WOAH Collaborative Centre Reports Activities 2022

Activities in 2022

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Title of WOAH Collaborating Centre	Food Safety in Eastern Europe, Central Asia and Transcaucasia
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1. Activities as a centre of research, expertise, standardisation and dissemination of techniques within the remit of the mandate given by WOAH

Food safety	
Title of activity	Scope
	As part of the state quality and safety monitoring program, the FGBU «VGNKI» carried out an annual research on determining chemical contaminants (antibacterial agents, hormonal growth promoters and other animal drugs, heavy metals, persistent organic pollutants, pesticides, mycotoxins, etc.), adulteration of dairy products (with non-vegetable fats, meat/fish products

State monitoring of food and feed safety	with meat of undeclared animal species) and microbiological contaminants. Studies were conducted in food products of animal origin (meat, offal, milk, fish, honey, meat, and dairy products), feedingstuffs, feed supplements and animal biomaterial. In 2022, FGBU «VGNKI» performed 21868 tests in 7036 samples, which is approximately 3 tests per sample. 4900 samples were of domestic origin (70%). Samples of foreign origin were from Republic of Belarus, Argentine Republic, Federative Republic of Brazil, Republic of Paraguay, China, Iran and other countries. 445 out of 7036 samples (6.3%) were noncomplaint with EAEU safety and quality regulations due to chemical and microbiological contamination above the maximum levels and adulteration. Milk, beef, pork and offal were among those products with the least percentage of positive results (0.65%, 0.33%, 0.15%). None of non-complaint samples were found for sheep, horse rabbit meat and offal, which can be partly explained by the fewer number of conducted tests. Among the xenobiotics, the most frequently detected were dioxins (12.3%), coccidiostats (10.1%), oxymethylfurfurol – the contaminant of honey (7.8%) and avermectins (6.6%), all above the maximum levels. No hormonal growth stimulators, beta-agonists and sedative drugs were found neither in domestic origin samples, nor in foreign. After conducting DNA analyses on samples of foreign origin, horse DNA appeared to be the most frequently detected (33% of positive tests). There were also findings of poultry, swine and ruminant animals' DNA , but no DNA of soy, other plants or carnivorous animals. Adulteration with non-milk fat was found in 7.5% of milk product samples.

Feed safety	
Title of activity	Scope
State monitoring of food and feed safety	Feed materials, reindeer offal and wild-caught fish showed the highest occurrence of positive results (9.6%, 7.0%, and 4.5%, respectively), followed by poultry and honey. Most trials showed the presence of heavy metals in wild-caught fish. Using risk based sampling technique, it was determined that reindeer liver and kidneys were contaminated with cadmium, mercury and dioxins. Such results for honey and poultry may be explained by the zero tolerance policy for almost all veterinary drug residues in these two types of products in the EAEU legislation.In 2022 FGBU «VGNKI» performed the analysis of 1382 samples of feed materials: compound feed, feed additives, forage grain, soy and sunflower cake, etc. 127 samples were positive (9.2%). GMOs were detected in 12.9% of samples. Heavy metals above the maximum levels – in 1.1% of samples, and mycotoxins – in 2.3%.

