The Seybold Report

ISSN 1533-9211

DOI: 10.5281/zenodo.10394540

INTRODUCTION OF PREMIXES INTO THE DIET OF BUFFALOES

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Abstract

The most acute problem in the structure of livestock production in Azerbaijan at present is increasing the volume of buffalo milk production, the solution of which is related to improving genetic resources and increasing their productive longevity. Conventional feeds are no longer able to cope with the task of meeting the needs of livestock and poultry for the substances necessary for their growth and development. It is premixes – additives of vitamins, minerals, antioxidants and biologically active substances – that allow you to obtain a balanced feed supply. It is thanks to them, that it became possible to solve a number of problems: strengthening the body of animals, increasing their immunity to many diseases, accelerating metabolic processes, and therefore growth, improving the condition and thickness of the coat, a significant increase in productivity, improving the quality and taste of meat, eggs, and milk. The article presents the results of a scientific and economic experiment in which a vitamin-mineral mixture will be used for the first time in buffalo diets. As a result of feeding 100 g of a vitamin-mineral supplement to buffaloes, rumen digestion, as well as the nutritional value of milk, improved. There was also a noticeable increase in daily milk yield. The premix had a positive effect on the general condition of the animals.

Keywords: Buffalo, Premix, Milk, Rumen Digestion, Milk Research.

INTRODUCTION

The concept of Azerbaijan's food program pays special attention to increasing the volume of production of domestic livestock products.

The successful development of livestock breeding, as well as the increase in milk and meat productivity, largely depends on the organization of well-balanced feeding. The productive potential of livestock is quite high in the presence of a solid feed base, based not only on the quantitative, but also on the quality provision of animals with all types of feed and feed additives containing the full range of nutrients necessary for the body. In the intensive production of livestock products, the most acute problem is the provision of protein,

The Seybold Report
ISSN 1533-9211
DOI: 10.5281/zenodo.10394540

biologically active and mineral substances and vitamins. Only if the necessary amount is present in the feed, the body most perfectly absorbs the substances of the feed and the animal is able to show maximum productivity [5,6,7].

There are many different additives called premixes used to standardize ration of livestock diets according to basic indicators.

Conventional fodder is no longer sufficient to meet the growth and development needs of livestock and poultry. It is the premixes - supplements from vitamins, minerals, antioxidants and biologically active substances that allow to get a balanced feed base. It is thanks to them that it became possible to solve a number of problems: strengthening of the animal organism, increase of their immunity to many diseases, acceleration of metabolic processes, and thus growth, improvement of the condition and density of the wool cover, significant increase in productivity, improving the quality and taste of meat, eggs, milk.

In addition, the additives allow to improve the quality of the feed, while reducing the cost of it. As a result, the cost of agricultural production is significantly reduced.

Premixes are classified according to the results that can be achieved with their help. In accordance with this, productive, medicinal and therapeutic-and-prophylactic additives are distinguished. Productive ones are responsible for strengthening immunity and increase-bringing. Prophylactic is used to protect against the most common diseases. As a rule, they are used constantly for power balancing. Therapeutic premixes are intended for feeding sick animals. They contain drugs to help recover quickly. Vitamins (A, E, D, group B), minerals (copper, iron, zinc, iodine, etc.) and amino acids (lysine, methionine, etc.) are added to the filler. Biologically active substances increase immunity and activity, providing excellent performance of the body. Microelements form all systems and are responsible for metabolic processes; enzymes increase the digestibility of feed [20].

The most acute problem in the structure of livestock production in Azerbaijan at present is increasing the volume of buffalo milk production, the solution of which is related to improving genetic resources and increasing their productive longevity. In this regard the buffalo's milk productivity needs to be improved.

