

Electronic Journal of Polish Agricultural Universities is the very first Polish scientific journal published exclusively on the Internet, founded on January 1, 1998 by the following agricultural universities and higher schools of agriculture: University of Technology and Agriculture of Bydgoszcz, Agricultural University of Cracow, Agricultural University of Lublin, Agricultural University of Poznan, Higher School of Agriculture and Teacher Training Siedlce, Agricultural University of Szczecin, and Agricultural University of Wroclaw.



**ELECTRONIC  
JOURNAL  
OF POLISH  
AGRICULTURAL  
UNIVERSITIES**

**2006  
Volume 9  
Issue 2  
Topic  
VETERINARY  
MEDICINE**

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MORDAK R., NICPOŃ J. 2006. VALUES OF SOME BLOOD PARAMETERS IN DAIRY COWS BEFORE AND AFTER DELIVERY AS A DIAGNOSTIC MONITORING OF HEALTH IN HERD *Electronic Journal of Polish Agricultural Universities*, Veterinary Medicine, Volume 9, Issue 2.

Available Online <http://www.ejpau.media.pl/volume9/issue2/art-20.html>

## **VALUES OF SOME BLOOD PARAMETERS IN DAIRY COWS BEFORE AND AFTER DELIVERY AS A DIAGNOSTIC MONITORING OF HEALTH IN HERD**

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### **ABSTRACT**

On dairy farms with high milk production there are much health problems. One of the most important periods, the critical time in dairy cows production is calving. In controlling and resolving of these problems the great role have the farmer and the veterinarian. There are many varied methods of dairy farms supervising. Diagnostic monitoring in herds of dairy cattle has an important role in controls an acceptable level of health and productivity in the cows and their progeny. Being familiar with the internal environment of the animal enables early detection of any dangers to the health of the animal and enables one to react before any clinical signs appear. Thus management in periparturient dairy cows is very important for prevention of many disturbances. The aim of the study was to compare the values of selected blood parameters in dairy cows shortly pre and post partum. It had to answer on the question The materials consisted of 30 clinical healthy cows tested 3-7 days before calving and 3-5 days after calving in this same good environmental and nutritional conditions (boring room). Selected twenty one various biochemical and morphological parameters of the blood similar to standard metabolic profile were included in the study. Significant differences ( $\alpha=0.05$ ) were noted in total bilirubin, SGOT, inorganic phosphorus, Calcium and Chloride. Parturition is an important period in cows from the point of view of the physiological changes taking place which in turn produce measurable, significant changes in the diagnostic parameters of the blood. These differences are presented in the paper.

**Key words:** dairy cows, blood, diagnostic parameters, parturition.

### **INTRODUCTION**

The veterinary care in dairy cattle farms is connected with widely reasoning prevention of diseases. Diagnostic monitoring in dairy cows is one of important elements of farm assurance and may be necessary to demonstrate health and welfare or their deficiency in livestock. Parturition especially in dairy cows is an important moment of large changes because it joints dry period with lactation period [1,9]. The analysis of some blood parameters in proper time or proper technological group of cattle may earlier identify health problems and may find the weak points on farms and be for farmers useful tool to help demonstrate and improve health and productivity of their animals [14]. The acquaintance of internal environment of the animal enables early detection of any danger to their

health and enables one to react before any clinical signs appear [13]. The appearance of clinical signs of disease in a larger number of animals in a herd is without exception always accompanied by the decrease in production and fertility, which means an increase in mortality rates as well as an increase in the costs associated with treatment of disease [2,15]

The aim of the study was to compare the values of selected blood parameters in dairy cows pre and post partum and detect values of potential changes due to the physiological parturition.

### MATERIALS AND METHODS

The materials consisted of 30 cows tested during the dry period 3–5 days before calving and 30 cows tested 3–5 days after calving. All the cows were housed in the same building under identical environmental and nutritional conditions. Clinical healthy cows were from a herd without health problems. The cows were in good environmental and nutritional farm conditions. The mean milk productivity in tested herd was near 7500 liters per cow per lactation period. Before and after calving in tested cows were not manifest any clinical signs of diseases or health disturbances. Included in the study were: erythrocyte count, leukocyte count, hemoglobin levels, haematocrit, levels of bilirubin, glucose, total protein, urea, creatinine, SGOT, SPGT, concentrations of Mg, Ca, Pn (inorganic phosphorus), K, Na, as well as acid base balance. Statistical comparisons were based upon analytical test variance at a level of significance  $\alpha = 0.05$ .

### RESULTS AND DISCUSSION

Detailed results are shown in [table 1](#).

