



جابتن قرتانين دن اكري ماكنن

AGRICULTURE AND AGRIFOOD DEPARTMENT
MINISTRY OF PRIMARY RESOURCES AND TOURISM | BRUNEI DARUSSALAM

VETERINARY LABORATORY SERVICES (VLS) TESTING BOOKLET

Veterinary Laboratory Services Unit
Division of Livestock Industry and Veterinary Services
Department of Agriculture and Agrifood

First Edition 2013
Second Edition 2017
Third Edition 2019

Compiled by:
Veterinary Laboratory Services Unit
Division of Livestock Industry and Veterinary Services
Department of Agriculture and Agrifood
Ministry of Primary Resources and Tourism
Brunei Darussalam

Copyright 2013

All rights reserved. No part of this book may be reproduced in any form or by any means without prior permission from the Veterinary Laboratory Services Unit, Division of Livestock Industry and Veterinary Services, Department of Agriculture and Agrifood, Ministry of Primary Resources and Tourism, Brunei Darussalam

Perpustakaan Dewan Bahasa dan Pustaka Brunei

Cataloguing-in-publication

BRUNEI Darussalam, Veterinary Laboratory Services Unit

Veterinary Laboratory Services (VLS)- VLS Testing/ Brunei Darussalam, Veterinary Laboratory Services Unit– Bandar Seri Begawan : Jabatan Pertanian dan Agrimakanan, 2013.

p.cm

ISBN 978-99917-38-64-2 (Kulit Keras)

1.Veterinary diagnostic. I. Title.

636.089 BRU (DDC22)

FOREWORD

Alhamdulillah, this Veterinary Laboratory Services Testing Booklet was developed to provide farmers, importers of veterinary products and public with information of services available in Veterinary Laboratory Services Unit (VLS), Division of Livestock Industry and Veterinary Services, Under the Department of Agriculture and Agrifood.

This booklet contains brief descriptions of laboratory testing provided under VLS. It also describes the procedure required to obtain laboratory services such as registering processes and guidelines for completing the Sample Receiving Form.

The booklet was produced to fulfill the ISO/IEC 17025 requirement. It also contains the client charters of each testing provided by VLS for client reference as well as test method reference used for laboratory testing.

We hope that the Veterinary Laboratory Services Testing Booklet can be used as a guide for farmers, importers and the public who wish to send sample for laboratory testing in VLS.

Finally, I would like to applaud and congratulate the VLS unit for their effort in publishing this guideline. May Allah *Subhanahu wa Ta'ala* bless you all.

Wassalam



[HAJAH AIDAH BINTI HAJI MOHD HANIFAH]

Director of Agriculture and Agrifood

CONTENTS

About Us	1
Laboratory Functions	2
Accreditation	3
Method References	3
Laboratory Sections	4
ANIMAL DIAGNOSTIC SECTION	5
Pathology/ Histopathology	6
Parasitology	7
Serology	8
Veterinary Microbiology	9
Clinical Chemistry/ Hematology	10
Molecular Biology	13
VETERINARY PUBLIC HEALTH SECTION	14
Microbiology	15
Drug Residue	17
Physical Quality	18
FEED AND BIOTECHNOLOGY SECTION	19
Nutrition and Toxicology	20
Chemical	21

CONTENTS

SALMONELLA REFERENCE LAB	22
CALIBRATION LAB	24
Practical Information	26
General Information	29

ABOUT US

Veterinary Laboratory Services (VLS) is a unit under Division of Livestock Industry and Veterinary Services, Department of Agriculture and Agrifood.

VLS was set up and initiated in 1978 at Veterinary Clinic, Jalan Kumbang Pasang and then moved to Jalan Berakas in 1980. By the end of 1988, VLS has moved to its current location.

VLS started of with Diagnostic Services to support the animal health programme. In 1991, VLS started undertaking veterinary services towards Quality Control and Food Safety of food deriving from animal origin.

By 2007, a second laboratory was set up at Jalan Pertanian Luahan, Jerudong for animal feed services to support the development of livestock industry.

LABORATORY FUNCTIONS

VLS Section:

- Animal Diagnostic Section
- Veterinary Public Health Section
- Feed & Biotechnology Section
- Salmonella Reference Lab
- Calibration Lab

VLS Main Function:

To support the livestock industry in Brunei Darussalam by providing excellent veterinary laboratory services.

