

WOAH Collaborative Centre Reports Activities 2023

Activities in 2023

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Centre Information

Title of WOA Collaborating Centre	WOAH Collaborating Center for Quality Management Systems
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Name (including Title and Position) of Head of the Collaborating Centre (WOAH Contact Point):	Asma Abdi Mohamed Shah
Name of the writer:	Asma Abdi Mohamed Shah

TOR1 AND 2: SERVICES PROVIDED

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

Category	Title of activity	Scope
Disease control (true)	1. Isolation and identification of viruses, bacteria, fungi, and parasites and writing the Standard Operating Procedures 2. PT and ring trials cycles 3. PT procedures-Detection of PPR antibodies in camel	1. Several bacteria, fungi and viruses were isolated and characterized at the ADAFSA-CC including Bibersteinia trehalose, Dermatophilus congolensis, AMR bacteria, Dermatophytosis, Corynebacterium pseudotuberculosis for the purpose of development and validation of diagnostic tests, increasing the scope of analysis, research and publication and vaccine development 2. The center participated in the annual PPR ring trial organized by CIRAD as well as a number of PT schemes provided by accredited providers (such as VETQAS, RCPA, and EQAS BioRad). 3. ADAFSA started world's first PT scheme for PPR in camel. This assures verification of diagnostic procedure and certifies the performance of the participating laboratories Different international laboratories from France, UK, Saudi Arabia, Jordan, Bahrain, Ethiopia and India participated in it.
		1. Provide comprehensive knowledge on the technical demands of implementing ISO/IEC 17025 and understand the requirements for the audit competence of testing and calibration laboratories 2. Develop expertise and value as an ISO/IEC 17025

<p>Training, capacity building (true)</p>	<p>1. ISO/IEC 17025:2017 VET. LAB QUALITY MANAGEMENT SYSTEM Implementation Training program. 31 July -1 August 2023 2. ISO/IEC 17025:2017 VET. LAB QUALITY MANAGEMENT SYSTEM 3. Internal auditor training program.2 – 3 August 2023 4. ISO/IEC 17043 and Internal Auditing October 23- 26, 2023- 4-days training course- Assuring quality in laboratories and General requirements for Proficiency Testing 5. Role of Reference Lab in Enhancing One Health Approach - Seminar 17/07/2023 - oral presentation on Quality assurance and quality control in diagnosing camel bacterial diseases targeting veterinarians and laboratory staff in RAK municipality, Al Ain Zoo and Abu Dhabi Quality and Conformity Council, UAE 6. Provided educational training for undergraduate students of United Arab Emirates University, Higher College of Technology, Abu Dhabi Vocational Training Institute. 7. CIRAD - Organization of Proficiency Test 14/06/2023 and 15/06/2023 -Webinar 8. The virtual training workshop on Camel Disease Diagnosis, held from September 6-7, 2023 9. Parasitology Reference and Teaching Slides kit Preparation 10. Bacteriology Reference and Teaching Slides kit Preparation 11. Scientific Lecture - Haematology An Overview 12. Private lab visit for pre-assessment 13. ADAFSA lab staff internal training on quality management</p>	<p>specialist and provide insight on how to plan and lead an ISO/IEC 17025 assessment. 3. Contribute to value adding and improving the organization Laboratory Management System by learning the skills and concepts essential to proficiency testing 4. Enhancing the quality control procedures for diagnosis of bacterial diseases. Also, unifying diagnostic protocols of bacterial diseases. 5. Hands-on Training on diagnostic techniques for animal diseases, laboratories safety requirement and quality management system implementation 6. To share knowledge, technical experience, and consultancy to promote veterinary education. 7. ADAFSA-CC-QMS staff attended webinar to develop expertise on organising PT samples as per ISO/IEC 17043 8. ADAFSA-CC in-collaboration with Tunisian collaborative reference centre for continuous training and capacity building organized a workshop attended by Specialists and experts in the field of veterinary medicine and animal health, veterinary laboratory technicians, researchers and those involved in the field of camel breeding and production almost from all camel rearing countries. Also, ADAFSA-CC experts delivered 6 scientific lectures for capacity building covering different aspects on diagnosis of camel diseases including bacterial, viral and parasitic diseases. 9. As part of contribution to the knowledge sharing and capacity building a parasitology slide set for teaching purpose is prepared by ADAFSA-CC. 10. ADAFSA-CC participated in knowledge transfer and enhance availability of reference material from camel origin by preparing reference slides from UAE local camel isolates. 11. Educating on the importance of sample collection, safe handling, transportation and laboratory blood tests to paramedical students of Abu Dhabi Vocational Education and Training Institute on 17-02-2023 12. 3 private laboratories were investigated in 2023 for pre-assessment as ADAFSA is planning for Quality training program in 2024 for the private laboratory sector 13. Organised Training Workshop in Vet Lab Al Ain on September 21 , 2023 and Validation on Foot and Mouth Disease Virus Testing</p>
<p>Wildlife (true)</p>	<p>Conducted collaborative study with Al Ain Zoo by investigating Dama gazelle (Nanger dama) as a potential novel reservoir of Theileria spp.</p>	<p>1. Sequencing and phylogenetic analysis of a subset (20) of PCR amplicons obtained by targeting fragment of the V4 hypervariable region of the 18S ribosomal RNA(r RNA) gene .revealed Theileria genotypes detected in gazelles of present study were clearly distinct from the other common theileria species of ruminants 2. Increase the scope of diagnostic tests and validation of tests for the detection of different pathogens in wild animals</p>
<p>Aquatic animal diseases (true)</p>	<p>Activated and obtained UKAS accreditation ISO17025 for the diagnostic test for white spot syndrome virus in shrimp</p>	<p>Increases the capabilities of preparedness and response to emergencies related to marine animal diseases</p>
<p>Diagnosis, biotechnology and laboratory (true)</p>	<p>1. Validation of diagnostic tests including genome sequencing techniques(for genotyping of Fowl adenovirus, genotyping of Peste des petit ruminants, genotyping of Infectious Bronchitis Virus, MERS CoV, 16s rRNA) 2. Validation of screening and confirmatory tests for the diseases namely PPR, FMD, Blue Tongue, RVF,</p>	<p>1. Increase the scope of diagnostic tests and validation of new tests for the detection of different pathogens in camel and other farm animals 2. Increase the scope of diagnostic tests and validation of tests for the detection of different pathogens in</p>

