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Physiological Research on Indices of Bull Sperm

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Abstract. Experimental data have found that the use of rations with high level of nitrates (0.43 g/kg body weight) led to significant increase in the level of serum lipid peroxidation in breeding bulls. Also there was observed inhibition of reproductive function in bulls and physiological indices of sperm.

Keywords: bull, semen volume, mobility, nitrates, ration, preparation, lipids

INTRODUCTION

Massive spread of technology and improvement of artificial insemination in animal reproduction performance requires knowledge of semen and hence changes that occur in the process of maturation and fecundation transport under the influence of internal and external factors.

Data from the literature presented (1,2,3,4,5,6,7,8) in this aspect concerning of the nitrate (NO3) in the diet of breeding bulls, affects spermatogenesis and the stages involved are regulated in a neurohormonal mechanism.

MATERIALS AND METHODS

Researches have been conducted on breeding bulls of breed Baltata cu Negru Moldavian type. There were formed two groups of breeding bulls by five heads in each.

The animals from the control group were given by ration 0.20 g/kg/day body weight per day. The animals from the experimental group had -0.45 g/kg/day of body weight.

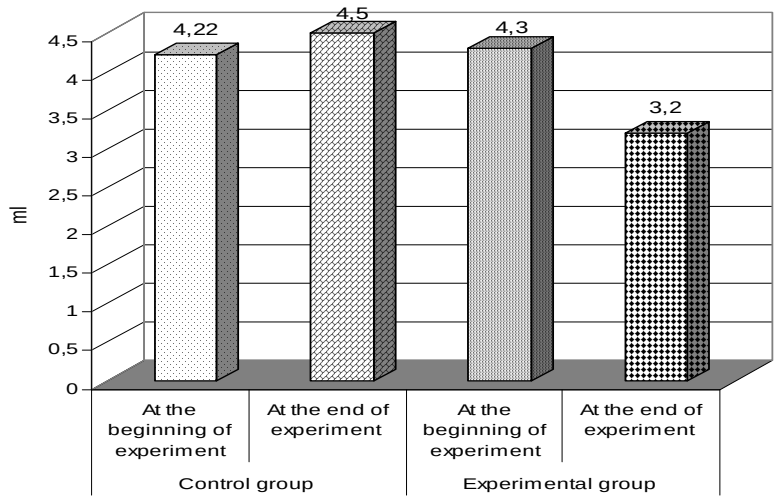
The duration of experience was 70 days.

Physiological indices of sperm were made after V.K. Milovanov (1962), the level of lipid peroxidation was performed by Specord UV-VIS device with a wavelength of 210, 233 and 270 nm.

RESULTS AND DISCUSSION

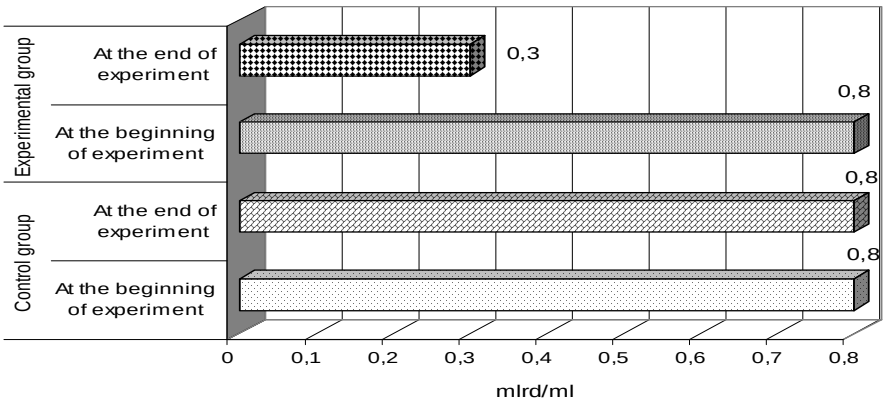
Research, using high doses of nitrates in the ration led to lower breeding function of breeding bulls (Fig. 1, 2, 3, 4, 5).