VLS Vision:

Towards an excellent provider of veterinary diagnostic and analytical services.

VLS Mission:

Committed to support livestock industry by providing excellent laboratory services conducted by competent staffs with up-to-date laboratory facilities.

ACCREDITATION

Veterinary Laboratory Services (VLS) is accredited to ISO/IEC 17025:2005 for specific scope within the field of Chemical and Biological Testing by SAC-SINGLAS, Singapore since 2012.

METHOD REFERENCES

Analysis methods used in the laboratories are referenced to international standards and guidelines.

- ISO Standard
- US-FDA BAM
- Association of Analytical Chemists (AOAC)
- APHA
- OIE Guidelines

Method references are given for information purposes only.

VLS reserves the right to select the most appropriate method for processing and testing a sample.

LABORATORY SECTIONS

1. ANIMAL DIAGNOSTIC SECTION:

- Pathology/Histopathology Lab (PHL)
- Parasitology Lab (PRL)
- Serology Lab (SRL)
- Veterinary Microbiology Lab (VML)
- Clinical Chemistry/ Haematology Lab (CCL)
- Molecular Biology Lab (MBL)

2. VETERINARY PUBLIC HEALTH SECTION:

- Microbiology Lab (MCL)
- Drug Residue Lab (DRL)
- Physical Quality Lab (PQL)

3. FEED & BIOTECHNOLOGY SECTION:

- Nutrition and Toxicology Lab (NTL)
- Chemical Lab (CML)

4. SALMONELLA REFERENCE LAB (SAL)

5. CALIBRATION LAB (CAL)

TESTING SERVICES PROVIDED

ANIMAL DIAGNOSTIC SECTION

PATHOLOGY

Diagnose veterinary diseases based on gross appearance of carcasses.

HISTOPATHOLOGY

Diagnose of veterinary diseases based on histopathological changes at microscopic level.

ANIMAL DIAGNOSTIC SECTION

Detection of diseases through laboratory examination and analysis to support Animal Health Programs to facilitate monitoring, control as well as eradication of diseases

PATHOLOGY

Testing	Method	Client Charter (working days)
Post-Mortem (PM) Examination	CAC/RCP 41-1993	3 days

HISTOPATHOLOGY

Testing	Method	Client Charter (working days)
Conventional Staining Methods	Theory and Practical of Histological Techniques	7 days
Immunohistochemistry Staining Methods	Theory and Practical of Histological Techniques	7 days

ANIMAL DIAGNOSTIC SECTION

PARASITOLOGY

Diagnose both veterinary endoparasites and ectoparasites infestation.

Testing	Method	Client Charter (working days)
Faecal Floatation Test	The RVC/FAO Guide to Veterinary Diagnostic Parasitology	3 days
Peripheral Blood Smear	OIC Terrestrial Manual 2010	3 days
Egg Count	The RVC/FAO Guide to Veterinary Diagnostic Parasitology	3 days
Coccidia	OIC Terrestrial Manual 2010	3 days

ANIMAL DIAGNOSTIC SECTION

SEROLOGY

Diagnose veterinary diseases based on antigen-antibody reactions.

Testing	Method	Client Charter (working days)
RAPID TEST		
Avian Influenza Ag	Anigen/Bionote Test Kit	1 day
H5 Avian Influenza Ag	Anigen/ Bionote Test Kit	1 day
ELISA TEST		
Newcastle Disease (ND)	Synbiotics Test Kit	5 days
Infectious Brusal Disease (IBD)	Synbiotics Test Kit	5 days
Foot and Mouth Disease (FMD)	PrioCHECK	5 days

ANIMAL DIAGNOSTIC SECTION

VETERINARY MICROBIOLOGY

Diagnose veterinary diseases caused by bacteria and fungi through isolation and identification of culture examination.

