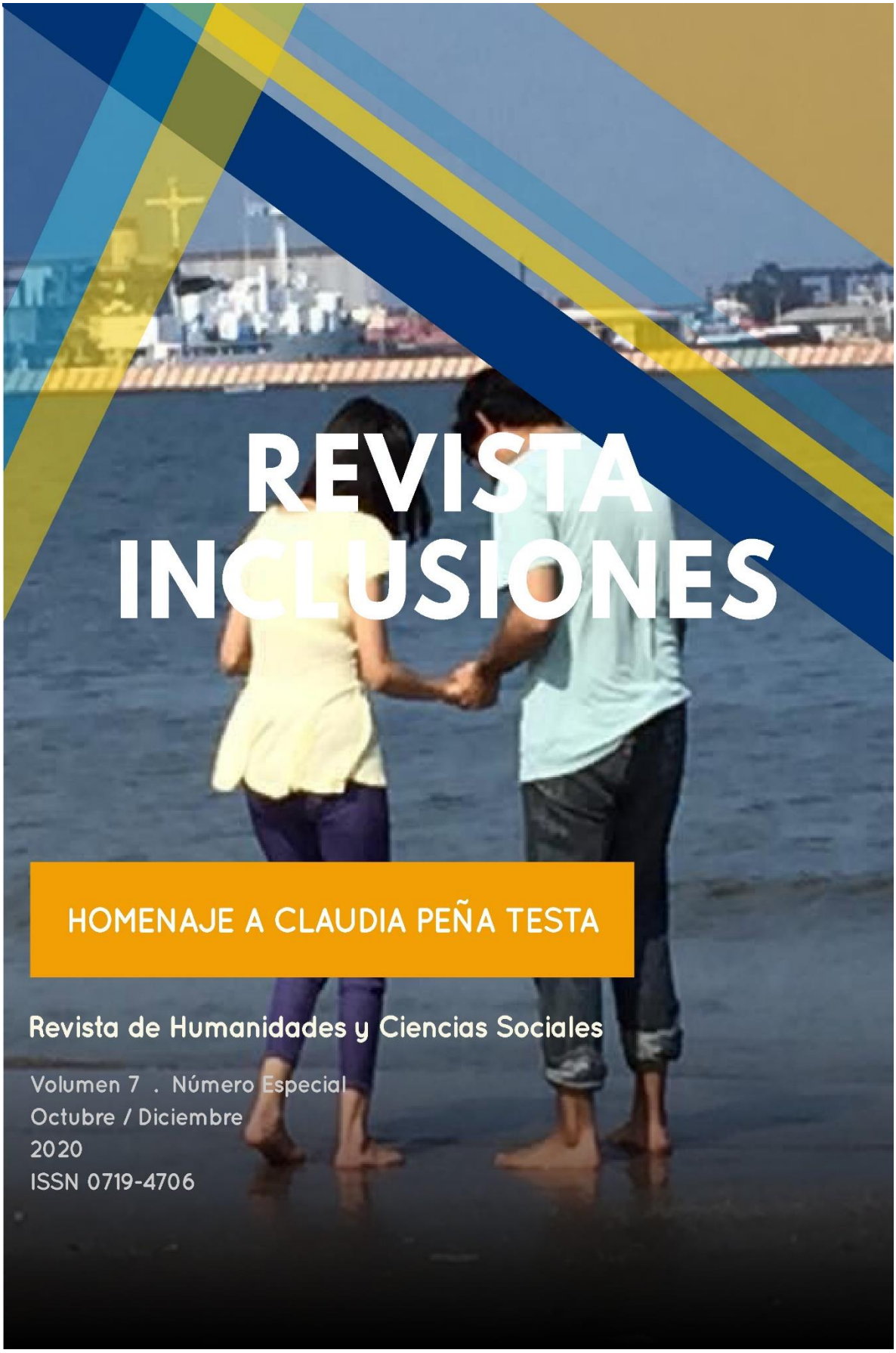

REVISTA INCLUSIONES

HOMENAJE A CLAUDIA PEÑA TESTA

Revista de Humanidades y Ciencias Sociales

Volumen 7 . Número Especial
Octubre / Diciembre
2020
ISSN 0719-4706

REVISTA
INCLUSIONES M.R.
REVISTA DE HUMANIDADES
Y CIENCIAS SOCIALES

CUADERNOS DE SOFÍA
EDITORIAL

REVISTA INCLUSIONES M.R.
REVISTA DE HUMANIDADES Y CIENCIAS SOCIALES

CUADERNOS DE SOFÍA EDITORIAL

REVISTA
INCLUSIONES M.R.
REVISTA DE HUMANIDADES
Y CIENCIAS SOCIALES

CUADERNOS DE SOFÍA
EDITORIAL

REVISTA
INCLUSIONES M.R.
REVISTA DE HUMANIDADES
Y CIENCIAS SOCIALES

CUADERNOS DE SOFÍA
EDITORIAL

Editorial Cuadernos de Sofía
Santiago – Chile
OBU – C HILE

Indización, Repositorios y Bases de Datos Académicas

Revista Inclusiones, se encuentra indizada en:

CATÁLOGO

BIBLIOTECA UNIVERSIDAD DE CONCEPCIÓN

REVISTA INCLUSIONES M.R.
REVISTA DE HUMANIDADES Y CIENCIAS SOCIALES

CUADERNOS DE SOFÍA EDITORIAL

ISSN 0719-4706 - Volumen 7 / Número Especial / Octubre – Diciembre 2020 pp. 133-138

THE EFFECT OF THE CONIFEROUS ENERGY ADDITIVE ON THE METABOLISM AND THE QUANTITATIVE AND QUALITATIVE INDICATORS OF DAIRY COWS' PRODUCTIVITY

Dr. Yuriy Nikolayevich Prytkov
Ogarev Mordovia State University, Russia
ORCID: 0000-0001-5348-537X
yury.n.prytkov@mail.ru
Dr. Anna Aleksandrovna Kistina
Ogarev Mordovia State University, Russia
ORCID: 0000-0003-4848-0421
anna.kistina@inbox.ru
Lic. Ekaterina Ivanovana Dorozhkina
Ogarev Mordovia State University, Russia
ORCID: 0000-0002-5169-3471
ekaterina.i.dorozhkina@mail.ru