	Trypanosome, CCPP. For Brucellosis , Serology is used for screening purpose and confirmed through bacterial isolation/PCR.	camel and other farm animals
Vaccines (true)	ADAFSA performed vaccine matching analysis against six FMD serotype O vaccine strains in collaboration with FAO WRL for FMD (WRLFMD, Pirbright, United Kingdom	To identify and monitor current local filed FMD serotype/lineage/sublineage circulating in the region in align with the progressive control pathway for FMD (PCP-FMD)

TOR3: HARMONISATION OF STANDARDS

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

Proposal title	Scope/Content	Applicable area
Interlaboratory comparison Program on diagnostic tests for Camel Diseases	Quality Assurance Program with national (9 labs) and international (2 labs) laboratories on the diagnosis of: • Brucella by RBT • Brucella by ELISA • Trypanosoma spp. by microscopy • Acid Fast Bacilli (AFB) by microscopy. • Pasteurella multocida - AST • Trypanosoma spp. By RT-PCR • Camel pox virus by RT-PCR • Fowl Adenovirus by RT-PCR	Laboratory expertise
Proficiency testing to detect PPR (first ring trial internationally)	PPR-Ab in camel by ELISA (India , Ethiopia KSA, Jordan, Bahrain, UK , France CIRAD)	Laboratory expertise
Developed Technical Assessment Tool for Equipment Performance in Laboratories	To assess the performance of the laboratory equipments to improve work efficiency, to reduce wastage, for accurate readings and satisfied clients. The assessment tool were presented in: - WOA- Middle East-7th Conference of the Regional Commission for the Middle East Riyadh - WOA- Biannual Seminar @ ISWAVLD2023 on "Country Perspectives: Benefits of the Sustainable Laboratories approach for national veterinary laboratory networks"-at Lyon	Laboratory expertise
Development of Teaching Kit for Parasitology and Bacteriology	Educational and reference kit for blood parasites and bacteria that infect camels from field samples serve as a reference for parasitic and bacterial diseases of camels, targeting diagnostic laboratories as well as university students, researchers. Presented this kit in 6th Conference of the International Society of Camelid Research and Development ISOCARD-2023 in Saudi Arabia, 12-16th March2023	Laboratory expertise Training and education
Developed and validated several diagnostic tests for screening and confirmation of diseases	Screening is done through Serology and PCR is used as confirmatory test for the diseases namely PPR FMD Blue Tongue RVF Trypanosome CCPP For Brucellosis , Serology is used for screening purpose and confirmed through bacterial isolation/PCR.	Laboratory expertise health management
Interlaboratory comparison Program on diagnostic tests for farm animals	Quality Assurance Program with national laboratories on the antimicrobial susceptibility test (AST) and diagnosis of Pasteurella spp and Mannheimia haemolytica	Laboratory expertise

