

А.А. Белооков¹, ✉
О.В. Белоокова¹,
Е.В. Чухутин¹,
О.В. Горелик^{2,3}

¹ Южно-Уральский государственный аграрный университет, Российская Федерация

² Уральский государственный аграрный университет, Екатеринбург, Российская Федерация

³ Уральский федеральный аграрный научно-исследовательский центр Уральского отделения Российской академии наук, Екатеринбург, Российская Федерация

✉ belookov@yandex.ru

Поступила в редакцию:
06.06.2022

Одобрена после рецензирования:
02.08.2022

Принята к публикации:
22.08.2022

Alexey A. Belookov¹, ✉
Oksana V. Belookova¹,
Evgeny V. Chukhutin¹,
Olga V. Gorelik^{2,3}

¹ South Ural State Agrarian University, Troitsk, Russian Federation

² Ural State Agrarian University, Yekaterinburg, Russian Federation

³ Ural Federal Agrarian Research Center of the Ural Branch of the Russian Academy of Sciences, Yekaterinburg, Russian Federation

✉ belookov@yandex.ru

Received by the editorial office:
06.06.2022

Accepted in revised:
02.08.2022

Accepted for publication:
22.08.2022

Эффективность применения пробиотиков в промышленном свиноводстве

РЕЗЮМЕ

Свиноводство является одной из ведущих отраслей сельского хозяйства, призванных обеспечить продовольственную безопасность страны. В этой связи свиноводство должно стать высокорентабельной отраслью АПК за счет роста ряда производственных показателей. Резервом увеличения продуктивности животных являются различные кормовые добавки. Наиболее популярными добавками на сегодняшний день являются пробиотики и фитобиотики. Современные пробиотические препараты представляют собой комплексы (симбиотики), состоящие из различных штаммов бактерий с добавлением ферментов, пребиотиков, хелатных элементов, аминокислот и биологически активных компонентов. В статье приводятся данные об использовании пробиотического препарата «Профорт» и фитобиотика «Интебио» в кормлении супоросных и подсосных маток. По результатам научно-хозяйственного опыта установлено, что в результате использования препаратов выросли следующие показатели: многоплодие маток — на 1,9–2,9%, крупноплодность молодняка — на 10,4–12,3%, число зрелых поросят в гнезде — на 10,8–11,8%, сохранность молодняка — на 4,0–6,1%, масса гнезда поросят к отъему — на 18,0–22,2%. Следствием этого стало снижение затрат корма на 1 кг прироста живой массы и увеличение выручки от реализации полученного молодняка.

Ключевые слова: свиноводство, кормление, пробиотический препарат «Профорт», фитобиотик «Интебио»

Для цитирования: Белооков А.А., Белоокова О.В., Чухутин Е.В., Горелик О.В. Эффективность применения пробиотиков в промышленном свиноводстве. <https://doi.org/10.32634/0869-8155-2022-361-7-8-98-101>

© Белооков А.А., Белоокова О.В., Чухутин Е.В., Горелик О.В.

The efficiency of probiotics in industrial pig breeding

ABSTRACT

Pig breeding is one of the leading agricultural sectors that ensures the country's food safety. In this regard, pig breeding must become a highly profitable branch of the agro-industrial complex due to growth of range of production performance indicators. Various feed additives are the reserve for increasing the productivity of the animals. The most popular feed supplements used today are probiotics and phytobiotics. Modern probiotic preparations are a complex (symbiotic additives) consisting of various strains of bacteria with addition of enzymes, prebiotics, chelating elements, amino acids and biologically active components. The article provides data on use of the probiotic preparation "Profort" and the phytobiotic "Intebio" in feeding of sows in farrow and nursing sows. According to the results of scientific and economic experience it was found that feed additives increased the following indicators: prolificacy — by 1.9–2.9%, size of the young piglets — by 10.4–12.3%, number of mature piglets in the litter — by 10.8–11.8%, rate of survival of the young piglets — by 4.0–6.1%, weight of the piglets litter by the moment of weaning — by 18.0–22.2%. The use of the preparations led to decrease in feed costs per 1 kg of liveweight gain and increased revenue obtained from the sale of the young livestock.