Lic. Vadim Aleksandrovich Ruin
Ogarev Mordovia State University, Russia
ORCID: 0000-0002-6304-8445
vadim.ruin@inbox.ru

Fecha de Recepción: 11 de junio de 2020 – **Fecha Revisión**: 23 de junio de 2020

Fecha de Aceptación: 28 de septiembre 2020 – **Fecha de Publicación**: 01 de octubre de 2020

Abstract

The article presents the results of studying the effect of the coniferous energy additive on the qualitative and quantitative indicators of milk productivity. It has been found that the introduction of the coniferous energy additive in the dosage of 17 g/kg of the dry matter to the cows' diet contributed to increasing the milk productivity and the biological value of the milk.

Keywords

Cows – Milk – Coniferous energy additive – Diet – Fodder – Fat content – Protein content

Para Citar este Artículo:

Prytkov, Yuriy Nikolayevich; Kistina, Anna Aleksandrovna; Dorozhkina, Ekaterina Ivanovana y Ruin, Vadim Aleksandrovich. The effect of the coniferous energy additive on the metabolism and the quantitative and qualitative indicators of dairy cows' productivity. Revista Inclusiones Vol: 7 num Especial (2020): 133-138.

Introduction

Currently, the dairy cattle breeding is a major source of biologically valuable food products, such as milk and various products. The nutritional value of milk mainly depends on the adequacy of cow feeding. It is feeding that has a great effect both on the level of milk production by the cows and on its composition, characteristics, and suitability for obtaining dairy products.

