NOTICE

DEPARTMENT OF AGRICULTURE, LAND REFORM AND RURAL DEVELOPMENT

No. 52 2023

DRAFT VETERINARY PROCEDURE IN TERMS OF THE MEAT SAFETY ACT, 2000 (ACT NO. 40 OF 2000)

INVITATION FOR PUBLIC TO COMMENT ON THE DRAFT VETERINARY PROCEDURE IN TERMS OF THE MEAT SAFETY ACT, 2000 (ACT NO. 40 OF 2000)

We hereby invite all interested stakeholders, organisations and individuals to submit comments on the draft veterinary procedure on sampling, removal of samples for examination, testing and examining of microbiological test results under the Meat Safety Act, 2000 (Act No. 40 of 2000).

Interested parties are invited to submit written comments within 30 days from the date of receiving the draft document. Comments can be addressed to the following address:

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VETERINARY PROCEDURE ON SAMPLING, REMOVAL OF SAMPLES FOR EXAMINATION, TESTING AND EXAMINING OF MICROBIOLOGICAL TEST RESULTS OF MEAT (MEAT SAFETY ACT, 2000)

CONTENTS

1. ACRONYMS

ACC	Aerobic Colony Count
FBO	Food Business Operator
GHP	Good Hygiene Practice
HACCP	Hazard Analysis and Critical Control Point
HMP	Hygiene Management Programme
OIE	World Organisation for Animal Health
NEO	National Executive Officer
PEO	Provincial Executive Officer
VPN	Veterinary Procedural Notice

2. DEFINITIONS

Definitions used in this document, unless specified hereunder, are as per the Meat Safety Act, 2000 (Act No. 40 of 2000) and regulations promulgated thereunder as well as Codex Alimentarius standards.

Competent authority	means either the National Executive Officer or Provincial Executive Officer, whichever is applicable
"Food safety indicator":	means a microorganism whose presence in a food product renders it harmful and unfit for human and animal consumption.
"Process hygiene Indicator":	means a microorganism or group of microorganisms (which may/may not be pathogenic) which indicate a potential poor hygiene during the manufacturing/production, storage and/or distribution of a food product. This may also be an indicator of a presence of a pathogenic microorganism in the product or environment in which the product is produced, stored and/or distributed.

3. INTRODUCTION

The Codex Alimentarius Commission (Codex) sets the principles for establishing microbiological criteria. The control of microorganisms in food is at the point of production, processing, or preparation for consumption. Before setting a criterion for a product, the product must meet at least one of the following criteria:

1. Has a potential to cause foodborne disease based on epidemiological evidence.
2. Has a reduced shelf life due to lack of compliance with Good Hygiene Practice (GHP).
3. Be of trade importance.

The criterion to be set must be able to assess the level of food safety risk associated with the product and provide assurance that the application of the criterion will reduce the food safety risk of the product. Beside foodborne viruses, foodborne parasites and chemical residues, raw

meat is an important source of food pathogens such as Salmonella, *Clostridium perfringens*, *Staphylococcus aureus*, Shiga toxin-producing *E.coli* (STEC), *Listeria monocytogenes*, *Campylobacter fetus subsp. jejuni*, and *Yersinia enterocolitica* which are often incriminated in outbreaks of foodborne diseases. In some instances, foodborne illnesses are due to consumption of raw or inadequately cooked meat, but a more common hazard arises through cross-contamination of cooked meat and other food products by raw meat, and subsequent time-temperature abuse.

The basis for selecting either frequency and/or concentration of a hazard in food as a tool for the control of microorganisms in foods at the point of production, processing, or preparation for consumption therefore depends on a complex number of factors. The number of viable bacterial cells necessary to cause a disease (the Minimum Infective Dose – MID) varies considerably between and within (strains) bacterial species. Some pathogens such as STEC appear able to infect at low doses of 1-100 units.

Products that have a history of being implicated as causes of foodborne illnesses should be sampled at appropriate points during production and distribution to determine the prevalence of contamination and to trace the source at primary production as well as to look at the effects of distribution and processing on the integrity of the product.

4. LEGISLATION AND INTERNATIONAL STANDARDS

This procedure derives its mandate from the Meat Safety Act and the Animal Diseases Act, 1984 (Act No. 35 of 1984). The Meat Safety Act provides for measures to promote meat safety and the safety of animal products and for matters connected therewith. The NEO, designated under the Meat Safety Act, may examine, sample, and test any animal, meat, or animal product for food safety purposes. The Animal Diseases Act provides for the control of animal diseases and parasites, for measures to promote animal health, and for matters connected therewith.

The Meat Safety Act defines “unsafe for human and animal consumption” as unsafe for human and animal consumption because of a disease, an abnormal condition, putrefaction, decomposition, contamination, or residues, or due to exposure to or contact with a disease or putrefied, decomposed or contaminated material.

Section 14(1)(h) states that subject to subsection (6), no person may export any meat from the Republic unless the meat has been inspected, sampled and tested. Section 13 (6)(d)(e) states that the meat in respect of which an import permit has been issued must be stored in the prescribed manner at a facility approved by the national executive officer until the prescribed veterinary procedures or other acts specified in the permit have been performed and must be available for inspection, sampling and testing by the national executive officer. In the case of imported meat, the veterinary procedures to be performed while the meat is stored as contemplated in sub regulation (2) are to confirm that no soiling, contamination or deterioration of the meat in any way took place during transportation prior to storage, to remove samples for examination; examine test results pertaining to samples taken from the consignment and to confirm that all other conditions stated on the import permit have been complied with; and conduct any other action necessary to ensure that the meat is safe and

suitable for human consumption and poses no threat of transmitting a contagious animal disease. The Red Meat Regulations No. R. 1072, the Poultry Regulations No. R. 153 and the Ostrich Regulations No. R. 54 lay down the compliance requirements for food business operators when implementing the general and specific hygiene measures referred to in the Meat Safety Act.

The regulations have set out hygiene management criteria regarding hygiene management programme for slaughter and dressing procedures. Essentially, one of the major control measures is to control temperature and to establish a food hygiene system based on hazard analysis and critical control point (HACCP) principles.

The measures provided for in this document are in accordance with the Codex alimentarius standards, guidelines and recommendations, risk management measures from current and potential trade partners. Additionally, research publications and scientific opinion from scientific bodies and in line with the findings during the monitoring and surveillance of food borne pathogens and process hygiene indicators in South Africa on hazards that are reasonably likely to occur in meat have also been considered.

5. PURPOSE

This document specifies the minimum microbiological sampling plans, criteria, and methods of testing for microbiological monitoring of meat intended for human consumption. Meat establishment operators are required to ensure compliance with the microbiological requirements for meat and meat preparations/products and process environments by implementing comprehensive microbiological testing programmes. There is cognizance on the requirements of trading partners who may be different to what is in this document, in which case additional requirements shall be included for compliance where applicable.

6. SCOPE

This document applies to local produce intended for exports and imports meat regulated under the Meat Safety Act. The veterinary procedure is to ensure that the slaughtered animals and the meat handled under hygiene management programmes is safe and suitable for human consumption.

This document replaces the Procedure Manual for Microbiological Monitoring of Imported Meat – 2011 and Veterinary Procedural Notice No. 15 (VPN15). The veterinary procedure applies for imported and exported meat.

