AMERICAN JOURNAL OF BIODIVERSITY
https://biojournals.us/index.php/AJB
ISSN: 2997-3600

The Importance of Nutritional Nutrition in Productive Cows

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Citation: Muhammadiso, A. The Importance of Nutritional Nutrition in Productive Cows. American Journal Of Biodiversity 2026, 3(5), 19-22.

Received: 05th Apr 2026
Revised: 20th Apr 2026
Accepted: 10th May 2026
Published: 26th May 2026

Abstract: This article investigates the significance of adequate nutrition in maintaining reproductive health and improving fertility in productive cows. Special attention is given to the role of protein, energy balance, vitamins, and macro- and microelements in preventing alimentary infertility. Nutritional deficiencies, particularly of calcium, phosphorus, copper, zinc, manganese, cobalt, and vitamin E, are identified as major contributing factors to reproductive disorders such as ovarian dysfunction, persistent corpus luteum, uterine hypotonia, and delayed postpartum recovery. The study highlights that improper feeding practices and unbalanced rations significantly reduce reproductive efficiency and increase economic losses in livestock farming systems. The findings emphasize that optimizing feeding strategies and ensuring balanced mineral and vitamin intake are essential for improving fertility rates and enhancing overall productivity in dairy cattle.

Keywords: Nutrition, Minerals, Vitamin Deficiencies, Infertility

Introduction

Obstetric and gynecological diseases of livestock are one of the major obstacles to the implementation of reforms aimed at further improving the provision of the population with high-quality and affordable livestock products by the Government of the Republic of Uzbekistan. Improving and implementing methods for early detection, effective treatment and prevention of obstetric and gynecological diseases, including infertility, which occupy a significant place among non-communicable diseases of animals, is one of the important factors in the development of the industry.[1][2]

The development of livestock farming in many respects requires providing the industry with mature, knowledgeable and highly qualified veterinary specialists and new effective modern veterinary medicines. In particular, in terms of increasing the number of hooves in cattle, the prevention of infertility in productive cows in local livestock farms requires great attention in veterinary practice. [3][4]

Among the productive cows imported to farms, there are many cases of placental retention, uterine hypotonia and subinvolution due to metabolic disorders such as alimentary infertility, hypocouprosis, hypocobaltosis, alimentary anemia, and goiter, which are caused by metabolic disorders. As a result, farms suffer significant economic losses due to increased feed consumption, decreased productivity and nutritional value of livestock products, and infertility of mother animals.[5][6][7]

Methods

This study is based on a qualitative review and synthesis of scientific literature, experimental research findings, and practical veterinary observations related to reproductive disorders in dairy cattle caused by nutritional deficiencies. Data were collected from published scientific articles, monographs, conference proceedings, and veterinary diagnostic reports focusing on metabolic and reproductive health in productive cows.[8] Particular attention was given to studies investigating the relationship between dietary mineral-vitamin imbalance and infertility.[9] The methodological approach included comparative analysis of different feeding systems used in dairy farms, with emphasis on the composition of rations and their adequacy in meeting physiological requirements of cows during pre- and post-partum periods. The role of macro- and microelements, as well as vitamin supplementation strategies, was evaluated in relation to reproductive performance indicators such as conception rate, postpartum recovery, and incidence of ovarian disorders.[10]

Additionally, case studies from livestock farms were analyzed to identify common nutritional deficiencies associated with reproductive failures. The collected information was systematically analyzed to determine key factors influencing alimentary infertility and to develop recommendations for improving feeding practices aimed at enhancing fertility in productive cows.[11]

Result and Discussion

At present, in the livestock farms of our republic, it is necessary to ensure early detection and prevention of alimentary infertility in highly productive cows through systematic veterinary screening (dispensarization), as well as to identify and improve preventive methods against infertility caused by disorders of protein–carbohydrate metabolism and disturbances in vitamin and microelement metabolism in animals.[12]

Feeding productive cows with dry plant-based feeds (such as corn silage, barley straw, legume hay, wheat straw, and mixed fodder-hay rations) alone is not sufficient to balance their diet with essential vitamins and minerals. In particular, the level of mineral supply in dairy cows' rations should include calcium at 90.1–93.8%, phosphorus at 68.7–86.2%, copper at 66.8–69.5%, zinc at 49.7–51.2%, manganese at 60.7–65.3%, and cobalt at 52.3–55.7% of their physiological requirements. If cows are not able to obtain the required minerals and vitamins from their diet, it creates favorable conditions for the development of infertility, which has been widely reported in the literature and is frequently observed in livestock farms.[13]

One of the main causes of alimentary infertility in productive cows in livestock farms of our republic is the general functional disorders of the ovaries. Among such diseases, persistent corpus luteum is widely spread, and several treatment methods have been developed in modern veterinary practice.

In productive cows, during the first one to one and a half months after calving, mineral and vitamin deficiencies in the animal's body prevent the normal involution of the corpus luteum. Among all cases of infertility, cows with persistent (permanent) corpus luteum account for at least 8–10%. This condition leads to anestrus, meaning the cessation of the sexual cycle. The formation of persistent corpus luteum is often associated with inadequate feeding, physical stress of animals, uterine diseases, and missed estrus detection.[14]

Based on literature analysis, the main factors in preventing obstetric and gynecological diseases in cows include the establishment of a strong feed base, complete and balanced nutrition, proper management and care, organized grazing, and adequate provision of vitamins and minerals, especially during the winter housing period.

Vitamin E deficiency results in weak and non-viable calves. In cows, reproductive performance is particularly affected, leading to retained placenta and an increased (often unjustified) insemination index. The requirement of vitamin E for cattle is 20–30 mg per 1 kg of dry matter in feed. Lactating cows should receive 400–1000 mg of vitamin E per day depending on milk productivity.

Manganese has a positive effect on reproductive functions and growth processes in animals. It improves oxidative processes, enhances oxygen supply, accelerates glycogen synthesis and fat utilization. Manganese accumulates in bones, kidneys, liver, pancreas, and pituitary gland. It activates enzymes involved in protein, fat, and carbohydrate metabolism. Its deficiency often leads to infertility

in cows and weakness in newborn calves. Manganese participates in protein formation, fat metabolism, and cholesterol synthesis. It also enhances the activity of rumen microorganisms that break down cellulose. Manganese deficiency makes it difficult to detect estrus, disrupts fertilization timing, and impairs embryo implantation in the uterus.

According to A.P. Studensov's classification, alimentary infertility refers to reproductive failure caused by feeding deficiencies. It has been proven that more than 50% of infertility cases in cows and heifers are directly related to improper feeding and inadequate housing conditions.[15]

Conclusion

In conclusion, based on scientific literature and practical research, we determined that gynecological treatment alone is not sufficient for preventing infertility in cows. For effective prevention and treatment, it is necessary to ensure a fully balanced ration containing proteins, carbohydrates, macro- and microelements, and vitamins starting from the dry period before calving through the first 100 days of lactation.

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