3. In exercising your activities, have you identified any regulatory research needs* relevant for WOA?

No

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

Yes

Name of WOA CC/RL/other	Region of
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organisation(s)	Location	networking Centre	Purpose
WOAH project "Transboundary animal diseases between Europe and United Arab Emirates"- Istituto Zooprofilattico Sperimentale della Lombardia e dell'Emilia Romagna	Italy	Europe	Collaborative Research proposal was prepared and under approval in "Filling the gap: production and validation of reagents and tools for the diagnosis and control of camel-specific pathogens (Istituto Zooprofilattico Sperimentale dell'Abruzzo e del Molise (IZSAM)
CIRAD, Italy	France	Europe	Collaboration on testing interlaboratory comparison samples. To organize the first proficiency test (PT) on PPR serology in camel
WOAH Collaborating Centre for Continuing Education and Capacity Building in the Veterinary Domain. Tunisia Centre National de Veille Zoosanitaire (CNVZ)	Tunisia	Africa	Technical virtual training to enhance quality and capacity building for the diagnosis of camel pathogens.
ADAFSA-CC collaborates with the Higher College of Technology in conducting research in tick-borne parasitic diseases in ruminants in the region	UAE	MiddleEast	Molecular epidemiological studies of tick-borne haemoparasitic diseases in livestock(sheep/goat/camels) in UAE with emphasis on the emergence of tick resistance to acaricides application
Liwa College, Faculty of Health and Medical Science	UAE	MiddleEast	To evaluate and compare the efficiency of a local isolated antigen from T.evansi for the detection of Trypanosomosis
FAO World Reference Laboratory for FMD (WRLFMD), The Pirbright Institute, Pirbright GU24, UK	United Kingdom	Europe	To identify and monitor current local filed FMD serotype/lineage/sublineage circulating in the region in align with the progressive control pathway for FMD (PCP-FMD)
FAO World Reference Laboratory for FMD (WRLFMD), The Pirbright Institute, Pirbright GU24, UK	United Kingdom	Europe	To evaluate whether local filed circulating FMD isolates antigenically matched to the commercial vaccines used in Abu Dhabi Emirates which include: O1 Campos (Biogénesis Bagó), O-3039 (Boehringer Ingelheim), O1 Manisa (Boehringer Ingelheim), O PanAsia-2 (Boehringer Ingelheim) and O/TUR/5/09 (MSD Animal Health).

TOR4 AND 5: NETWORKING AND COLLABORATION

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 WOAH CC/RL/other organisation(s)	Location	Region of networking Centre	Purpose
WOAH Collaborating Centre for Continuing Education and Capacity Building in the Veterinary Domain. Tunisia Centre National de Veille Zoosanitaire (CNVZ)	Tunisia	Africa	Technical virtual training to enhance quality and capacity building for the diagnosis of camel pathogens.
European Union Reference Laboratory for peste des petits ruminants - CIRAD	France	Europe	Collaboration on testing interlaboratory comparison samples. To organize the first proficiency test (PT) on PPR serology in camel
FAO World Reference Laboratory for FMD (WRLFMD), The Pirbright Institute, Pirbright GU24, UK	United Kingdom	Europe	To identify and monitor current local filed FMD serotype/lineage/sublineage circulating in the region in align with the progressive control pathway for FMD (PCP-FMD)
FAO World Reference Laboratory for FMD (WRLFMD), The Pirbright Institute, Pirbright GU24, UK	United Kingdom	Europe	To evaluate whether local filed circulating FMD isolates antigenically matched to the commercial vaccines used in Abu Dhabi Emirates which include: O1 Campos (Biogénesis Bagó), O-3039 (Boehringer Ingelheim), O1 Manisa (Boehringer Ingelheim), O PanAsia-2 (Boehringer Ingelheim) and O/TUR/5/09 (MSD Animal Health).

