

INFLUENCE OF BIOR PREPARATION ON BOAR SPERMOGRAM

Elena CIBOTARU¹, Grigori DARIE², Alisa PIRLOG^{1*}, Doina ROTARI²

¹Department of Animal Production Management and Safety Agrifood, State Agrarian University, Moldova

²Scientific-Practical Institute of Biotechnology in Animal Husbandry and Veterinary Medicine, Moldova

*Corresponding author: alisa.pirlog@gmail.com

Abstract

The aim of the research was to study the influence of biologically active preparations, extracted from *Spirulina platensis* (BioR) on the quantitative and qualitative indices of the usual spermogram in boars. The biological studied material was the Landrace boars and the semen material taken from them, raised at M. S. Moldsuinhibrid, Orhei, Republic of Moldova. The experiments were carried out between July and August, the months with hot temperatures. The boars were administered BioR preparation intramuscularly 0.3 ml / 100 kg live mass for 5 and 10 days, the preparation being produced at the Institute of Microbiology and Biotechnology of the Republic of Moldova. The sperm indices were studied before administration and 50 days after cessation of administration. The results showed that the mobility of sperm after 5 days of administration was 90%, after 10 days - 91%, compared to the control group where the mobility was 82% lower; the volume of ejaculate was 213 ml after 5 days and 229 ml after 10 days of administration of the preparation or by 25 ml and 41 ml, compared to the control group, and the fecundity increased by 3.29% and 4.57% compared to the control group where this index was only 75.83% (80.4% when the BioR preparation was administered for 10 days, and it was 79.12% after 5 days of administration).

Keywords: *Spirulina platensis* (BioR), boars, sperm indices.

Introduction

Animal husbandry is a dynamic branch of science and practice mainly imposed by the economic factor. The means by which the reproductive process is coordinated are diverse and often having mutual independent influences. Directing the breeding activity contributes to increasing the obtained production and the economic efficiency, respectively, by making the most of the potential of genetically superior animals. The breeding strategies used to raise pigs are in a continuous renewal along with the "old" ones, elaborating new strategies that are more and more efficient. They mainly refer to artificial insemination, spermatogenesis management, embryo transfer, etc. (V. Nauc, 1991; Darie G.; 1983; 2006, Boronciuc G., 2003; Bogdan A, 1999; Bogdan L.M. 2000). These biotechnologies make it possible to obtain the greatest genetic advances in farm animals. The success in the application of artificial insemination is determined by the knowledge of the particularities of spermatogenesis and their mechanism of regulation. Therefore, the opportunity of studying the efficient improvement of the sperm production, at the same time with the increase of the sperm material resistance with the conditions of its conservation, especially in the critical periods of the year, is of a perspective.

The research conducted at the Institute of Microbiology and Biotechnology of the Republic of Moldova (Rudic V et al., 2006; Darie G and cool., 2006) have demonstrated the beneficial effect of biopreparations of algal origin obtained from the strain *Spirulina Platensis* on the breeding

animals' spermograms from zootechnical point of view. They are of interest for the investigation of the biologically active preparation obtained from *Spirulina Plantesis* on the function and the reproductive system and the resistance of the semen material under conservation.

Material and Methods

The research was carried out on Landrace pigs. First of all, 3 batches of calves of 5 heads each were formed, two experimental and one control. The experimental groups were administered the preparation BioR, with a concentration of 0.5% for a duration of 5 and 10 days, the administration dose 0.3ml/100 kg live weight, head/day.

The BioR preparation was obtained in the Microbial Products laboratory of the Institute of Microbiology and Biotechnology in the Republic of Moldova.

The preparation has a varied content of proteins, carbohydrates, fats, amino acids, lipids, vitamins, macro and micro elements, etc.

The BioR preparation has the ability to be included to a different degree in the complex mechanism at the level of the hypothalamus - pituitary gland - testicles, thus, sensitizing and influencing them beneficially.

At the same time, the following indices were determined: the homeostasis of blood lipids and proteins - which was determined using the semi-automatic analyzer STAT-fax 3300; the spermogram indices being evaluated by the computerized method "CEROS". The inoculation of semen in sows was carried out intrauterinely using the Golden-Pic instrument in a volume of 1 ml/kg live weight but not more than 150 ml sperm with a total number of sperm cells with rectilinear forward movements equal to 3 billion/dose. The fecundity rate of females after the first insemination was previously established according to the number of non-returning females 16-21 days after inoculation and definitively according to the results of parturition.