The data refer to *Figure 1*, showed the volume of ejaculate in the control group at the end of the experience was 4.5 ml and in the experimental group it got lower to 3.2 ml.



*P<0.05; **P<0.01, ***P<0.001

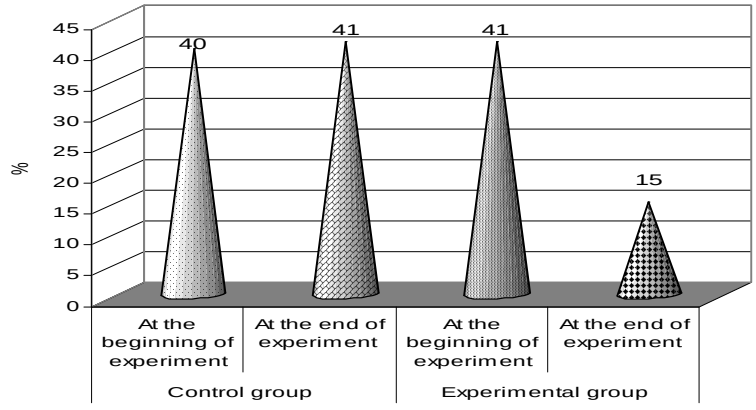
Fig. 1. Ejaculate volume, ml



*P<0.05; **P<0.01, ***P<0.001

Fig. 2. Concentration of sperm in ejaculate, billion/ml

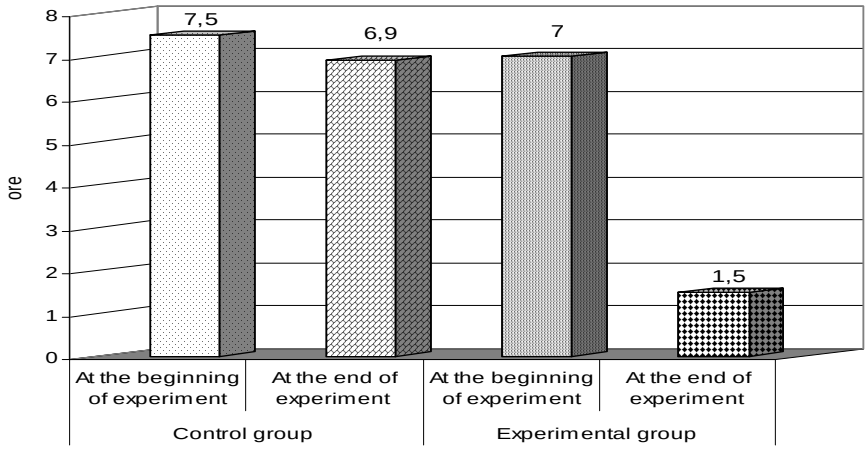
Sperm concentration in semen study showed (Fig. 2) that at the beginning of the experience this index was 0.8 billion/ml in both groups, and at the end of experience sperm concentration decreased compared with the experimental group.



*P<0.05; **P<0.01, ***P<0.001

Fig. 3. Mobility after reanimation, %

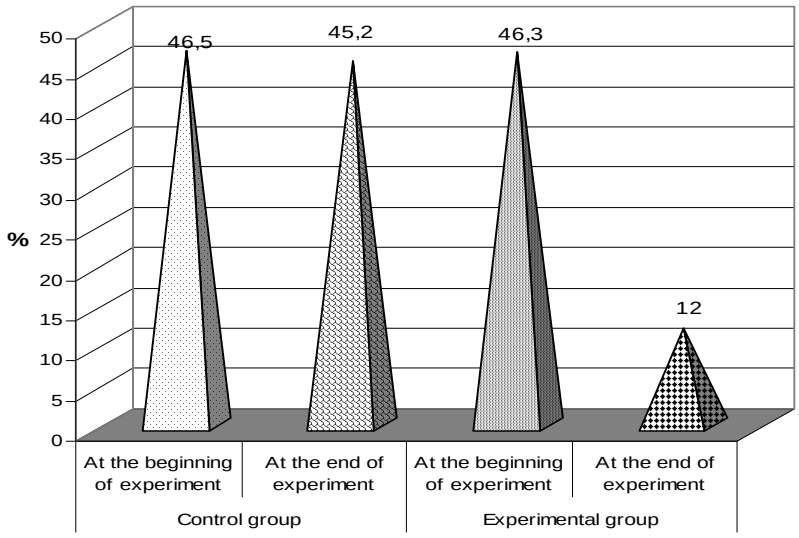
Mobility of sperms decreased and under the influence of high concentrations of nitrate in the ratio of bulls (Fig. 3). After thawing, in the experimental group mobility decreased from 41% to 15%.



