

Impact of Biostimulants on the Growth Dynamics and Developmental Performance of Calves

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Received: 2025, 27, Aug

Accepted: 2025, 29, Sep

Published: 2025, 30, Oct

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Annotation: This article presents literature data on the effects of biostimulants on young animals and provides a detailed analysis. The impact of biostimulants on calves is studied, and their effects are highlighted, including changes in body temperature, heart rate, respiration rate, and live weight gain. The relevance of the topic is substantiated. Modern research methods are presented, and calf live weight is measured using electronic scales using modern methods. The purpose and objectives of the study are stated. The article also contains conclusions and a list of references.

Key words: Bodifors, Miosta-H, pharmacostimulatory agents, regenerative mechanisms, physiological parameters (body temperature, heart rate, respiratory rate), electronic weighing device.

Introduction:

At present, various pathologies in animals pose significant barriers to meeting the growing global demand for environmentally friendly and high-quality livestock products, as well as ensuring food security. In addition, the decline in animals' natural resistance, productivity, and fertility, along with the retardation of growth and development in young animals, causes considerable economic losses to livestock enterprises.

To address these problems effectively, there is an increasing need to modernize and rapidly develop the production of import-substituting, locally manufactured, and environmentally safe veterinary medicinal products, particularly biopreparations.

In our country, several measures are being implemented to accelerate livestock development through innovative technologies and to increase the population of highly productive animals. However, the currently used veterinary preparations for treatment and prevention of animal diseases often fail to deliver the expected outcomes, highlighting the urgent need to develop affordable and effective pharmacological agents to ensure sustainable sectoral growth.

Biostimulants act as potent stimulators on the animal organism, enhancing overall resistance, improving metabolic processes, and positively influencing productivity. Therefore, studying the effects of biostimulants on the animal body remains a highly relevant scientific and practical task.

Materials and Methods:

This study was based on an analytical review of scientific literature and clinical observations conducted at Samarkand State Medical University between 2022 and 2024. The research included evaluation of immune parameters in healthy individuals and patients with immune-related disorders. Laboratory analyses focused on the quantification of white blood cells, lymphocyte subpopulations (CD4+, CD8+, B cells, NK cells), and cytokine levels (IL-2, IL-6, TNF- α , and interferon- γ). Blood samples were collected and processed using flow cytometry and enzyme-linked immunosorbent assay (ELISA). Comparative assessment of immune responses under normal and pathological conditions was carried out to determine how immune activity contributes to maintaining homeostasis. Additionally, data on inflammatory markers such as C-reactive protein (CRP) and erythrocyte sedimentation rate (ESR) were analyzed to evaluate the systemic response to immune disturbances.

The experiments were conducted at the "Shabboda Sururi" farming enterprise located in the Furqat district of Fergana region. Twenty 5–6-month-old calves with relatively retarded development were selected for the study. The calves were divided into four groups, each consisting of five animals. The first, second, and third groups were designated as experimental groups, while the fourth group served as the control.

Before the start of the experiment, the physiological parameters of the calves — including respiratory rate, heart rate, and body weight — were measured and recorded. Live weight measurements were taken every 15 days using an electronic scale to monitor changes over time.

Result and Discussion

The experimental investigation involved twenty calves aged 5–6 months, which were randomly distributed into four equal groups of five animals.

Group I (Dostim): administered *Dostim* intramuscularly at a dose of **5 ml once every 14 days**;

Group II (Bodifors): administered *Bodifors* intramuscularly at **5 ml every 14 days**;

Group III (Miosta-H): administered *Miosta-H* intramuscularly at **5 ml every 30 days**;

Group IV (Control): no pharmacological treatment applied.

All experimental groups were maintained on a uniform feeding regimen consistent with farm standards. To determine the pharmacological effects of the administered preparations, continuous

monitoring of **body temperature, respiratory frequency, heart rate, growth rate, and developmental dynamics** was carried out.

Comparative analyses were performed using data collected prior to administration and at **15, 30, 45, and 60 days** following the onset of treatment. The results served as the basis for assessing the physiological and growth-promoting efficacy of the tested biostimulants.

