

## RESEARCH ON CHARACTERIZATION OF HAEMATOLOGICAL PROFILE IN CATTLE SLAUGHTERED IN ROMANIA

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### Abstract

Researches performed on hematological parameters of blood reflects the adaptability of animals to adverse environmental conditions, to different stress factors influence. Physiological responses of the animal organism reflects how the welfare indicators are accomplished, indicators that are implicated to obtaining a superior quality of meat. To characterize the hematological profile were collected blood samples from the jugular vein of the cattle that were randomly selected from the slaughter house paddock. Determination of red blood cell (RBC, Hb, Ht, MCV, MCH, MCHC) and the white ones (WBC, Lym, Mon, N, Eosin, Baz) were made using the automatic analyzer ABX Micros Vet. So, it was possible to make comparisons with data from literature and framing them with existing normal values for cattle species. This study may contribute to the establishment and improvement of rest time effects on cattle that are transported to the slaughterhouse by adjusting the imbalances that occur in blood levels.

**Key words:** hematological profile, cattle, physiological

### INTRODUCTION

Aengwanich W. et al., (2009) mentions that blood constituent values, the number of red blood cells (RBC), the amount of hemoglobin (HCT), mean corpuscular volume (MCV), mean erythrocyte hemoglobin amount, the number of white blood cells, such as lymphocytes and monocytes indicate the adaptability of the animal to unfavorable environmental conditions.

Many authors have used some blood constituents to determine the accumulated stress of cattle before slaughter.

In addition, hematological constants help diagnose disease states and monitor the responses describing the severity of the animal to the treatment of various. [2]

To get optimal quantitative and qualitative production, after the slaughter of animals for human consumption, it is necessary to maintain an appropriate metabolic status thereof. This is possible only through a nutritional balance and a growth

medium adapted to the needs of each and every animal organism species.

Any human activity, from handling and different method of restraint of cattle during blood sampling leads to increased excitability of the animal, which will cause an increase in red blood cells volume.

### MATERIAL AND METHOD

Blood samples are from 10 cattles aged between 18-36 months, waiting to be slaughtered, specifically beeing harvested from the jugular vein of animals.

For venous blood collection was used closed system type BD Vacutainer EDTA. This system provides a plug inside and a protective outer cover, protecting the user from contact with blood, being more efficient, because it starts immediately after the puncture, reducing blood clotting time.

Due to the distance between the slaughterhouse where they are collected, and laboratory tests that were carried out blood analysis, blood was kept for a period of 2 hours at refrigerated (0-4°C).

Determining blood count was performed using automatic analyzer ABX Micros Vet.

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## RESULTS AND DISCUSSIONS

The welfare of animals before slaughter is greatly reflected in their state of health. This is observed in researches on animal body, whose function in physiological limits is influenced by environmental conditions, transport conditions, rest and their diet, veterinary treatments to which have undergone.

So, in Table 1 is observed erythrocyte averages parameters from the bovine blood studied.

The average values of erythrocytes number of collected blood are higher than those found by W. Aengwanich et al. (2009) ( $6.43 \times 10^6/\text{mm}^3$ ), all these results frame within the limits from specified literature ( $5 - 10 \times 10^6/\text{mm}^3$ ).

Table 1 – Values and statistical estimators of bovine erythrocyte series

No. crt	RBC ( $10^6/\text{mm}^3$ )	HGB (g/dL)	HT (%)	MCV $\mu\text{m}^3$	MCH (pg)	MCHC (g/dL)
1	7.62	12.1	37.5	49	15.9	32.3
2	6.67	10.9	33.8	51	16.3	32.1
3	7.28	11.6	35.4	49	15.9	32.7
4	10.27	13	34.9	34	12.7	37.3
5	7.97	9.7	27.6	35	12.2	35.4
6	8.14	9.7	28.6	35	12	34.1
7	9.09	11	33.1	36	12.1	33.2
8	9.79	12	36.8	38	12.2	32.6
9	11.54	14.2	40.8	35	12.2	34.5
10	10.37	12.8	36.6	35	12.4	35.1
$\bar{X} \pm s_{\bar{x}}$	$8.87 \pm 0.5$	$11.70 \pm 0.45$	$34.5 \pm 1.27$	$39.70 \pm 2.21$	$13.39 \pm 0.58$	$33.93 \pm 0.53$
<b>V%</b>	17.82	12.27	11.60	17.57	13.72	4.92
<b>Min.</b>	6.67	9.70	27.60	34.00	12.00	32.10
<b>Max.</b>	11.54	14.20	40.80	51.00	16.30	37.30

Regarding the amount of hemoglobin, it was within normal values specific for this species ( $8 - 15 \text{ g/dL}$ ), and reported to values quoted in the literature by M. Heidarpour et al. (2014) ( $93.1 \text{ g/L}$ ), and there were no significant differences between the results obtained.

