International Journal of Pediatrics and Genetics
Vol. 4 No. 03 (2026)
ISSN: 2995-5483

The Importance Of Vitamins And Minerals In The Functioning Of The Reproductive Organs Of Cows

N.K. Tajieva, B.A. Jumanov, H.S. O‘rinov (PhD)
Zarmed University, Scientific Researchers
Email: haqberdiorinov@gmail.com
O.U. Kuldoshev
VITI (proffesor)

Abstrak. This scientific study investigates the physiological significance of vitamin and mineral supplementation in the reproductive function of high-yielding Holstein cows and its impact on their productivity indicators. The research focuses on the role of essential vitamins and microelements in maintaining normal reproductive activity and preventing reproductive disorders in dairy cattle. Particular attention is given to the relationship between nutritional deficiencies and reproductive performance, including the extension of the service period and the occurrence of obstetric-gynecological diseases. The study evaluates how the use of vitamin-mineral feed additives contributes to improving reproductive efficiency and overall physiological status in high-producing dairy cows.

Keywords: reproductive activity, vitamin-mineral supplementation, service period, obstetric-gynecological disorders, LPP-1, copper, cobalt, manganese, zinc, iodine, retinol, tocopherol, phylloquinone, calciferol, ascorbic acid, thiamine, microelements.

1. Introduction

Relevance of the Study

Under the conditions of modern cattle farming, imported high-producing dairy cows frequently experience metabolic disorders related to vitamin and mineral deficiencies. These imbalances can negatively affect reproductive performance, leading to prolonged service periods, decreased fertility, and an increased incidence of obstetric-gynecological diseases. Such disorders not only compromise animal health and productivity but also result in significant economic losses for livestock farms. Therefore, studying the causes of these reproductive disturbances, particularly the role of nutritional and alimentary factors, as well as understanding their mechanisms of development and methods for early diagnosis, is of great scientific and practical importance. The development and implementation of effective methods for prevention and treatment remain among the urgent challenges of modern veterinary science and practice.

2. Research Objective

The aim of this study was to investigate the impact of disturbances in vitamin-mineral metabolism on reproductive performance in high-producing dairy cows, including the prolongation of the service period and the spread of obstetric-gynecological diseases. The study also aimed to determine the role of nutritional factors in the development of these disorders, analyze their underlying mechanisms, assess their economic impact, and develop effective preventive and therapeutic approaches that can be implemented in veterinary practice.

3. Materials and Methods

The research was conducted at the “Alisher Saxovati” cattle farm located in the Romitan district of the Bukhara region. Ten imported Holstein-Friesian cows aged 5–6 years and in their

Vol. 4 No. 03 (2026)
ISSN: 2995-5483

third lactation were selected as the study subjects. These animals were examined once a month through clinical and gynecological examinations.

Clinical assessments included measurements of body temperature, pulse rate, respiratory rate, rumen motility, body condition score, skin and hair coat condition, appetite, and the status of mucous membranes. In addition, particular attention was paid to the manifestation of sexual reflexes and the condition of reproductive organs. Pregnancy status and infertility were determined through rectal palpation. The housing and feeding conditions of the animals were also evaluated, and dietary feed additives were introduced to assess their effects on the animals' clinical and physiological indicators.

Ten recently calved cows were selected and divided into three groups. The first and second experimental groups consisted of three animals each, while the control group consisted of four animals. The cows in the first experimental group received the feed additive LPP-1, while the cows in the second experimental group received the feed additive VILOFOSS. The control group was maintained on the standard farm ration without additional supplementation.

4. Result and Discussion

During the study period, the physiological parameters of the cows, including body temperature, heart rate, and respiratory rate, remained within normal physiological limits. The average heart rate was 82.2 ± 2.1 beats per minute, and the average respiratory rate was 14 ± 0.7 breaths per minute. The number of rumen contractions observed within two minutes averaged 2.2 ± 0.4, whereas the normal range is typically 3–5 contractions per two minutes.