Key words: pig breeding, feeding, probiotic drug "Profort", phytobiotic "Intebio"

For citation: Belookov A.A., Belookova O.V., Chukhutin E.V., Gorelik O.V. The efficiency of probiotics in industrial pig breeding. <https://doi.org/10.32634/0869-8155-2022-361-7-8-98-101> (In Russian).

© Belookov A.A., Belookova O.V., Chukhutin E.V., Gorelik O.V.

Introduction

According to wide range of experts, nowadays Russia is provided with domestically grown pig-breeding products by 90%. In this regard, issues related to increasing the efficiency of the livestock industry become increasingly important [1–4].

One of the ways to increase the profitability of this industry is using of probiotic and phytobiotic preparations infeeding of sows in farrow and nursing sows.

Feeding the animals with high quality feed, including the biologically active substances, has undoubted potential for growth of pig productivity [5, 6].

In pig breeding industry the biologically active substances are required to reduce the negative impact of a range of factors associated with feeding and breeding of farm animals [7–11].

Probiotics — in the context of industrial pig breeding — are important elements for achieving high results. The optimal way to add the probiotics is adding them to the feed of the parent livestock. The probiotics are used to restore and maintain the normal flora of the gastrointestinal tract, to optimize metabolic processes, to improve the productive health of sows and ensure a more complete fulfilment of the genetic potential of young pigs [12–15].

Phytobiotics are feed additives obtained from plant raw materials. The application of these feed additives raises the productivity of animals and the quality of the resulting products [16–22].

Therefore, the studying of use of feed additives in feeding of sows in farrow and nursing sows is of certain scientific and practical interest.

Materials and method

The scientific and economic experiment was held in the industrial conditions of the pig-breeding complex LLC “Agrofirma Ariant”. The additives were used in feeding sows in farrow to study the effect of dietary supplements on the reproductive functions of the animals.

To achieve this goal, we formed 3 groups of sows in farrow according to the principle of analogues pairs, 10 heads per each group. The animals were taken care of and fed equally. Sows in farrow received basic diet — complete mixed feed SK-1, nursing sows got SK-2. In addition to the basic diet the tested groups of sows got the feed additives. Sows of the 1st experimental group received phytobiotic preparation “Intebio” at a dose of 120 g/t, the sows of the 2nd experimental group got the probiotic preparation “Profort” at a dose of 500 g/t 30 days before and 30 days after farrowing (Figure 1).

Results and discussion

It is obvious from the data in Fig. 2, that the prolificacy of sows in the control group was 10.4 heads, and in the experimental groups the prolificacy was by 2.9% and 1.9% higher respectively.

In the control group, the number of mature piglets in the litter amounted to 9.3 heads, which is less than in the 1st experimental group by 1.1, and less than in the 2nd experimental group by 1.0 head. The share of large-sized piglets in the experimental groups turned out to be significantly higher than in the control group (1.06 kg) by 12.3% at $P < 0.01$ in the 1st experimental group and by 10.4% at $P < 0.01$ in the 2nd