In the Republic of Azerbaijan buffaloes are grown as a valuable agricultural animal in a number of tropical and subtropical regions of the world, especially in many countries of South-East Asia, Southern Europe, and partly in the wetlands of America. Buffalo breeding requires special environmental conditions. Dry and cold places for buffaloes are not suitable. Therefore it is widespread in Azerbaijan, mainly in the areas located along the Kura, the Araz and the Caspian Sea. Buffalo are known for their high economic and useful qualities, being undemanding when it comes to feeding and maintaining conditions, and being resistant to high ambient temperatures and humidity, which has led to their widespread spread throughout many countries worldwide. They are unpretentious to feed because they have a larger stomach than cattle. This determines the ability to eat more bulky cheap feed such as chaff, straw, twigs and other roughage, as well as food industry waste. [1, 2, 3].

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ISSN 1533-9211
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The fat content of buffalo milk is almost twice that of normal livestock (8.5 percent on average) and it also contains 12 percent of residual milk. Due to lack of carotene, the buffalo's milk is pure white [13].

Buffalo milk is known to have higher levels of proteins, minerals (calcium, iron, and zinc), and vitamins (vitamins A, B1, C, and H) [10, 11, 12].

As in other areas of agriculture, the number of buffalo has steadily increased in our country due to recent agricultural reforms. Due to the fact that the buffalo are less demanding to feed, tolerant to local climatic conditions, and resistant to diseases, the population has opted for this direction. The demand for buffalo meat and milk in the country has increased significantly.

«Azerbaijani» buffalo breed has a milky-meat orientation and differs from cattle with a number of valuable biological features. The fat content of buffalo milk is 8-12 percent, which is 2-3 times higher than that of cows. The oiliness of buffalo milk is an individual characteristic of buffalo, it is a hereditary trait that has arisen in the process of historical development and is genetically secured [14].

Purpose of the study: Effect of Salvavit Premix on scar digestion, lactation and milk quality of buffalo.

MATERIAL AND METHODOLOGY

In our Republic, much attention is paid to feeding animals by adding premixes to feed. To increase the milk productivity of buffalo we applied premixes of Russian production «Salvavit». It was this premix, which we chose correctly, that positively affected the general condition of the animals, and also improved the scar digestion of buffalo and the digestive value of milk. The daily milk productivity has increased significantly.

The biological properties of 1% premix «Salvavit» for cattle and horses are due to the presence of vitamins (A, D, E, K, C, and group B) of microelements (iron, copper, zinc, manganese, cobalt, iodine, selenium), macroelements (calcium, magnesium, phosphorus, sodium) antioxidants, antimicrobials (feed antibiotics), enzyme preparations. In optimal quantities and ratios of premium «Salvavit»: helps to prevent diseases related to vitamin deficiency, macro- and microelements; increases digestion of nutrients of the feed, while increasing the productivity of animals to 12- 15%, with reduced feed consumption per unit of production; improve animal immunity, overall body resistance to diseases, to the harmful effects of small doses of chemicals, radioisotopes, mycotoxins; improves the nutritional value of milk and meat.

Daily use of premix «Salvavit» as feed for buffalo allows to achieve the following results: to balance recipes of feed by basic vitamins and trace elements; to prevent hypovitaminosis, to normalize metabolism and energy; stimulate the immune system and increase resistance to stress, safely overcome stress during withdrawal; facilitate the formation of a system of secretion of enzymes of vegetable feeds; improve digestion and absorption of feed, increase productivity and preservation, reduce feed costs; Develop nutrient reserves and high

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ISSN 1533-9211
DOI: 10.5281/zenodo.10394540

productivity during the break-up period; improve the transformation of nutrients into milk components. [19].

Composition of the premix «Salvavit» per 100 grams of premix

Composition	Per 100 grams of premix
amino acids:	lysine - 6.0 g,
	methionine - 2.5 g,
	threonine - 2.0 g,
	arginine - 2.0 g,
	aspartic acid - 2.0 g,
	glutamic acid - 10.0 g.
	glycine - 1.5 g,
	valine - 1.0 g,
	leucine - 2.0 g,
	phenylalanine - 1.0 g.
macro- and microelements:	calcium - 10.0 g,
	phosphorus - 3.0 g,
	iron - 380.0 mg. ,
	zinc - 450.0 mg. ,
	manganese - 310.0 mg. ,
	copper - 80.0 mg. ,
	cobalt - 5.0 mg. ,
	iodine - 10.0 mg.
vitamins:	A - 250,000 IU,
	D - 40000 ME,
	E - 500 mg. ,
	B1 - 10 mg. ,
	B2 - 100 mg. ,
	B3 - 15 mg. ,
	PP - 150 mg. ,
	pantothenic acid - 100 mg. ,
	B6 - 20 mg. ,
	B12 - 0.7 mg.
filler:	wheat bran - up to 100 g

THE RESULTS OF RESEARCH

The research was carried out for 3 months over buffalo that are located in the Goygol agricultural production enterprise of the Ministry of Agriculture.