Results and Discussion

The experimental data on blood lipids homeostasis under the influence of the administration of the BioR preparation to the reproductive boars are presented in Table 1.

Table 1. The effect of the BioR administration on blood lipids homeostasis in breeding boars

Experimental groups	Total lipids	β -lipoproteins, Un / l	Triglycerides, mmol/l	Cholesterol, mmol/l
I (10 days)	<u>2,67±0,256*</u>	<u>0,103±0,010</u>	<u>0,315±0,025</u>	<u>1,998±0,107</u>
	3,80±1,329**	0,076±0,012	0,378±0,064	2,188±0,233
II (5 days)	<u>2,69±0,183*</u>	<u>0,107±0,07</u>	<u>0,413±0,032</u>	<u>2,140±0,296</u>
	4,95±1,744**	0,053±0,004	0,223±0,030	2,33±0,174
III (control)	<u>2,83±0,419*</u>	<u>0,092±0,007</u>	<u>0,227±0,022</u>	<u>1,360±0,126</u>
	4,73±1,666**	0,070±0,001	0,240±0,030	2,010±0,330

* Data obtained after 10 days (II) and 5 days (III) of administration of the preparation;

** Data after 35 days after the cessation of administration;

The experimental data on the homeostasis of blood lipids show that, along the way, both the total lipids and the studied fractions underwent changes. The total lipids after administration of the bioextract showed a tendency to decrease the blood concentration by 4.95% in the animals from group II in which the preparation was administered for 5 days compared to the control group. At the same time, when doubling the administration period of the preparation (duration of a boar spermatogenesis cycle) in group I, the value of this index shows a decrease equal to 5.66% compared to the control group. After 35 days from the cessation of the administration to all groups of animals, there is an increase in the concentration of total lipids in the blood with the intensification of the differences between the control group and the experimental ones. The blood concentration of total lipids in animals from group I is lower than in the control group by 19.34%. The concentration of total lipids in the animals from group II is 30.26% higher than the results recorded in group I and under the same conditions it prevails the results of the control group by 4.65%.

The experimental data on the influence of algal preparation (BioR) administration on blood protein homeostasis are presented in Table 2.

Table 2. The effect of BioR preparation on blood protein concentration

Experimental groups	Duration of admin.	Proteins	Albumin
I (control)	<u>0</u>	<u>81,37±1,03 *</u>	<u>41,87±0,203*</u>
	<u>35</u>	82,17±1,087**	36,53±2,769**
II (10 days)	<u>10</u>	<u>83,37±3,424*</u>	<u>38,12±1,104*</u>
	<u>35</u>	77,6±5,263**	47,67±1,231**
III (5 days)	<u>5</u>	<u>83,90±5,970*</u>	<u>34,33±1,317*</u>
	<u>35</u>	77,60±5,263**	38,03±1,690**

* Data obtained after 10 days (II) and 5 days (III) of administration of the preparation;

** Data after 35 days after cessation of administration;

The data presented in Table 2 show contradictory changes in blood protein concentration. After the administration of the preparation, there is a tendency to increase the concentration of blood proteins in the boars from the experimental groups compared to the control group, constituting 3.90% in group III and 2.45% in group II.

After 35 days from the cessation of the drug administration, the prevalence of blood protein concentration is maintained only in the boars from group III, the value of blood protein concentration being identical to the control group. We note that the protein metabolism proved to be more indifferent to the administration of the bioextract and prevailed the control group only in the situation when during the administration period it was doubled.

The administration of the BioR preparation to the breeding boars favored some indications of sperm production. The unique properties of the cells are some of the factors that move it to its destination - the anterior third of the oviduct to achieve its biological destination. In the practice of reproduction it serves as an index of fecundity prediction, we evaluated the effects produced by BioR on the mobility of semen cells after collection (fig.1).

