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Non-Traditional Way Of Cleansing Milk And The Body Of Cows With The Attenuation Of Lactation From Heavy Metals.

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ABSTRACT

The use of dried vegetable crops (table beet and fodder carrots) and natural coniferous extract in cow rations with lactation attenuation (in the last two months) caused a decrease in the concentration of heavy and toxic metals in the milk of highly productive black-and-white cows with anthropogenic conditions environmental pollution. Type of feeding - silage-hay. Against the background of the basic diet (RR), animals of the experimental groups are fed (additionally) 30, 50 and 80 g per head per day of beets and a similar amount of carrots (fodder). Coniferous natural extract (liquid) at a dose of 5.0 ml / goal was fed in a mixture with mixed feed. The studied phytogenic feed additives led to an increase in the digestibility of nutrients in diets, a significant decrease in the accumulation in the body of Zn, Cu, Pb, Cd, As, Hg, Fe +2.

Keywords: cows, milk, lactation attenuation, heavy metals, purification method, feed antioxidants.

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INTRODUCTION

To obtain environmentally safe milk of cows on farms and complexes under conditions of anthropogenic pollution of the environment, in the last 15–20 years, various phytogenic feed additives have been used and are being applied using rations of medicinal herbs and grass mixtures, and wild crops grown in different regions of the country. [1-7, 10, 17].

In addition to the studied cultures, in the diet of highly productive dairy cows during the stressful period of the production cycle, in the last two months of lactation, vegetable cultures are used in the form of table beets and carrot feed, as well as natural coniferous (liquid) extract, (10.13-17). They are mainly used for the prevention, purification of individual organs and tissues of the body from various slags, improvement of metabolic processes, palatability of the main feed (hay, silage, haylage, etc.), productivity, product quality [1, 3, 5, 11-13], especially with a high anthropogenic load in the vicinity of modern large livestock farms, complexes and industrial enterprises [11-16].

In modern conditions of milk production in specialized farms and complexes into cow's rations, it is advisable to use a wider range of local, easily accessible, most effective, healthy feed additives with high antioxidant and sorption properties [2, 4, 6, 18-19] and to get ready products with a minimum content of heavy and toxic metals.

The use of dried vegetable crops (table beet and fodder carrots) and natural coniferous extract in rations of cows as antioxidants and adsorbent, which are complex mixtures of vitamin C, group B vitamins, and vitamin E of aromatic plants, helps to more successfully solve problems related to quality of dairy products, increasing the digestibility of nutrients rations and reducing the degree of localization of heavy metals in the body.

The solution to this problem is of scientific and practical interest, especially in the year-round method of keeping animals on large farms and complexes.

Previously, this direction of research in agronomic, zoo-veterinary and biological science has not been conducted.

The purpose of the study is to increase the usefulness and quality of feeding cows with the attenuation of lactation (in the last two months). The task was to study the effect of phyto-protectors used in the diet of cows to reduce the degree of contamination of the body with heavy metals.

MATERIAL AND RESEARCH METHODS

Conducted scientific, economic and physiological experiments on dairy cows of black and white breed on the farm agro-technical college "Novgorod" of the Novgorod region. Groups of cows are formed by the method of group analogs taking into account the age, body weight, productivity for the previous lactation of more than 6 thousand kg of milk, the origin of the breed and insemination terms.

The experience consisted of preparatory (10 days) and accounting (main, 60 days) periods. The physiological experiment was conducted against the background of scientific and economic experience of 7 days.

Animals of the silage type of feeding both the control and experimental groups in the rations include 7.5 kg of hay, 15.2 kg of silage from perennial grasses, 2.4 kg of grain concentrates (compound feed), 50 g of table salt, 60 g precipitate (dicalcium phosphate) feed. Animals of the first experimental group were given an additional beetroot - 30g / goal / day. II experimental - 50 g / head / day, III experimental - 80 g / head / day, and carrot feed - IV experimental group - 30 g / head / day, V experimental - 50 g / head / day, VI experimental - 80 g / goal / day Cows VII experimental group in the diet included 5.0 mol / head / day of extract of natural coniferous (mixed with feed).

The diets of feeding cows are balanced in nutrients and energy, and meet the standards of feeding (M., 2003). Experiments were carried out according to generally accepted methods (A.I. Ovsyannikov, 1976). All bioprobes (feed, additives, milk and other excreta products) were studied in the Akron central chemical

laboratory of the Novgorod region and in the laboratory of agricultural products quality at the Institute of Organic Chemistry of the Prgov State University of Nuclear Science method of atomic adsorption spectrophotometry (Perkin Elmer США, Analyst 400).

