Characterization of Blood Energetic Profile of Bovines Designed for Slaughter

Coşuleanu Ancuţa Elena

"Ştefan cel Mare" University of Suceava, Faculty of Food Engineering, 720229-Suceava, 13 Universităţii Street, Romania

Abstract
The research in meat production domain is based on determining the quality of muscle tissue, missing the data on the physiological status of the animals before slaughter. Interpretation of the physiological status of bovines through blood biochemical methods provide information's regarding the animal, growth and maintenance technologies of which consequences are reflected on the quality of meat. The porpoise of this study was to analyze the blood energetic profile of Fleckveih and Pinzgauer race, which have been slaughter for sale as cut portions. From this animals blood samples were collected. Blood glucose presented values that have ranged from 61,53 mg/dL at the females of Fleckveih race and 141,6 mg/dL in males of the same race. Uric acid presented values lower than the species normal and urea higher quantities. Analysis of the obtained values showed the presence of stressed animals, a diet low in proteins.

Keywords: acid uric, bovine, blood glucose, urea

1. Introduction

With the development of automated laboratory instrumentation, the use of certain blood parameters as indicators of the physiological, nutritional, metabolic and clinical status of farm animals is gaining a wider application [2].
The research in meat production domain is based on determining the quality of muscle tissue, missing the data on the physiological status of the animals before slaughter [1]. Interpretation of the physiological status of bovines through blood biochemical methods provide information's regarding the animal, growth and maintenance technologies of which consequences are reflected on the quality of meat [3].
The aim of this study was to analyze the blood energetic profile of Fleckveih and Pinzgauer race, which have been slaughter for sale as cut portions.

* Corresponding author: Coşuleanu Ancuţa Elena, Email: cosuleanu_ancuta@yahoo.com

2. Materials and methods

The research material used was represented by bovines, belonging to races Fleckvieh, Pinzgauer and Black Spotted Romanian, which were slaughtered for sale as cut portions. The cattle were classified according to their gender; any other factor was not taken into account since we refer to cattle sold on the current markets.
From these animals blood samples were taken. In the undertaken researches for the venous blood collection we have used a Vacutainer S-Manovette closed system, vacuum technique, in which the tube is evacuated before harvest, eliminating the risk of vacuum loss. This system provides a constant proportion of collected blood-additive, causing it to obtain accurate results. Blood collection was done from the jugular and mammary vein.
The volume of blood collected to carry out the research was 4 to 5 mL blood for the usual biochemical investigations. The blood is allowed to clot.

Blood biochemical parameters were determined using ACCENT 200 device, which is a projected biochemistry system designed for quantitative determinations in vitro from serum, plasma, urine or cerebrospinal fluid (Fig. 1).

Fig. 1 Automatic biochemical analyzer

Data collected from the conducted research were processed using tabular MsExcel computing applications. Usual statistical estimators were calculated.

3. Results and discussion

For the analysis of the blood energy metabolism the levels of blood glucose, urea and uric acid were studied. Changes in blood glucose by gender are contained in table 1. The average level of blood glucose varied between the minimum of 61,53 mg/dL at the females from the Fleickveih breed and the maximum of 141,60 mg/dL at the males from the same breed. In our research the blood glucose levels showed averages higer than those from the literature. These high levels may be due to the stress accumulated by the accommodation of a large number of bovines in the spaces design for this thing, during the transport if the rest period was not appropriate and slaughter.

Blood urea concentrations varied within limits relatively large (table 2). The minimum of this parameter was found at Pingauer males (8,70 mg/dL) and the maximum at the females from the same breed (30,20 mg/dL). At females the limit of variation were 9,80 mg/dL (Pinzgauer and Fleickveih breed) and 30,20 mg/dL (Pinzgauer breed). At males the minimum concentration was 9,70 mg/dL and the maximum 30,10 mg/dL, both determined at the Fleickveih breed. After analyzing the values of the variation coefficient we have observed percentage above the limit of 10%, specific to a good homogeneity. The blood urea concentrations in our research showed values above those presented in the literature, which are due to dehydration or the presence of kidney diseases.