Other	
Title of activity	Scope

Antimicrobial resistance	FGBU "VGNKI" is implementing a research project called "Veterinary monitoring of bacterial resistance to antimicrobial agents and identification of genetic determinants of resistance from environmental objects" (hereinafter referred to as R&D). As part of the R&D, 2942 bacterial isolates were isolated in the period from 2021 to 2022, including: Enterococcus spp. - 1222, Escherichia coli - 898, S. aureus - 302, Campylobacter spp. - 14, Listeria monocytogenes - 374, Salmonella spp. - 132. Proportion of multi-resistant isolates, according to EUCAST interpretation (simultaneous resistance to three or more classes): - Escherichia coli - 49.6%, - Salmonella spp. - 32.2%, - Enterococcus spp. - 2.9%, - S. aureus - 74%. All results of veterinary monitoring for antibiotic resistance are available on the online platform for analysis, visualization and sharing of data on antibiotic resistance - AMRcloud. The data is available via the links: ECOFF: https://public.amrcloud.net/link?id=IqGxM47G024G014 EUCAST 2022: https://public.amrcloud.net/link?id=VtIqs08ST27ST14 CLSI 2022: https://public.amrcloud.net/link?id=c JHvE21vr28vr14. In addition to a phenotypic assessment of resistance, molecular genetic methods were also implemented, in particular, whole genome sequencing of multiresistant isolates of Salmonella enterica, Escherichia coli, Campylobacter spp., Listeria monocytogenes, Staphylococcus spp., Enterococcus spp. as well as bioinformatics analysis of the obtained data. Analysis of the whole genome sequencing data allows for accurate taxonomic and/or strain identification of microorganisms with determination of sequence types, functional gene annotation, phylogenetic analysis of genomes in various ways, search for virulence factors, etc. Genetic characterization is aimed at assessing the prevalence of genetic determinants of resistance among zoonotic bacteria isolated from productive animals and from food and feed products. Antibiotic resistance genes are usually associated with the mobile part of the bacterial genome: with plasmids, transposons, integrons, genomic islands, etc. All of these components provide the means for a horizontal gene transfer between taxonomically and ecologically distant microorganisms like, for example, between the microbiomes of agricultural animals and birds and the human microbiome. Whole genome sequencing data not only reveals the presence of resistance genes, but also establishes their localization, including on mobile elements. The combination of classical microbiological methods with molecular genetic methods allows to obtain the most complete information about the various properties of bacteria, and also helps to confirm a number of phenotypic properties of specific isolates. In 2022, Methodology was developed for the detection of resistance genes to aminoglycosides, sulfonamides, trimethoprim in bacteria of the Enterobacteriaceae family. According to it, samples can be taken from food raw materials, food products, from animals, from environmental objects with or without the stage of bacterial isolation from these samples. Fragments of aadA1 and aadA2 genes were chosen that encode an enzyme

	that inactivates aminoglycosides by adding an adenine nucleotide. Fragments of sul1 and dfrA12 genes were selected that encode atypical enzymes of folate biosynthesis in bacteria, which practically do not interact with sulfonamides and trimethoprim. All target genes were localized on mobile elements: plasmids. A fragment of the csrB chromosomal gene was selected as an internal control element, designed to detect E. coli DNA (studies from 2020). ↙ design of primer and probe sets for amplification of aadA1 and aadA2 gene fragments (one set); sul1, dfrA12; ↙ optimization of PCR conditions; ↙ development of positive control samples based on plasmid DNA solutions; ↙ validation tests of the accepted methodology; ↙ determination of analytical characteristics. Within the framework of R&D, the most scientifically interesting strains of microorganisms are regularly deposited, and are later used as controls in conducting studies to test the sensitivity of microorganisms to antibiotics, as well as in the diagnosis of infectious diseases (salmonellosis, campylobacteriosis, etc.) For the implementation of the national patent deposit procedure, multidrug-resistant strains of microorganisms with phenotypic resistance were selected, and which were confirmed by the corresponding genetic determinants of resistance during a whole genome sequencing. The State Collection contains 18 newly isolated and fully characterized strains of microorganisms with multidrug resistance, three of which received patentable documents for a period of 20 years. Two applications have been submitted to FIIP (Federal Institute of Industrial Property) for obtaining patents.