Unbalanced feeding of the cows delays the natural physiological process of milk formation after calving and prevents identifying the potential of the cows. Adequate feeding ensures good health of the animals, their high productivity, and high quality of the products with the lowest possible fodder consumption.

In order to significantly reduce energy deficiency, it is necessary to introduce energy-rich feed additives to the diet.

In this regard, recently, scientists and livestock breeders have been constantly searching for, developing, and testing new, less expensive, and environmentally friendly and safe feed additives based on mobile complexes for processing forest biomass[1].

It is well known that such nontraditional feed additives obtained from the waste and byproducts of forest processing contribute to normalizing the physiological processes in the animals' organisms, improve their growth, productivity, preservation, and increase the organism resistance.

Given this circumstance, the employees of OOO Khiminvest Scientific and Technical Center (Nizhny Novgorod) created a new coniferous energy additive (CEA) based on the processing of the green mass of coniferous trees and extraction of the biologically active substances using a new selective extractant. This additive features improved properties and ensures long-term preservation of its consumer quality. However, there is little information about studying the effect of the CEA on the cows' milk productivity[2].

Therefore, identifying the optimal dosage of the CEA in the diets and studying its effect on the quantitative and qualitative indicators of milk productivity are of certain scientific and practical interest. In this regard, the issue of using natural waste from forest processing as an energy feed additive seems very relevant and useful for practical production.

Methods

The studies of using the CEA in the diets of the cows were performed from 2018 to 2019 in the production conditions of OOO JV Bogdanovskoye in the Staroye Shaygovo district of the Republic of Mordovia.

---

[1] A. P. Kalashnikov; V. I. Fisinin y V. V. Shcheglov, Normy i ratsiony kormleniya selskokhozyaistvennykh zhivotnykh: Reference manual (Moscow, 2003) y Y. N. Prytkov; A. A. Kistina y G. G. Bragin, “Vliyanie khvoino-energeticheskoi dobavki na perevarimost i ispolzovanie pitatelnykh i mineralnykh veshchestv ratsionov netelyami”, Agricultural scientific journal Vol: 12 (2017): 42–45.

[2] Y. N. Prytkov; A. A. Kistina; V. P. Korotkiy; V. A. Ryzhov y V. I. Roshchin, “Biological Substantiation Of Application Of The Coniferous-Energy Supplement In Feeding Of Heifers”, Journal of Pharmaceutical Sciences and Research Vol: 9 num 6 (2017): 817–821 y Y. N. Prytkov; A. A. Kistina y M. Y. Chervyakov, “Effektivnost primeneniya khvoino-energeticheskoi kormovoi dobavki v molochnom skotovodstve”, Agricultural scientific journal Vol: 10 (2015): 17–20.

The animals had been chosen by the principle of analogs, considering their live weight, breed, age, origin, individual characteristics, and physiological state. As a result, four groups of the cows in the colostric period were formed, 10 animals in each group, with an average live weight of 520 – 550 kg.

During the experiment, the animals were fed twice a day in all the physiological periods. The diets for the experimental animals had been developed following the norms of the Russian Academy of Agricultural Sciences (RAAS) (2003), given the chemical composition of the fodder available at the farm[3]. The experimental animals were clinically healthy and were kept in the same building. In terms of the energy value and the content of the main nutrients, the diets of the animals of the same age in all the groups were the same and met the zootechnical standards. The cows of the reference group received the diet without the CEA. Their peers in experimental groups I, II, and III, in addition to the main diet, received the CEA in the amounts of 12, 17, and 22 g/kg of the dry matter in the diet, respectively. The daily dosages of the CEA were mixed with concentrates and individually fed to the animals every day.

The CEA (ToR 9759-011 4240035713) produced at OOO KHIMINVEST STC contained 0.17 mg/kg of vitamin B_1, 13 mg/kg of vitamin B_2, 2.3 mg/kg of vitamin B_3, 0.29 mg/kg of vitamin B_5, 0.1 mg/kg of vitamin B_6, 0.7 mg/kg of folic acid, and 12 – 15 mg/100 g of carotenoids. The energy value was 250 kcal/100 g.