Testing	Method	Client Charter (working days)
ISOLATION AND IDENTIFICATION		
<i>Salmonella</i> culture	ISO 6579:2002 + A1:2007 Standard	12 days
Aerobic Bacterial Culture	Clinical Veterinary Microbiology	12 days
Anaerobic Bacterial Culture	Clinical Veterinary Microbiology	12 days
ENUMERATION		
Total Aerobic Count	Clinical Veterinary Microbiology	4 days
Total Coliform Count	Idexx, Colilert	3 days
Total <i>E.coli</i> Count	Idexx, Colilert	3 days
ENVIRONMENTAL MONITORING		
Exposure	Clinical Veterinary Microbiology	4 days

ANIMAL DIAGNOSTIC SECTION

CLINICAL CHEMISTRY / HEMATOLOGY

Diagnose veterinary diseases through determination of blood clinical parameters and hematology.

Testing	Method	Client Charter (working days)
CLINICAL BLOOD CHEMISTRY TEST		
Alkaline Phosphatase*	VetScan VS2 Procedure	3 days
Alanine Aminotransferase*		
Albumin*		
Aspartate Aminotransferase*		
Bile Acids*		
Blood Urea Nitrogen*		
Glucose*		
Calcium*		
Amylase*		
Cholesterol*		
Uric Acid*		
Creatine Kinase*		
Globulin*		
Phosphorus*		
Creatinine*		
Chloride*		

ANIMAL DIAGNOSTIC SECTION

CLINICAL CHEMISTRY / HAEMATOLOGY

Testing	Method	Client Charter (working days)
CLINICAL BLOOD CHEMISTRY TEST		
Total Bilirubin*	VetScan VS2 Procedure	3 days
Total Protein*		
GGT*		
Magnesium*		
Potassium*		
Sodium*		
Thyroxine*		
Total Carbon dioxide*		
COMPLETE BLOOD COUNT		
White Blood Cell Count*	Scil Vet ABC Plus Hematology Procedure	3 days
Lymphocyte %/#* (%/ # LYM)		
Monocyte %/#* (%/ # MON)		
Granulocytes %/#* (%/ # GRA)		
Eosinophils %/#* (%/ # EOS)		
Red Blood Cell Count* (RBC)		
Mean Cell Volume* (MCV)		
Hematocrit* (HCT)		
Mean Corpuscular Haemoglobin* (MCH)		

* package testing

11

ANIMAL DIAGNOSTIC SECTION

CLINICAL CHEMISTRY / HAEMATOLOGY

Testing	Method	Client Charter (working days)
COMPLETE BLOOD COUNT		
Mean Corpuscular Haemoglobin Concentration* (MCHC)	Scil Vet ABC Plus Hematology Procedure	3 days
Haemoglobin* (HGB)		
Red Cell Distribution Width* (RDW)		
Platelets Count* (PLT)		
Mean Platelets Volume* (MPV)		
URINE ANALYSIS		
pH*	Idexx Test Procedure	3 days
Leukocytes (LEU)*		
Protein (PRO)*		
Glucose (GLU)*		
Ketones (KET)*		
Urobilinogen (UBG)*		
Bilirubin (BIL)*		
Blood/Haemoglobin (BLD/HGB)*		

* package testing

12

ANIMAL DIAGNOSTIC SECTION

MOLECULAR BIOLOGY

Confirmatory of veterinary diseases at molecular level (DNA/RNA) as well as determination of species identification / meat speciation.

Testing	Method	Client Charter (working days)
DNA/RNA DETECTION		
H5N1 Avian Influenza	Veredus Test Kit Procedure	5 days
H7 Avian Influenza	Veredus Test Kit Procedure	5 days
H9 Avian Influenza	Veredus Test Kit Procedure	5 days
Rabies	In-house Method	5 days
ANIMAL SPECIATION		
Pork	Neogen Biokits Procedure	5 days
Goat	Neogen Biokits Procedure	5 days
Chicken	Neogen Biokits Procedure	5 days
Beef	Neogen Biokits Procedure	5 days
Horse	Neogen Biokits Procedure	5 days
Rabbit	Neogen Biokits Procedure	5 days
Sheep	Neogen Biokits Procedure	5 days

VETERINARY PUBLIC HEALTH SECTION

Analyse food products of animal origin for the detection of pathogens, veterinary drug residues and physical quality testing towards quality assurance and food safety status

VETERINARY PUBLIC HEALTH SECTION

MICROBIOLOGY

Provides enumeration and detection of food pathogens in livestock and livestock products to ensure the quality are safe for consumption before distribution. The laboratory also offers hygiene monitoring of the abattoir and processing plants.