Fig. 1. Scheme of scientific and economic experiment

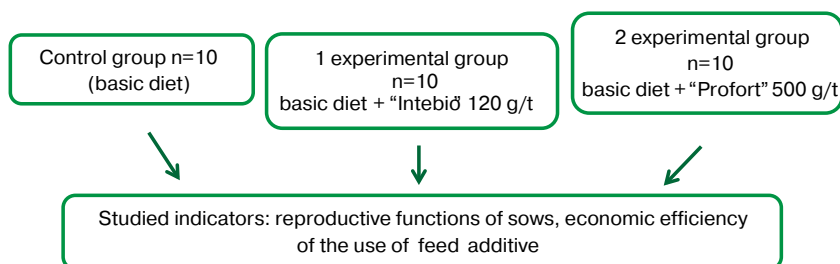


Fig. 2. Reproductive functions of the sows

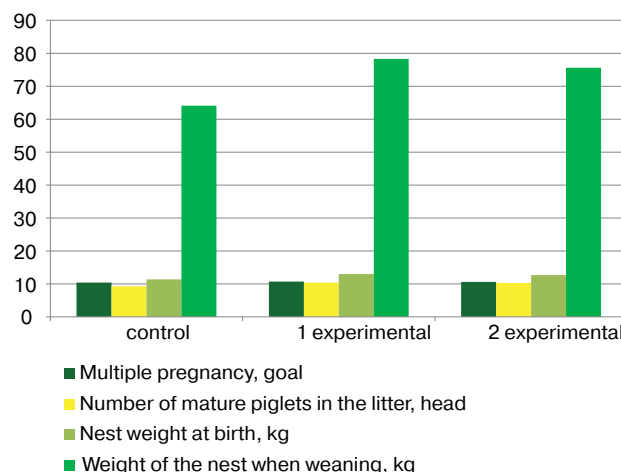


Fig. 3. Reproductive functions of the sows

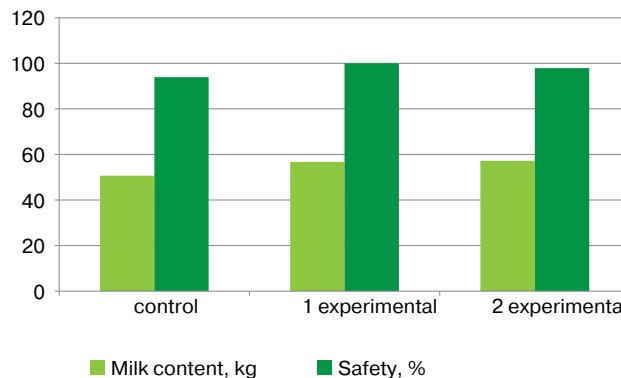
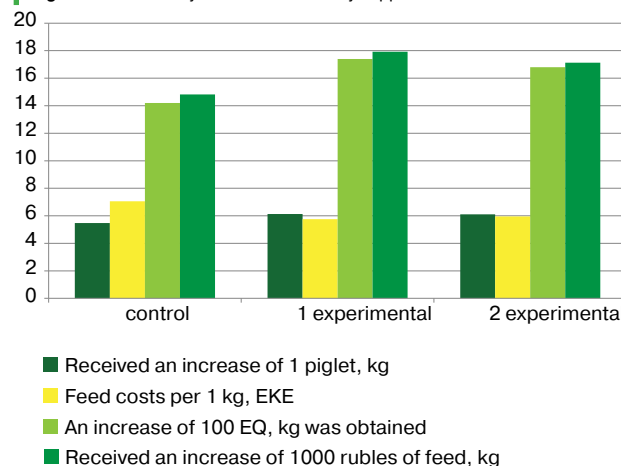


Fig. 4. The efficiency of the use of dietary supplements



and experimental group. (Piglet litter weight at birth was 11.35 kg in the control group, 12.97 kg ($P < 0.01$) in the 1st experimental group, 12.66 kg ($P < 0.05$) in the 2nd experimental group).

At the moment of weaning piglets at the age of 28 days their weight was, respectively, 64.09 kg (control group), 78.32 kg (the 1st experimental group), 75.61 kg (the 2nd experimental group). The difference from the control group was, respectively, 14.23 ($P < 0.001$) and 11.52 kg ($P < 0.001$).

It can be seen from the data in Figure 3 that the milk yield of the sows in the control group was at the level of 50.7 kg. At the same time, the milk yield of sows in the experimental groups was 56.73 and 57.23 kg respectively. The difference amounted to 11.9% and 12.9% ($P < 0.01$). The rate of survival of the piglets in the control group was 93.9%, which is less than in the experimental ones by 6.1% and 4.0% respectively.

So, consequently, the use of feed supplements in feeding sows in farrow and nursing sows had a positive effect on the reproductive functions of the pigs.

During the scientific and economic experiment the economic efficiency of probiotic and phytobiotic preparations was assessed (Figure 4).

During the experiment, the amount of the feed compound given per 1 sow was the same in all groups: 295.8 kg, including SK-1 — 105.0 kg, SK-2 — 190.8 kg, which amounted to 377.9 EFU. The cost of consumed feed was 3611.0 rubles. In the experimental groups the additional costs were paid for the purchase of the preparations as follows: in the 1st experimental group — 49.7 rubles, in the 2nd experimental group — 89.5 rubles.