2. Proposal or development of any procedure that will facilitate harmonisation of international regulations applicable to the main fucus area for which you were designated

Proposal title	Scope/Content	Applicable area
Studies quality control	Patent RU 2 782 213 C1 «Salmonella infantis bacterial strain used as a positive control for molecular genetic and microbiological studies related to determining the sensitivity of microorganisms to antibacterial drugs». Kish L., Ivanova O., Soltynskaya I., Lenev S., Prasolova O., Bogomazova A.	Laboratory expertise
Studies quality control	Patent RU 2 769 226 C1 «Set of oligonucleotides for semi-quantitative assessment of chicken DNA content in meat products by real-time PCR ». Gergel M., Bogomazova A., Soltynskaya I., Krylova E., Zaytseva E., Putintseva A.	Laboratory expertise

4. Did your Collaborating Centre maintain a network with other WOAH Collaborating Centres (CC), Reference Laboratories (RL), or organisations designated for the same specialty, to coordinate scientific and technical studies?

No

5. Did your Collaborating Centre maintain a network with other WOAH Collaborating Centres, Reference laboratories, or organisations in other disciplines, to coordinate scientific and technical studies?

Yes

Name of OIE CC/RL/other organisation(s)	Location	Region of networking Centre	Purpose
The French Agency for Veterinary Medicinal Products (ANSES-ANMV)	Javene, France	Europe	Risk assessment and management with regard to antomicrobial resistance in food and feed in agriculture

6. Did your Collaborating Centre place expert consultants at the disposal of WOAH?

Yes

NAME OF EXPERT	KIND OF CONSULTANCY	SUBJECT
Olga Ivanova	Round table of experts as part of the World Antimicrobial Awareness Week (Together with FAO, WHO, WOAH, UNEP)	Antimicrobial resistance

7. Did your Collaborating Centre provide advice/services to requests from Members in your main focus area?

No

8. Did your Collaborating Centre provide scientific and technical training, within the remit of the mandate given by WOAH, to personnel from WOAH Members?

Yes

a) Technical visit : 0

b) Seminars : 0

c) Hands-on training courses: 1

d) Internships (>1 month) : 0

TYPE OF TECHNICAL TRAINING PROVIDED (A, B, C OR D)	CONTENT	COUNTRY OF ORIGIN OF THE EXPERT(S) PROVIDED WITH TRAINING	NO. PARTICIPANTS FROM THE CORRESPONDING COUNTRY
c	Topic of general microbiology and the basics of molecular biology	Turkey	1

9. Did your Collaborating Centre organise or participate in the organisation of scientific meetings related to your main focus area on behalf of WOAH?

Yes

NATIONAL/INTERNATIONAL	TITLE OF EVENT	CO-ORGANISER	DATE (MM/YY)	LOCATION	NO. PARTICIPANTS
International	Socially Significant Infections of Farm Animals: Prevention and Control Measures	FAO, WHO, WOAH, UNEP	2022-12-15	VGNKI, Moscow	150

10. Publication and dissemination of any information within the remit of the mandate given by WOAH that may be useful to Members of WOAH

a) Articles published in peer-reviewed journals:

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1. Lakhov, S., Petrova, T., Bachinskaya, V., Antipov, A., Lugovaya, I., Burlakova, G. Sanitary and hygienic study of feed and evaluation of the sorption properties of the feed additive MAXISORB®, Veterinary Medicine (9), 2022, pp. 70-72.

2. Lugovaya, I., Petrova, Yu., Azarnova, T., Naydensky, M., Antipov, A., Kirzhinov, R., Anshakov, D., Zolotukhina, E., Burlakova, G. Results of veterinary and sanitary examination of turkeys using biostimulants in early ontogenesis. FSBEI HE "Moscow State Academy of Veterinary Medicine and Biotechnology named after K.I. Scriabin, FGBU "VGNKI", 2022, (1), pp. 89-92.

3. Makarov, D., Kozeicheva, E., Lavrukhina, O., Gergel, M., Kish, L. Different countries' requirements for the content of chemical contaminants in food products: what to consider when exporting. Production Quality Control, (3), 2022, pp. 50-57.

4. Kozeicheva, E., Makarov, D., Kozhushkevich, A., Lebedev, A. The problem of food contamination by 3-MCPD and glycidyl esters of fatty acids. Production Quality Contro,l (6), 2022, pp. 36-42.