Observations indicated cases of rumen hypotonia, prolonged service periods, and delayed estrus in some animals. These conditions can be explained by long-term confinement of cows in a single location, prolonged feeding with a unilateral silage-concentrate type diet, and deficiencies of essential trace elements and vitamins. In particular, insufficient levels of copper, cobalt, manganese, zinc, iodine, retinol, tocopherol, phylloquinone, calciferol, ascorbic acid, and thiamine were identified as important nutritional factors contributing to metabolic imbalance and reproductive dysfunction.

Figure 1. Clinical examination process of cows involved in the experiment

If the feeding and management conditions of high-producing animals do not correspond to their physiological requirements, profound disturbances in all types of metabolic processes may occur in the organism. Such metabolic disorders reduce the animals' resistance and productivity and may lead to the clinical manifestation of various gynecological diseases.

Numerous studies have shown that metabolic disorders often negatively affect the reproductive organs of female animals, particularly due to disturbances in mineral metabolism. Along with the basic nutritional components such as proteins, carbohydrates, and fats, an adequate supply of mineral substances is essential to ensure the optimal course of metabolic processes in organs and tissue cells. Therefore, the intake of mineral elements in accordance with the physiological requirements of the organism plays a crucial role in maintaining normal physiological functions and reproductive health.

Figure 2. Supplementation of the farm ration with feed additives for cows in the experimental groups.

Cows in the first experimental group were supplemented with 100 g of the feed additive "LPP-1" mixed into the daily ration for 10 consecutive days.

Cows in the second experimental group received 100 g of the feed additive "VILOFOSS" added to their daily ration for 10 days.

The third group served as the control group and was fed only with the standard farm ration without additional feed supplements.

Effect of Feed Additives on the Reproductive Activity of Experimental and Control Cows

№	Indicators	Number of cows	Service period	Estrus occurrence	Fertilization

1	Farm ration supplemented with **LPP-1**	3 cows (100 g per cow)	70–75 days	3 out of 3 cows showed estrus	2 out of 3 cows were fertilized
2	Farm ration supplemented with **VILOFOSS**	3 cows (100 g per cow)	60–65 days	3 out of 3 cows showed estrus	3 out of 3 cows were fertilized
3	**Control group** (standard farm ration)	4 cows	90–100 days	2 out of 4 cows showed estrus	1 out of 2 cows was fertilized

5. Conclusion

The results of our scientific research indicate that vitamins and minerals play a significant role in the reproductive function of high-producing Holstein cows. Adequate vitamin–mineral supplementation contributes to the shortening of the service period and the timely physiological manifestation of estrus. In addition, cows that exhibited estrus demonstrated high fertilization rates, indicating improved reproductive efficiency. Furthermore, the use of vitamin–mineral supplements positively influenced milk productivity and the overall physiological condition of the animals. This allows for a more effective utilization of the genetic potential of high-yielding dairy cows. Consequently, the application of balanced vitamin–mineral supplementation in dairy cattle feeding systems can significantly improve reproductive performance and provide substantial economic benefits for livestock farms.

REFERENCES

[1] V. A. Kvadyayeva, Nakoplenie i raspredelenie mikroelementov tsinka, medi, margantsa v organizme telok pri senazhnom tipe kormleniya (Accumulation and distribution of trace elements zinc, copper, and manganese in heifers under a silage feeding system), Ph.D. dissertation abstract, Novgorod, Russia, 2006.

[2] I. P. Kondrakhin and V. I. Levchenko, Diagnostika i terapiya vnutrennikh bolezney zhivotnykh (Diagnosis and therapy of internal diseases of animals). Moscow, Russia: Aquarium-Print Publ., 2005, pp. 196–269.

[3] T. V. Metreveli, Biokhimiya zhivotnykh (Animal biochemistry). St. Petersburg, Russia: Lan Publ., 2005.

[4] V. T. Skopichev, L. V. Zhichkina, O. M. Popova, A. A. Karpenko, and N. N. Maksimyuk, Mikroelementozy zhivotnykh (Microelementoses of animals). Educational manual, 2015.