Urea showed a maximum average concentration of 20,37 mg/dL determined at the males from Fleickveih breed and a minimum of 11,73 mg/dL at the Fleicveih females.

The uric acid showed a maximum average concentration of 1,24 mg/dL at the Fleickveih females and a minimum of 0,88 mg/dL at the Pinzgauer breed females (table 3).

The results of blood uric acid concentrations revealed values above 10% of the variation coefficient, which showed a relatively low homogeneity population in terms of the studied character. The minimum blood uric acid level was found in Pinzgauer females (0,63 mg/dL) and the maximum was 1,60 mg/dL at the Fleickveih females.

Taken together the values of this parameter showed some deviations from the limits found in the literature. The low levels may be due to the presence of liver diseases or low protein diets, which can not be clearly stated since the bovines have been purchased from the farmers in the area.

Table 1. Estimators of blood glucose at Fleickveih and Pinzgauer bovine breeds before slaughter (mg/dL)

Specification	Bovine sex			
	Females		Males	
	Fleickveih	Pinzgauer	Fleickveih	Pinzgauer
number of animals	5	5	5	4
$\bar{x} \pm s_{\bar{x}}$	61.53±5,13	79.68±6.41	141.60±53.83	96.15±20.59
s	11.47	14.33	120.38	41.17
V%	18.63	17.98	69.50	42.82
Min÷Max	48.30÷68.50	60.50÷96.50	71.90÷280.60	59.70÷154.40

Table 2. Estimators of blood urea at Fleickveih and Pinzgauer bovine breeds before slaughter (mg/dL)

Specification	Bovine sex			
	Females		Males	
	Fleickveih	Pinzgauer	Fleickveih	Pinzgauer
number of animals	5	5	5	4
$\bar{x} \pm s_{\bar{x}}$	11.73±0.85	18.78±3.68	20.37±4.58	21.03±4.13
s	1.90	8.22	10.23	8.26
V%	16.20	43.79	50.24	39.29
Min÷Max	9.80÷13.60	9.80÷30.20	9.70÷30.10	8.70÷26.30

Table 3. Estimators of blood uric acid at Fleickveih and Pinzgauer bovine breeds before slaughter (mg/dL)

Specification	Bovine sex			
	Females		Males	
	Fleickveih	Pinzgauer	Fleickveih	Pinzgauer
number of animals	5	5	5	4
$\bar{x} \pm s_{\bar{x}}$	1.24±0.14	0.88±0.07	0.98±0.06	1.04±0.08
s	0.31	0.15	0.12	0.17
V%	25.35	16.79	12.74	16.14
Min÷Max	1.02÷1.60	0.63÷1.00	0.84÷1.08	0.80÷1.19

4. Conclusions

Uric acid presented values lower than the species normal and urea higher quantities.

Analysis of the obtained values showed the presence of stressed animals, a diet low in proteins.

To develop organized markets for promoting indigenous cattle products, there is need to develop parameters that objectively assess nutritional and health status of the animals.

Breed differences and genetic variation within breeds in rate and efficiency of growth, disease resistance and tolerance, and meat quality can be assayed using blood metabolites so as to find genetically superior animals adapted to harsh environmental conditions.

References

1. Agenas S., Heath M. F., Nixon R. M., Wilkinson J. M., Phillips C. J. C., Indicators of undernutrition in cattle, Animal Welfare, 2006, 15(2), 149-160.

2. Doornenbal H., Tong A.K.W., Murray N.L., Reference values of blood parameters in beef cattle of different ages and stages of lactation. Canadian Journal of Veterinary Research, 1988, 52(1), 99-105.

3. Ndlovu T., Chimonyo M., Okoh A. I., Muchenje V., Dzama K., Raats J .G., Assessing the nutritional status of beef cattle: current practices and future prospects. African Journal of Biochtehnology, 2007, 6 (24), 2727-2734.