During the experiment the control group showed live weight increase of 5.48 kg per 1 piglet, which is lower than in the experimental groups by 11.9% and 11.5% respectively. The weight of the litter per one sow also showed difference between the control group (53.5 kg)

and experimental groups by 22.6% and 18.5% respectively.

Feed costs per 1 kg of live weight gain (per litter per every 1 sow) were minimal in the 2nd experimental group, i.e. 5.76 EFU (55.8 rubles), and maximum in the control group — 7.06 EFU (67.5 rubles), the difference accounted for 18.4%.

Per every 100 EFU of the feed given per litter of 1 sow in the control group, the increase of live weight reached 14.2 kg, and in the experimental groups that rate was higher, respectively, by 22.5% and weight per every 18.3%. In monetary terms for every 1000 rubles, spent of forage, the difference amounted to 20.9% and 15.6% respectively in favor of the experimental groups of the sows.

The 1st experimental group achieved 12.1 kg, and the 2nd experimental group achieved 9.9 kg of additional live weight gain of piglets from 1 sow.

The proceeds from the sale of the additional live weight gain of piglets in the 1st experimental group amounted to 1815.0 rubles, in the 2nd experimental group — to 1485.0 rubles. In general, the proceeds from the sale of the live weight of piglets in the control group amounted to 8025.0 rubles, which is less than in the 1st experimental group by 1815.0 rubles, and in the 2nd experimental group — by 1485.0 rubles.

Conclusion

The use of the phytobiotic preparation "Intebio" and the probiotic preparation "Profort" in feeding of sows in farrow and nursing sows provided the increase of sows prolificacy by 1.9–2.9%, number of mature piglets in the litter — by 10.8–11.8%, size of the young piglets — by 10.4–12.3%, weight of the litter by the moment of weaning — by 18.0–22.2%, rate of the piglets survival — by 4.0–6.1%.

At the same time, those feed additives reduced feed costs per 1 kg of live weight gain per a litter of 1 sow — by 15.6–18.4%, and increased the proceeds from the sale of the obtained additional live weight by 1485.0–1815.0 rubles.

Все авторы несут ответственность за свою работу и представленные данные.

Все авторы внесли равный вклад в эту научную работу. Авторы в равной степени участвовали в написании рукописи и несут равную ответственность за плагиат. Авторы заявляют об отсутствии конфликта интересов.

All authors bear responsibility for the work and presented data.

All authors have made an equal contribution to this scientific work. The authors were equally involved in writing the manuscript and bear the equal responsibility for plagiarism. The authors declare no conflict of interest.