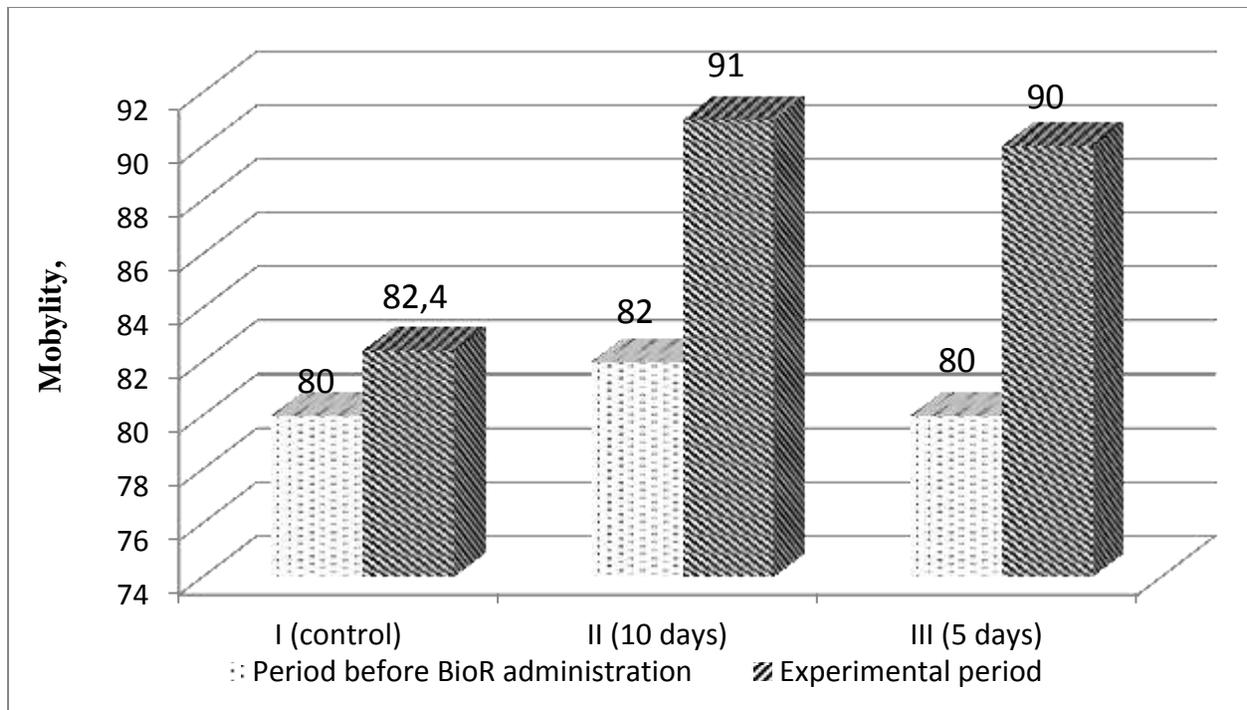


Figure 1. The dynamics of semen cell mobility under the influence of BioR administration, %

The data in Fig. 1 indicate the presence of differences between the mobility of native sperm cells in boars from the experimental groups, compared to those from the control group. As the mobility was identical until the administration of the preparation, at the end of the experimental period the spermatic mobility in group II progressed over the control one by 10.44%. The mobility in the semen collected from the animals from group III increased by 9.22% compared to the control group.

At the same time, we evaluated the influence of the bioextract on the ejaculate volume (fig.2) in the breeding boars.

