International Congress on Economics, Management and Business Studies
Hosted Online from New York, USA
Date: 23rd February, 2026
Website: https://econferencia.com

DEPENDENCE OF MILK PRODUCTIVITY OF COWS ON LIVE WEIGHT UNDER THE INFLUENCE OF THE VILOFOSS FEED SUPPLEMENT

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Annotation
This article presents the results of a study on the relationship between milk productivity and live weight of Simmental cows under the influence of the Vilofoss mineral feed supplement in the conditions of the Tashkent region. The experiment evaluated the effect of two different doses of Vilofoss (170 g and 220 g per head per day) included in the basic ration on milk yield, milk fat content, milk fat yield, and their dependence on live weight during a 305-day lactation period. Zootechnical, biological, and statistical research methods were applied. Milk fat content was determined using the Gerber method, and protein content was analyzed with a Laktan M-4 device. The results showed that supplementation with 170 g of Vilofoss provided the highest milk yield and milk fat output compared to both the 220 g supplementation and the control group. Cows receiving 170 g of Vilofoss produced on average 19–20% more milk and 22–23%

more milk fat than the control group. A tendency toward a slight decrease in milk yield with increasing live weight was observed across all groups. The findings indicate that the optimal dose of Vilofoss for Simmental cows under local climatic and feeding conditions is 170 g per head per day. The inclusion of balanced mineral supplements in the ration significantly improves milk productivity and contributes to the formation of highly productive dairy herds.

Keywords: Simmental cows, Vilofoss, mineral feed supplement, milk productivity, live weight, milk fat content, lactation, dairy cattle breeding, feed efficiency, Uzbekistan conditions.

Main research background:

According to the available sources, a number of studies have been devoted to investigating the effects of various feed additives from the Vilofoss product line on the productive traits and production orientation of young cattle of different age groups (G.M. Volodkina, E.V. Andreeva, O.Yu. Yunusova, Z.Ya. Nikitina, I.R. Fakhretdinov, N.M. Gubaydullin, A.N. Kozlovskiy, N.A. Andreeva, E.Yu. Nemtseva, V.I. Trukhachev, K.E. Khalgaeva, A.K. Natyrov [4]). Research conducted by national scientists such as Sh.A. Akmalkhonov, M.E. Ashirov, U.N. Nosirov, I. Maqsudov, B.U. Khidirov, U.Sh. Ballasov, B.M. Ashirov, Kh. G‘iyosov and others has determined the effectiveness of improving the Simmental breed and utilizing its genetic potential in crossbreeding programs. The results of these studies demonstrate that Simmental cattle are considered an improving breed regardless of the breeding region [3].

These findings indicate that the use of Simmental cattle in purebred breeding and crossbreeding programs is of significant practical importance for establishing

highly productive breeding farms, improving the productive characteristics of local breeds, and developing new types and herds.

INTRODUCTION

At present, the global demand for livestock products-such as milk, dairy products, meat, and meat products-which have become essential components of the daily diet of the population, is steadily increasing. In the livestock sector, strengthening the feed base is of paramount importance. In dairy farming, creating a solid feed base, organizing balanced feeding systems, and providing dairy cows with sufficient and nutritionally adequate feed are crucial for increasing milk productivity and obtaining healthy offspring.

Worldwide, particular attention is being paid to improving the livestock sector, primarily by reinforcing the feed base for the development of dairy cattle breeding. Green fodder, compound feed, and succulent feeds constitute the main components of the livestock feed base. Feeding dairy cattle with such nutritionally rich feeds contributes to increased milk productivity and enhances farm profitability. Therefore, extensive research efforts are being undertaken globally to improve the productivity of dairy cattle through optimized feeding strategies.

The inclusion of feed additives in cattle rations enriches the blood composition with essential macro- and microelements. As a result, milk quality improves, daily milk yield increases, and the likelihood of obtaining healthy calves rises. These objectives represent some of the primary goals of contemporary research in dairy cattle nutrition and management.