5. Makarov, D., Ivanova, O., Pomazkova, A., Egoreva, M., Prasolova, O., Lenev, S., Gergel, M., Bukova, N., Karabanov, S. (2022). Antimicrobial resistance of commensal Enterococcus faecalis and Enterococcus faecium from food-producing animals in Russia. Veterinary World, Vol. 15 (3), 2022, pp. 611-621. DOI: 10.14202/vetworld.2022.611-621.

6. Makarov, D., Nesterenko, I., Belov, S., Tretyakov, A., Nebera, E. Animal fat in dairy products: the adulteration problem and control methods. Production Quality Control, (12), 2022, pp. 42-47.

7. Makarov, D., Gergel, M. Three Challenging Problems Of Honey Official Control: Antimicrobial Residues in Honey (Part 1). Veterinary medecine (9), 2022, pp. 12-16. DOI: 10.30896/0042-4846.2022.25.9.12-16.

8. Makarov, D., Gergel, M. Three Challenging Problems Of Honey Official Control: Adulteration Of Honey (Part 2). Veterinary medecine (10), 2022, pp. 10-14. DOI:10.30896/0042-4846.2022.25.10.10-13.

9. Makarov, D., Gergel, M. Three Challenging Problems Of Honey Official Control: Protection of Bees from Pesticides (Part 3). Veterinary medecine (11), 2022, pp. 11-14. DOI:10.30896/0042-4846.2022.25.11.11-14.

10. Makarov, D., Balagula, T. Tretyakov, A. Targeted Research as a Tool of Improving the Effectiveness of State Monitoring of Chemical Pollutants in Food Products. Journal of Agriculture and Environment, Vol. 6 (26), 2022. DOI: https:/doi.org/10.23649/jae.2022.6.26.04.

11. Balagula, T., Makarov, D., Lavrukhina, O. About the Development of the State Food Safety Monitoring System. Veterinary medecine (12), 2022, pp. 8-14. DOI: 10.30896/0042-4846.2022.25.12.08-14.

12. Prasolova, O., Malik, N., Soltynskaya, I., Bogomazova, A., Krylova, E., Malik, E. Modern molecular genetic technologies for forming a list of representatives in normal bird microflora. International Bulletin of Veterinary Medicine (4), 2022, pp. 203-210. DOI: 10.52419/issn2072-2419.2022.4.203.

13. Soltynskaya, I., Bogomazova, A., Krylova, E., Prasolova, O., Ivanova, O. Design of oligonucleotide primers for the development of a method for typing Salmonella isolates in the Russian Federation. International Transaction Journal of Engineering, Management, & Applied Sciences & Technologies, Vol. 13 (12), 13A12T, pp. 1-7. DOI: 10.14456/ITJEMAST.2022.251.

14. Lenev, S., Krylova, E., Gordeeva, V., Prasolova, O., Soltynskaya, I., Abrosimova, N. Biological properties and genetic characteristics of collection and epizootic strains of Salmonella. International Transaction Journal of Engineering, Management, & Applied Sciences & Technologies, Vol. 13 (12), 13A12L, pp. 1-11. DOI: 10.14456/ITJEMAST.2022.243.

15. Makarov, D., Ivanova, O., Pomazkova, A., Egoreva, M., Prasolova, O., Lenev S., Gergel M., Bukova N., Karabanov S. Antimicrobial