7. LABORATORY REQUIREMENTS

7.1. Laboratory Registration

All laboratories performing microbiological testing of meat and meat products under the scope of the Meat Safety Act are required to be registered by the NEO as per legislation and/or applicable guidelines.

7.2. Laboratory Test Methodology

A laboratory registered by the NEO for microbiological testing of meat and meat products must use the most recent ISO testing methods accredited by the South African National Accreditation System (SANAS) and additionally validated against the requirements contained in the OIE Manual of Diagnostic Tests and Vaccines for Terrestrial Animals and ISO 16140. It is a requirement that alternative testing methods must be accredited and must provide a higher or equal level of sensitivity and specificity to the reference methods and approved as fit for purpose by the NEO.

Where *Salmonella* spp. and *Campylobacter* spp. are detected or quantified, the strain or serotype of the isolates must be further analysed to verify compliance with the microbiological criterion set out for serotypes of significant risk to public health (pathogenic).

7.3. Assuring the quality of test results

Laboratories must have documented procedures for monitoring the validity of test results including media quality control, environmental monitoring, and verification of test results as per policies dealing with laboratory requirements.

7.4. Laboratory Competency

All registered laboratories must participate in a recognised Proficiency Testing (PT) programme (The NEO may grant exemption based on the merit of the submission for such) at least bi-annually for each test covered by their scope of registration. Laboratories must agree to the release of PT results directly to the NEO from the PT service provider.

7.5. Reporting Results

The provisions of VPN56 shall mutatis mutandis apply to the person in charge of any laboratory or other institution at which a controlled pathogen is examined for diagnostic purposes. This implies that any laboratory that isolates or identifies a categorised foodborne pathogen or identifies a suspicion of an outbreak must report its finding to the NEO under the Meat Safety Act. Laboratory results for samples analysed under the Meat Safety Act shall be in a format acceptable to the NEO.

8. GENERAL RESPONSIBILITIES OF MEAT ESTABLISHMENTS

The FBO has the following responsibilities:

a. Develop and implement a programme compliant with the requirements contained in this document.

b. Ensure that personnel collecting, and handling samples are properly trained and competent to perform these functions.
c. Monitor and record the sampling procedures.
d. Ensure all testing is performed at an NEO registered laboratory using indicated methods.
e. When required, notify laboratories of testing and reporting requirements associated with samples.
f. Authorise and instruct testing laboratories to provide all relevant test results and or isolates to the NEO.
g. Keep and maintain records of training, sampling, and results of screening and confirmatory tests.
h. Support NEO monitoring, verification, and enforcement activities.
i. Avail the records to the NEO upon request.

The FBO must conduct a thorough risk assessment of the establishment and demarcate the establishment into different levels of risks. An establishment may be demarcated into low, medium, and high-risk areas.

In case of imported products, the importer has the responsibility of assessing foreign suppliers against their food safety management systems based on company criteria in compliance with regulatory requirements and international standards. Importers may use own technically competent employees or third-party service providers to assess foreign suppliers. Importers are to ensure their suppliers, transportation systems and storage facilities in both the country of origin and upon arrival in South Africa respect good practices and meet regulatory requirements.

9. MICROBIOLOGICAL TESTING PROGRAMMES FOR DETERMINING HYGIENE PERFORMANCE AND FOOD SAFETY

9.1 Categorisation of tests

Recommendation on microbiological testing of production, cold storage and laboratory environments are detailed in annexure B. Microbiological criteria for meat is categorised either under the food safety criteria or process hygiene criteria. In the case of process hygiene criteria e.g. generic *E. coli*, *Enterobacteriaciae* and ACC, the presence and / or concentration of these indicator organisms reflects the state or condition that could indicate lack of process controls in the food establishment.

Food safety criteria requires that the product that test positive for an indicator organism above a stated concentration be removed from the food chain immediately. All pathogenic microorganisms fall under this criterion.

9.2 Interpretation of test results

A two or three-class sampling plan may be used for the interpretation of results, depending on the target organism or test.

The following values are utilised in the sampling plans:

n – total number of samples to be collected.
m – a value below which a result is acceptable.
c – the maximum allowable number of samples yielding results between m and M.
M – a value above which a sample is unacceptable. This is used in a three-class sampling plan.

In a two-class sampling plan, the value *c* is always set at zero and there is no value *M*. This means that any of the total number of samples *(n)* that is above *m* renders the product as unacceptable.

In a three-class plan, the limit *m* is used to separate acceptable from marginally acceptable. A result below *m* is acceptable and a value above *m* is marginally acceptable. A second limit, denoted by *M*, denotes results below which the results are marginally acceptable and above which the results are unacceptable. This therefore means results below *m* are acceptable, those above *m* but below *M* are marginally acceptable, and those above *M* are unacceptable. The value *c* is then used to set the limit of the number of samples to be between m and M for the product to be acceptable.

An example of a three-class sampling plan is as follows:
Criteria:

Number of samples (n)	***Maximum number permitted in marginal range (c)***	***Lower limit of marginal range (m)***	***Upper limit of marginal range (M)***
5	*3*	*100 000 cfu/g*	*1000 000 cfu/g*

Interpretation:
A result equal or less than 100 000 cfu/g is acceptable
A result higher than 1000 000 cfu/g is unacceptable
A result between 100 000 cfu/g and 1000 000 cfu/g is marginally acceptable.
In 5 samples collected (n), a maximum of 3 (c) results which are between 100 000 cfu/g and 1000 000 cfu/g will be allowed for the results to be declared acceptable.

Sample testing for carcass *Enterobacteriaceae*, generic *E. coli* and Aerobic Colony Count (ACC) is based on a three-class sampling plan, whereas sample testing for pathogenic organisms is based on a two-class sampling plan.

9.3. Moving windows approach

A moving window approach to microbiological monitoring of meat must be implemented by the food business operator. In the moving window approach a number of sample units (*n*) is collected over a period of time, i.e. the w*indow*. Every time a new test result above *n* becomes available, it is included in the window and the oldest result is removed, so that only the most

recent *n* test results are in the window and thereby the window moves. When a new test result is added to the window, the *n* observation in the window is compared with the microbiological limit(s) (*m*, *M*) using the acceptance number (*c*), like the application of two- and three-class sampling plans.

Whenever the number of positive results is above the acceptable number *(c)*, or a single sample is above (M), this becomes a window failure and the window must be reset, meaning the next sample becomes sample number one for the new window. The process being measured (food safety or process hygiene) will remain in a "failure" state until the next number of samples set *(n)* have been collected and the number of acceptable results *(c)* are below the set limit.

A window failure must trigger an 'ALERT', which will require the establishment to initiate a review of the slaughter and hygiene processes and investigate the possible contributing causative factors of the window failure. It also should include corrective and preventative actions to be undertaken to prevent the recurrence of the contributing factors.

Review outcomes should be documented and signed by the person(s) responsible for food safety in the establishment and be available to the NEO for audit purposes. Verification of corrective and preventative actions is to be achieved through continuous monitoring of the processes. Further actions to be taken in case of a window failure for a food safety indicator is described under the performance standard section for food pathogens in this document.

9.4. Carcases, meat cuts and offal sampling frequency for official verification of compliance

Salmonella spp, *Enterobacteriaceae*, *E. coli* and Aerobic Colony Count (ACC)

Samples must be taken at a frequency based on the volume of production. Guidelines to the minimum sampling rates for each slaughter class are provided in **Error! Not a valid bookmark self-reference.**. The intention of these minimum rates is to ensure that at least one sample is collected daily at the establishment. The sampling frequency must be determined separately for each slaughter class, production line and shift. Sampling days within a week must be alternated.