The main experimental and laboratory part of the work was performed at the Department of Hygiene and Food Safety in the laboratory of veterinary and sanitary examination.

The objects of the study were: milk, blood, and scar content of clinically healthy buffalo, produced from experimental batches of milk of cows from experimental and control groups.

Premix was introduced into the basic diet of buffalo. Used daily, mixing in the food at the rate of 10 g. premix per 1 kg. of food. Feeding was carried out twice a day at regular intervals.

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The studies used 10 buffaloes, divided into experimental and control groups according to the principle of paired analogues, formed taking into account age, calving time, number of lactations, live weight and productivity, fat and protein content in milk, with identical conditions of housing, milking and feeding.

The 1st group received the basic diet (control group, n=5), 2nd group mixing into food at the rate of 10 g. premix per 1 kg. of food (experimental group, n=5).

The buffalo content during the study was stable, and tethered.

The clinical examination of animals was carried out according to the generally accepted method, with mandatory control of the general condition, thermometry, counting of the volume of respiratory movements and rumen contractions and evaluation of the udder condition.

Rumen content samples were taken at the same time after feeding using an oropharyngeal tube and removal of the first portions (up to 200 ml) on the 10th, 30th, 60th and 90th days of lactation.

A study was carried out on the rumen contents of buffaloes of the control and experimental groups according to organoleptic indicators, checking for the number of protozoa and bacteria, the activity of rumen microflora, the total amount of VFA, the enzymatic activity of microorganisms and the concentration of ammonia.

Organoleptic examination of the rumen includes the definition of smell, color, consistency and flotation. The ruminal fluid of the experimental group 89% of cases had parameters corresponding to the norm, that is gray-green, 19% of cases-yellow-brown; smell specific, aromatic, consistency-traction, and flotation time was 8 minutes.

Minor unusual characteristics were also found, which had color, smell, and consistence-dark brown, musty-acidic, viscous and foamy defects.

The microflora of rumen contents plays a very important role for the health of animals, as it absorbs 80-85% of the diet dry matter. The counting of the protozoa in the rumen contents was carried out usually in the Goryaev counting chamber under a microscope, using a small magnification (eyepiece 7, lens 10).

Our experiment showed that by the 90th day bacterial background in the experimental group had increased. The data are recorded in tables 1 and 2

Table 1: Number of protozoa in the rumen contents of buffaloes, thousand ml

Groups	Research time			
	Day 10	Day 30	Day 60	Day 90
Control	276,5±2,28	280,8±3,98	285,4±2,31	288±1,12
Experienced	310,4±2,10	386,5±1,86	432,6±1,90	523,8±1,22

Table 1 shows an increase in bacterial landscape in the experimental group. If before the introduction of the premix into the feed of buffalo the number of protozoa on the 10th day was 310.4ths/ml, then on the 90th day 523.8 thousand/ml, that was 68.75%.

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ISSN 1533-9211
DOI: 10.5281/zenodo.10394540

The number of microorganisms was determined by microscopy and the data are recorded in table 2.

Table 2: Number of bacteria in the ruminal contents of experimental animals, billion/ml

Groups	Research time			
	Day 10	Day 30	Day 60	Day 90
Control	8,05±0,98	8,12±0,76	8,09±0,78	8,12±0,79
Experienced	8,87±0,76	9,37±0,86	9,87±0,92	10,15±0,85

Table 1 shows an increase in the bacterial landscape in the experimental group. If before the introduction of the premix into the buffalo feed, the number of that was 14.43%.

