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INNOVATIVE DEVELOPMENTS IN THE FIELD OF ANIMAL FEEDING FOR THE NORTH CONDITIONS

ИННОВАЦИОННЫЕ РАЗРАБОТКИ В ОБЛАСТИ КОРМЛЕНИЯ ЖИВОТНЫХ ДЛЯ УСЛОВИЙ СЕВЕРА

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Abstract. The purpose of the work is to review achievements in the field of feeding farm animals and birds in the conditions of the Far North and the Arctic. The research and innovation activities of the Department of General Animal Science in the field of feeding farm animals and birds are considered. In the scientific papers of Associate

Professor M.F. Grigorev - the effectiveness of zeolite, mineral, zeolite-mineral, organo-mineral, protein-mineral enzyme, complex innovative additives in feeding animals and birds was noted. Studies have found that the inclusion of non-traditional feed additives helps to increase the growth rate of young cattle up to 24.47%. In other experiments, it was found that the use of non-traditional feed additives in sheep feeding contributed to an increase in the feed protein conversion rate in food by 0.84 and 0.35%. Also in a series of experiments on horses - to study the effect of non-traditional feed additives, it was found that the preservation of live weight of animals increased by 0.81% and 0.5%. In other experiments on poultry, the effectiveness of non-traditional feed additives was also established, which was reflected in an increase in productivity and an improvement in the physiological state.

Аннотация. Цель работы обзор достижений в области кормления сельскохозяйственных животных и птиц в условиях Крайнего Севера и Арктики. Рассмотрена научно-исследовательская и инновационная деятельность кафедры «Общая зоотехния» в области кормления сельскохозяйственных животных и птиц. В работах - отмечена эффективность цеолитовых, минеральных, цеолито-минеральных, органоминеральных, белково-минеральных ферментных, комплексных инновационных добавок в кормления животных и птиц. В исследованиях установлено, что включение нетрадиционных кормовых добавок способствует повышению скорости роста молодняка крупного рогатого скота до 24.47 %. В других опытах установлено, что использование нетрадиционных кормовых добавок в кормлении овец способствовало повышению коэффициента конверсии протеина кормов в пищевой на 0,84 и 0,35 %. Также в сериях опытах на лошадях - по изучению влияния нетрадиционных кормовых добавок, было установлено, что сохранение живой массы животных увеличилось на 0,81 % и 0,5 %. В других опытах на сельскохозяйственной птице также была установлена эффективность нетрадиционных кормовых добавок, что отразилось на повышении продуктивности и улучшения физиологического состояния.

Keywords: achievements, scientific work, results, animal husbandry, north.
Ключевые слова: достижения, научная работа, результаты, животноводство, север.

Improving feeding conditions is one of the factors for increasing the efficiency of animal husbandry in the conditions of the Far North and the Arctic. As you know, the productivity of farm animals is influenced by many factors such as genetic, keeping technology, microclimate, natural and climatic, and also, to a greater extent, feeding conditions.

Federal State Budgetary Educational Institution of Higher Education Arctic State Agrotechnological University (ex. FSBEU EI Yakut State Agricultural Academy) is a basic agrarian institution of higher education, where research is carried out to improve animal husbandry.

In this paper we present some research results on improving the feeding of animals using non-traditional feed additives in their diets in conditions of Yakutia and the prospects for continuing research on this topic. **Mikhail Fedoseevich Grigorev**, Candidate of Agricultural Sciences, Associate Professor of the Department of General Zootechnics Faculty of Agrotechnology of the Arctic State Agrotechnological University, Republic of Sakha (Yakutia), Professor of Russian Academy of Natural History, is a leading specialist in this scientific direction.

It should be noted that Associate Professor M.F. Grigorev for scientific results and cycle of research works "Scientific and practical rationale for the use of innovative organomineral, mineral feed additives in the system of feeding farm animals and birds in the conditions of Yakutia" received the award Laureate of the State Prize of the Republic of Sakha (Yakutia) named after V.P. Larionov in the direction of science and technology (Decree of the Head of the Republic of Sakha (Yakutia) No. 993 from February 03, 2020).

As noted by Associate Professor Grigorev M.F. - zeolite-mineral additives are effective feed for cattle. The experiment was carried out on fattening bulls of the

Simmental breed of cattle in the conditions of Central Yakutia. As a result, it was noted that the inclusion of a zeolite-mineral additive in the diets of cattle made it possible to obtain an increase in live weight of 587.62 g per day (5.92% more than the control group), and to achieve a live weight of 380.3 kg (more than in control by 1.74%), as well as obtaining an economic effect in the amount of 75.90 thousand rubles. or 7.23 rubles. per day per head [1].

As noted on the territory of the Republic of Sakha (Yakutia) there are quite large raw materials reserves of natural zeolites in the Suntarsky ulus (Honguruu, Ulakhan-Wattaakh, Soros and Chuchuba). This natural raw material is well used in various industries ranging from medical to mineral extraction. The well-recommended properties include cation-exchange capacity, the content of deficient trace elements (this is very important for the permafrost zone, where there is a shortage of standardized elements for a number of elements), as well as binding qualities. Also in this ulus there is a salt deposit (Kempendyai), the chemical composition of which is represented not only by NaCl, but also by other useful microelement compounds [2].