REFERENCES

1. Nikolaichik I. et al. Study of the effect of a stabilized enzyme complex on the productive and biological indicators of young pigs. Bulletin of the Kurgan State Agricultural Academy. 2020. 4(36) 23-29 (In Russian)
2. Fedorov V.K., Fedyuk V.V., Kruglikov A.N. The influence of phytochemical preparations on the safety, growth, fattening, meat quality and resistance indicators of pigs. Agrarian science. 2021; (10):17-23. (In Russian) <https://doi.org/10.32634/0869-8155-2021-353-10-17-23>
3. Okhokhonina E. The current state of pig breeding in Russia. Priority areas of regional development: Collection of articles based on the materials of the II All-Russian (national) scientific-practical conference with international participation. Kurgan, 2021, 466-469 (In Russian)
4. Smakuyev D. et al. Acclimatization and productive qualities of american origin aberdeen-angus cattle pastured at the submontane area of the northern Caucasus. Journal of the Saudi Society of Agricultural Sciences, 2021. doi:10.1016/j.jssas.2021.05.011
5. Morozova L. et al. Improving the physiological and biochemical status of high-yielding cows through complete feeding. International Journal of Pharmaceutical Research, 2020, 12 2181-2190 doi:10.31838/ijpr/2020.SP1.319
6. Ivanova N. Efficiency of pork production. Sciencetime, 2019, 7(67) 34-37
7. Koschaev A., Shkredov V. and Chus R. The efficiency of pig breeding and ways to increase it with the use of probiotics. Institutional transformations of the agro-industrial complex of Russia in the context of global challenges Krasnodar, 2018, 54 (In Russian)
8. Rebezov M.B., Topuria G.M., Singarieva N.S. Immunobiochemical blood parameters of sows. Innovations in scientific and technical support of the agro-industrial complex of Russia. materials of the All-Russian (national) scientific and practical conference. Kursk, 2020. 330-334. (In Russian)
9. Rebezov M.B., Topuria G.M., Trushina L.N., Kogan Yu.Yu. The content of mineral substances in the blood of sows. Agricultural science — agriculture. Collection of materials of the XV International Scientific and Practical Conference. Barnaul, 2020. 341-342. (In Russian)
10. Akhmedkhanova R., Gamidov N. The use of aquatic organisms in the feeding of poultry. Problems of the development of the agro-industrial complex of the region, 2010, 1(1) 73-77
11. Stepanova I. Friends of the intestines: Aspects of the use of probiotics in industrial pig breeding. Effective animal husbandry, 2020, 8(165) 22-27
12. Callaway T., Edrington T., Anderson R., Harvey R., Genovese K., Kennedy C. Probiotics, prebiotics and competitive exclusion for the prevention of bacterial diseases. Anim Health Res Rev, 2008, 9(2) 217 pmid:19102792
13. Corcionivoschi N., Drincanu D., Pop I., Stack D., Ștef L., Julean C. The effect of probiotics on animal health. Scientific papers animal Husbandry and biotechnology, 2010, 43(1) 35-41
14. Gareau M., Sherman P., Walker W. Probiotics and the gut microbiota in intestinal health and disease. Nat Rev Gastroenterol Hepatol, 2010, 7(9) 503-514 pmid:20664519
15. Brown M. Methods of action of probiotics: recent developments. Journal of Achievements in Animal husbandry and Veterinary Medicine, 2011, 10(14) 1895-1900
16. Debski B. Supplementation of pigs with zinc and copper as an alternative to traditional antimicrobials. Pol J Vet Sci, 2016, 19(4) 917-924 pmid:28092617
17. Dowarah R., Verma A., Agarwal N. The use of lactobacilli as an alternative to growth-promoting antibiotics in pigs: a review. Anim nutr, 2017, 3(1) 1-6 pmid:29767055
18. Świątkiewicz S., Arczewska-Włosek A., Józefiak D. Application of microalgae biomass in poultry nutrition. World's Poultry Sci J, 2015, 71 663-672 doi: 10.1017/S0043933915002457
19. Windisch W., Schedle K., Plitzner C., Kroismayr A. Use of phytochemical products as feed additives for swine and poultry. J Anim Sci, 2008, 86(Suppl14) 140-148 doi: 10.2527/jas.2007-0459

20. Sen M.N., Gorelik O.V., Neverova O.P. Improving the efficiency of pork production. Scientific contribution of young researchers to the preservation of traditions and the development of agriculture. Collection of scientific papers of the International Scientific and Practical Conference of Young Scientists and Students. 2016. 189-191. (In Russian)
21. Belookova O.V., Belookov A.A., Chukhutin E.V., Gritsenko S.A. The influence of phytobiotics on the productive qualities of pigs. Topical

- issues of veterinary and agricultural sciences. Materials of the National (All-Russian) Scientific Conference of the Institute of Veterinary Medicine. Chelyabinsk, 2021. 99-106. (In Russian)
22. Belookov A.A., Belookova O.V., Chukhutin E.V., Gorelik O.V. The use of antibiotics in pig breeding. Feeding of farm animals and feed production. 2021. № 11(196): 50-56. (In Russian)

ОБ АВТОРАХ:

Алексей Анатольевич Белооков,
доктор сельскохозяйственных наук, доцент
Южно-Уральский государственный аграрный университет,
Троицк, Российская Федерация
<https://orcid.org/0000-0002-1083-5832>

Оксана Владимировна Белоокова,
кандидат сельскохозяйственных наук, доцент
Южно-Уральский государственный аграрный университет,
Троицк, Российская Федерация
e-mail: belookova@yandex.ru

Евгений Владимирович Чухутин,
аспирант
Южно-Уральский государственный аграрный университет,
Троицк, Российская Федерация
e-mail: chukhutin_vet@mail.ru

Ольга Васильевна Горелик^{1,2},
доктор сельскохозяйственных наук, профессор
¹ Уральский государственный аграрный университет, Екате-
ринбург, Российская Федерация;
² Уральский федеральный аграрный научно-исследователь-
ский центр Уральского отделения Российской академии наук,
Екатеринбург, Российская Федерация;
<https://orcid.org/0000-0002-9546-2069>
e-mail: olgao205en@yandex.ru