Class	Annual throughput per species	Initial Sampling Frequency	Reduced frequency if results are satisfactory	Minimum Sampling Area when swabbing is applied
Red meat (Category 1)	Over 20 000 bovine, large game (category A & B) and equine. 100 000 pigs, sheep, lambs, calves, goats,	Salmonella, STEC, Enterobacteriaceae Listeria spp and ACC: at least 5 carcasses within a week for 4 weeks for each species	Salmonella, STEC, Enterobacteriaceae, Listeria spp and ACC: at least 5 carcasses within two weeks for 8 weeks for each species	400 cm^2

	category C game (>400 or 2 000/week)			
Red meat (category 2)	Below 20 000 but over 7 500 bovine, large game (category A & B) and equine. Below 100 000 but over 37500 pigs, sheep, lambs, calves, goats, category C game (>150 or 750/week)	Salmonella, STEC Enterobacteriaceae, Listeria spp and ACC: at least 5 carcasses within two weeks for 4 weeks for each species	Salmonella, STEC Enterobacteriaceae,Listeria spp and ACC: at least 5 carcasses once every 4 weeks for each species	400 cm^2
Red meat (category 3)	Below 7 500 but over 500 bovine, large game (category A&B) and equine. Below 37 500 but over 2500 pigs, sheep, lambs, calves, goats, category C game (>10 or 50/week)	Salmonella, Enterobacteriaceae, Listeria spp and ACC: at least 5 carcasses every 4 weeks for each species	Salmonella, Enterobacteriaceae, Listeria spp and ACC: at least 5 carcasses every 12 weeks for each species	400 cm^2
Crocodile	Over 2 500	Salmonella, Enterobacteriaceae, Listeria spp and ACC: at least 5 carcasses within a week for 4 weeks	Salmonella, Enterobacteriaceae, Listeria spp and ACC: at least 5 carcasses for every 8 weeks	25 cm^2
Poultry and Rabbit	Over 13 500	Salmonella, Campylobacter, Enterobacteriaceae, Listeria spp and ACC: at least 5 carcasses within a week for 4 weeks	Salmonella, Campylobacter, Enterobacteriaceae and ACC: at least 5 carcasses for every 8 weeks	100 cm^2
Ratite	Over 2 500	Salmonella,	Salmonella,	100 cm^2

		Enterobacteriaceae, Listeria spp and ACC: at least 5 carcasses within a week for 4 weeks	Enterobacteriaceae, Listeria spp and ACC: at least 5 carcasses for every 8 weeks	

Table 1: *Salmonella spp.*, *E. coli* and ACC sampling frequency and area for different species

NB: The NEO is to determine the sampling frequency for establishments slaughtering less than the stated numbers in table 1 on a case-by-case basis.

9.5. Alternative sampling frequency

An establishment operating under a validated HACCP plan or Hygiene Management Program based on the General principles of food hygiene CAC/RCP 1-1969 as amended and in accordance with the regulations under the Meat Safety Act may use an alternative sampling frequency plan if:

- The alternative is an integral part of the establishment's verification procedures for its HACCP plan or Hygiene Management Program.
- The NEO has not determined and notified the establishment in writing, that the plan is inadequate to verify the effectiveness of the establishment's hygiene process controls and.
- The alternative plan is consistent with the requirements in the applicable Codex Alimentarius standards, guideline, and recommendation.

The sampling frequency may be readjusted when the sampling results are within the permissible limits unless changes are made in establishment facilities, equipment, personnel, or procedures that may affect the adequacy of existing process control measures, as determined by the establishment or NEO in writing. The sampling frequency may be adjusted to comply with changes in reaction to foodborne diseases outbreaks or specific FBO, industry, national or provincial monitoring or control programmes at primary production.

9.6. Sampling levels for imported meat at official verification of compliance

The table below depicts the different sampling levels and sampling frequency and size that must be implemented by establishments.

Sampling Levels	Sampling level and size
Level I++	Subject to NEO determination based on risk assessment
Level I+	One in every 3 consignments is sampled for microbiological testing
Level I	One in every 2 consignments is sampled for microbiological testing
Level II	Baseline: ≥5 random samples are collected from five (5) or more boxes per every consignment
Level III	Increased frequency at batch and or minimum of 10 random samples per consignment

Table 2: Baseline Sampling Plan

A risk-based sampling procedure in which the level of sampling of consignments from an establishment is dependent on the level of compliance to food safety and hygiene provisions must be implemented. The inspection level relates to the sample and lot/batch size, and hence to the discrimination afforded between 'good' and 'poor' quality. Lower levels of sampling (I) must be used when consignments are received from establishments practicing good hygiene practice as evidenced from the inspections outcomes and other sources of information whereas higher levels (III) should be used when consignments are received from establishments with a history of non-compliances or consignments not complying with hygiene criteria. Level II is the set baseline sampling level.

Each container is defined as a consignment. The baseline level II category sampling frequency is calculated at 5 random samples for an approximately 27000kg shipping container. When 10 consignments or its equivalents from the same establishment are consecutively tested at baseline level, adjustments to the sampling frequency can be made. Adjustment of the sampling frequency and size stated is also applicable to import registered establishments or suppliers that have provided satisfactory results and consecutive compliance on the last 10 consignments. At level I am sampling frequency will be one consignment in every 2 consignments is tested or 5 random samples in every approximately 54000 kg. At Level 1+ one consignment in every 3 consignments is sampled or 5 random samples in every 81000kg is applied. Inspection data and request for approval from the NEO is required when implementing testing frequency beyond the level 1+.

Where positive results for food pathogen(s) or other violations that are likely to influence microbial contamination are recorded, such an establishment or supplier will automatically be moved to the baseline testing category where every container is to be tested at baseline but at increased sample numbers and where applicable sample size until it meets the basic criteria for category change.

The NEO must from time to time communicate the pathogens to be included in the routine sampling plan. At least two tests from the following criteria must be used for the routine monitoring and verification of compliance of imported meat (red meat and poultry, whole, cut, trimmed, minced, or mechanically deboned meat (MDM)

Test	**Number of samples (n)**	**Number of marginally acceptable samples (c)**	**Minimum (m)**	**Maximum (M)**	**Analytical Reference Method**
Zoonotic *E.coli* (STEC)	5	0	Not detected in 25g	**-**	
Zoonotic Campylobacter spp.	5	1	Not detected in 25g.	When detected should be <100cfu/g	

Salmonella spp.	5	0	Not detected in 25g	-	ISO 6579-1
Listeria monocytogenes	5	1	Not detected in 25g;	When detected it must be <10cfu/g	ISO 11290-1
Aerobic Colony Count	5	2	$1x10^5$ cfu/g	$1x10^6$ cfu/g	
Escherichia coli	5	2	$5x10^2$ cfu/g	$1x10^3$ cfu/g	ISO 16649
Clostridium perfringens	5	3	$1x10^2$ cfu/g	$1x10^3$ cfu/g	ISO 7937
Coagulase-positive staphylococci	5	3	$1x10^2$ cfu/g	$1x10^3$ cfu/g	ISO 6888-1

Table 3 – Criteria for testing of imported meat

Annexures C and D illustrate acceptable standards and decisions to be taken at the ports of entry.