resistance of commensal Enterococcus faecalis and Enterococcus faecium from food-producing animals in Russia. Veterinary World, Vol. 15 (3), pp. 611-621. DOI: 10.14202/vetworld.2022.611-621.
16. Ivanova, O., Blumenkrants, D., Krylova, E., Soltynskaya, I., Goncharova, A., Chaikyn, E., Achmedzyanova, A., Panin, A. Experience in the formation of a research collection antibiotic-resistant strains zoonotic bacteria in the Russian Federation. Veterinary World, Manuscript ID: 2-1668065157.
17. Kozhushkevich, A., Kozeicheva, E., Lebedev, A., Ovcharenko, V., Kalantaenko, A. Determination of 3-Monochloropropanediol and Glycidol in Food Products. Asian J. of Chemistry. Vol. 34 (2), 2022, pp. 429–431.
18. Kozeicheva, E., Makarov, D., Kozhushkevich, A., Lebedev, A. Problem of food contamination with 3-MCPD and glycidyl esters of fatty acids. Production Quality Control, (6), 2022, pp. 36-42.
19. Kozhushkevich, A., Kozeicheva, E., Lebedev, A. Development of a method for the determination of 3-MCPD and glycidyl esters of fatty acids in food products. IV Congress of Analysts of Russia, Moscow, September 26-30. Abstracts of reports, p. 510.
20. Kozhushkevich, A., Kozeicheva, E., Lebedev, A., Turbanina, K. Determination of pesticides in the dead bees. IV Congress of Analysts of Russia, Moscow, September 26-30. Abstracts of reports, p. 106.
21. Priyma, A., Nesterenko, I., Bakay, K., Safronova, V., Tretyakov, A. Development of a specific method for determining the residual amounts of tylosin in livestock products by enzyme immunoassay. IV Congress of Analysts of Russia, Moscow, September 26-30. Abstracts of reports, p. 206.
22. Bakay, K., Nesterenko, I., Priyma, A., Safronova, V., Tretyakov, A., Mukhametova, L. Development of a method for the determination of glyphosate by enzyme immunoassay in soybeans. IV Congress of Analysts of Russia, Moscow, September 26-30. Abstracts of reports, p. 207.
23. Priyma, A., Nesterenko, I., Bakay, K., Safronova, V., Tretyakov, A. Development of a polarization fluorescent immunoassay technique for the determination of kanamycin. IV Congress of Analysts of Russia, Moscow, September 26-30. Abstracts of reports, p. 208.
24. Batov, I., Nesterenko, I., Sorokin, A., Zhedulov, A., Nekrasov, D., Sukhova, T., Gracheva, T., Mamedova, E., Kovalenko, A., Seryakova, M., Tretyakov, A. HPLC-MS/MS determination of the content of clotrimazole, rifampicin, fumagillin, nystatin, colchicine, imidacloprid, clothianidin and dapsone in honey. IV Congress of Analysts of Russia, Moscow, September 26-30. Abstracts of reports, p. 514.
25. Sorokin, A., Bakay, K., Nesterenko, I. Quantitative determination of the content of glyphosate and its metabolite in soybeans and meal by HPLC-MS/MS. IV Congress of Analysts of Russia, Moscow, September 26-30. Abstracts of reports, p. 518.