RESEARCH RESULTS AND DISCUSSION

Adding to the rations of the studied doses of table beet, fodder carrots and natural coniferous extract, a significant decrease in the content of heavy metals in milk was found (Table 1).

Table 1 The effect of feeding table beets, carrots and natural coniferous extract on the content of heavy metals in milk of cows, mg / kg.

Group of cows	Metal name							
	Zinc	Copper	Lead	Cadmium	Arsenic	Mercury	Iron	Amount
Control (PR)	0,60±0,04	0,24±0,02	0,01±0,001	0	0,02±0,002	0	7,96±0,38	8,83±1,26
I experienced (RR + 30g table beet)	0,39±0,02	0,54±0,05	0,05±0,005	0	0,05±0,004	0	0,78±0,07	1,81±0,26
II experienced (RR + 50g canteen beet)	0,20±0,01	0,10±0,01	0,05±0,005	0,04±0,003	0,03±0,003	0,10±0,01	0,20±0,02	0,9±0,01
III experienced (RR + 80g canteen beet)	0,57±0,04	0,30±0,02	0.05±0,005	0,09±0,008	0,03±0,003	0,18±0,02	0,96±0,09	2,45±0,35
IV experienced (RR + 30g carrots)	0,57±0,04	0,47±0,03	0,02±0,002	0	0,03±0,003	0,05±0,004	0,60±0,06	1,74±0,58
V experienced (RR + 50g carrots)	0,56±0,05	0,23±0,02	0,03±0,003	0	0,02±0,002	0,02±0,002	0,65±0,06	1,51±0,21
VI experienced (RR + 80g carrots)	0,11±0,01	0,10±0,01	0,03±0,003	0,04±0,003	0,03±0,003	0,01±0,001	0,38±0,03	0,7±0,01
VII experienced (PR + 5 drops of coniferous extract)	0,46±0,03	0,42±0,04	0,03±0,003	0	0,02±0,002	0	0,60±0,06	1,53±0,21

Digestibility of nutrient rations

With the inclusion in the rations of various doses of beetroot (in dry form) - from 30 to 80 g per head per day there was a tendency to increase the digestibility of dry matter compared to the control - by 2.9-3.58%, organic matter - by 2.49-3.21%, protein by 0.98-2.01%, fiber- by 0.76-1.85%, fat- by 0.5-1.43% and BEV- by 0 11-3.62%.

The use of the maximum dose of dried beetroot as part of the diet contributed to an increase in the digestibility of the studied nutrients, mainly due to increased peristalsis of the longitudinal and transverse muscles of the intestine and stimulation of digestive juices and bile. The pectin of red beet (red) contained in large quantities (up to 50%) helps to improve the digestibility of nutrients in the rations and the removal of heavy metals from the body through the gastrointestinal tract and kidneys, as well as cholesterol. It contains almost all water-soluble vitamins and vitamin E, mineral macro-and microelements, protein with a wealth of amino acids and easily digestible sugars, organic acids that are useful for the human body and dairy cattle, etc.

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All nutrients and biologically active substances contained in the beetroot, together stimulated an increase in the digestibility of certain nutrients of the rations.

With the inclusion in the rations of various doses of beetroot (in dry form) - from 30 to 80 g per head per day there was a tendency to increase the digestibility of dry matter compared to the control - by 2.9-3.58%, organic matter - by 2.49-3.21%, protein by 0.98-2.01%, fiber- by 0.76-1.85%, fat- by 0.5-1.43% and BEV- by 0,11-3,62% (Table 2).

Table 2 Digestibility of nutrients rations, %

Group of cows	Dry matter	Organic matter	Crude protein	Crude Fiber	Raw fat	Raw BEV
Control (PR)	68,80±0,48	71,15±0,61	60,04±0,56	50,62±0,38	62,9±0,39	79,31±1,05
I experienced (OR + 30g canteen beet)	*** 71,70±0,73	** 73,64±0,44	61,02±0,14	51,38±0,67	63,4±0,47	79,42±1,10
II experienced (RR + 50g canteen beet)	*** 72,15±1,16	** 74,33±1,18	61,15±0,28	* 52,09±0,52	63,81±0,61	** 82,81±0,72
III experienced (RR + 80g canteen beet)	*** 72,38±1,24	*** 74,42±0,46	*** 62,05±0,30	* 52.47±0,66	* 64,33±0,55	** 82,93±0,74
IV experienced (RR + 30g carrots)	*** 72,51±1,29	*** 74,63±0,57	*** 62,73±0,38	52,11±0,49	** 64,72±0,71	*** 83,44±0,56
V experienced (RR + 50g carrots)	*** 72,60±1,37	74,80±0,91	*** 62,88±0,64	52,78±0,80	** 65,83±0,64	*** 83,52±0,38
VI experienced (RR + 80g carrots)	*** 72,75±0,83	*** 74,39±0,62	*** 62,91±0,55	* 52,83±0,44	*** 65,90±0,60	*** 83,67±0,61
VII experienced (PR + 5 drops of coniferous extract)	69,94±0,35	71,34±0,46	61,23±0,47 1732,75	51,48±0,39	63,35±0,53	79,39±0,91