10. PERFORMANCE STANDARD: *E. COLI* AND ACC ON CARCASES

Target limits have been established in table 4 for the mentioned process hygiene indicators e.g. *Enterobacteriaceae*, generic *E. coli* and ACC that are assessed on a moving window of 35 consecutive samples to allow for continuous evaluation of performance.

10.1 Failure to meet E.coli and ACC on carcases

A window failure must trigger an alert which should be attended to as described in section 9.3.

11. PERFORMANCE STANDARD*: SALMONELLA* AND OTHER FOODBORNE PATHOGENS

The positive detection of a foodborne pathogen as listed in table 4 must be assessed against the performance standard set. A positive test result will trigger a sample–window. The 'window' will be representative for the relevant class of product. It will require the establishment to immediately commence daily sampling until a window is satisfactorily completed for that slaughter class. Any further positives that exceed the acceptable number of positives within the same sample window would result in failure of the window. For example, in the bovine category, 2 *Salmonella* positives are permitted in a set of 50 samples, which constitutes a 'window'. Where the *Salmonella* detections are over the permitted number of positives, it will be classed as 'failure of the moving window'. In such cases, stop further sampling irrespective of whether the number of samples required to complete that sample window were achieved.

11.1. Failure to meet *Salmonella* or other foodborne pathogens performance standards

11.1.1. Food Business Operator

The establishment must investigate possible causes of any failure to meet the *Salmonella* or other organisms' performance standards as indicated in the respective regulation(s) under the Meat Safety Act. Should evidence of poor hygiene be identified, corrective and preventive action must be taken. The effectiveness of corrective action is to be verified through increased oversight and audits. In the event that a slaughter/processing deviation does not account for the findings, pre-slaughter factors, e.g. cleanliness of livestock and transport or animal stress (including feeding practices), should be investigated.

Once the establishment has completed an investigation and implemented corrective actions that have been verified by the officials as satisfactory, the establishment will commence a second window as per the performance standard. If the establishment fails to meet the performance standard on the second window for that class of product, the establishment shall re-assess its Hygiene Management System (HAS)/HACCP plan for that product and take appropriate corrective action. The establishment will start the third sample window.

11.1.2. Competent authority

Where a non-compliance is identified, the competent authority must take:

(a) any action necessary to determine the origin and extent of the non-compliance; and
(b) appropriate measures to ensure that the FBO concerned remedies the non-compliance and prevents further occurrences of such non-compliance.

When deciding on a regulatory control action to be taken, the nature of the non-compliance (see VPN 18) and the facility's past record regarding compliance must be taken into account.

The regulator may take any of the following listed actions or any other appropriate action as shall be deemed appropriate for the level of non-compliance:

(a) suspend the slaughter and/or meat processing at the facility.
(b) withdraw the registration certificate of the facility.
(c) order the recall, withdrawal, removal, and destruction of meat,
(d) order the alteration of labels or corrective information to be provided to consumers.
(e) restrict or prohibit the placing on the market, the movement, the entry into the country or the export of meat; or order the meat to be returned to the country of dispatch.
(f) order the FBO to increase the frequency of own controls.
(g) order certain activities of the FBO concerned to be subject to increased or systematic official controls.
(h) order the isolation or closure, for an appropriate period, of all or part of the facility
(i) order the conditional slaughter or killing of animals for human and animal health reasons in the case of diseases like Bovine tuberculosis and Brucellosis and welfare reasons.

11.2. *Salmonella* serotyping

All isolates must be handled as per the relevant VPN and/or legislation. All *Salmonella* isolates obtained must be sent to a *Salmonella* reference laboratory (Agricultural Research Council - Onderstepoort Veterinary Research (ARC - OVR) or National Institute of Communicable Diseases (NICD)) for storage and/or typing. Results of typing must be reported as indicated in the relevant VPN and/or legislation by the testing laboratory.

Table 4: Moving window for *Escherichia coli*, *Salmonella spp.*, *Campylobacter spp.*, *Enterobacteriaceae* and ACC performance standard (PS)

Category	Micro-organisms	Sampling Plan		Limits		Analytical Reference Method	Criterion
		n	c	m (log value)	M (log value)		
Carcasses and meat cuts of wild cloven-hoofed game and wild solipeds (per gram or cfu/cm^2)	Aerobic colony count	35	7	(3.5 log) per gram or cfu/cm^2 (	(5.0 log)	ISO 4833	Process hygiene criterion
	Enterobacteriaceae	35	11	(2.0 log)	(2.5 log)	ISO 21528-2	Process hygiene criterion
	Generic *E.coli**	35	11	(1.7 log)	(2.7 log)	ISO 16649-2	Process hygiene criterion
	Salmonella spp.	49	2	Absence in 25g	-	ISO 6579	Performance criterion
Carcasses and meat cuts of poultry, crocodiles and ostrich and Rabbits (per gram or cfu/cm^2)	Aerobic colony count	35	7	(3.5 log)	(5.0 log)	ISO 4833	Process hygiene criterion
	Campylobacter spp.	50	5	Absence in 25g	-	ISO 10272-1&2	Process hygiene and Performance criterion
	Generic *E.coli**	35	7	(1.0 log)	(2.7 log)	ISO 16649-2	Process hygiene criterion
	**Listeria monocytogenes*	35	4	Absence in 25g	-	ISO 11290-1 & 2	Performance criterion
	Salmonella spp.	49	2	Absence in 25g	-	ISO 6579	Performance criterion
Carcasses and meat cuts of cattle, pigs, sheep, goats and horses (per gram or cfu/cm^2)	Aerobic colony count	35	7	(3.5 log)	(5.0 log)	ISO 4833	Process hygiene criterion
	Enterobacteriaceae	35	11	(1.5 log)	(2.5 log)	ISO 21528-2	Process hygiene criterion
	Generic *E.coli**	35	7	(0 log)	(2.7 log)	ISO 16649-2	Process hygiene criterion
	**Listeria monocytogenes*	35	6	Absence in 25g	-	ISO 11290-1 & 2	Performance criterion
	Salmonella spp.	49	2	Absence in 25g	-	ISO 6579	Performance criterion

12. MONITORING OF ENVIRONMENTAL HYGIENE

12.1. General

The environment in which the food product is manufactured must be monitored microbiologically to ensure that the facility operates in a hygienic environment. The presence and/or concentration of process hygiene indicators reflects the efficacy of process controls or the lack thereof. Flexibility should be provided so that the most effective hygiene verification indicators can be established at the establishment level. The most common and applicable are:

Enterobacteriaceae

Enterobacteriaceae counts reflect in addition to faecal contamination, the level of environmental hygiene.

Aerobic Colony Count (ACC)

ACC also known as Aerobic Plate Count (APC) can be regarded as a reliable indicator of the overall level of bacterial contamination in the environment and food sample. ACC counts above a certain threshold would typically suggest that sanitation of the specific environment or equipment was compromised

Listeria spp.

The detection and presence of Listeria spp. is a good indicator of an inadequate hygiene and/or cleaning process in food handling areas

12.2 Sampling frequency for environmental monitoring

All registered establishments must test their processing environment for the presence of process hygiene indicators at a minimum risk-based testing frequency. A defined minimum number of samples should always be carried out within a specified period. If the results are satisfactory over a period, the frequency of sampling may be reduced. A schedule should be made indicating which surfaces should be sampled on which days. To ensure that all surfaces are tested, surfaces to be monitored should be identified based on risk and scheduled overtime to ensure that all surfaces are monitored and repeated to show developments with time.