26. Zhedulov, A., Batov, I., Nekrasov, D., Sorokin, A., Sukhova, T., Mamedova, E., Seryakova, M., Agaltsova, A., Kovalenko, A. Quantitative determination of the content of avilamycin in food and feed products using high performance liquid chromatography with a mass spectrometry detector. IV Congress of Analysts of Russia, Moscow, September 26-30. Abstracts of reports, p. 511.
27. Zhedulov, A., Batov, I., Nekrasov, D., Sorokin, A., Sukhova, T., Mamedova, E., Seryakova, M., Agaltsova, A., Kovalenko, A. Quantitative determination of the residual content of clavulanic acid in livestock products by high performance liquid chromatography with mass spectrometry detection. IV Congress of Analysts of Russia, Moscow, September 26-30. Abstracts of reports, p. 512.
28. Batov, I., Nekrasov, D., Sorokin, A., Zhedulov, A., Sukhova, T., Gracheva, T., Mamedova, E., Agaltsova, A., Kovalenko, A., Tretyakov, A., Kish, L. HPLC–MS/MS determination of residual nitrovin content, 4-nitrophenolate and nifurstyrenate in livestock products. IV Congress of Analysts of Russia, Moscow, September 26-30. Abstracts of reports, p. 513.
29. Nekrasov, D., Batov, I., Sorokin, A., Sukhova, T., Gracheva, T., Mamedova, E., Agaltsova, A., Seryakova, M., Kovalenko, A. Determination of quinolones in livestock products by HPLC-MS/MS. IV Congress of Analysts of Russia, Moscow, September 26-30. Abstracts of reports, p. 515.
30. Nekrasov, D., Zhedulov, A., Batov, I., Sorokin, A., Sukhova, T., Gracheva, T., Mamedova, E., Agaltsova, A., Seryakova, M., Kovalenko, A. Determination of tetracyclines in livestock products by HPLC-MS/MS. IV Congress of Analysts of Russia, Moscow, September 26-30. Abstracts of reports, p. 516.
31. Sorokin, A., Batov, I., Nekrasov, D., Zhedulov, A. Quantitative determination of macrolide content in livestock products by HPLC-MS/MS. IV Congress of Analysts of Russia, Moscow, September 26-30. Abstracts of reports, p. 519.
32. Grachev, S., Sarkhanov, A., Penkov, T., Tretyakov, A. Determination of total arsenic in fish and seafood by atomic absorption spectrometry with electrothermal atomization. Modification and optimization of sample preparation and analysis conditions. IV Congress of Analysts of Russia, Moscow, September 26-30. Abstracts of reports, p. 205.
33. Bardugov, N., Dronova, E., Nebera, E., Penkov, T. Determination of toxic metals in medicinal raw materials and drugs using inductively coupled plasma mass spectrometry. IV Congress of Analysts of Russia, Moscow, September 26-30. Abstracts of reports, p. 273.
34. Nikiforova, Z., Priyma, A., Khrushchev, Yu., Orlova, K., Himenes, D., Sarkhanova, A., Baykay, K., Penkov, T., Konovalova, G., Tokar, V., Gritsyk. V. Synthesis and determination of copper and zinc lysinates by Fourier-transform infrared spectroscopy. IV Congress of Analysts of Russia, Moscow, September 26-30. Abstracts of reports, p. 256.
35. Nikiforova, Z., Orlova, K., Priyma, A., Khrushchev, Yu., Himenes, D., Sarkhanova, A., Nebera, K., Baykay, K., Tochieva, O., Gritsyk. V. Determination of cobalt, copper, zinc and manganese methionines in feed additives by Fourier-transform infrared spectroscopy. Materials