The rumen activity of micro flora was determined by calculating the time of discoloration of a 0.03% solution of methylene blue in an amount of 1 ml added to 20 ml of rumen contents (methylene blue method according to G. Dirksen) [4]. The data is included in table 3

Table 3: Activity of ruminal microflora of buffaloes

Groups	Research time			
	Indicator discoloration time, min			
	Day 10	Day 30	Day 60	Day 90
Control	3,8±0,04	4,2±0,02	4,6±0,09	5,0±0.012
Experienced	4,0±0,05	3,8±0,02	3,2±0,07	3,0±0,09

In the control group, our indicator was lower than in the experimental group by 35.6% ($P \leq 0.001$). No microflora activity was observed in the experimental group, which increased by 25% on the 90th day (P 0.001).

The total amount of volatile fatty acids was determined by steam distillation in the Markgam apparatus (essence of the method: under the influence of steam, volatile fatty acids from the rumen contents are distilled off with the subsequent determination of their quantity by titration with an alkali solution [4].

Table 4: Total amount of VFA in the ruminal contents of experimental subjects animals, mmol/l

Groups	Research time			
	Day 10	Day 30	Day 60	Day 90
Control	77,6±9,4	74,3±8,5	76,7±8,9	78,8±9,6
Experienced	80,5±10,2	95,8±11,2	114,6±12,9	119,3±13,6

In a study of the total amount of volatile fatty acids in the contents of the test group showed an increase in the index from the 30th day to the 90th day. On the 90th day, this figure increased by 119.3 13.6 mmol/l, or 48.19%.

The rumen micro flora determines the health and milk productivity of animals, since rumen bacteria are practically the only source of enzymes necessary for the breakdown of plant feed in the rumen of ruminants.

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ISSN 1533-9211
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In addition, rumen microorganisms synthesize volatile fatty acids (VFAs) and vitamins, support immunity, protect the body from pathogens, neutralize toxins, etc.

Normally, microbial populations of rumen act coherently, their ratio is optimal. Even opportunistic microflora (some enterobacteria, streptococci, etc.) in the scar of healthy animals functions as normal. With reduced body resistance, the reproduction of Fusobacterium necrophorum, Staphylococcus aureus and other pathogens often causes the development of animal diseases, reducing its productivity, a shortening of the period of economic use, as well as deterioration in the quality of milk [18].

The contents of the rumen contain a large number of bacteria; the total number can reach 10 in 1 g. The growth and reproduction of some microorganisms is accompanied by autolysis and death of others, so the rumen always has living, decaying and dead microorganisms. The forestomachs contain cocci, streptococci, lactic acid, cellulolytic and other bacteria, which enter the rumen with feed and water and in optimal conditions, actively multiply. The most important rumen microorganisms are cellulolytic. These bacteria break down and digest fiber, which is important for the nutrition of ruminants.

Amylolytic bacteria, mainly streptococci, are represented in the rumen by a large group. They are found in the rumen when giving different diets. Their number especially increases when using grain, starchy and sugary feeds.

Lactic acid bacteria play an important role in the pregastric digestion of simple carbohydrates (glucose, maltose, galactosis, lactose and sucrose). Lactic acid bacteria are important in dairy feeding.

There is a symbiotic relationship between all types of micro-organisms: the active reproduction of some species can stimulate or inhibit the reproduction of others. Thus, the development of streptococcus inhibits the growth of lactic acid bacteria, and vice versa, the active reproduction of lactic acid bacteria creates an unfavorable environment for the activity of streptococcus plant feeds.

It has been proven by science that the rumen microflora enzymes meet up to 80% of ruminants' energy needs, 30 to 50% protein, largely macro- and microelements and vitamins, and digest 50 to 70% of raw fiber diet.

Thus, the most optimal substrate for reproduction of cellulose, lactic acid bacteria, streptococcus and stimulation of fermentation processes in the pregastric are diets containing a green mass of herbs and their mixtures [16].