Results

The results of the studies showed that adding various dosages of CEA to the diets of the cows had a certain effect on the hematological parameters. For instance, in the blood of the cows in experimental group II during the colostric period, the content of erythrocytes and hemoglobin increased by 9.50 % and 9.52 %, compared to their peers in the reference group, and by 6.26 % and 6.82 %, compared to their peers in experimental group I. Increasing the content of CEA in the diets of the cows in experimental group III to 22 g/kg of the dry matter contributed to a slight decrease of the studied indicators; however, they were higher than those of their peers in the reference group[4].

Hemoglobin in the blood combined with carbon monoxide, forming the compound named carboxyhemoglobin, which improved the operation of the blood-forming organs. The leukocyte count remained almost the same; only a slight increase was observed in the blood of the animals in the reference group. All this testified to the more intensive redox processes in the animal organisms.

Important indicators of protein metabolism in the organism are the contents of protein

[3] Y. N. Prytkov; A. A. Kistina; V. P. Korotkiy; V. A. Ryzhov y V. I. Roshchin, “Biological Substantiation Of Application Of The Coniferous-Energy Supplement In Feeding Of Heifers”, Journal of Pharmaceutical Sciences and Research Vol: 9 num 6 (2017): 817–821.

[4] Y. N. Prytkov y A. A. Kistina, “Vliyanie selenoorganicheskikh preparatov v ratsionakh korov cherno-pestroi porody na obmen veshchestv i molochnuyu produktivnost”, Agricultural scientific journal Vol: 1 (2018): 31–35; Y. N. Prytkov; A. A. Kistina y G. G. Bragin, “Vliyanie khvoino-energeticheskoi dobavki na perevarimost i ispolzovanie pitatelnykh i mineralnykh veshchestv ratsionov netelyami”, Agricultural scientific journal Vol: 12 (2017): 42–45 y M. Y. Chervyakov; Y. N. Prytkov y A. A. Kistina, “Vliyanie raznykh dozirovok khvoino-energeticheskoi kormovoi dobavki v ratsione na dinamiku zhivoi massy i srednesutochnykh prirostov netelei”, Resursosberegayushchie ekologicheski bezopasnye tekhnologii proizvodstva i pererabotki selskokhozyaistvennoi produktsii (2016): 74–76.

and its main fractions in the blood and their ratios. The research showed that using CEA in the diets of the cows in experimental group II at the rate of 17 g/kg of the dry matter increased the total protein content in the blood by 6.12 %, compared to the reference group, and by 5.83 %, compared to experimental group I ($P < 0.001$). A similar pattern was revealed in the albumin and globulin counts. In the blood of the cows in experimental group II, the content of albumins was higher by 12.34 %, and that of globulins — higher by 1.23 % than in the blood of their peers in the reference group, and higher by 9.23 % and 2.08 % than in the blood of the animals in experimental group I, respectively. Out of the globulin fraction, the largest share belonged to gamma globulins; their lowest concentrations in all age periods were observed in the animals in experimental group II. The counts of alpha- and beta-globulins in experimental group II were also higher by 14.92% and 10.87 %, compared to the animals in the reference group, and higher by 9.93% and 6.68 % than in their peers in experimental group I, respectively[5].

The studies showed that introducing various dosages of CEA to the diets of the cows had a positive effect on milk quantity and quality. It was found that during the first lactation, the heifers in experimental group II produced 5,483.0 kg of milk, which was by 12.0 % ($P < 0.001$) and 3.0 % ($P < 0.001$) higher, compared to their peers in the reference group and in experimental group I. Increasing the dosage of the CEA to 22 g/kg of the dry matter in the diet did not result in any further increase in the milk production; however, the yield of milk over the first lactation was higher by 449.8 kg, or 9.2 % ($P < 0.001$), compared to their peers in the reference group[6].

The milk quality directly depends on the intake of nutrient and biologically active substances in the organism, their ratio in the diet, and bioavailability, which, in turn, is determined by the chemical composition of the fodder and the feed additives.