TOR6: EXPERT CONSULTANTS

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

Yes

NAME OF EXPERT	KIND OF CONSULTANCY	SUBJECT
Dr. Abdelmalik Khalafalla	Invited speaker-The 6th Conference of the International Society of Camelid Research and Development (ISOCARD-2023) King Faisal University, Al Ahsa, Kingdom of Saudi Arabia, on 12-16th of March 2023	The 6th Conference of the International Society of Camelid Research and Development (ISOCARD-2023) King Faisal University, Al Ahsa, Kingdom of Saudi Arabia, on 12-16th of March 2023
Dr. Hassan Ishag Dr. Shameem Habeeba Dr. Abdelnasir Terab	Invited Reviewers-Contributed with the Thematic Group (TG) 4 of the One Health High Level Expert Panel (OHHLEP) to review 5662 title and abstract in COVIDENCE interface for the systematic review for upstream drivers of pathogen spillover	Contributed with the Thematic Group (TG) 4 of the One Health High Level Expert Panel (OHHLEP) to review 5662 title and abstract in COVIDENCE interface for the systematic review for upstream drivers of pathogen spillover

Dr. Rashid Khan Dr. Mohammed Albreiki	Invited Speaker-WOAH Reference lab for PPR network workshop – 13 December 2023 organised by CIRAD- France- Online	WOAH Reference lab for PPR network workshop – 13 December 2023 organised by CIRAD- France- Online
Asma Abdi Mohamed	Invited Speaker-WOAH-Middle East-7th Conference of the Regional Commission for the Middle East Riyadh, Saudi Arabia, 1 - 5 October 2023 on "Update on the Camel Middle East Network (CAMENET)"	WOAH-Middle East-7th Conference of the Regional Commission for the Middle East Riyadh, Saudi Arabia, 1 - 5 October 2023 on "Update on the Camel Middle East Network (CAMENET)"
Asma Abdi Mohamed	Speaker-WOAH Biannual Seminar @ ISWAVLD2023 on "Country Perspectives: Benefits of the Sustainable Laboratories approach for national veterinary laboratory networks"-at Lyon (France) 30-6-2023	WOAH Biannual Seminar @ ISWAVLD2023 on "Country Perspectives: Benefits of the Sustainable Laboratories approach for national veterinary laboratory networks"-at Lyon (France) 30-6-2023
Asma Abdi Mohamed	Speaker/Panellist-WOAH Parallel Session with Diagnostics for Animals at Lyon (France) 30-6-2023 on "Insight from WOAH Laboratory Equipment Management and Sustainability."	WOAH Parallel Session with Diagnostics for Animals at Lyon (France) 30-6-2023 on "Insight from WOAH Laboratory Equipment Management and Sustainability."
Dr. Hassan Ishag Dr. Shameem Habeeba Dr. El Tigani Ahmed El Tigani Mohammed	Expert opinion-Upon request by WOAH, experts at the collaborating centre provided an expert opinion on the appropriate risk mitigation measures that may apply for imported camels from countries/zones infected with T.evansi (surra).	Upon request by WOAH, experts at the collaborating centre provided an expert opinion on the appropriate risk mitigation measures that may apply for imported camels from countries/zones infected with T.evansi (surra).

TOR7: SCIENTIFIC AND TECHNICAL TRAINING

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

Yes

1. *Technical Expertise on diagnosis of a clinical case given to Veterinarian- Kingdom of Saudi Arabia by Dr. Shameem Habeeba- Veterinary Parasitologist*

2. *Expert Identification and Taxonomy Declaration of Parasite in Chilled Beef Sample to Ras Al Khaimah Municipality by Dr Shameem Habeeba Veterinary Parasitologist*