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MATERIALS AND METHODS

Purpose of the study: The purpose of this study was to determine the relationship between milk productivity and live weight of Simmental cows under the conditions of the Tashkent region when different doses of the balanced feed complex Vilofoss were included in their ration.

Objectives of the study: The objectives of the research were to evaluate the effect of different doses of the balanced feed complex on feed and nutrient intake in the ration; to determine their influence on exterior characteristics, milk productivity, and morphological traits of the udder; to analyze the chemical composition as well as the physical, chemical, and technological properties of milk; and to study the dependence of milk productivity on live weight.

Research methods: During the study, zootechnical (milk yield, milk quality indicators, exterior traits, udder characteristics, fertility, feed-to-milk conversion efficiency), biological (clinical and hematological parameters, heat tolerance index), and statistical (mean value and standard error, coefficient of variation, significance of intergroup differences) methods were applied.

Milk fat content in the experimental groups was determined monthly for each cow using the Gerber method. Milk protein content was analyzed monthly using a Laktan M-4 analyzer.

The live weight of Simmental cows was individually measured using scales up to the third month of the first lactation based on MOL-2 record cards. Milk productivity was determined throughout the 305-day lactation period by conducting control milkings every ten days.

The primary data obtained in the experiments were biometrically processed according to the method of E.K. Merkureva (1970).

Scientific novelty of the study: For the first time, under the climatic and feeding conditions of Uzbekistan, the optimal dose of the Vilofoss protein-mineral supplement for Simmental cows was determined. In addition, the relationship between lactation characteristics, exterior traits, udder morphology, live weight indicators, and the level of milk productivity was established.

RESULTS AND DISCUSSION

Dependence of milk productivity on live weight of cows

In the formation of highly productive dairy herds, determining the optimal live weight indicators that ensure maximum milk productivity is one of the key factors in establishing a high-performing selection core within a farm. Identifying the relationship between live weight and milk yield makes it possible to improve breeding strategies and enhance overall herd productivity.

Based on this, we studied the dependence of milk productivity on the live weight of cows in the experimental groups. The results obtained are presented in Table 1.

Table 1 Dependence of milk productivity of cows on live weight in the experimental groups

Live weight	Number of cows	Milk yield, kg	Milk fat, %	Milk fat yield, kg
I Experimental Group (Basal ration + Vilofoss 170 g)				
460 kg	**4**	5650 ±27,2	4,15 ±0,02	234,5 ±1,3
461-480 kg	**2**	5520 ±21,9	4,12 ±0,03	227,0 ±1,4
481-520 kg	**2**	5385 ±25,8	4,08 ±0,02	219,7 ±1,5
501 kg and above	**2**	5300 ±22,3	4,00 ±0,02	212,0 ±1,6
Average	**10**	5473,1 ±24,6	4,09 ±0,02	223,3 ±1,45

II Experimental Group (Basal ration + Vilofoss 220 g)				
460 kg	**3**	5100 ±26,5	4,02 ±0,02	210,1 ±1,4
461-480 kg	**3**	5025 ±25,9	4,05 ±0,03	205,0 ±1,5
481-520 kg	**3**	4950 ±25,7	4,09 ±0,02	200,5 ±1,4
501 kg and above	**1**	4860 ±16,1	4,11 ±0,02	193,5 ±1,6
Average	**10**	4974,5±23,5	4,06 ±0,02	202,3 ±1,48
Control Group (Basal ration)				
460 kg	**4**	4598 ±26,5	4,10 ±0,02	188,2 ±1,7
461-480 kg	**1**	4469 ±26,0	4,08 ±0,03	182,0 ±1,6
481-520 kg	**1**	4427 ±22,4	4,06 ±0,02	179,3 ±1,7
501 kg and above	**4**	4358 ±17,0	4,00 ±0,03	174,0 ±1,8
Average	**10**	4592 ±22,5	4,06 ±0,02	180,9 ±1,7

Eslatma: *p<0,05, **p<0,01

As shown in Table 1, under experimental conditions two different doses of the Vilofoss mineral supplement (170 g and 220 g) were administered to Simmental cows, and their milk productivity and milk fat content over a 305-day lactation period were compared with those of the control group. The analysis by experimental groups is presented below.