Testing	Method	Client Charter (working days)
ENUMERATION		
Aerobic Plate Count*	BAM Chapter 3	7 days
Coliform (MPN)*	BAM Chapter 4	
<i>E.coli</i> (MPN)*	BAM Chapter 4	
<i>Staph. Aureus</i> Count*	BAM Chapter 12	
<i>Clostridium perfringens</i> Count	BAM Chapter 16	
<i>E.coli/ Coliform</i> Count*	AOAC 988.08	
DETECTION OF PATHOGENS		
<i>Salmonella spp.*</i>	BAM Chapter 5	7 days
<i>Listeria monocytogenes*</i>	BAM Chapter 10	
<i>Campylobacter jejuni</i>	BAM Chapter 7	
HYGIENE MONITORING		
Swab test (<i>Salmonella spp.</i>)	BAM Chapter 5	7 days
Swab test (<i>Listeria monocytogenes</i>)	BAM Chapter 10	7 days

* package testing

VETERINARY PUBLIC HEALTH SECTION

MICROBIOLOGY

Testing	Method	Client Charter (working days)
HYGIENE MONITORING		
Aerobic Plate Count	APHA, Compendium of Method for The Microbiological Examination of Foods, Chapter 3	4 days
RODAC (Replicate Organism Direct Agar Contact)	APHA, Compendium of Method for The Microbiological Examination of Foods, Chapter 3	4 days
Air Exposure (Sedimentation Method)	APHA, Compendium of Method for The Microbiological Examination of Foods, Chapter 3	4 days

VETERINARY PUBLIC HEALTH SECTION

DRUG RESIDUE

Provides screening, semi-quantitation and confirmatory testing of veterinary drug residues in tissues of food animal using MIA, ELISA and LC-MS/MS methods.

Testing	Method	Client Charter (working days)
MICROBIAL INHIBITION ASSAY (MIA)		
Penicillin*	USDA MLG34.03	7 days
Tetracycline*		
Erythromycin*		
Streptomycin*		
Neomycin*		
ELISA		
Chloramphenicol	RIDASCREEN Chloramphenicol R1151	7 days
LC-MS/MS		
Tetracycline	In-House Method	7 days
Chloramphenicol	In-House Method	7 days

* package testing

VETERINARY PUBLIC HEALTH SECTION

PHYSICAL QUALITY

Determination of the eggs' quality and to support the local poultry layer industry.

Testing	Method	Client Charter (working days)
EGG QUALITY		
Whole Egg Weight*	TSS Application Note	3 days
Shell-Strength*		
Shell Deformation*		
Shell Thickness*		
Albumen Height*		
Haugh Unit (HU)*		
Yolk Colour (Roche)*		
Shell Colour*		
Meat and Blood Spots*		
Shell Density*		
Shell Weight*		

* package testing

FEED AND BIOTECHNOLOGY SECTION

NUTRITION AND TOXICOLOGY

Determination of animal feed and plant nutritional value, contamination of mycotoxins as well as determination of gross calorific value.

Testing	Method	Client Charter (working days)
PROXIMATE ANALYSIS		
Moisture*	AOAC 39.1.02 B(a) - In-house Method	14 days
Ash*	AOAC 4.1.10	
Total Fat/ Oil*	FOSS Application Note 3414	
Crude Fibre*	FOSS Application Note 3428 / Gerhardt Fibretherm Application Note	
Crude Protein*	AOAC 4.2.11	
MYCOTOXIN		
Aflatoxin	Vicam Test Procedure (AOAC 991.31)	7 days
ENERGY		
Gross Calorific Value	BS EN ISO 9831:2003 Standard	7 days

FEED AND BIOTECHNOLOGY SECTION

Support and facilitate feed and nutrition programs toward better quality of livestock products

FEED AND BIOTECHNOLOGY SECTION

CHEMICAL

Provide laboratory testing for the determination of heavy metals/ trace elements in animal feeding stuffs by ICP-OES.