In general, during the lactation period, the cows in experimental group II produced 219.9 kg of milk fat, which was higher by 27.5 kg, or 14.3 % ($P < 0.001$), compared to their peers in the reference group, and higher by 8.0 kg, or 3.8 % ($P < 0.01$), compared to their peers in experimental group I.

The metabolism of proteins in dairy cows depends not only on their intake with the fodder but on the lactation phase as well. However, no significant differences were found in the protein content in the milk during the experiment.

---

[5] A. A. Kistina, Ispolzovanie seleno-karotinovoi dobavki v ratsionakh kur-nesushek. Nauchnye osnovy sovremennykh agrotekhnologii v selskokhozyaistvennom proizvodstve, in: Scientific bases of modern agricultural technologies in the agricultural production: Materials of the All-Russian Scientific and Practical Conference (Saransk, 2015); M. Y. Chervyakov; A. A. Kistina y Y. N. Prytkov, "Vliyanie khvoino-energeticheskoi kormovoi dobavki v ratsione na intensivnost rosta netelei", Agrarian scientific journal Vol: 4 (2015): 36–39 y Y. N. Prytkov; A. A. Kistina; M. Y. Chervyakov y A. S. Zenkin, "The effect of Coniferous – Energy Feed Additive in Diets on Metabolic and Productive Factors of Heifers and Cows of Black and Motley Breed", Biosciences Biotechnology Research Asia Vol: 12 num 2 (2015): 1047–1054.

[6] Y. N. Prytkov y A. A. Kistina, "Vliyanie selenoorganicheskikh preparatov v ratsionakh korov cherno-pestroi porody na obmen veshchestv i molochnuyu produktivnost", Agricultural scientific journal Vol: 1 (2018): 31–35; N. G. Makartsev, Kormlenie selskokhozyaistvennykh zhivotnykh (Kaluga: SUE Oblizdat, 1999) y Y. N. Prytkov; Kistina, A. A. y Tsarenkova, L. S. Primenenie seleno-karotinovoi dobavki v ptitsevodstve. Intensivnye tekhnologii proizvodstva produktsii zhivotnovodstva, in: Materials of the International Scientific and Practical Conference (Penza, 2015).

A similar tendency was identified in the amount of milk protein. While the cows in experimental group II during the lactation produced 185.9 kg of milk protein, the amount of milk protein obtained from their peers in the reference group was lower by 15.7 % ($P < 0.001$), and its amount obtained from the cows in experimental group I was lower by 4.2 % ($P < 0.01$). Significant differences in the qualitative composition of the milk were observed as early as after the first days of feeding the additive to the animals in experimental group II. For instance, the amount of the dry matter increased by 0.54 %, the content of milk solids-non-fat (MSNF) – by 0.35 %, the content of fat – by 0.08 %, and the content of protein – by 0.11 %, compared to their peers in the reference group[7].

Conclusion

Thus, it should be noted that feeding CEA to lactating cows improves the biological value of milk and increases the milk yield.

References

Chervyakov, M. Y.; Kistina, A. A. y Prytkov, Y. N. “Vliyanie khvoino-energeticheskoi kormovoi dobavki v ratsione na intensivnost rosta netelei”. Agrarian scientific journal Vol: 4 (2015): 36–39.

Chervyakov, M. Y.; Prytkov, Y. N. y Kistina, A. A. “Vliyanie raznykh dozirovok khvoino-energeticheskoi kormovoi dobavki v ratsione na dinamiku zhivoi massy i srednesutochnykh prirostov netelei”. Resursosberegayushchie ekologicheski bezopasnye tekhnologii proizvodstva i pererabotki selskokhozyaistvennoi produktsii (2016): 74–76.

Kalashnikov, A. P.; Fisinin, V. I. y Shcheglov, V. V. Normy i ratsiony kormleniya selskokhozyaistvennykh zhivotnykh: Reference manual. Moscow. 2003.