12.3 Calculation and interpretation of results

Test	Acceptable range	Unacceptable
Aerobic colony counts (ACC)	As per testing kit manufacturer instructions and approval by the PEO	as per testing kit manufacturer instructions and approval by the PEO
Enterobacteriaceae	As per testing kit manufacturer instructions and approval by the PEO	As per testing kit manufacturer instructions and approval by the PEO
Listeria spp	Not detected	Not detected in food contact surfaces

Table 5: Minimum and maximum ranges

12.4 Alternative approaches to microbiology for environment monitoring

Alternative approaches to microbiological testing that are properly validated may be established where they offer practical advantages such as ATP+ADP+AMP test. ATP hygiene monitoring tests are widely used for assessing the effectiveness of cleaning procedures.

13. ADDITIONAL MICROBIOLOGICAL TESTING GUIDANCE TO SATISFY SPECIFIC MARKET REQUIREMENTS

This section provides a summary of known microbiological testing requirements implemented by export markets.

13.1 Requirements for raw beef and game components intended for export to USA, EU, and other territories

13.1.1. Lot/Batch identification and traceability

When a consignment has been defined, the establishment must allocate a unique test identifier to all cartons to ensure that the batches in the consignment identification can be maintained, controlled, and always traced.

When a batch for export is placed into a container which was sampled and tested negative: The batch must be exported in its entirety and in a single container. The lot/batch must be identifiable. There must be traceability from the test result to the sample, to the sampled batch identifier.

The establishment is responsible for maintaining control of all sampled batches that test negative and that are eligible for export until they are presented at a port-of-entry for inspection by the importing country competent authority. Raw beef and game component consignments transferred between registered export establishments must have their test status referenced on the meat transfer certificate and be able to be linked.

13.1.2. Shiga toxigenic Escherichia coli testing

This is a test and hold programme designed to satisfy the requirements to export raw beef and game components to the EU, USA and Canada and other markets where STEC testing is a requirement of export. Product must remain under the control of the establishment (able to be recalled) until the result of any testing under this programme is known to be negative.

All cartons, packages, or containers represented by the tested sample as identified by the establishment as microbiologically independent from other lots/batches based on a risk-based sampling programme constitute a representative consignment in the programme. These products must:

where applicable, be sampled using a n=60 sampling plan as described in this section.
only originate from a single packing establishment.
be identified with a single mark.
not be redefined after sampling and testing.
not be retested to change the disposition of the lot/batch; and
only be loaded in a single shipping container.

13.1.2.1. Definitions

Confirmed Positive: A test result indicating that an isolate obtained from a potential positive sample has been purified and confirmed as one of the STEC identified below.

Deemed Positive: A sample has returned a potential or presumptive positive result and has not been tested further to confirm the testing result as “test positive” or “test negative”. Product exported without testing when testing was required may be deemed positive for the purposes of disposition.

Microbiological independence: For this programme, the microbiological independence of a sampled lot/batch is an indication of the separateness of one sampled and tested lot/batch from another. In determining the independence of a lot/batch the establishment should consider the formation of the lot/batch, the robustness of the sampling regime(s) applied to the lot/batch and other factors that assist in identifying one lot/batch as distinct from another. It is the responsibility of the establishment to identify how the microbiological independence of a sampled lot/batch is determined and maintained.

Potential positive: A positive result for a screening test for STEC.

Raw beef and game components: Raw ground beef components include all beef and game bulk packed manufacturing trimmings and other beef and game components such as primal cuts, sub primal cuts, head meat, cheek meat, oesophagus meat, and advanced meat recovery product intended for grinding in the EU, USA and/or Canada.

Shiga toxin producing E. *coli* (STEC): For this section, markets that require STEC tests as part of market access requirements, STEC comprises of serotypes O157, O26, O45, O103, O111, O121 and O145. The organism isolated from an enrichment broth must be:

- Confirmed biochemically as *E. coli.*
- Confirmed by serological or molecular testing as one of the seven serotypes of concern.
- Confirmed to produce Shiga toxin or contain one or more of the Shiga toxins genes.
- In the case of non-O157, STEC confirmed to contain the intimin (*eae*) gene.

13.1.2.2. Microbiological criteria for STEC in beef and game meat

Below are the microbiological criteria for STEC in beef and game meat.

Table 6: STEC criteria for meat

Product category	**Microorganisms /test**	**Sampling Plan**		**Microbiological limits unless otherwise specified**		**Reference testing method**	**Criterion**
		n	**c**	**m (log value)**	**M (log value)**		
Beef and game meat	Shiga toxin-producing *E. coli* (STEC)*	5	0	**Not detected in 25g		ISO/TS 13136	Food safety Criterion

**Applies to the following STEC serotypes O26, O45, O103, O121, O145 and O157 and where presence of eae or ehxA genes or stx1and or stx2 is demonstrated.*
*** Applied for the first 6 months and thereafter must be not detected in 325g.*

13.1.2.3. HACCP reassessment covering STEC control

Establishments must consider STEC as a potential hazard in their HACCP based food safety systems to maintain eligibility for a particular market. HACCP reassessment must determine which STEC serotypes will be used to verify process control and used in testing of lots/batches. Whether or not testing for the non-O157 STECs continues in loads intended for export depends on the outcome of the HACCP reassessment.

13.1.2.4. Sampling

General considerations for sampling:

Selected cartons may be removed from production line and stored under appropriate conditions for later sample collection, however these cartons form part of and must be returned to the sampled lot/batches. Samples collected over several production days must be stored frozen until pooled for analysis.

Where samples are collected at independent cold stores, lots/batches may only consist of products from a single source deboning establishment.

13.1.2.5. Sample collection

The establishment must ensure that the full range of the raw beef or game components intended for further processing on the market have an equal opportunity to be sampled in the lot. The sample collected for this programme is comprised of at least 60 sub-samples (n=60) which must satisfy the following criteria:

- Sample consist of small pieces of meat (surface slices) representing the surface of the carcase.
- The pieces of meat are to be selected from a minimum equivalent of 12 cartons representing the sampled lot/batch with a minimum of five pieces taken from each carton. Where the lot/batch is less than 12 cartons in size, then all cartons must be sampled, and the total number of sub-samples collected from these cartons must equal 60.
- The total number of pieces sampled per lot/batch must be at least 60 (i.e. n=60).
- The total individual sample weight collected must be at least 375g.
- The sample must be collected using sanitised instruments under sanitary conditions.
- Samples collected from frozen cartons must be kept frozen until dispatched to the laboratory for testing.

13.1.2.6. Sample labelling

The sample must be labelled appropriately to ensure traceability. The following information must be included:

- Establishment number (if samples are to be sent to an external laboratory);
- Date of sampling.
- Packing line (if applicable).
- Unique identifier of the sampled lot.
- Product description; and
- The name of the approved testing laboratory.