Testing	Method	Client Charter (working days)
HEAVY METALS		
Arsenic	In-House Method	7 days
Cadmium		
Chromium		
Lead		
Mercury		
Thallium		
TRACE ELEMENTS		
Calcium	In-House Method	7 days
Cobalt		
Copper		
Iron		
Magnesium		
Manganese		
Molybdenum		
Phosphorus		
Potassium		
Sodium		
Zinc		

SALMONELLA REFERENCE LAB

Serves as reference lab to confirm for *Salmonella* and antimicrobial resistance (AMR) analysis to support national monitoring and surveillance programs of *Salmonella* and AMR on the poultry farms

SALMONELLA REFERENCE LAB

Provides confirmatory testing of *Salmonella* serotypes and semi-quantitative measurement of bacteria sensitivity.

Testing	Method	Client Charter (working days)
SALMONELLA SEROTYPING		
<i>Salmonella enteritidis</i>	SSI Test Kit	5 days
<i>Salmonella typhimurium</i>	SSI Test Kit	5 days
<i>Salmonella kedougou</i>	SSI Test Kit	5 days
<i>Salmonella infantis</i>	SSI Test Kit	5 days
ANTIMICROBIAL SUSCEPTIBILITY TESTING		
Agar Dilution Method	CLSI	10 days

CALIBRATION LAB

Ensure all laboratory equipment and instrument is accurate, reliable and consistent for use following ISO/IEC 17025 and SAC-SINGLAS requirement

CALIBRATION LAB

Perform in-house calibration and verification of certain laboratory instrument and to make sure all laboratory equipment are calibrated on time as per ISO requirements. The following laboratory instrument and equipment will be verified internally by this calibration lab:

1. Balance
2. Timer
3. Pipettor
4. Bottle Top Dispenser
5. Incubator

PRACTICAL INFORMATION

Sample:

- Type of sample/ specimen to be tested depends on which laboratory testing is required by the client.
- Sample volumes and packaging varies for different testing.
- Client can refer to VLS Guidelines For Sample Collection and Submission Booklet for further detailed information.
- VLS reserves the right to decline any improper packaging and conditions of samples sent.
- Sample sent will be received by VLS staff and an acknowledgement receipt will be issued to the client.
- Sample sent and left **UNATTENDED** at the VLS receiving counter will not be acknowledged.

Testing Requirements:

- Clients who wish to send sample for laboratory analysis:
 - ⇒ Must be registered to the Department of Agriculture and Agri-food.
 - ⇒ Must fill in a Testing Request Form (TRF) available at the VLS counter.

PRACTICAL INFORMATION

- Client will be briefed on VLS testing services, sample submission and turn-around time of the testing services.
- TRF will then be processed for approval by Head of Unit.

Sample Receiving Form:

- There are 3 different Sample Receiving Form (SRF) available depending on the tests required:
 - ⇒ Animal Diagnostic Test Request Form
 - ⇒ Veterinary Public Health Test Request Form
 - ⇒ Feed and Biotechnology Test Request Form
- Client must fill in all the details required in SRF.
- SRF must be filled in using **BLUE INK ONLY**. Corrections must be done by crossing out the mistake and to be initialed by the client.
- Correction pen/ fluid cannot be used in SRF.
- Incomplete SRF will not be acknowledged.

Analysis Results:

- Analysis results will be issued at the end of the testing period as stated in each test.

PRACTICAL INFORMATION

- Client is responsible to collect the analysis results at the VLS counter.
- Analysis result is kept **CONFIDENTIAL**, therefore result will not be issued via email or through phone.

Sampling Procedure:

- For sampling procedures guidelines please refer to:
 - ⇒ Guidelines For Sample Collection and Submission, Animal Diagnostic (ADG)
 - ⇒ Guidelines For Sample Collection and Submission, Veterinary Public Health (VPH)
 - ⇒ Guidelines For Sample Collection and Submission, Feed and Biotechnology (FB)

GENERAL INFORMATION

Sample Receiving Counter open:

Monday—Thursday and Saturday

8.00am until 11:30am

1:30pm until 3:00pm

For any enquiries, please email or contact us at:

veterinarylab@gmail.com

Telephone: +673 - 8965122

Division of Livestock Industry and Veterinary Services

Department of Agriculture and Agrifood

Ministry of Primary Resources and Tourism

Brunei Darussalam

The laboratory has the facilities suitable for working with agents in Risk

Group 2 Only.