International Science Group

ISG-KONF.COM

SCIENTIFIC BASES OF SOLVING OF THE MODERN TASKS

01 JUNE 02

XIX SCIENTIFIC AND PRACTICAL CONFERENCE

FRANKFURT AM MAIN, GERMANY

Frankfurt am Main

DOI 10.46299/ISG.2020.XIX

ISBN 978-1-64871-425-2

SCIENTIFIC BASES OF SOLVING OF THE MODERN TASKS

Abstracts of XIX International Scientific and Practical Conference

Frankfurt am Main, Germany
1-2 June, 2020

Library of Congress Cataloging-in-Publication Data

UDC 01.1
The 19 th International scientific and practical conference « SCIENTIFIC BASES OF SOLVING OF THE MODERN TASKS » (1-2 June, 2020). Frankfurt am Main, Germany 2020. 416 p.

ISBN - 978-1-64871-425-2

Published on Bookwire by Bowker
https://www.bookwire.com/

The content and reliability of the articles are the responsibility of the authors. When using and borrowing materials reference to the publication is required.

Collection of scientific articles published is the scientific and practical publication, which contains scientific articles of students, graduate students, Candidates and Doctors of Sciences, research workers and practitioners from Ukraine. The articles contain the study, reflecting the processes and changes in the structure of modern science. The collection of scientific articles is for students, postgraduate students, doctoral candidates, teachers, researchers, practitioners and people interested in the trends of modern science development.

The recommended citation for this publication is:

Afanasiev V., Sitkov O., Afanasiev Y., the use of unmanned aerial vehicles as a mobile gateway in the iot concept // SCIENTIFIC BASES OF SOLVING OF THE MODERN TASKS. Abstracts of XIX International Scientific and Practical Conference. Frankfurt am Main, Germany 2020. pp. 12-15 pp.

URL: http://isg-konf.com .

THE INFLUENCE OF PROBIOTICS AND THE COMPLEX OF BIOGENIC NANOSELENIUM AND PROBIOTICS ON THE BLOOD AND LIVER BIOCCHEMICAL INDICATORS

Tsekhmistrenko Oksana,
Ph.D., Associate Professor
Bila Tserkva National Agrarian University

Bityutskyy Volodymyr,
Doctor of Agricultural Sciences, Professor
Bila Tserkva National Agrarian University

Tsekhmistrenko Svitlana
Doctor of Agricultural Sciences, Professor
Bila Tserkva National Agrarian University

Biogenic nanoparticles of selenium (SeNPs) synthesized with the participation of bacteria3 have unique physicochemical and biological properties compared to inorganic and organic Se. The synthesis of SeNPs, with the participation of probiotic strains of bacteria, is an environmentally friendly, inexpensive, high-performance and large-scale nanobiotechnological production. Probiotic bacteria enriched with nanoselenium can be effectively used as an alternative to other forms of selenium as a food and feed additive due to the synergistic action of Se and probiotics [2, 9, 11, 13]. Se nanoparticles like nanoparticles of another elements [1, 15] have enzymatic activity, capable of altering the oxidation step and auto-regenerating, and therefore function as SOD, catalase and peroxidase, protecting tissues and organs from oxidative stress [10, 14]. Having qualities of mimetics of oxidases, peroxidases, and phosphatases, nano-sized selenium preparations can be used in vitro to detect biomarkers of diseases, and in vivo as antioxidants. Future studies will help to identify the interaction of nanoscale drugs with biological molecules, especially their metabolism, breakdown, biocompatibility and side effects.

Biogenic selenium nanoparticles have been found to affect the redox sensitive transcription factor Nrf2 (Keap1 / Nrf2 / ARE signaling), which activates the transcription and synthesis of a number of antioxidant enzymes [12]. The purpose of this study was to investigate the effect of the native probiotic supplement Lactobacillus plantarum IMB B-7679, and the probiotic cultured in the presence of nanoselenium and sodium selenite on growth, conservation, feed conversion, quail's blood and liver biochemical parameters.