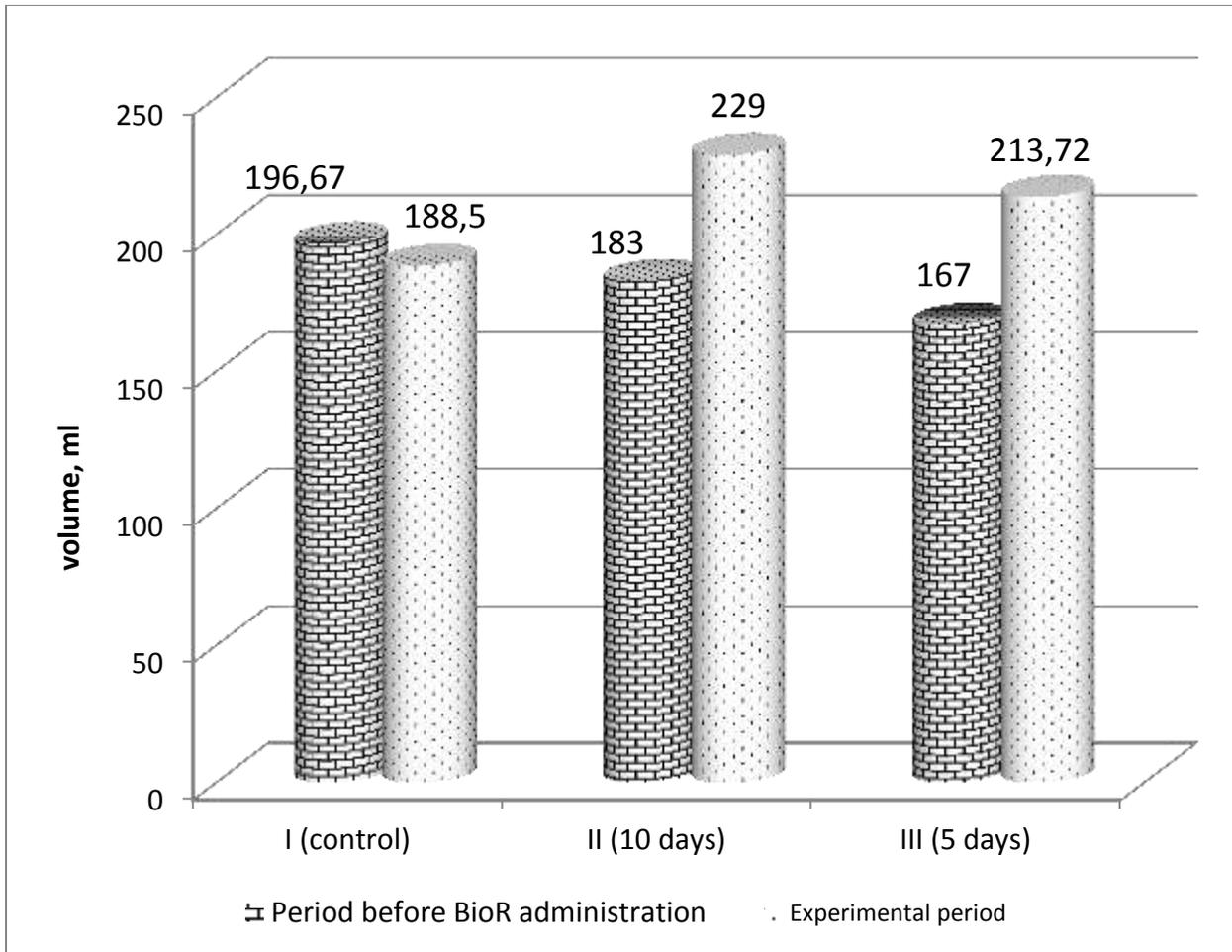


Figure 2. The influence of BioR administration on the ejaculate volume in breeding boars, ml

The experimental results reflect changes in favor of the experimental groups. At the end of the experimental period, the sperm mobility in the boars from group II increased by 21.48% compared to the control group. The same trend is manifested in the boars from group III, regardless of the fact that the administration period was 5 days, the volume increase was 13.38. The next step was to establish the effect induced by the experienced preparation on the fertilizing ability of the semen obtained from the experimental boars (fig. 3.).