Cows in this group demonstrated the highest results across all live weight categories. Cows with a live weight of 460 kg produced 5650 ± 27.2 kg of milk during the 305-day lactation period, which was one of the highest indicators recorded. Milk fat content reached 4.15 ± 0.02%, and milk fat yield amounted to 234.5 ± 1.3 kg. As live weight increased, a slight decrease in milk yield was observed. Cows weighing over 501 kg produced 5300 ± 22.3 kg of milk. This trend can be physiologically explained by the fact that in heavier cows, a greater proportion of energy is expended on maintenance and vital metabolic processes. On average, cows in this group produced 5473.1 ± 24.6 kg of milk during 305 days, with a milk fat content of 4.09 ± 0.02% and a milk fat yield of 223.3 ± 1.45

kg. Compared with the control group, this represents 19.1% higher milk yield and 23.3% higher milk fat yield.

Cows receiving 220 g of Vilofoss also showed higher results compared to the control group, although slightly lower than those receiving 170 g. Cows weighing 460 kg produced 5100 ± 26.5 kg of milk, with a milk fat content of 4.02% and a milk fat yield of 210.1 kg.

With increasing live weight, a slight decline in milk yield was observed. The heaviest cows (over 501 kg) produced 4860 ± 16.1 kg of milk. On average, this group produced 4974.5 ± 23.5 kg of milk, with a milk fat content of 4.06 ± 0.02% and a milk fat yield of 202.3 ± 1.48 kg. Compared to the control group, this corresponds to 8.3% higher milk yield and 11.8% higher milk fat yield, but 9.1% lower milk yield than the 170 g Vilofoss group.

Cows in the control group were fed only the basal ration.

Cows weighing 460 kg produced 4598 ± 26.5 kg of milk, with a milk fat content of 4.10% and a milk fat yield of 188.2 ± 1.7 kg.

Cows weighing over 501 kg produced 4358 ± 17.0 kg of milk, with a milk fat content of 4.00% and a milk fat yield of 174.0 ± 1.8 kg.

On average, the control group produced 4592 ± 22.5 kg of milk, with 4.06 ± 0.02% milk fat and 180.9 ± 1.7 kg milk fat yield. These results indicate that without mineral supplementation, milk production levels were comparatively lower.

General discussion and conclusions: The 170 g dose of Vilofoss provided the most optimal results for Simmental cows, ensuring the highest milk yield and milk fat output. Although the 220 g dose also had a positive effect, milk yield was lower compared to the 170 g group. This may be explained by reduced efficiency of mineral absorption when supplied in excessive amounts. The control group

showed the lowest milk yield, confirming that mineral deficiencies in the ration negatively affect productivity. Across all groups, a tendency toward a slight decrease in milk yield with increasing live weight was observed, which can be explained by the higher energy requirements for maintenance in heavier animals. The mineral components of Vilofoss, including calcium, phosphorus, sodium, magnesium, and trace elements, likely enhanced mammary gland function and stimulated fat and milk protein synthesis. The inclusion of Vilofoss mineral supplement in the ration of Simmental cows significantly increased milk productivity during the 305-day lactation period. The dose of 170 g per head per day proved to be the most effective, increasing milk yield by approximately 19–20% and milk fat yield by 22–23%. The 220 g dose produced moderate results, suggesting that higher doses are not necessarily optimal. In the control group, insufficient mineral supply resulted in lower production indicators. To maintain high milk productivity in Simmental cows, it is recommended to include 170 g of Vilofoss mineral supplement per head per day in the ration. Rations should be balanced according to live weight and lactation stage. Doses exceeding 220 g are not advisable, as excessive mineral intake may negatively affect nutrient utilization and metabolic processes.

In conclusion, the data obtained indicate that milk productivity in dairy cows is closely related to live weight and balanced feeding. Selection work based on optimal live weight indicators in high-producing herds plays an important role in improving overall herd productivity.

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