Four groups of poultry with 50 heads each were formed for the study: 1st - control group receiving standard feed, 2nd - received with *L. plantarum* IMB B-7679 diet, 3rd - received *L. plantarum* IMB B -7679, cultivated in the presence of nanoselenium, 4-a - *L. plantarum* IMB B-7679, which grew in the presence of sodium selenite.

The accumulation of nanoselenium in bacteria and the biogenic transformation of sodium selenite into selenium nanoparticles had been established. The obtained selenium nanoparticles had the appearance of round granules of 8-10 nm in size, mainly accumulated in the periphery of lactic acid bacteria near the cell membrane. It was experimentally proved that the conservation and the live weight of the quails of the experimental groups outweighed the control analogues. The concentration of cholesterol, total lipids and triacylglycerols in serum decreased and the calcium content increased relative to control. Addition to the diet of *L. plantarum* IMB B-7679, which grew in the presence of nanoselenium and sodium selenite, significantly increased the protein content of the blood. In the serum of the research groups, the content of ceruloplasmin and glutathione peroxidase activity were higher ($p < 0.05$). Similar results were also observed with the addition of a basal diet (0.1 ppm Se) of 0.3 ppm Se in the form of nanoelemental Se, sodium selenite or yeast Se [6]. The addition of nano-Se (0.2, 0.3, 0.4, and 0.5 ppm) in the broiler diet improved growth, immune function, and carcass characteristics without affecting the internal organs [2, 11, 14]. The combination of probiotics (*Aspergillus*) and nano-particles of Se also showed an improvement in growth, fatty acid profile of skeletal muscle and α-tocopherol content in serum of broilers [4]. In addition, nano-Se improved antioxidant status (mediated through malondialdehyde and glutathione peroxidase), and increased IgG and IgM levels compared to organic and inorganic Se under oxidative stress [10] in chickens and thermal stress [14] in broilers while improving growth and immunity (cytokine gene expression).

The content of total protein in the tissues of quail's liver in the experimental groups increased. The activity of catalase, glutathione peroxidase and superoxide dismutase in quail's liver treated with *L. plantarum* IMB B-7679, which grew in the presence of nanoselenium and sodium selenite, significantly exceeded that of control birds. The activity of AlAT, AsAT, catalase, blood creatinine content in the research groups were at the control level.

Organic Se (Se-yeast or Zn-Se-Met) and nano-Se showed similar improvement in broiler growth, meat and carcass characteristics, but significantly higher than inorganic Se [7]. Similarly [2, 14] found a significant increase in weight gain, survivability and improvement in FCR by supplementing different sources of Se compared to controls. Moreover, serum and hepatic GSH-Px activity was also better in the supplementation group than in the control group. However, different sources of selenium (sodium selenite, yeast enriched in Se, selenium-methionine, nano-Se) in Chinese local chicken Subei did not affect growth parameters, but antioxidant ability GSH-Px in breast meat / serum and serum malodialdehyde blood and meat quality were improved by organic and nano-Se [8]. Some studies also show a slight effect of nano-Se supplementation on growth, carcass color, and immune organ index (thymus, spleen, and bursa) in broilers [3]. However, significant antioxidant effects have been reported in many studies related to nano-Se supplementation in chickens.

Many studies have reported the antioxidant capacity of Se, but very few have used its nanoparticles. Nano-Se broiler feeding has been reported to significantly increase serum GSH-Px and superoxide dismutase (SOD) activity and decrease malodialdehyde concentrations [10]. However, broilers receiving higher levels of nano-Se showed a decrease in serum GSH-Px and SOD activity. In addition, there is a higher ratio of heterophiles and lymphocytes in birds receiving nano-Se without altering other hematological parameters [14]. Oxidative stress raises blood glucose and cholesterol levels. Nano-Se increases the antioxidant capacity of the liver by reducing the amount of oxidized GSH-Px in the liver, accelerating the decrease in GSH-Px levels [2].