14. PARASITOLOGICAL TESTING

14.1 Trichinella spp. in meat

14.1.1. Background

The European Commission Regulation EC 2015/1375 requires testing of specified meats for *Trichinella* prior to or at post-mortem inspection. The National Executive Officer has approved the "magnetic stirrer method for pooled-sample digestion" for the analysis of samples for *Trichinella* spp. Additional information can be obtained from Annexure A, the OIE Terrestrial Animal Health Code, Chapter 8.17, the Codex Guidelines for the control of *Trichinella* spp. in meat of Suidae (CAC/GL 86-2015) and the International Commission on Trichinellosis. For the purposes of this section '*Trichinella*' means any nematode belonging to species of the genus *Trichinella*.

14.1.2. Scope

This section details the requirements for testing for *Trichinella* spp. in meat for export to the EU, Russia and any other market requiring *Trichinella* testing according to the EU Regulations. The requirement applies to all meat from domestic swine, equine, wild boar, and crocodile produced for export.

14.1.3. Responsibilities

The FBO must compile a contingency plan indicating the steps to be taken in a case of *Trichinella* positive results for a particular batch of meat. The plan must include, but is not limited to:

a. Reassessment of the establishment's HACCP based food safety system.
b. Subjection of the meat to a process that guarantees the destruction of the *Trichinella* larvae in accordance with the Codex guidelines for the control of *Trichinella* spp. in meat.
c. Identification, tracing, and detention of all the meat that comprises this specific batch of meat that tested positive for *Trichinella*.
d. Traceability of the affected batches to prevent export or distribution of the infected meat.
e. meat to be condemned.
f. Meat or carcasses to be send for destruction or to be subjected to an approved treatment such as heat treatment or irradiation method (where permitted) in the case

of non-cold tolerant species or freezing treatment method before the meat is distributed.

g. Safe handling instructions labelling as part of the risk mitigation measures especially when animals originate from potentially high-risk holdings.
h. Subjection of the *Trichinella* nematode for species identification.
i. Steps to inform the state veterinarian responsible for the area where the infested animals originated.

No export certification to the EU may be issued by the certifying official, unless the requirements of this section, read in conjunction with Commission Regulation (EC) 2075/2005 as amended have been met.

14.1.4. Sampling

The PEO may exempt an abattoir from the minimum *Trichinella* spp. sampling frequencies when the PEO has ascertained by risk evaluation that the risk of *Trichinella* infestation of a particular farmed or wild species or holding is negligible.

The following samples for *Trichinella* examination must be collected from each individual carcass as part of the post-mortem inspection procedure and examined as pooled samples:

Specie	**Muscle sample site**	**Muscle sample size/carcass**	**Pool size for testing**
Equine	Lingual or Masseter or if these are not available, Diaphragmatic pillar	≥20g	5 carcasses x 20g/carcass = 100g
Crocodile	Pterygoid and/or Masseter and/or Intercostal	≥20g	5 carcasses x 20g/carcass = 100g
Porcine: all breeding sows and boars' carcasses and at least 10% of carcasses of animals sent in for slaughter from each holding	Diaphragm; pillars of the diaphragm; muscle of the tongue; masseters	≥20g	5 carcasses x 20g/carcass = 100g

Table 7: *Trichinella* sampling

14.1.5. Laboratory

Meat samples may only be examined by a laboratory that has been registered by the Department of Agriculture, Land Reform and Rural Development (DALRRD) for *Trichinella* examinations. The laboratory shall inform the Official Veterinarian in charge of the establishment of the positive results as soon as they are known.

14.1.6. Traceability

The aim of the HMP on *Trichinella* is to prevent dispatch or export of unapproved meat from the premises/export establishment and to keep all batches of meat for which *Trichinella* examination results are pending in bond, until satisfactory results have been received. Export approval marks may only be applied to packaging containing cuts of export meat once the results of the *Trichinella* examination have been received and if the batch of meat tested negative for *Trichinella*. This is not required in the case where exemption may have been approved by the PEO as per abattoir HMP.

In cases where traceability is only possible onto batch level, rather than to an individual carcase, any positive results will result in condemnation of all meat that comprises the batch and in cases of suspect results, will result in refusal of all the meat that comprises the particular batch for release until the results are confirmed. Where samples are however traceable to individual carcases, only individual infested or suspect carcases will either be condemned or refused for distribution or recalled if the results are confirmed positive.

14.1.7. Competency of Testing Personnel

All personnel involved in the examination of samples to detect *Trichinella* must be appropriately trained, and records of the training maintained. Establishments must ensure that they implement a quality control programme for the laboratory undertaking testing for *Trichinella*.

14.1.8. Freezing Treatment for Domestically Produced Pork and Crocodile Meat Freezing as a control option for *Trichinella*

Insulated packaging must be removed before freezing, except in the case of meat that has already been at the required temperature throughout when it is brought into the refrigeration room or if meat is packaged in such a manner that the packaging will not prevent it from reaching the required temperature within the specified time. The time when each consignment is brought into the freezer room must be recorded.

Required period of freezing at temperature indicated:

Temperature °C (°F)	Group 1* (days)	Group 2** (days)
-15 (5)	20	30
- 23.3 (−10)	10	20
-28.9 (−20)	6	12

**- Group 1 comprises product in separate pieces not exceeding 15 cm (6in.) in thickness or arranged on separate racks with the layers not exceeding 15 cm (6 in.) in depth, or stored in crates or boxes not exceeding 15 cm (6 in.) in depth or stored as solidly frozen blocks not exceeding 15 cm (6 in.) in thickness.*

***- Group 2 comprises product in pieces, layers, or within containers, the thickness of which exceeds 15 cm (6 in.) but not 69 cm (27 in.), and product in containers including tierces, barrels, kegs, and cartons having a thickness not exceeding 69 cm (27 in.).*

The product undergoing freezing, or the containers thereof must be so spaced to ensure free circulation of air between the pieces of meat, layers, blocks, boxes, barrels, and tierces in order that the temperature of the meat throughout will be promptly and uniformly reduced. The rooms or compartments containing product undergoing freezing must be equipped with accurate thermometers placed at or above the highest level at which the product undergoing treatment is stored and away from freezer coils.

14.1.9. Treatment of meat consisting of commercial freeze drying or controlled freezing at the centre of the meat pieces

The following alternate time temperatures can be used:

Meat of a diameter or thickness of up to 15 cm must be frozen for one of the following time-temperature combinations:
20 days at -15°C
10 days at -23°C
6 days at -29°C

Meat of a diameter or thickness of between 15 cm and 50 cm must be frozen for one of the following time-temperature combinations:
30 days at -15°C
20 days at -25°C
12 days at -29°C

The following alternate time temperatures can be used for product of any thickness, where temperature is measured at the thermal centre of the product:
106 hours at -18°C
82 hours at -21°C
63 hours at -23.5°C
48 hours at -26°C
35 hours at -29°C
22 hours at -32°C
8 hours at -35°C
1/2 hour at -37°C

The temperature is to be measured using calibrated thermometers and recorded continuously. The thermometer probe is inserted in the centre of a cut of meat no smaller in size than the thickest piece of meat to be frozen. The cut must be placed at the least favourable position in the freezer, not close to the cooling equipment or directly in the cold air flow. The temperature charts must include the data numbers from the inventory/inspection record and the date and time of commencement and completion of freezing and must be retained for one year after compilation.

Annexure A

1. Recommendation for carton meat microbiology testing for export markets that requires non detection of a specific pathogen

The procedure for collecting and analysing samples must be included in the establishment's procedure.