ABOUT THE AUTHORS:

Alexey Anatolyevich Belookov,
Doctor of Agricultural Sciences, Associate Professor
South Ural State Agrarian University, Troitsk,
Russian Federation
<https://orcid.org/0000-0002-1083-5832>

Oksana Vladimirovna Belookova,
Candidate of Agricultural Sciences, Associate Professor
South Ural State Agrarian University, Troitsk,
Russian Federation
e-mail: belookova@yandex.ru

Evgeny Vladimirovich Chukhutin,
Graduate student,
South Ural State Agrarian University,
Troitsk, Russian Federation
e-mail: chukhutin_vet@mail.ru

Olga Vasilyevna Gorelik^{1,2},
Doctor of Agricultural Sciences, Professor
¹ Ural State Agrarian University, Yekaterinburg,
Russian Federation;
² Ural Federal Agrarian Research Center of the Ural Branch of the
Russian Academy of Sciences, Yekaterinburg,
Russian Federation
<https://orcid.org/0000-0002-9546-2069> e-mail: olgao205en@
yandex.ru

НОВОСТИ • НОВОСТИ • НОВОСТИ • НОВОСТИ • НОВОСТИ •**В РФ с начала года зарегистрировано 48 очагов АЧС**

В России с начала текущего года по 26.07.2022 зарегистрировано 48 очагов африканской чумы свиней (АЧС), сообщает Информационно-аналитический центр Россельхознадзора. Как отмечают в ведомстве, среди домашних свиней зарегистрировано 22 очага АЧС: на территории Астраханской (4), Ивановской (2), Костромской (3), Омской (1), Ростовской (1), Самарской (2), Саратовской (1), Свердловской (1), Смоленской (1), Ярославской (1) областей, Хабаровского (1) и Ставропольского (1) краев, республик Башкортостан (1) и Северная Осетия (1), в Ханты-Мансийском АО (1). Вспышки в основном регистрируются в ЛПХ. Среди диких кабанов зафиксировано 26 случаев АЧС: на территории Амурской (3), Волгоградской (2), Ивановской (3), Костромской (5), Орловской (1), Ростовской (1), Саратовской (2), Ярославской (1) областей, Приморского (3), Хабаровского (2) и Ставропольского (1) краев и Республики Северная Осетия (2). По данным Россельхознадзора, в России эпизоотическая ситуация более контролируемая по сравнению с положением дел в Европе. Для сравнения, в Румынии с начала этого года по 25.07.2022 зарегистрировано 478 очагов АЧС, в Латвии – 327, в Польше – более 1 тыс. Что касается Германии, то там с момента первого обнаружения 09.09.2020 по настоящее время зафиксировано 903 очага АЧС. В РФ, пояснили в ведомстве, отработана система регионализации, компартментализации свиноводческих предприятий (зооанитарный статус) и прослеживаемости продукции животноводства.

(Источник: vetandlife.ru)

Российские исследователи разработали проект автоматизированной системы для оперативного определения антигенов африканской и классической чумы свиней

Пермскими учеными разработан проект автоматизированной системы для оперативного определения антигенов африканской и классической чумы свиней. В разработке приняли участие научные сотрудники Пермского Политеха, ПГАТУ, Пермского института ФСИН России и Государственного аграрного университета Северного Зауралья. Исследование выполнено в рамках Программы стратегического академического лидерства «Приоритет 2030». Как сообщил один из разработчиков, профессор кафедры информационных технологий и автоматизированных систем Пермского Политеха, доцент, д.т.н. Сергей Костарев, сегодня основной способ выявления вирусов классической и африканской чумы – серологическое обследование. Исследователи решили использовать для автоматизированной диагностики этих заболеваний систему на основе ПЦР. Устройство довольно просто в использовании: биоматериал нужно загрузить в контейнер для тестирования, далее анализатор определяет вид антигена чумы, и система, проанализировав результаты реакции, выдает информацию. Затем происходит озонирование и дезинфекция прибора.

(Источник: официальный портал Пермского Политеха)