of the XXIII International scientific-practical conference of students and young scientists "chemistry and chemical technology in the XXI century", Tomsk, May 16-19, Vol.1, pp. 379-380.
36. Priyma, A., Nesterenko, I., Baykay, K. Development of a method for screening determination of kanamycin in milk by ELISA. Materials of the XXIII International scientific-practical conference of students and young scientists "chemistry and chemical technology in the XXI century", Tomsk, May 16-19, Vol. 1, pp. 439-440.
37. Baykay, K., Nesterenko, I., Priyma, A. Determination of glyphosate in wastewater by inhibitor analysis. Materials of the XXIII International scientific-practical conference of students and young scientists "chemistry and chemical technology in the XXI century", Tomsk, May 16-19, Vol. 1, pp. 140-141.
38. Nesterenko, I., Baykay, K., Priyma, A., Safronova, V., Sarkhanova, A., Belytskaya, A. Development of a method for competitive enzyme immunoassay to determine the residual amounts of fluoroquinolones in livestock products. Veterinary medicine. Vol. 1, pp. 59-64.
39. Batov, I., Nekrasov, D., Zhedulov, A., Mamedova, E., Sukhova, T., Gracheva, T., Sorokin, A., Agaltsova, A., Kovalenko, A., Tretyakov, A., Kish, L. Determination of residual contents of nitrovin, 4-nitrophenolate and nifurstyrenate in livestock products using high-performance liquid chromatography with mass spectrometry detection. Veterinary medicine. Vol. 2, pp. 48-57.
40. Makarov, D., Nesterenko, I., Belov, S., Tretyakov, A., Nebera, E. Animal fat in dairy products: the problem of falsification and methods of control. Production Quality Control. Vol. 12, 2022, pp. 42-48.
41. Khrushchev, A., Akmaev, E., Kis, I., Gulyaeva, A., Bondarenko, V. Combination of HPLC and SERS detection applied to the analysis of the trace content of amoxicillin in milk. Vibrational Spectroscopy, Vol. 123, 2022.
42. Gulyaeva, A., Akmaev, E., Muravyeva, V., Khrushchev, A., Soboleva, N., Bondareko, V., Kolyachkina, S. Development of a reference material for the composition of tylosin tartrate. Standards in measurements and technologies. Abstracts of the V International Scientific Conference. Yekaterinburg, 2022.
43. Khrushchev, A., Akmaev, E., Likhikh, T., Khodkova, Yu., Bondarenko, V., Gulyaeva, A. Determination of trace amoxicillin by SERS. Proceedings of the Symposium of the IV Congress of Russian Analysts, Moscow, 2022.
44. Khrushchev, A., Akmaev, E., Gulyaeva, A., Likhikh, T., Khodkova, J., Kolyachkina, S. Quantitative measurement of trace amoxicillin using SERS under the conditions of controlled agglomeration of silver nanoparticles. Vibrational Spectroscopy, (120), 2022.
45. Khrushchev, A., Akmaev, E., Gulyaeva, A., Zavialov, A., Sidorenko, A., Bondarenko, V., Lvovskiy, A. Ion-induced agglomeration of Ag NPs for quantitative determination of trace malachite green in natural water by SERS. Vibrational Spectroscopy, (120), 2022.
46. Gulyaeva, A., Kis, I., Antonova, S., Sidorenko, A., Sirotkina, V. Approved standard material for doxycycline hyclate formulation: design guidelines. Proceedings of the Symposium of the IV Congress of Russian Analysts, Moscow, 2022.
47. Muravyeva, V., Soboleva, N., Makhlis, O., Bondarenko, V., Dorozhkin, V. Comparative characteristics of agar diffusion methods for the determination of tylosin activity. Problems of veterinary sanitation, hygiene and ecology, Vol. 1 (41), 2022.
48. Novik, T., Bondarenko, V., Khrushchev, A., Dorozhkin, V., Samsonov, V. Determination of residual amounts of metrifonate after external use of the drug "Antiovod". Problems of veterinary sanitation, hygiene and ecology, Vol. 2 (42), 2022.
49. Muravyeva, V., Kolyachkina, S., Makhlis, O., Soboleva, N., Zavyalov, A. Issues of development of flavophospholipol by microbiological method. Proceedings of the Symposium of the IV Congress of Russian Analysts, Moscow, 2022.
50. Smirnov, A., Bondarenko, V., Soboleva, N., Makhlis, O., Chagin, A. Pharmacokinetics of praziquantel and moxidectin in dogs after the use of "Helmimax". Russian parasitological journal, 2022.
51. Zemtsova, L., Esepenok, K., Kis, I. Influence of the procurement region on the properties of feathery raw materials and semi-finished products. In the collection: Actual problems of veterinary medicine, zootechnics, biotechnology and examination of raw materials and products of animal origin. Collection of works of the scientific-practical conference. Under the general editorship of S.V. Pozyabina, L.A. Gnezdilova, 2022, pp. 532-533, Moscow.