**Table 1. The mean value of some blood parameters in tested cows pre and post partum. (x – mean, s – standard deviation)**

Pre post	erythrocyte		leukocyte		haemoglobin		haematocrit		bilirubin *		glucose		total protein	
	T/L	G/L	g/dl	L/L	umol/l	mmol/l	g/l							
	x	s	x	s	x	s	x	s	x	s	x	s	x	s
pre	5.47	0.41	7.52	2.31	9.56	1.99	0.34	0.03	5.12	2.42	3.26	0.94	69.43	8.91
post	5.65	0.39	7.13	2.08	9.54	1.94	0.32	0.03	12.41	4.31	3.21	1.34	65.38	10.23

**Table1. Continuation.**

urea		creatinine		SGOT*		SGPT		Mg		Ca*		Pn*		
mmol/l		umol/l		U/L		U/L		mmol/l		mmol/l		mmol/l		
x	s	x	s	x	s	x	s	x	s	x	s	x	s	
pre	3.87	1.56	133.1	36.55	45.57	12.5	16.85	5.98	1.052	0.21	2.54	0.81	2.08	0.56
post	3.98	2.92	115.17	31.62	72.45	30.2	17.23	7.95	1.54	0.18	2.11	0.31	1.62	0.19

**Table 1. Continuation.**

Cl*		K		Na		pH		pO2		pCO2		BE		
g/l		mmol/l		mmol/l		mmHg		mmHg		mmol/l				
x	s	x	s	x	s	x	s	x	s	x	s	x	s	
pre	106.74	4.65	3.83	0.33	142.9	1.55	7.398	0.04	28.4	3.60	47.89	4.10	3.28	4.28
post	100.57	4.42	3.80	0.80	141.0	2.81	7.393	0.04	33.1	10.55	49.86	4.71	4.72	3.48

\* statistical significant differences  $\alpha=0.05$ .

Significant differences were noted in total bilirubin, level of SGOT, inorganic phosphorus (Pn), Calcium and Chloride. However large differences in the levels of total protein, Glucose, Creatinine and pO<sub>2</sub> were noted but did not exceed the level of significance  $\alpha = 0.05$ . In the trial were tested 21 different biochemical parameters of blood in cows. The cows were clinically healthy in periparturient period they had not any pathological signs of disturbances just before, during or after delivery and the results were as a measurement of influence of normal parturition on tested blood parameters in these animals. The survey regarding the herd with middle level of milk production. The knowledge regarding these changes of blood parameters in normal conditions of healthy cows is very important for veterinarians and farmers particularly in farms where they expect health problems or these problems are present. The other authors tested only few parameters of the blood like minerals [8,9] or other besides these regarding acid-base balance or in another approach and periods in the cattle or herds with health problems in general with very high or low milk productivity [12,13,14,15]. The veterinary care in dairy cattle farms is connected with widely understand prevention of diseases. No doubt that the metabolic profile tests may be of value in providing a link between the veterinary surgeon and dairy farmer in the application of modern preventive medicine [12]. It is known from literature and practice that environmental and nutritional conditions in cows have a great influence on diagnostic picture of the blood [1,13]. In dairy cows the most important period is the calving [11]. Following parturition, nutritional requirements increase rapidly with milk production and resulting negative energy balance extends for 8-10 weeks [2,3] The metabolic profile and other monitoring of the blood in peripartum period is being used as an aid to the management of dairy cow nutrition as well as the management of their fertility and productivity [4]. Whitaker and other authors tested cows with special system 7 – 10 days before calving and 10-20 days after calving (early lactation) and mild lactation period, 20-120 days calved [13]. These systems of metabolic profiles allow to control different technological groups of cows in herds (levels of energy, protein and minerals). For example, decreased concentration of inorganic phosphorus or calcium before calving causes increase risk of deficiency after calving with symptoms of postparturient haemoglobinuria or parturient paresis. Different needs and physiological status are in dry cows before parturition and in cows after parturition. The knowledge of physiological changes in selected blood parameters in this short period of separated by calving may be useful during practical interpretation of analysis doing in herds when health problems occur [4,5,6,8]. Diagnostic monitoring has a stable, prophylactic role too and may be repeated few times a year at critical times as a check “ask the cows what they think” [13]. Following parturition, the new lactation and nutritional requirements increase rapidly with milk production and the resulting negative energy balance (NEBAL) extends for 8-10 weeks [3]. According to the levels of minerals, protein, glucose and other blood parameters selective dietary and prophylaxis both prepartum and postpartum may be performed. The indicators of hepatic tissue damage like AST, bilirubin and hepatic synthesis like protein, cholesterol, and triglycerides are very important [7]. The control of the danger areas on dairy farm with an ability to affect changes in husbandry practices in a technological group, will affect the physiological state of the herd, which may be reflected in the results obtained in the laboratory analysis of their blood. The bovine practitioners testing blood samples independently pre or postpartum as well as having knowledge of significant differences in value of some blood parameters between cows before or after delivery may better recognize risk many diseases, fertility and needs of these animals. The results of the research work may have practical relevant for cattle veterinarians as a better anticipation, identification and prevention healthy problems in dairy cows shortly before and after calving.

## CONCLUSIONS

1. Parturition is an important period in dairy cows from the point of view of physiological changes taking place, which in turn produce measurable changes in the diagnostic parameters of the blood.
2. Having knowledge of the diagnostic parameters just before and just after parturition in cows enable one to effectively predict many varied problems occurring in the herd and to react accordingly.
3. In tested cows just pre and post partum significant differences were noted in total bilirubin level, SGOT activity, inorganic phosphorus, Calcium and Chloride concentration.

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