In the analyzes which aimed determining the hematocrit values was found that they had lower values ( $34.5 \pm 1.27\%$ ) than those reported by Luigi Liotta et al. (2007) ( $41.04\% - 44.53\%$ ) in their study. However, such minima and maxima were within the normal range ( $24 - 46\%$ ) in this species.

Mean corpuscular volume showed minimum values of  $34 \mu\text{m}^3$ , the upper limit value recorded  $51 \mu\text{m}^3$ , values that are found within the limits of the literature ( $40 - 60 \mu\text{m}^3$ ).

Most researchers argue that low amount of mean erythrocyte hemoglobin (MCH) and

mean erythrocyte hemoglobin concentration (MCHC) is due to the age of the animal. Once with the age of the animal increases the values increase too. Reporting to the limits stated in the literature  $14 - 19 \text{ pg}$  (MCH) and  $38 - 43 \text{ g/dL}$  for MCHC [5], these characters are close to the lower limit, averaged being  $13.39 \pm 0.58 \text{ pg}$  and  $33.93 \pm 0.53 \text{ g/dL}$ .

The values obtained show that, with age, the prevailing numerical constants of cattle blood are lymphocytes, whereas neutrophils decrease.

Although the leukocytes level is considered a physiological constant, it increases at the healthy animal in certain circumstantial condition after food consumption as platelets (post-prandial leukocytosis), in the muscular effort, during gestation and during the second half of the day (daytime variations).

Table 2 Values and statistical estimators of white blood cells and white blood cell counts

No crt.	WBC (10 <sup>3</sup> /mm <sup>3</sup> )	Formula leucocitară		
		LYM (%)	MON (%)	GRA (%)
1	8.6	17.7	4.9	77.4
2	8.1	14.2	6.4	79.4
3	8.3	17.9	7.9	74.2
4	10.1	22	8.6	69.4
5	13.2	25.5	8.1	66.4
6	13.2	18.7	6.8	74.5
7	11.7	28.4	6.5	65.1
8	12.7	24.2	6.6	69.2
9	14	30.9	8.7	60.4
10	15.5	18.7	7.4	73.9
$\bar{X} \pm s_{\bar{X}}$	11.54±0.83	21.82±1.68	7.19±0.37	70.99±1.88
<b>V%</b>	22.68	24.39	16.38	8.35
<b>Min.</b>	8.10	14.20	4.90	60.40
<b>Max.</b>	15.50	30.90	8.70	79.40

The researchers found that under conditions of high temperature or wet weather leukocyte series values are not significantly different, which is why it is considered that this species exhibits high strength and adaptability under the influence of environmental conditions. [1]

For most cattle, monocytes represent 1-7% of leukocytes formula.

From measurements performed was an average of  $11.54 \pm 0.83$  10<sup>3</sup>/mm<sup>3</sup> regarding

the WBC, specifying that the other average values of all descriptors leukocyte were within normal limits species and are consistent with literature values. [5]

Thrombocytes number or platelets increases during intense physical activity, gestation, digestion, during the day and decreases at night, in infectious diseases and acute anaphylactic shock, they actively participating in providing hemostasis in physiological processes homeostasis and blood clotting.

Table 3 Values and statistical estimators of platelets and mean platelet volume

No. crt	PLT (10 <sup>3</sup> /mm <sup>3</sup> )	MPV $\mu\text{m}^3$
1	90	6.7
2	186	6.5
3	87	7.1
4	442	9.4
5	252	7.4
6	183	7.4
7	242	7.2
8	151	6.9
9	213	7.6
10	484	7.8
$\bar{X} \pm s_{\bar{X}}$	233±42.26	7.40±0.26
<b>V%</b>	57.35	10.92
<b>Min.</b>	87	6.50
<b>Max.</b>	484	9.40

Average blood platelets obtained from measurements was within the limits specified by the literature (160-650 10<sup>3</sup>/mm<sup>3</sup>), but varying from 87-484 10<sup>3</sup>/mm<sup>3</sup>, the minimum may be the existence of a thrombocytopenia.

Regarding the mean platelet volume, minimum recovered was 6.50 and the maximum 9.40  $\mu\text{m}^3$ .

## CONCLUSIONS

Making blood tests for cattle slaughtered for human consumption were needed to characterize their physiological status, status which is one of the factors that influence the final quality of meat.

The results of measurements performed on tissue blood of cattle enabled us their classification within the limits specified from literature.

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