It was also important for us to study the enzymatic activity of the scar microflora of buffalo. The amylolitic activity of the rumen contents was determined by photoelectro-colorimetric analysis based on the color reaction of starch and iodine. This method is based on the principle of starch breakdown by microbial amylase [4]. Next, we determined the proteinase activity of the rumen contents, the essence of which is based on the fact that at a pH greater than 5.0, α-amino acids react with ninhydrin to form carbon dioxide, aldehyde and a blue-colored compound, which is characterized by maximum absorption at a wavelength of 597 nm. The

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ISSN 1533-9211
DOI: 10.5281/zenodo.10394540

color intensity is directly proportional to the number of amino acids [4]. The determination of cellulosis activity of the rumen microflora was based on the marginal dilution method. When using it, we used the Hungate environment, the only source of carbohydrates in which is filter paper [8].

To detect ammonia in the culture under study, we also used pieces of paper processed in advance with Nessler's or Krupa's reagent.

Overall, during the experimental period (P 0.001) the amylolytic activity of the rumen microflora increased by 6.5%. Protease activity of the rumen microflora increased by 20.7% (P 0.001) and cellulose activity of the rumen microflora increased by 3.58% (P 0.05).

The amount of ammonia in the rumen contents changed slightly.

To determine the veterinary and sanitary assessment, we have conducted a study of both organoleptic and physical-chemical indicators of buffalo milk. First, we studied organoleptic parameters. Here we noticed the consistency of milk, its taste, smell and color. The samples from both groups were homogeneous, with no sediment and no flakes, and the taste and smell were clean, free of foreign flavors and smell, and the color of the milk in both groups was white.

Next, the chemical composition of milk was determined using the Lactan device. We mainly paid attention to the total fat and protein content. Milk protein is an important indicator of milk quality; modern genetics is aimed at increasing it. The protein content of milk reflects whether the animal is well supplied with energy and is a kind of energy barometer for the herd. It is on whether the rumen microbes that synthesize microbial protein have enough energy at their disposal determines what the protein level in milk will be. And only with high productivity, protein that is not broken down in the rumen becomes increasingly important. The fat in milk determines its nutritional value and gives milk a soft, pleasant taste, homogeneous structure and consistency.

Table 5: Chemical composition of buffalo milk from the control and experimental groups

Index	Day 10	Day 30	Day 60	Day 90
	Control group			
Fat content,%	5,65	6,12	5,85	6,03
Protein,%	4,03	3,98	4,01	4,01
	Experimental group			
Fat content,%	6,89	7,34	7,78	8,45
Protein,%	4,10	4,23	4,36	4,45

As you can see from the table, the test group has changes in fat and protein. The mass share of fat has increased by 8.53% and the fat content by 22.64%.

In our further research, we will produce dairy products both from buffalo milk and by mixing cow and buffalo milk, so we considered it necessary to also determine the technological properties of milk.

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ISSN 1533-9211
DOI: 10.5281/zenodo.10394540

The technological properties of milk are properties that ensure the production of a dairy product that meets state standards.

A technological property of milk in the production of fermented milk products is the ability of milk to be fermented by lactic acid bacteria to form clots of the desired consistency with certain taste qualities. When producing oil, the main technological property is the ability of dairy fat to give a fat product of a certain hardness and plasticity. When producing cheese and curd, the main property of milk is the ability to coagulate.

Thermal stability was determined by an alcohol test. Depending on which ethyl alcohol solution did not cause sedimentation of flakes in the tested milk and cream, it is divided into groups: I – volume fraction of ethyl alcohol – 80%, II – 75%, III – 72%, IV – 70%, V – 68%. [15].

CONCLUSION

Buffalo's milk differs from that of normal livestock by almost twice as much fat (8.5 per cent on average), with even 12 per cent of residual milk. But also higher levels of proteins, minerals (calcium, iron and zinc) and vitamins (vitamins A, B1, C, H) are typical of buffalo milk. Application of Salvavit Premix favorably influences the general condition of animals, normalizes metabolism and energy, stimulates the immune system and resistance to stress, improves digestion and absorption of feed, increases productivity and safety, provides high performance during the break period, and improves the transformation of feed nutrients into milk components.

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