Selection of cartons for sampling: Samples must be collected as close to final carton closure as possible. Where boned product is produced in units other than a carton, equivalent arrangements with regards to the testing of final product must be undertaken and approved as directed under the Meat Safety Act. When selecting cartons for sampling the following conditions apply:

- Cartons from different shifts, boning and/or species must be sampled and tested independently.
- Cartons must be selected randomly from those available for testing as defined above.

The intent of this programme is that each slaughter establishment, independent deboning room or wild game further processing establishment should be collecting at least one sample per day.

2. Sampling procedure and frequency

At slaughter establishments, samples are to be collected from carton meat (bulk packed trim or similar product) at the same frequency as *Enterobacteriaceae*/ACC/*E. coli* carcass samples.

Where an establishment is an independent deboning room and does not conduct carcase swabbing then carton samples must be collected according to the carcase equivalents processed daily. For this programme carcase equivalents are defined as follows:

For bovines: one pooled swab from five carcasses per 300 carcases.

For ovines: one swab per 1000 carcases.

For poultry: one pooled sample per 13500 carcasses. Alternatively, at least 5 samples can be collected on the same day once a week for analysis.
Sampling is by surface slices pieces of meat originating from the surface of the neck.

Consignment/lot under dispute or to be resampled after failing the initial test must be resampled using a sampling plan (n=60) or alternatively as described in the relevant Codex General Guidelines on sampling.

Annexure B

1. Recommendation on microbiological testing of production, cold storage, and laboratory environments

The objective of the routine environmental monitoring programme is to detect pathogen niches and to target batches of final products for sampling for effectiveness of cleaning and sanitation to initiate corrective actions before pathogens can contaminate product contact surfaces (PCS) or product.

The routine environmental monitoring programme will typically focus on surfaces in the production area(s) where at-risk product is exposed to the environment. The food business operator may designate sampling locations into zones based on the proximity to the product. The number of samples collected will differ by zone, the risk to exposed product and the complexity of the production system.

2. Environmental hygiene monitoring: aerobic colony count and *Enterobacteriaceae*

Aerobic colony count (ACC) can be regarded as reliable indicators of the overall level of bacterial contamination. *Escherichia coli* is a good indicator of faecal contamination however, *Enterobacteriaceae* counts reflect in addition to faecal contamination, the level of environmental hygiene. Since sanitizers readily inactivate these organisms, they can be used as an evaluation tool for good manufacturing practices.

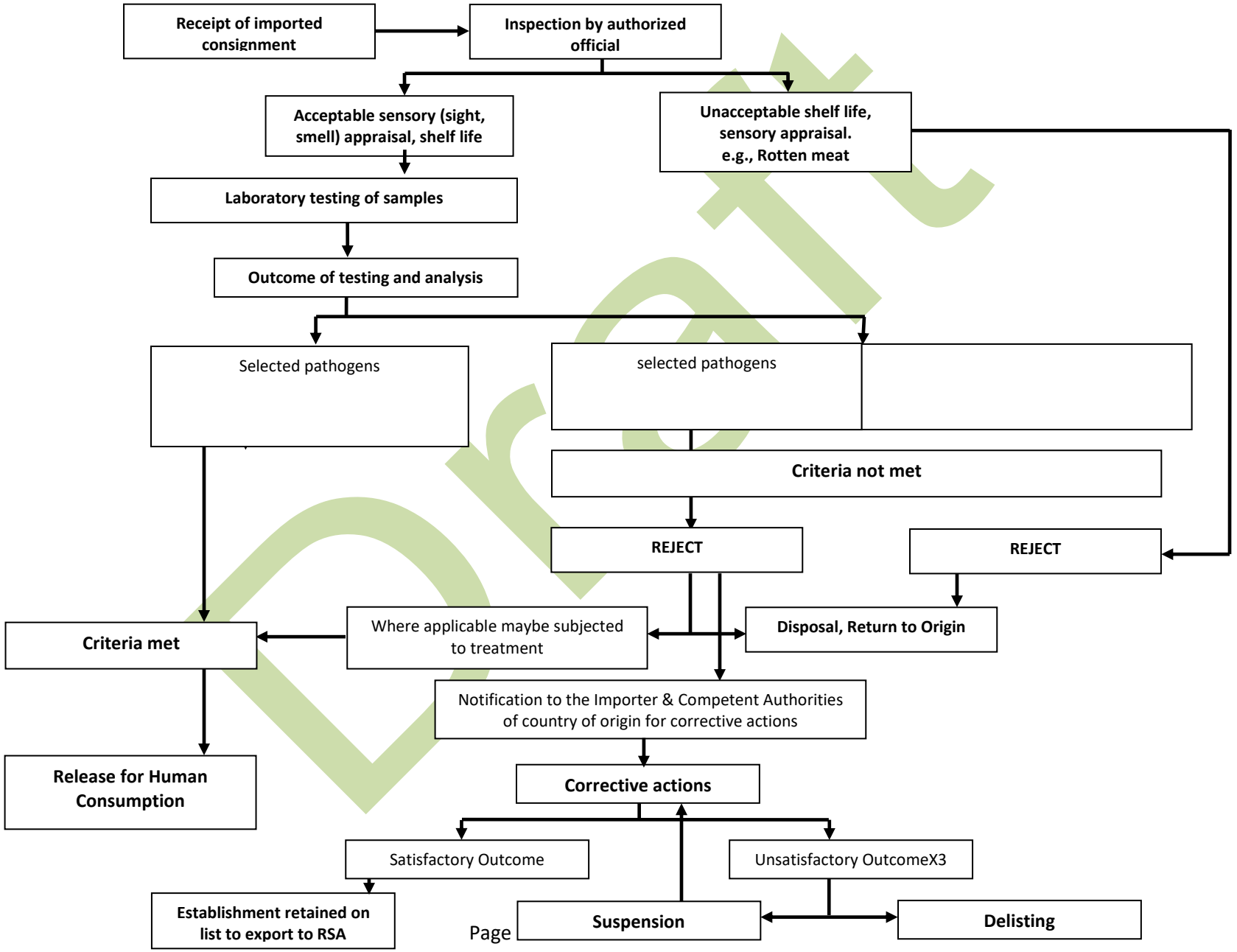
3. Environmental Hygiene Monitoring: *Listeria* spp.

While annex 19c of CAC/GL 61 – 2007 addresses *L. monocytogenes*, for effective monitoring programmes it recommends the involvement of testing for *Listeria* spp. as their presence is a good indicator of conditions supporting the potential presence of *Listeria monocytogenes*. The following steps usually applies:

a. Label the 10ml full strength Fraser's broth (bottle).
b. Select a sterile swab.
c. Pre-moisten the swab in the 10ml full strength Fraser's broth.
d. Take the sample with the moistened swab.
e. Place the swab back into the 10ml full strength Fraser's broth and break off the handle.
f. Close the 10ml full strength Fraser's broth lid and place into cooler box.