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 : 3

b) Seminars : 1

c) Hands-on training courses: 0

d) Internships (>1 month) : 1

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
A	Technical Visit-CDC delegation headed by Ms. Heather Burke, the Regional Director for the Middle East, and North Africa	United States Department of Health and Human Services	6
B	ADAFSA-CC-QMS provided Virtual training workshop on Camel Disease Diagnosis, jointly with Tunisian collaborative reference centre for continuous training and capacity building, held from September 6-7, 2023	Tunisia	140
D	Supervising and technical support provided to the Mrs. Manju Stephen in her study to award the PHD in Food Safety and Microbiology. Hands on training provided for bacterial isolation and identification using MALDTI-ToF system, Antibiotic sensitivity testing phenotypically and genotypically, isolates long storage procedure and quality control and quality	India	1

	assurance of the used techniques		
A	AMR Consortium Delegates-	United Kingdom and United Arab Emirates	10
A	CAMENET Steering and Technical Committee	GCC	12

TOR8: SCIENTIFIC MEETINGS

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

Yes

NATIONAL/INTERNATIONAL	TITLE OF EVENT	CO-ORGANISER	DATE (MM/YY)	LOCATION	NO. PARTICIPANTS
International	Webinar CIRAD - Participated-Organisation of Proficiency Test	WOAH/FAO Reference Laboratory for peste des petits ruminants (PPR) CIRAD, France.	2023-06-14	Webinar	6
International	Organised Meeting of the Technical Committee of the Middle East Camel Network (CAMENET)	Sub-Regional Office of the World Organization for Animal Health (OIE) for the Arabian Gulf	2023-11-21	Abu Dhabi	18
International	Participated in 6th Conference of the International Society of Camelid Research and Development ISOCARD-2023 "The Role of Camel in Food Security and Economic Development	KING FAISAL UNIVERSITY	2023-03-12	Saudi Arabia	6

TOR9: DATA AND INFORMATION DISSEMINATION

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

a) Articles published in peer-reviewed journals:

3

1. *Molecular detection and characterization of a novel Theileria genotype in Dama Gazelle (Nanger dama). Ana Perez de Vargas , Shameem Habeeba , Mohd Farouk , Bakhita Al Hbabi , Amna Al Otaiba , Salama Al Muhairi , Zulaikha Al Hammadi , Asma Abdi Shah. International Journal for Parasitology: Parasites and Wildlife. 21: (2023) 55–58. (April2023) <https://doi.org/10.1016/j.ijppaw.2023.04.002>.*

2. *A Clinical, Pathological, Epidemiological and Molecular Investigation of Recent Outbreaks of Peste des Petits Ruminants Virus in Domestic and Wild Small Ruminants in the Abu Dhabi Emirate, United Arab Emirates. Ishag HZA, Terab AMA, Eltahir YM, El Tigani-Asil ETA, Khalil NAH, Gasim EFM, Yuosf MF, Al Yammahi SMS, Al Mansoori AMA, Al Muhairi SSM, Al Hammadi ZMAH, Shah AAM, Alherbawi MMAN, Al Nuaimat MMH, Bensalah OK, Khalafalla AI. Vet Sci. 2023 Jan 13;10(1):56. doi: 10.3390/vetsci10010056.PMID: 36669056*

3. *The evaluation of five serological assays in determining seroconversion to peste des petits ruminants virus in typical and atypical hosts. Tully M, Batten C, Ashby M, Mahapatra M, Parekh K, Parida S, Njeumi F, Willett B, Bataille A, Libeau G, Kwiatek O, Caron A, Berguido FJ, Lamien CE, Cattoli G, Misinzo G, Keyyu J, Mdetele D, Gakuya F, Bodjo SC, Taha FA, Elbashier HM, Khalafalla AI, Osman AY, Kock R. Sci Rep. 2023 Sep 8;13(1):14787. doi: 10.1038/s41598-023-41630-3.PMID: 37684280*

b) International conferences:

7

1. *Oral Presentation: Asma Abdi Mohamed - The Role of Veterinary Laboratories - Abu Dhabi Agriculture and Food Safety Authority (VLD-ADAFSA) in COVID-19 Pandemic in the United Arab Emirates. International Symposium of the World Association of Veterinary Laboratories Diagnosticians, ISWAVLD 2023 in Lyon, France, 29 June to 1 July*

2. *Oral Presentation: Asma Abdi Mohamed: Country Perspectives- Benefits of the Sustainable Laboratories approach for national veterinary laboratory networks. WOA?H-Bi Annual Seminar- International Symposium of the World Association of Veterinary Laboratories Diagnosticians, ISWAVLD 2023 in Lyon, France, 29 June to 1 July*

3. Oral Presentation: Saeed Al Yammani: Pathology and Molecular Epidemiology of Fowl Adenovirus Serotype 4 Outbreaks in Broiler Chicken in Abu Dhabi Emirate, UAE. Poultry Breeding Plante Scientific Conference Kingdom of Saudi Arabia on 1-3 May 2023.