1-table

Clinical Parameters of Experimental Calves (n=20)

Groups	Time of the experiment	Body temperature ^{°C}	Time of the heart beat, 1 minute	Respiratory frequency (breaths·min ⁻¹)
1-experiment Dostim preparation	1-day	39,3±0,03	94,5±3,4	35,8±2,5
	15- day	39,1±0,03	89,0±3,4	36,0±2,3
	30- day	38,9±0,04	91,4±3,8	33,3±2,2
	45- day	38,7±0,02	90,1±3,5	32,5±2,8
	60- day	38,5±0,03	87,5±3,3	31,7±2,4
2- experiment Bodifors preparation	1- day	39,5±0,04	91,5±4,1	38,4±2,1
	15- day	39,3±0,02	89,8±4,8	37,2±2,6
	30- day	39,3±0,03	88,7±4,6	35,4±2,0
	45- day	39,0±0,03	88,4±3,5	35,4±2,4
	60- day	38,8±0,02	85,3±3,5	34,8±2,4
3- experiment Miosta-H preparation	1- day	39,3±0,02	94,0±3,6	37,7±2,5
	15- day	39,4±0,04	89,0±4,6	34,6±3,6
	30- day	39,2±0,03	88,3±3,7	33,5±2,7
	45- day	38,9±0,03	86,1±4,5	33,0±2,7
	60- day	39,0±0,04	84,0±3,8	31,9±2,4
4- experimental control	1- day	38,5±0,04	89,6±5,1	35,9±2,1
	15- day	38,9±0,03	88,4±4,7	34,6±2,4
	30- day	39,0±0,04	86,4±4,6	34,8±2,3
	45- day	39,0±0,03	85,4±4,5	33,0±2,6
	60- day	39,1±0,02	85,3±4,6	32,9±2,4

Clinical Parameters of Experimental Calves

At the beginning of the study, calves in the **control group** had an average body temperature of **38.5 ± 0.04 °C**, which increased to **39.1 ± 0.02 °C** by the end of the experiment. Their heart rate decreased from **89.6 ± 5.1** to **85.3 ± 4.6 beats/min**, and their respiration rate from **35.9 ± 2.1** to **32.9 ± 2.4 breaths/min**.

In calves treated with **Dostim**, body temperature dropped from **39.3 ± 0.03 °C** to **38.5 ± 0.03 °C**, heart rate from **94.5 ± 3.4** to **87.5 ± 3.3 beats/min**, and respiration rate from **35.8 ± 2.5** to **31.7 ± 2.4 breaths/min**.

In the **Bodifors** group, average temperature decreased from **39.5 ± 0.04 °C** to **38.8 ± 0.02 °C**, heart rate from **91.5 ± 4.1** to **85.3 ± 3.5 beats/min**, and respiration rate from **38.4 ± 2.1** to **34.8 ± 2.4 breaths/min**.

Calves given **Miosta-H** showed a mild decrease in body temperature from **39.3 ± 0.02 °C** to **39.0 ±**

0.04 °C, heart rate from **94.0 ± 4.6** to **84.0 ± 3.8 beats/min**, and respiration rate from **37.7 ± 2.5** to **31.9 ± 2.4 breaths/min**.

2-table

Average Body Weight Dynamics of Calves (kg)

Experimental groups	Number of heads	Live weight, kg				
		Before the experiment	15-day	30- day	45- day	60- day
I-Experiment	3	126,9±0,64	134,7±0,67	144,5±0,71	153,4±0,58	162,01±0,69
II-Experiment	3	125,6±0,45	134,5±0,72	143,96±0,71	152,4±0,69	162,32±0,85
III-Experiment	3	127,8±0,51	136,2±0,63	147,72±0,65	157,2±0,65	167,64±0,72
IV-Experiment	3	124,8±0,68	130,5±0,45	136,3±0,36	143,5±0,55	151,6±0,66

Table 2 shows that administration of Dostim increased the average live weight of calves relative to the control group by 3.21% (day 15), 6.016% (day 30), 6.89% (day 45), and 6.87% (day 60). In the Bodifors group, the corresponding increases were 3.065%, 5.61%, 6.2%, and 7.07%, respectively.

The Miosta-H group exhibited the most pronounced growth: 4.36% (day 15), 8.37% (day 30), 9.54% (day 45), and 10.58% (day 60) above the control. These findings indicate that Miosta-H has a superior pharmacostimulatory effect on calf growth and development compared to both Dostim and Bodifors.

Conclusions

Monthly intramuscular administration of 5 ml of Miosta-H positively affects calf growth and development.

Calves treated with Dostim, Bodifors, and Miosta-H showed higher growth than the control group by 6.87%, 7.07%, and 10.58% after 60 days, respectively. The most pronounced effect was observed in the Miosta-H group.

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