848

RESEARCH RESULTS

Indicators of enzymatic and microbiological processes in the rumen of bulls of different ages

(M±m, n=5)

Note:

1, 2 – significant difference $p<0.05$ to the corresponding age

Index	age		
	4 months	9.5 months	13 months
Weight gain (g)	1300	1340	1420
pH	6.3±0.14	6.8±0.02 ¹	7.1±0.04 ^{1,2}
Ammonia, mg%	12.3±0.78	6.4±0.98 ¹	7.8±0.55 ¹
VFA, mmol/100 ml	16.0±1.79	8.6±0.38 ¹	8.9±0.27 ^{1,2}
Acetate, %	58.2±1.52	68.5±0.44 ¹	71.3±1.01 ^{1,2}
Propionate, %	30.7±2.02	16.8±0.31 ¹	15.5±0.55 ¹
Butyrate, %	11.0±1.93	14.6±0.18 ¹	13.0±0.57 ²
Bacteria count, billion/ml	8.3±0.32	9.73±0.06	9.7±0.18
Number of ciliates, thousand/ml	429±6.6	688±17.7	615±22.5 ^{1,2}
Amylolytic activity, U/ml	30.3±0.96	28.7±0.65	34.3±0.35 ²
Cellulolytic activity, %	5.3±0.39	5.0±0.27	10.4±0.39 ^{1,2}

CONCLUSION

- The development of an optimal calculation of the consumption of protected protein, allows ***you to provide the growing animal body with protein***, with the laying of the future potential of health and productivity and prevent the development of rumen pathologies.
- The use of concentrated feed for intensive rearing and fattening of dairy bulls ***leads to a live weight of 500 kg by 14 months of age***.
- Effective feeding and nutrition contributes to ***the normal course of enzymatic processes in the rumen and throughout the body***, which is especially ***highly profitable*** in regions with ***a large number of dairy cattle and low cost of concentrated feed***.

THANK YOU FOR ATTENTION

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