WOAH Collaborative Centre Reports Activities 2022

Activities in 2022

This report has been submitted: 4 mai 2023 11:33

<table>
<thead>
<tr>
<th>Title of WOAH Collaborating Centre</th>
<th>Food Safety in Eastern Europe, Central Asia and Transcaucasia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address of WOAH Collaborating Centre</td>
<td>FGBU “VGNKI”, 5 Zvenigorodskoye Highway 123022 Moscow, Russia</td>
</tr>
<tr>
<td>Tel.:</td>
<td>+74992531491</td>
</tr>
<tr>
<td>E-mail address:</td>
<td><a href="mailto:kanc@vgnki.ru">kanc@vgnki.ru</a></td>
</tr>
<tr>
<td>Website:</td>
<td><a href="http://www.vgnki.ru/">http://www.vgnki.ru/</a></td>
</tr>
<tr>
<td>Name Director of Institute (Responsible Official):</td>
<td>Leonid Kish</td>
</tr>
<tr>
<td>Name (including Title and Position) of Head of the Collaborating Centre (WOAH Contact Point):</td>
<td>Maria Gergel</td>
</tr>
<tr>
<td>Name of the writer:</td>
<td>Olga Ivanova</td>
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</table>

1. Activities as a centre of research, expertise, standardisation and dissemination of techniques within the remit of the mandate given by WOAH

<table>
<thead>
<tr>
<th>Title of activity</th>
<th>Scope</th>
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<tbody>
<tr>
<td>Food safety</td>
<td>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</td>
</tr>
</tbody>
</table>
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 noncompliant 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.

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<td>State monitoring of food and feed safety</td>
<td>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%.</td>
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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=cJHvE21vr28vr14. 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 FIP (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

<table>
<thead>
<tr>
<th>Proposal title</th>
<th>Scope/Content</th>
<th>Applicable area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Studies quality control</td>
<td>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.</td>
<td>Laboratory expertise</td>
</tr>
<tr>
<td>Studies quality control</td>
<td>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.</td>
<td>Laboratory expertise</td>
</tr>
</tbody>
</table>
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

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

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

Yes

<table>
<thead>
<tr>
<th>NAME OF EXPERT</th>
<th>KIND OF CONSULTANCY</th>
<th>SUBJECT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Olga Ivanova</td>
<td>Round table of experts as part of the World Antimicrobial Awareness Week (Together with FAO, WHO, WOAH, UNEP)</td>
<td>Antimicrobial resistance</td>
</tr>
</tbody>
</table>

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

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

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

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:

51. 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.


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


b) International conferences:

7. 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.

8. 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.

9. On December 8, 2022 specialists of the FGBU ”VGNKI” took part in the international conference "Food safety, Diagnosis and Control of Animal Diseases in Eastern Europe, Central Asia and Transcaucasia - WOAH Collaborative Centre Reports Activities 2022


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 socially 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