*P <0,05, **P <0,01, ***P <0,001

When using different doses of carrots (dried) - from 30 to 80 g per head per day against the background of the basic diet, an increase in digestibility was found compared to the animals of the control group: dry matter - by 3.71-3.95%, organic matter - by 3,48-3.24%, protein - by 2.69-2.87%, fiber - by 1.49-2.21%, fat - by 1.82-3.0% and BEV - by 4.13 -4.36%.

The richness of easily digestible carbohydrates, full-fledged amino acids, provitamin A (carotene), protein, pharmacological properties, excellent taste and aromatic qualities have gained fame and invaluable benefits in improving the system of feeding animals.

The use of coniferous natural extract at a dose of 5 drops per head per day compared with the control stimulated an increase in the digestibility of dry matter - by 1.14%, organic matter - by 0.19%, protein - by 1.19%, fiber - 0.86%, fat - 0.45% and BEV - 0.08%.

The use of the maximum dose of dried beetroot as part of the diet contributed to an increase in the digestibility of the studied nutrients, mainly due to increased peristalsis of the longitudinal and transverse muscles of the intestine and stimulation of digestive juices and bile. The pectin of red beet (red) contained in a larger amount (up to 50%) helps to improve the digestibility of nutrients in the rations and the removal of heavy metals from the body (Table 5) through the gastrointestinal tract and kidneys, as well as cholesterol. It contains almost all water-soluble vitamins and vitamin E, mineral macro- and microelements, protein with a wealth of amino acids and easily digestible sugars, organic acids that are useful for the human body and dairy cattle, etc.

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The balances of heavy metals in the body of cows are given in table 5

Indicator	Control group (PR)	I experienced (OR + 30g canteen beet)	II experienced (RR + 50g canteen beet)	III experienced (RR + 80g canteen beet)	IV experienced (RR + 30g carrots)	V experienced (RR + 50g carrots)	VI experienced (RR + 80g carrots)	VII experienced (PR + 5 drops of coniferous extract)
			Zinc					
Balance±Zinc	-218,360	-131,581	-153,725	-210,206	-221,122	-221,584	-241,204	-154,040
			Copper					
Balance± copper	-226,384	-233,578	-221,451	-269,844	-220,238	-246,762	-269,851	-284,695
			Lead					
Balance± lead	-144,805	-190,788	-207,114	-299,966	-138,517	-151,861	-171,253	-64,677
			Cadmium					
Balance± cadmium	-110,975	-142,131	-134,352	-153,188	-25,756	-43,751	-55,091	-32,443
			Arsenic					
Balance± arsenic	-2,444	-1,011	-0,372	-0,626	-0,256	-0,39	-0,646	-0,246
			Mercury					
Balance±Mercury	-0,486	-0,09	0,64±0,03	-0,636	1,002±0,05	0,868±0,04	1,75±0,06	1,88±0,07
			Iron					
Balance ±iron	-116,226	-16,898	-16,208	-23,152	-70,426	-49,14	-84,07	-91,65

Note. The balance of ± heavy metals (TM) means the level of excretion or accumulation in the body.

The presence in the coniferous extract of the abundance of vitamin C, a number of other vitamins, organic acids, and it is also an important source of carbohydrate nutrition for the synthesis of microorganisms in the rumen of cows and improve the digestibility of nutrients of diets.

CONCLUSIONS

The inclusion in the diets of cows during the decay period of lactation of vegetable crops (table beets, carrots) and liquid extract of coniferous natural contributed to improving the exchange of heavy metals (Zn, Cu, Pb, Cd, As, Hg, Fe2 +) by the body. Using these components, you can increase the intensity of their release through the gastrointestinal tract, kidneys and the mammary gland and get negative balance (TM) in the body, the ability to produce environmentally safe dairy products in the last two months, that is, when lactation decays.

Due to the use of phytogenic feed additives, there was a real opportunity to increase the digestibility of nutrients in rations, significantly reduce the concentration of heavy metals in milk (in total) and cleanse the body of toxicants.

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