4. Oral Presentation: Dr. Mohammed Albreiki & Dr. Rashid Khan: Serodiagnosis Proficiency Testing Scheme for PPR in Camel. WOAHS Reference lab for PPR network workshop – 13 December 2023 organised by CIRAD- France- Online

5. Poster Presentation: Zulaikha Al Hammadi: VLD-ADAFSA experience in rapid laboratory diagnosis and phylogenetic analysis of the first Monkeypox virus case in May 2022 (an application of one health approach) WOAHS Global Conference on Emergency Management. Paris (France) 3-5 April 2023

6. Poster Presentation- Muna Al Yassi: A Clinical, Pathological, Epidemiological and Molecular Investigation of Recent Outbreaks of Peste des Petits Ruminants Virus in Domestic and Wild Small Ruminants in the Abu Dhabi Emirate, United Arab Emirates. International Symposium of the World Association of Veterinary Laboratories Diagnosticians, ISWAVLD 2023 in Lyon, France, 29 June to 1 July

7. Poster Presentation- Asma Abdi Mohamed: "One Health" - ADAFSA contributions towards effective responses to emerging diseases" WOAHS-Middle East- 17th Conference of the Regional Commission for the Middle East Riyadh, Saudi Arabia, 1 - 5 October 2023

c) National conferences:

4

1. One Health AMR Research Collaboration Planning Workshop, 27th -28th February 2023 Organized by Cefas & Khalifa University, Khalifa University, Abu Dhabi, UAE

2. Oral Presentation: Noura Alzarooni : Developing the Knowledge Between the Field/Specialist and the Future Veterinarian and Medical Students. The First International Conference on Advancements in Health Sciences (ICAHS) 2023, Dubai March 9.

3. Oral Presentation – Dr. Ghada Abdelwahab - AMR management and surveillance in animal sector - Abu Dhabi - ADAFSA activities. UAE-UK One Health AMR consortium, November 15th, 2023- Abu Dhabi.

4. Oral Presentation – Dr. Ghada Abdelwahab - Retrospective Study on Antimicrobial Resistance from Bovine Mastitis Cases in the Emirates of Abu Dhabi, United Arab Emirates - Regional Cattle Congress 2023 - 30th November to 2nd December 2023- Fujairah -UAE.

d) Other (Provide website address or link to appropriate information):

2

1. Abstracts Booklet -2023-WOAH Collaborating Centre in Camel Diseases and WOAHS Collaborating Centre in Quality Management Systems This booklet includes the research studies on camel diseases and quality management activities carried out at the Veterinary laboratories of ADAFSA during the past eight years (2015 to 2023).

2. Partial genome sequences of small subunit ribosomal RNA gene of *Theileria sp. dama gazelle* (Accession numbers OP763588-OP763607) in the NCBI GenBank database <https://www.ncbi.nlm.nih.gov/nuccore/OR159796,OR159797,OR159798,OR159799,OR159800,OR159801,OR159802,OR159803,OR159804>

11. What have you done in the past year to advance your area of focus, e.g. updated technology?

1. ADAFSA QMS CC established a new facility for diagnosis of fish disease pathogens– in this regards VITEK 2 identification system and MALDI ToF MS technology using Vitek MS were validated, and prove their fit of purpose using both technology in identification of fish pathogens in UAE.

2. Enhancement capacity building and diagnosis facilities by building up a biobank depository for camel viral and bacterial isolates including resistant bacteria isolated from camels in addition to reference samples for infectious diseases collected from camel. The Biobank also includes reference nucleic acids from camel pathogens as well as camel sera. This step is crucial for the development and validation of diagnostic tests

12. Additional comments regarding your report: