

INFLUENCE OF VARIOUS PORTIONS OF SELENIUM-CONTAINING FEED ADDITIVE "TETRA+" ON MILK EFFICIENCY OF LACTATING COWS

A.A. Bochkov

Don state agrarian university, Persianovsky, Rostov Region, Russia
science-almanac@mail.ru

There exists a deficiency or excess of the various elements, which leads to diseases, reduced productivity, fertility, deterioration of product quality and efficiency of feed use. To prevent this, it can be used a variety of compounds, but their bioavailability can vary. In addition, the technological properties of the salts of trace elements significantly affect the quality of premixes and feed. The study found that the introduction of the diet of cows during milking selenium-containing feed additive "Tetra +" in a different dosage allowed to increase their milk production, chemical, biochemical composition and technological properties of milk. From these scientific data, we can conclude that the higher biological value characterized milk cows fed with the feed additive "Tetra +". The most effective dose in this case was additive in an amount of 80 g per 1 head, allowing affect the quality of milk and dairy products by adjusting the feed ration of lactating cows selenium supplement "Tetra +".

Key words: milk, technology, lactating cows diet, selenium, amino acids, milk production.

The main source of trace elements for animal – feed. However, the mineral composition of the latter depends on the soil type, climatic conditions, plant species, vegetation phase, agrochemical activities, harvesting technology, storage and preparation for feeding and other factors. In this connection, there is often a lack of one, and a plethora of other elements, which leads to diseases, reduced productivity and fertility, deterioration of product quality and efficiency of feed use. To prevent this, use a variety of connections, but their bioavailability varies. In addition, the technological properties of the salts of trace elements significantly affect the quality of premixes and feed [2, 3].

Selenium coming from the environment is absorbed in the gastro-intestinal tract with food or additives, and in addition, through the respiratory tract and skin. Assimilation selenate suppress close to him on the physical and chemical properties of inorganic (sulfate, thiosulfate, molybdate, chromate) and organic (oxalate, oxaloacetate) anions. The absorption of selenium from selenite (but not selenate) stimulate cysteine and glutathione and inhibiting methionine and its analogs. Selenium-containing amino acids and their sulfur analogs (cysteine, methionine) share common mechanisms of absorption.

In animal studies, the bioavailability of organic compounds of selenium (selenomethionine, yeast products vysokoselenovaya wheat selpleks, selenopyran, DAFS-25, and others.) Was higher than that of sodium selenite [2]. Research on this topic carried out from 2010 to 2013god LLC "Don" Kalachevsky district of the Volgograd region.

To carry out scientific and economic experience were formed 4 groups of mature lactating cows of black-motley breed on 20 goals each. The animals were selected on the basis of pairs of peers based on age, body weight, level of milk production, calving time. The cows in the control group milking period (90 days) was obtained in the basic diet, analogs I, II and III of the experimental groups to replace the corresponding parts of concentrated feed nutritionally – feed additive "Tetra + 'at 40; 60 and 80 grams per head 1 respectively [1]. In the process of research on three groups of experimental animals revealed that introduction of the diet of cows during milking selenium feed additive "Tetra +" in varying doses resulted in improved milk production. The results are shown in Table 1.

It is established that during 3 months of milking cows I, II and III of the experimental groups was obtained natural milk more in comparison with analogous control group respectively at 80.65 kg, or 3.97% ($P > 0.95$); 105.94 kg, or 5.22% ($P > 0.95$) and 172.88 kg, or 8.51% ($P > 0.99$).

Table 1. Milk yield experimental cows

Index	Group			
	controlling	I experience	II experience	III experience
Milking for 90 days of lactation, kg	2029,50±27,45	2110,15±21,10	2135,44±24,65	2202,38±29,59
Milking for 90 days of lactation, kg (basic fat 3,4%)	2178,87±31,67	2302,55±22,36	2336,42±33,95	2435,57±30,11
Mass fat share, %	3,65±0,05	3,71±0,03	3,72±0,02	3,76±0,05
Mass protein share, %	3,24±0,04	3,28±0,05	3,35±0,03	3,42±0,04
Number, kg: fat	74,08±1,37	78,29±0,78	79,44±1,29	82,81±1,11
protein	65,76±1,21	69,21±0,70	71,54±1,16	75,32±1,01
Milking for 305 days of lactation, kg	6319,7±30,1	6592,5±43,4	6731,8±50,9	6914,3±36,8
Milking for 305 days of lactation, kg (basic fat 3,4%)	6988,8±31,6	7387,5±43,1	7721,8±51,2	8053,1±37,3
Mass fat share, %	3,76±0,04	3,81±0,04	3,90±0,03	3,96±0,05
Mass protein share, %	3,27±0,03	3,30±0,04	3,38±0,02	3,43±0,04
Received, kg: fat	237,6±1,64	251,2±2,13	262,5±1,96	273,8±1,52
protein	206,6±1,42	217,5±1,98	227,5±1,38	237,2±2,06

The test groups of cows milk fat content is increased in comparison with the control at 0.06; 0.07 and 0.11%, protein – respectively, 0.04; 0.11 (P> 0.95) and 0.18% (P> 0.99). The impact on the dynamics of milking cows test different doses of selenium-containing feed additive "Tetra +" is graphically represented in Figure 1.

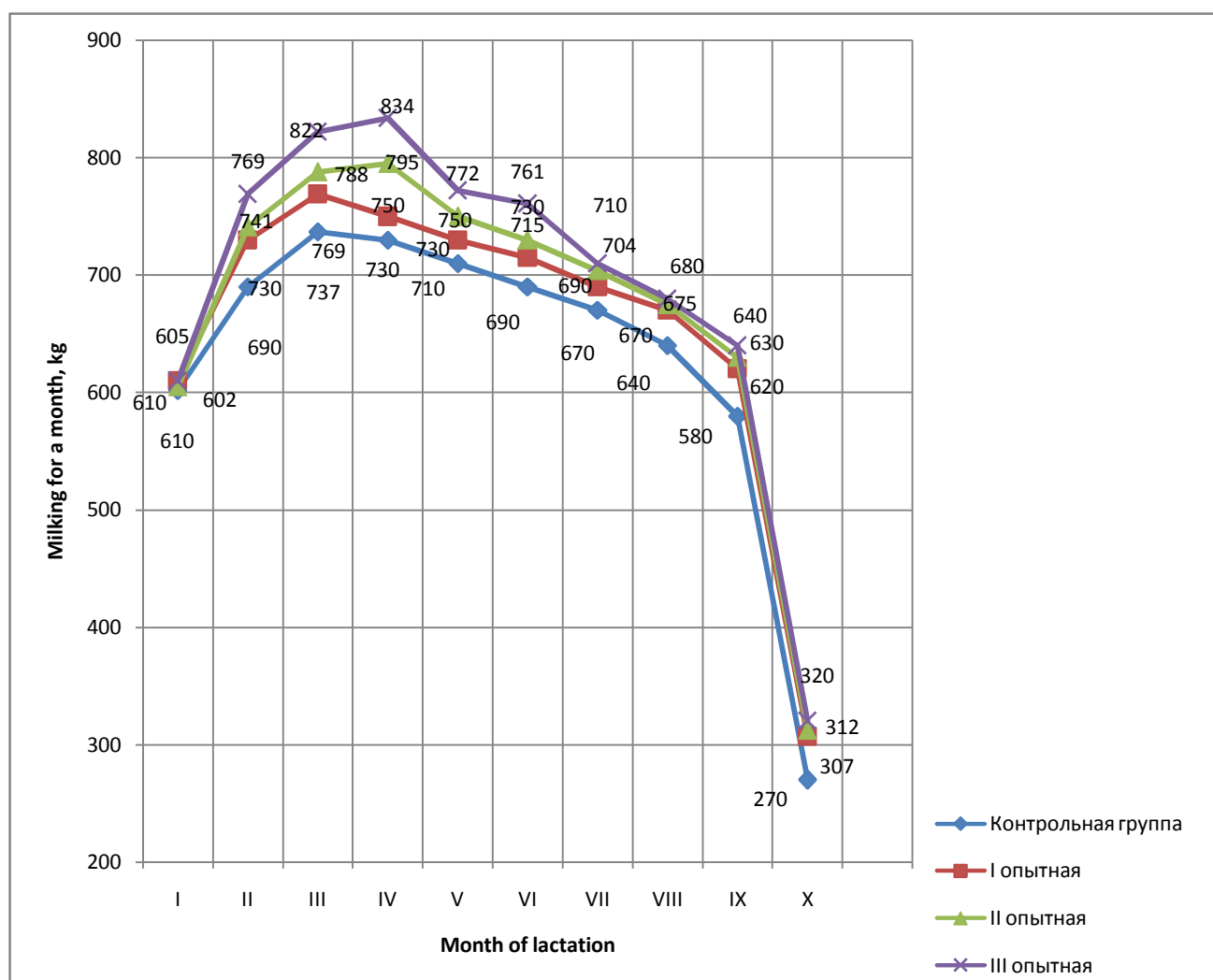


Figure 1 – lactation curve

It is known that the most important indicators of the quality of milk is its chemical, biochemical composition and technological properties. Studies have shown that in milk samples after 90 days of feeding cows feed additive showed significant differences in the number of indicators. Thus, in the test groups of cows milk fat mass fraction was greater than that of the analog control respectively 0.06; 0.02 and 0.11%, protein - 0.02; 0.11 and 0.18%, SOMO - 0.05; 0.12 and 0.22% ($P > 0.95$), QS - 0.11; 0.19 ($P > 0.95$) and 0.33% ($P > 0.99$) Lactose – to 0.00; 0.01 and 0.02% (Table 2). [1]

In cow milk, consumed feed additive "Tetra +" more calcium-containing and phosphorus.

Table 2. Quality indicators of milk obtained from experimental cows

Index	Group			
	controlling	I experience	II experience	III experience
Fat, %	3,65±0,05	3,71±0,07	3,72±0,07	3,76±0,06
Protein, %	3,24±0,08	3,28±0,06	3,35±0,07	3,42±0,07
incl: casein, %	2,63±0,02	2,67±0,02	2,73±0,01	2,81±0,02
Serum protein, %	0,61±0,01	0,61±0,01	0,62±0,01	0,61±0,01
Capacity, kg/m ³	1028,82±0,10	1028,26±0,12	1028,20±0,15	1027,95±0,13
SOMO, %	8,59±0,08	8,64±0,06	8,71±0,05	8,81±0,07
SMO, %	12,24±0,07	12,35±0,07	12,43±0,05	12,57±0,06
Lactose, %	4,61±0,06	4,61±0,04	4,62±0,07	4,63±0,06
Ashes, %	0,74±0,05	0,75±0,05	0,74±0,05	0,76±0,05
Acid, °T	16,35±0,07	16,00±0,03	16,00±0,04	16,27±0,06
Ca, ммоль/л	31,79±1,03	32,15±0,98	32,47±1,12	32,54±0,87
Phosphor, ммоль/л	25,12±0,76	25,38±0,84	25,86±0,58	25,91±0,44

Thus, studies have shown that the introduction of the diet of lactating cows feed additive "Tetra +" at different doses has had a positive impact on the quality characteristics of milk.