Addition of nano-Se to laying diets showed insignificant effects of various sources of selenium (Se methionine, Se yeast and nano-Se) on the performance and quality parameters of eggs other than egg mass, and selenium retention in eggs, which were enhanced without supplementation. sources [14]. The highest Se retention in the tissues of the pectoral muscle of the liver was observed in response to dietary nano-Se. Nano-Se has improved cellular and humoral immunity [5]. Despite the key role of Se in reproductive physiology, the incubation of selenium was unaffected [1]. Further studies are needed in birds of egg and meat breeds to evaluate the potential of nano-Se to modulate deposition performance, hatchability, and immune responses.

Thus, the addition of probiotics and a complex of probiotics and nanoselenium had a positive effect on growths, biochemical parameters, feed conversion rate and quail preservation.

Reference

1. Bityutskyy, V. S., Tsekhmistrenko, O. S., Tsekhmistrenko, S. I., Spyvack, M. Y., & Shadura, U. M. (2017). Perspectives of cerium nanoparticles use in agriculture. The Animal Biology, 19(3), 9–17. http://doi.org/10.15407/animbiol19.03.009

2. Bityutskyy, V., Tsekhmistrenko, S., Tsekhmistrenko, O., Melnychenko, O., & Kharchyshyn, V. (2019). Effects of Different Dietary Selenium Sources Including Probiotics Mixture on Growth Performance, Feed Utilization and Serum Biochemical Profile of Quails. In Modern Development Paths of Agricultural Production (pp. 623-632). Springer, Cham. https://doi.org/10.1007/978-3-030-14918-5_61

3. Mohammadi, H., Farzinpour, A., Vaziry, A. (2016) Reproductive performance of breeder quails fed diets supplemented with L-cysteine-coated iron oxide nanoparticles. Reprod Domest Anim, 2017, 1–7

4. Mohammadi, V., Ghazanfari, S., Mohammadi-Sangcheshmeh, A., Nazaran, M.H. (2015) Comparative effects of zinc-nanocomplexes, zinc-sulphate and zinc methionine on performance in broiler chickens. Br Poult Sci, 56, 486–493

5. Mohan, P., Mala, R. (2019) A review on the effect of ZNO nanomaterial as supplement in poultry farming. AIP Conference Proceedings 020030 (2019); https://doi.org/10.1063/1.5100715

6. Ognik, K., Stepniowska, A., Cholewinska, E., Kozlowski, K. (2016) The effect of administration of copper nanoparticles to chickens in drinking water on estimated intestinal absorption of iron, zinc, and calcium. Poult Sci, 95, 2045–2051

7. Olgun, O., Yildiz, A.O. (2017) Effects of dietary supplementation of inorganic, organic or nano zinc forms on performance, eggshell quality, and bone characteristics in laying hens. Ann Anim Sci, 17(2), 463–476

8. Pandav, P.V., Puranik, P.R. (2015) Trials on metal enriched *spirulina platensis* supplementation on poultry growth. Glob. J. Biosci Biotechnol, 4, 128–134

9. Tsekhmistrenko, S. I., Bityutskyy, V. S., Tsekhmistrenko, O. S., Horalskyi, L. P., Tymoshok, N. O., & Spivak, M. Y. (2020). Bacterial synthesis of nanoparticles: A green approach. Biosystems Diversity, 28(1), 9-17.

10. Tsekhmistrenko, S.I., Bityutskyy, V.S., Tsekhmistrenko, O.S., Polishchuk, V.M., Polishchuk, S.A., Ponomarenko, N.V., Melnychenko, Y.O., & Spivak, M.Y. (2018). Enzyme-like activity of nanomaterials. Regulatory Mechanisms in Biosystems, 9(3), 469–476. DOI https://doi.org/10.15421/021870

11. Tymoshok, N. O., Kharchuk, M. S., Kaplunenko, V. G., Bityutskyy, V. S., Tsekhmistrenko, S. I., Tsekhmistrenko, O. S., Spivak, M. Y., & Melnichenko O. M. (2019). Evaluation of effects of selenium nanoparticles on *Bacillus subtilis*. Regulatory Mechanisms in Biosystems, 10(4), 544–552. https://doi.org/10.15421/021980