*P<0.05; **P<0.01, ***P<0.001

Fig. 4. Viability, hours

Significant changes occurred on sperm viability at a temperature of 37^{o}C (Fig. 4) and integrity of acrosom (Fig. 5).



*P<0.05; **P<0.01, ***P<0.001

Fig. 5. Acrosom, %

Finally note that semen quality study showed reduction of sperm physiological indices depending on the level of nitrates in the ration of breeding bulls. In the experimental group at the end of experience, compared with control group, decreased ejaculate volume of 1.3 ml ($P<0.05$), sperm concentration in ejaculate to 0.5 billion/ml sperm mobility after thawing by 26%, viability at 37^{o}C with 5.4 hours and acrosom integrity with 33.2%.

Study of levels of lipid blood peroxidation in breeding bulls showed that the level of POL in blood of bulls in the experimental group increased authentically compared with control group (Tab. 1).

Tab. 1

The level of peroxidation of lipids in blood

Specification	The level of peroxidation of lipids U.C.x10^{-2}	
	D_{232} / D_{220}	D_{270} / D_{210}
Control group	25.12±0.47	7.32±0.21
Experimental group	29.1±0.59*	6.98±0.32

(P<0.05)

To reduce the negative factor of nitrates on reproductive function in breeding bulls on the one hand it is necessary to use preparations that would act as a prevention of the negative effectives of nitrate, on the other hand to increase immunity of the body.

To this end, in another series of experiments was tested preparation "Biofat" in the role of protector of cryo resistance of sperm what has been injected to the bulls, each 0.2 mg/100 kg body weight once in seven days for a period of 70 days. At the end experiences sperm was frozen in special haulm and after thawing was tested by mobility, viability, integrity of acrosom. Semen that corresponded to the standard was distributed at the offices of artificial insemination and it was inseminated artificially to 250 heads from each batch (Tab. 2).

Tab. 2

Semen quality after reanimation

Specification	Groups	
	Control	Experimental
Sperm mobility after reanimation, %	4.1±0.07	4.5±0.08*
Viability, hours	6.5±0.22	7.4±0.22*
Acrosom integrity, %	40.1±1.11	47.3±0.90***
Fertility rate	57.0±2.21	64.0±2.17*

*P<0.05; ***P<0.001

Data of *Table 2* shows that the preparation "Biofat" given to the breeding bulls allowed to increase significantly (P<0.05) sperm mobility and viability after reanimation, keep the integrity of acrosom (P<0.001) and sperm fertility power after reanimation (P<0.05).

CONCLUSIONS

Ration of food of breeding bulls containing nitrates of 0.43 g/kg body mass leads to lower indices of quality and quantity of semen: Volume of ejaculate with 1.3 ml (P<0.05), sperm concentration in the ejaculate with 0.5 billion/ml, mobility after reanimation with 26% (P<0.001), viability by 5.4 hours (P<0.001) and integrity of acrosom with 3%.

Preparation "Biofit" given to breeding bulls receiving high nitrate levels significantly increased sperm mobility and viability after reanimation (P<0.05), integrity of acrosom (P<0.001) and sperm fertility power (P<0.05).

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