In another experiment, an organomineral supplement represented by sapropel, zeolite and mineral natural salt was tested in feeding cattle in the conditions of Western Yakutia. In contrast to the previous scientific experience, in this case sapropel was additionally given in different proportions. The chemical composition of the used sapropel contained water, protein, fat, fiber, minerals (compounds Ca, P, Zn, Fe, I, Co, Mo, Se, etc.). As a result of the experiment, it was found that the animals of the experimental groups exceeded the control group in live weight by 3.3 and 5.47% (P> 0.999). And in the growth rate of animals, this is more noticeably shown, where in the periods of growth these groups exceeded the control group in the 9-12-month age period by 2.42% and 3.23%, in the 12-15-month age period by 0.57% and 0.85%, and at the end by 16.01% (P>0.99) and 24.47% (P>0.999). At the same time, all clinical and physiological parameters of the organism of the experimental cattle did not go beyond the limits, which is evidence of safety [3].

The third series of experiments includes experiments where a coniferous-mineral supplement was tested, which was given in a complex way in feeding fattening cattle of the Simmental breed in the conditions of West Yakutia. Summarizing the results of the author, it should be noted that the animals of the two experimental groups absorbed nutrients better and had a greater live weight. At the end of fattening was carried out, where high slaughter qualities of two experimental groups were noted. In these groups, a slaughter yield of 61.04 and 60.34%, respectively, was noted against 58.28% in the control group. In this case, more meat was obtained by 33.83% and 17.99%, more protein yield by 9.70% and 5.08%, and the protein-to-protein conversion rate in the control group was 7.53%, yielding to the two groups by 3.52 and 1.8%. The coefficient of transformation of the exchange energy of feed into the energy of food products was 2.31% in the control group, 1 experimental 3.37%, and 2 experimental 2.86% (or more than 1.06 and 0.55%) [4].

At the same time, experiments were also carried out to test protein-mineral feed additives in feeding cows and young cattle in Yakutia [5, 6]. The papers note the prospects of experimental additives and the positive effect of their influence on the productivity and physiological state of cattle in the conditions of the North.

In other scientific works of Associate Professor M.F. Grigorev presents the results of a study of the effect of non-traditional feed additives in the diets of sheep in the conditions of Central Yakutia. At the end of the experiment it was found that in the 1st and 2nd experimental groups, the carcass weight was greater than in the control group by 9.13 and 5.72% (or 3.03 and 1.9 kg), fat mass by 10.34 and 6.03 % (or 0.12 and 0.07 kg), and slaughter yield by 2.31 and 1.88%, respectively. Analysis of bioconversion showed that the coefficient of conversion of feed protein into food protein in the experimental groups was higher than the control group by 0.84 and 0.35% [7].

In other papers of M.F. Grigorev are presented a data on the study of the effectiveness of non-traditional feed additives in feeding horses in the conditions of the Central and Arctic zones of Yakutia. The paper describes the results of the use of

organomineral top dressings from local natural raw materials in the feeding of horses of the Yang type in the winter. It was noted that the use of feed additives contributed to the preservation of the live weight of horses by 0.81% and 0.5%. Improved blood counts [8].

Also presented a data on the study of the effect of non-traditional feed additives on the metabolism of mares in Central Yakutia. The results noted an increase in the digestibility of nutrients for crude protein, crude fat, fiber, nitrogen-free extractives. At the same time, an improvement in the metabolism of horses was noted [9].

In other articles [10, 11], the results of a study of the effectiveness of non-traditional feed additives in the feeding of poultry (geese and laying hens) are presented. It was noted that the improvement of metabolism, increase in productivity and normalization of the physiological state of birds when non-traditional feed additives are included in their rations.

It should be noted that the results of research on the use of non-traditional feed additives in the feeding of farm animals and poultry are used in the educational process. Within disciplines: "Animal husbandry with the basics of fodder production" (bachelor's), "Animal feeding" (bachelor's), "Compound feed mixtures in animal husbandry" (bachelor's), "Feeding farm animals and fodder production" (bachelor's), "Zootechnical analysis of feeds" (bachelor's), "Increasing the productivity of farm animals" (MSc), "Innovative technologies in feed production and cattle feeding" (MSc), "Feeding highly productive animals" (MSc), and etc.

The results of scientific research by Associate Professor M.F. Grigorev awarded:

- Letter of thanks from the Elges Municipal Administration of the Verkhoyansk District of the Republic of Sakha (Yakutia) - for scientific and practical assistance in the field of horse breeding, for the introduction of local non-traditional feed additives in the feeding of horses, Khayysardakh village (2021);

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- Letter of thanks from the Department of Agriculture of the Churapchinsky ulus of the Republic of Sakha (Yakutia) - for the introduction of local non-traditional feed additives in cattle breeding in the Churapchinsky ulus, Churapcha village (2021);
- Medal "Best Young Scientists - 2020" among scientific and educational institutions of the Commonwealth of Independent States - for contribution to the development of Science and Education (organizer union of companies in the form of association “National Union “Bobek””, 09/28/2020), Nur-Sultan, Kazakhstan (2020);
- Winner of the Grant of the President of the Republic of Sakha (Yakutia) for young scientists and specialists in the scientific direction "Agricultural Sciences", Yakutsk city (2013);
- Letter of thanks from Agrofirma Khatas LLC - for scientific and practical assistance, Yakutsk city (2013).

Thus, there are prospects for the development of livestock and poultry farming based on the improvement of feeding technology.

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