During the research it was also found that in the milk of cows consuming a feed additive was more favorable amino acid composition. For example, cow's milk protein in the experimental group was more essential amino acids in comparison with analogues of control at 0,096; 0.156 and 0.202% and interchangeable – to 0.290; 0.790 and 0.121%. The amino acid in the milk of cows Speed experimental groups was higher at 0.125, respectively; 0.235 and 0.323% (Table 2). Amino acid index was also higher in the milk of cows consuming a feed additive. It should be noted that, of the essential amino acids longer leucine, arginine, phenylalanine, threonine, and lysine; nonessential – glutamic acid, proline, serine and tyrosine [1].

Table 3. Amino acid composition of milk obtained from test cows, % (n = 3)

Amino acid	Group			
	controlling	I experience	II experience	III experience
Essential amino acids:				
arginine	0,361	0,391	0,408	0,423
histidine	0,059	0,063	0,056	0,066
valine	0,132	0,160	0,168	0,167
isoleucine	0,128	0,144	0,158	0,169
leucine	0,399	0,418	0,430	0,435
lysine	0,131	0,139	0,148	0,148
threonine	0,150	0,143	0,143	0,146
phenylalanine	0,251	0,249	0,256	0,259
Total essential amino acids	1,611	1,707	1,767	1,813
Nonessential amino acids:				

aspartic acid	0,198	0,206	0,219	0,225
alanine	0,090	0,097	0,100	0,103
glutamic acid	0,658	0,636	0,660	0,669
glycine	0,101	0,105	0,103	0,107
serine	0,240	0,244	0,243	0,249
proline	0,271	0,281	0,288	0,302
tyrosine	0,170	0,188	0,194	0,194
Total essential amino acids	1,728	1,757	1,807	1,849
Total amino acids	3,339	3,464	3,574	3,662
amino acid index	0,932	0,972	0,978	0,981

From these scientific data, we conclude that the highest biological value characterized milk cows fed with the feed additive "Tetra +". The most effective dose in this case was an additive in an amount of 80 g per one head.

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