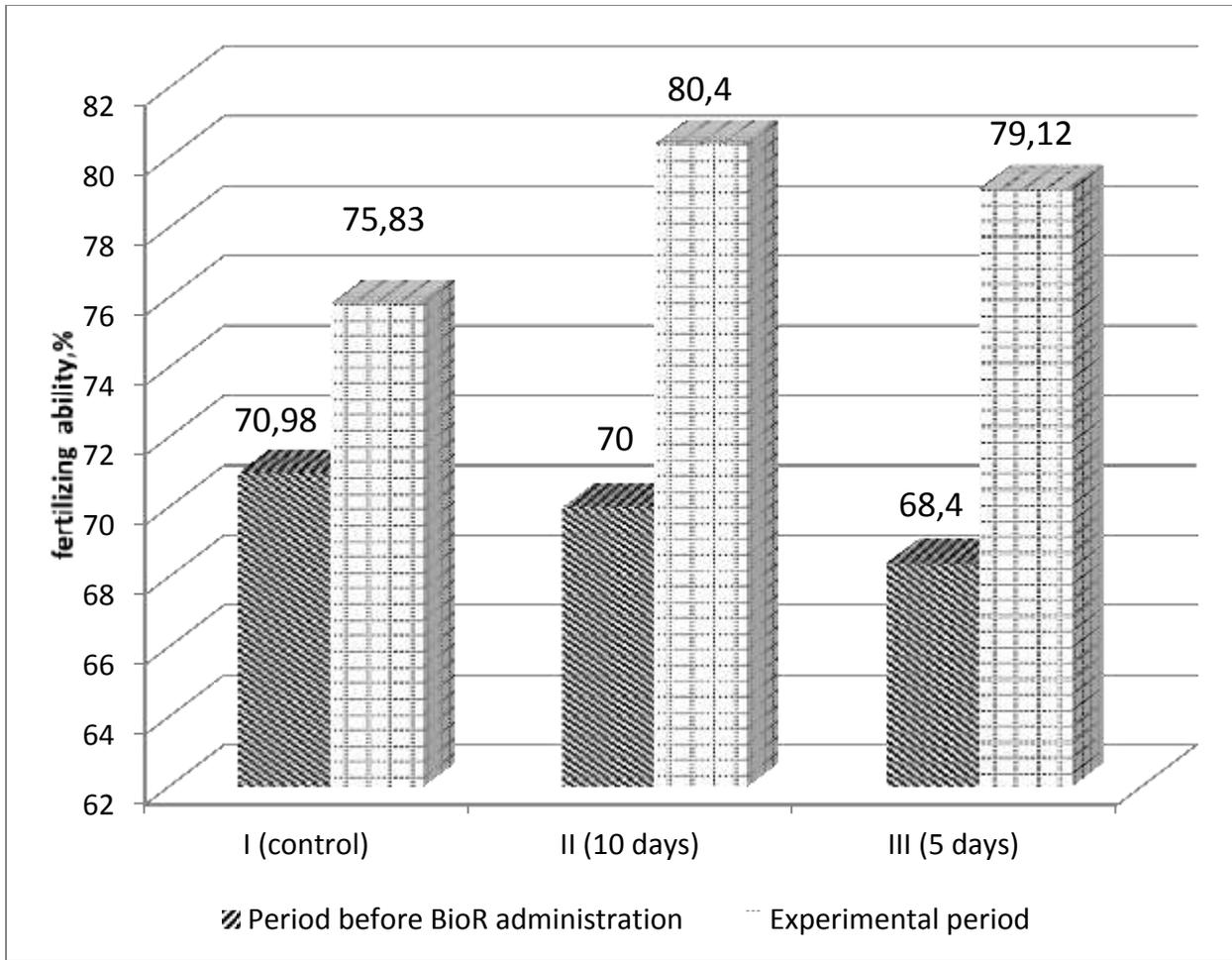


Figure 3. The effect of BioR administration on the fertilizing ability of the semen,%

The results presented in Fig. 3 show that the administration of algal bioextract contributed to the increase of the sows’ ability to fertilize. The most relevant results were obtained in the animals from group II, in which an increase in fertility was by 4.57%. In group III, the fertilizing capacity of the sperm prevails over the control group by 3.29%.

Significant progress has been made in the prolificacy of sows, inseminated with the semen obtained from the boars during the experimental period (Table 3).

Table 3. Prolificacy of sows according to the semen used for insemination.

Experimental groups of boars	Proliferation, heads		±, in relation to the control during the experimental period %
	Experimental period	Experimental period	
I (control)	10,83±1,30	10,84±1,22	100
II (10 days)	9,06±0,61	11,83±0,55	+9,13
III (5 days)	9,19±0,49	11,23±0,71	+3,60

The analysis of the experimental data shows that the prolificacy of the sows inseminated with the sperm of the boars from group II increased by 9.13% compared to the control group. For the sows inseminated with the semen collected from the boars in group III, the increase was 3.6%.

Conclusions

The BioR preparation of algal origin produced anabolic effects depending on the duration of the administration period of the preparation, it favors the metabolism of total lipids (when administered in 5-day regimen), triglycerides and blood β -lipoproteins and cholesterol (when administered in both regimens) and the concentration of these fractions in the blood;
It favors the indications of the usual spermogram in boars, mainly the ejaculate volume and the moderate mobility of the sperm cells in the ejaculate;
By improving the indices of the usual spermogram in boars, it moderately favors the percentage of fecundity and the prolificacy of the sows.

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