b) International conferences:

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1. From November 24th – 25th of 2022, specialists of the Rosselkhoznadzor and FGBU "VGNKI" took part in the Third Ministerial Conference on Antimicrobial Resistance in Muscat (Oman), at the end of which the Muscat Ministerial Manifesto on AMR was adopted.
2. On November 29, 2022 a round table of conference was held as part of the World Antimicrobial Awareness Week (Together with experts from FAO, WHO, WOAH, UNEP), Moscow 2022.
3. On December 8, 2022 specialists of the FGBU "VGNKI" took part in the international conference "Food safety and joint efforts to reduce resistance to antimicrobial drugs", held under the auspices of the Federal Service for Surveillance on Consumer Rights protection and Human Wellbeing (Rospotrebnadzor) with the technical assistance from the Food and Agriculture Organization of the United Nations.
4. Putintseva A., Kirsanova N., Leukhina O., Krylova E. Selection of sequences for internal control for use in PCR methods for determining the species affiliation of food products components. Science of young people is the future of Russia: Materials of the 7th International scientific conference of promising developments of young scientists. 12-13.12.2022. Kursk, Russia. V.4. P.328-331. DOI: 10.47581/2022/ML-

71/Putinceva.01.
5. Bogomazova A., Krylova E., Gordeeva V., Timofeeva I., Putintseva A., Kirsanova N., Prasolova O., Ivanova O., Soltynskaya I. Use of metagenomic samples collected at agricultural enterprises for PCR studies as part of veterinary monitoring of bacterial antibiotic resistance. Materials of the international scientific-practical conference «Fundamental and applied aspects of microbiology in science and education». 25-26.05.2022, Ryazan, Russia. P.66-69. Edited by Evdokimova O., Novak A., Kotelevets E.
6. Kirsanova N., Putintseva A., Timofeeva I., Osipova Yu., Krylova E., Prasolova O., Bogomazova A., Soltynskaya I., Ivanova O. Development and validation of a PCR method for detecting the qnrS and qnrB resistance genes that provide resistance to fluoroquinolones in Enterobacteriaceae. Abstracts of the XXIV International IACMAC Congress on antimicrobial theherapy. 25-27.05.2022. Moscow, Russia. CMAC. 2022. V.24. S.1, P.17.
7. Prasolova O., Timofeeva I., Osipova Yu., Akinina T., Krylova E., Kirsanova N., Kurichenkova E., Putintseva A., Bogomazova A., Leukhina O., Soltynskaya I. Analysis of the distribution of genetic determinants of resistance to tetracyclines, cephalosporins, penicillins, fluoroquinolones and colistin within the framework of veterinary monitoring in the Russian Federation. Abstracts of the XXIV international IACMAC congress on antimicrobial theherapy. 25-27.05.2022. Moscow, Russia. CMAC. 2022. V.24. S.1, P.29.

c) National conferences:
0
NA

d) Other (Provide website address or link to appropriate information):
6
Training was conducted on the topic: "Antibiotic resistance. Measures to contain it" with the use of online learning platforms.
5 advanced training courses were held on the topic of detection, identification and quantifying of GMOs in plant-based products, feed, seeds and planting material.

International cooperation
Throughout the year of 2022, FGBU "VGNKI" had an extensive cooperation with international organizations on a variety of topics and occasions. On January 24, 2022 a delegation from the International Center for the Fight against Antibiotic Resistance (ICARS) visited the Institution. The delegation from the Kingdom of Denmark was headed by the scientific consultant Per Hendriksen.
Later in February, FGBU "VGNKI" conducted a meeting with the Director of the French Agency for Supervision of Medicinal Products for Veterinary Use (ANMV) Jean-Pierre Auran, where the sides discussed plans for the future work on fighting antimicrobial resistance.
On November 25, 2022 specialists of the Institution participated in the 3rd High-Level World Ministerial Conference on Antimicrobial Resistance (AMR) in Oman. All of the members once again highlighted the importance of making effort when approaching this emerging health problem.

11. What have you done in the past year to advance your area of focus, e.g. updated technology?
FGBU "VGNKI" obtained a mega grant "Development of means for the prevention of soially significant infections in productive animals based on modern methods of nutrigenomis". With the participation and leader of this megagrant Prof. Andrew Karlyshev from Kingston University (United Kingdom)

12. Additional comments regarding your report:
NA