[5] H. S. O‘rinov, “Golshtin zotli sigirlar reproduktiv faoliyatini rag‘batlantirish usullarini takomillashtirish,” in Agrosanoat majmuining dolzarb muammolarini hal etishda veterinariya fani va biotexnologiyalarning ahamiyati, Proc. Republican Scientific-Practical Conf., Sept. 21.
[6] H. S. O‘rinov, “Mahsuldor sigirlar reproduktiv faoliyatiga vitaminlarning ta’siri,” in Infeksion kasalliklar diagnostikasi va profilaktikasining dolzarb muammolari, Proc. International Scientific-Practical Conf. dedicated to the 100th anniversary of Prof. Sh. T. Rasulov, Samarkand, Oct. 6.
[7] H. S. O‘rinov, “Golshtin zotli sigirlar reproduktiv faoliyatini rag‘batlantirishda ‘TrauDray’ ozuqaviy qo‘shimcha samaradorligini o‘rganish,” in Veterinariya fiziologiyasi, biokimyosi va patofiziologiyasining dolzarb muammolari va rivojlantirish istiqbollari, Proc. Republican Scientific-Practical Conf., Dec. 20.
[8] H. S. O‘rinov, N. S. Salohiddinova, and O. U. Kuldashev, “Golshtin zotli sigirlar reproduktiv faoliyatini rag‘batlantirishda qo‘llanladigan ozuqaviy qo‘shimcha ‘VILOFOSS’ ni hazm organlarida bo‘ladigan fermentatsiya jarayoniga ta’siri,” in Veterinariya sohasidagi dolzarb muammolar yechimi yosh tadqiqotchilar talqinida, Respublika ilmiy-amaliy konferensiyasi materiallari, Samarqand, O‘zbekiston, 2024, pp. 54–58.
[9] H. S. O‘rinov and O. U. Kuldashev, “Golshtin zotli sigirlar reproduktiv faoliyatini rag‘batlantirishda ‘VILOFOSS’ ozuqaviy qo‘shimcha samaradorligini o‘rganish,” Veterinariya Meditsinasi, maxsus son 6, Samarqand, O‘zbekiston, 2024, pp. 15–19.
[10] O. U. Kuldashev, Sh. Xamraev, S. Suvonov, H. O‘rinov, and R. Bobomurodov, “Biologik preparatlarning sigirlar jinsiy faoliyatini rag‘batlantirishda ahamiyati,” Veterinariya Meditsinasi, maxsus son 3, Samarqand, O‘zbekiston, 2024, pp. 200–203.
[11] H. S. O‘rinov and O. U. Kuldashev, “Influence of nutritional premixes on reproductive activity of Holstein cows,” in International Conference on Medical Science, Medicine and Public Health, E-Conf Series, Jakarta, Indonesia, Mar. 30, 2025, pp. 132–135.
[12] H. S. O‘rinov and O. U. Kuldashev, “Effect of nutritional supplements on reproductive performance of Holstein cows,” in International Conference on Scientific Research in Natural and Social Sciences, E-Conf Series, New York, USA, Apr. 2, 2025, pp. 107–110.
[13] H. S. O‘rinov, “Mahsuldor sigirlar reproduktiv faoliyatini rag‘batlantirishda ‘TrauDray’ ozuqaviy qo‘shimchasining samaradorligi,” Veterinariya Meditsinasi, maxsus son 7, Samarqand, O‘zbekiston, 2023, pp. 115–118.
[14] H. S. O‘rinov, “Mahsuldor sigirlar reproduktiv faoliyatiga vitaminlarning ta’siri,” Veterinariya Meditsinasi, maxsus son 3, Samarqand, O‘zbekiston, 2023, pp. 154–157.
[15] B. A. Jumanov, N. K. Tajieva, and H. S. O‘rinov, “Impact of Pesticides on Human Health and the Environment: Current State of the Problem,” American Journal of Biodiversity, vol. 3, no. 3, pp. 13–18, Mar. 2026.
[16] N. K. Tajieva, B. A. Jumanov, and H. S. O‘rinov, “Application of Hormonal Preparations to Stimulate the Sexual Cycle and Increase Fertilization Rate in Cows,” American Journal of Biomedicine and Pharmacy, vol. 3, no. 3, pp. 59–63, Mar. 2026.