12. Xiao, X., Song, D., Cheng, Y., Hu, Y., Wang, F., Lu, Z., & Wang, Y. (2019). Biogenic nanoselenium particles activate Nrf2-ARE pathway by phosphorylating p38, ERK1/2, and AKT on IPEC-J2 cells. Journal of cellular physiology, 234(7), 11227–11234. https://doi.org/10.1002/jcp.27773

13. Xu, C., Guo, Y., Qiao, L., Ma, L., Cheng, Y., & Roman, A. (2018). Biogenic synthesis of novel functionalized selenium nanoparticles by Lactobacillus casei ATCC 393 and its protective effects on intestinal barrier dysfunction caused by enterotoxigenic Escherichia coli K88. Frontiers in microbiology, 9. doi: 10.3389 / fmicb.2018.01129

14. Цехмістренко, О.С., Бітюцький, В.С., Цехмістренко, С.І., Мельниченко, О.М., Тимошок, Н.О., Співак, М.Я. (2019). Використання наночастинок металів та неметалів у птахівництві. Технологія виробництва і переробки продукції тваринництва, 2, 113–130.

15. Цехмістренко, О.С., Цехмістренко, С.І., Бітюцький, В.С., Мельниченко, О.М., Олешко, О.А. (2018). Біоміметична та антиоксидантна активність наносполук діоксиду церію. Світ медицини та біології, 1(63), 196–201.

[i] *Медведська Л. О.* Особова справа. Ніжинський пед. у-т імені Миколи Гоголя. Ф. 427. Оп. 2. Арх. № 64. Відділ кадрів. 34 арк.
[ii] Л. А. Медведская [Некролог]. История СССР. 1970. № 4. С. 243.
[iii] Л. О. Медведська [Некролог]. Український історичний журнал. 1970. № 3. С. 156
[iv] *Медведская Л. А.* Южное общество декабристов и Польское патриотическое общество. Очерки из истории движения декабристов: Сб. статей под ред. Н. М. Дружинина, Б. Е. Сыроечковского. М., 1954. С. 277, 279.
[v] Там само. С. 288.
[vi] Там само.
[vii] Там само. С. 288.
[viii] Там само. С. 289.
[ix] Там само. С. 298, 303.
[x] Там само. С. 299–307.
[xi] Там само. С. 300.
[xii] Там само. С. 301.
[xiii] *Медведська Л. О.* Декабристи на Полтавщині. Харків, 1960. 61 с.
[xiv] Там само. С. 7–8.

[xv] Там само. С. 8.
[xvi] Там само. С.49–50.
[xvii] Там само. С. 51.
[xviii] Там само. С. 9.
[xix] Там само. С.. 13.
[xx] Там само. С.14.
[xxi] ВД. Т.IX. С.217; *Медведська Л. О.*. Декабристи на Полтавщині. С. 16.
[xxii] Там само. С. 17–19.
[xxiii] Там само. С. 46.
[xxiv] Там само. С. 61
[xxv] Там само. С. 59.
[xxvi] *Волконский С. Г.* Записки. Иркутск. 1991. 512 с..
[xxvii] *Медведська Л. О*. Сергій Іванович Муравйов-Апостол (Біографічний нарис). К., 1961. 147 с.
[xxviii] *Медведская Л. А*. Сергей Иванович Муравьев-Апостол. М. 1970. 176 с.
[xxix] *Медведська Л. О*. Сергій Іванович Муравйов-Апостол (Біографічний нарис). С. 27; *Медведская Л. А*. Сергей Иванович Муравьев-Апостол. С. 35.
[xxx] Там само.
[xxxi] Там само. С. 11.
[xxxii] Там само. С.18–19.
[xxxiii] Там само. С. 21.
[xxxiv] Там само. С. 36–37.
[xxxv] Там само. С.25; *Медведская Л. А*. Сергей Иванович Муравьев-Апостол. С. 35.
[xxxvi] Там само. С. 37.
[xxxvii] Там само. С. 43.