Kalashnikov, A. P.; Kleimenov, A. P. y Shcheglov, V. V. Normy i ratsiony kormleniya selskokhozyaistvennykh zhivotnykh. Moscow: Znanie. 1994.

Kistina, A. A. Ispolzovanie seleno-karotinovoi dobavki v ratsionakh kur-nesushek. Nauchnye osnovy sovremennykh agrotekhnologii v selskokhozyaistvennom proizvodstve, in: Scientific bases of modern agricultural technologies in the agricultural production: Materials of the All-Russian Scientific and Practical Conference. Saransk. 2015.

Kistina, A. A. y Prytkov, Y. N. “Vliyanie selenoorganicheskikh preparatov na intensivnost rosta i myasnye kachestva bychkov”. Achievements of science and technology in the AIC Vol: 11 (2008): 59-61.

Makartsev, N. G. Kormlenie selskokhozyaistvennykh zhivotnykh. Kaluga: SUE Oblizdat. 1999.

[7] A. A. Kistina y Y. N. Prytkov, Vliyanie selenoorganicheskikh preparatov na intensivnost rosta i myasnye kachestva bychkov. Achievements of science and technology in the AIC Vol: 11 (2008): 59-61; A. P. Kalashnikov; A. P. Kleimenov y V. V. Shcheglov, Normy i ratsiony kormleniya selskokhozyaistvennykh zhivotnykh (Moscow: Znanie, 1994) y N. S. Shevelev, “Obmen mikroelementov u laktiruyushchikh i sukhostoinykh korov pri raznom soderzhanii selena”, Moscow: Full-value feeding of ruminant animals in the conditions of intensive use 2: (1990): 66–79.

Prytkov, Y. N. y Kistina, A. A. “Vliyanie selenoorganicheskikh preparatov v ratsionakh korov cherno-pestroi porody na obmen veshchestv i molochnuyu produktivnost”. Agricultural scientific journal Vol: 1 (2018): 31–35.

Prytkov, Y. N.; Kistina, A. A. y Bragin, G. G. “Vliyanie khvoino-energeticheskoi dobavki na perevarimost i ispolzovanie pitatelnykh i mineralnykh veshchestv ratsionov netelyami”. Agricultural scientific journal Vol: 12 (2017): 42–45.

Prytkov, Y. N.; Kistina, A. A. y Chervyakov, M. Y. “Effektivnost primeneniya khvoino-energeticheskoi kormovoi dobavki v molochnom skotovodstve”. Agricultural scientific journal Vol: 10 (2015): 17–20.

Prytkov, Y. N.; Kistina, A. A.; Chervyakov, M. Y. y Zenkin, A. S. “The effect of Coniferous – Energy Feed Additive in Diets on Metabolic and Productive Factors of Heifers and Cows of Black and Motley Breed”. Biosciences Biotechnology Research Asia Vol: 12 num 2 (2015): 1047–1054.

Prytkov, Y. N.; Kistina, A. A.; Korotkiy, V. P.; Ryzhov, V. A. y Roshchin, V. I. “Biological Substantiation Of Application Of The Coniferous-Energy Supplement In Feeding Of Heifers”. Journal of Pharmaceutical Sciences and Research Vol: 9 num 6 (2017): 817–821.

Prytkov, Y. N.; Kistina, A. A. y Tsarenkova, L. S. Primenenie seleno-karotinovoi dobavki v ptitsevodstve. Intensivnye tekhnologii proizvodstva produktsii zhivotnovodstva, in: Materials of the International Scientific and Practical Conference. Penza. 2015.

Shevelev, N. S. Obmen mikroelementov u laktiruyushchikh i sukhostoinykh korov pri raznom soderzhanii selena. Moscow: Full-value feeding of ruminant animals in the conditions of intensive use 2 (1990): 66–79.

REVISTA INCLUSIONES M.R.
REVISTA DE HUMANIDADES Y CIENCIAS SOCIALES

CUADERNOS DE SOFÍA EDITORIAL