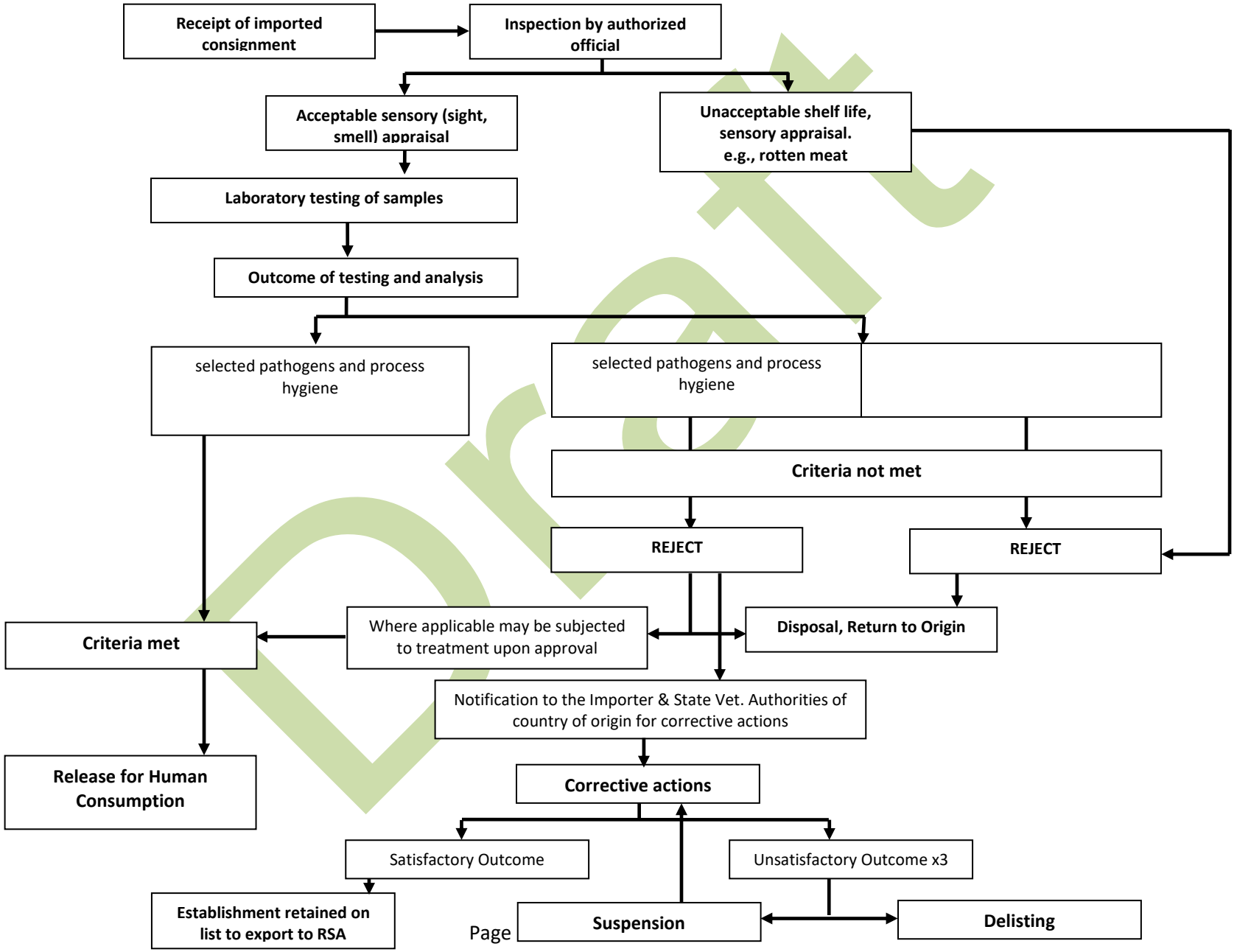
ANNEXURE C

MDM/MRM/MDP, TRIMMINGS, CARCASSES, PORTIONS/CUTS AND RED OFFAL



ANNEXURE D

ROUGH OFFAL and Other Products such as White offal



agriculture, land reform
& rural development

Department:
Agriculture, Land Reform and Rural Development
REPUBLIC OF SOUTH AFRICA

SAMPLING, TRANSPORTATION AND HANDLING OF SAMPLES FOR MICROBIOLOGICAL MONITORING OF MEAT.

MEAT SAFETY ACT, 2000
(Act No. 40 of 2000)

CONTENTS

1. DEFINITIONS

Act	The Meat Safety Act, 2000 (Act No. 40 of 2000)
Authorised person	A trained and competent person authorized by the National Executive Officer to perform meat sampling and related activities to ensure compliance of the meat to provisions of the Act
Cleaning	The process of removing unwanted substances, such as dirt, infectious agents, and other impurities, from an object or environment.
Composite sample	A composite sample is produced by mixing the primary samples (items) from a lot of pre-packaged products; or by mixing the primary samples (increments) from a bulk (not pre-packaged) lot
Consignment	means a quantity of some commodity delivered at one time. It may consist in either a portion of a lot, or a set of several lots. For inspection purposes, each consignment shall be considered as a new lot for the interpretation of the results. If the consignment is a set of several lots, before any inspection, the composition of each lot must be considered. A stratified sampling may be applied in case of non-homegenous lots within a consignment.
Control Measure	Any action and activity that can be used to prevent or eliminate a food safety hazard or reduce it to an acceptable level as per voluntary or regulatory requirement.
Critical limit	A criterion, observable or measurable, relating to a control measure at a CCP which separates acceptability from unacceptability of the food
Direct supervision	means that the authorised person must be present at the establishment and directly supervising and monitoring the said processes. The authorised person takes responsibility of processes being supervised
Disinfection	Reduction by means of chemical agents and/or physical methods in the number of microorganisms on surfaces to a level that does not compromise food safety and suitability.
Lot	A lot is a definite quantity of some commodity imported, manufactured or produced under conditions, which are presumed uniform. For the purpose of these guidelines, a day's production or a single consignment in the case of exports and imports shall be considered as a new lot for inspection of products.

Microbiological criteria	means a risk management metric which indicates the acceptability of a food, or the performance of either a process or a food safety control system following the outcome of sampling and testing for microorganisms, their toxins/metabolites or markers associated with pathogenicity or other traits at a specified point of the food chain.
Monitoring	The act of conducting a planned sequence of observations or measurements of control parameters to assess whether a control measure is under control.
Sample size	A representative set composed of item(s) selected by different means in a lot intended to provide information on a given characteristic of the lot from which it is drawn.
Sampling Officer	A trained person who is not an official, authorized by the controlling authority to perform meat sampling and related activities under the supervision of the NEO to ensure compliance of the meat to provisions of the Act
Sampling point	A point where samples for laboratory analysis are taken
Verification	The application of methods, procedures, tests and other evaluations, in addition to monitoring, to determine whether a control measure is or has been operating as intended.

2. INTRODUCTION

The National Executive Officer (NEO) designated under the Meat Safety Act, 2000 (Act No. 40 of 2000)("the Act") is responsible for the verification of compliance of product from registered slaughter, deboning and processing establishments to the Act..

3. LEGISLATION MANDATE

The Act provides for measures to promote meat safety and the safety of animal products. Under the Act, the NEO may examine, sample, and test any meat or animal product. Paragraph 53 of the poultry meat regulations (R153 of 2006) and paragraph 55 of the red meat regulations (R1072 of 2004) provide for a hygiene management programme for regular checking for soiling on a representative sample of carcases throughout the day on a random basis and to determine the levels of contamination of carcases.

Paragraph 97(3) of the poultry meat regulations and paragraph 126(3) of the red meat regulations provide for veterinary procedures to be performed by the NEO whilst meat is stored at cold stores to confirm that no soiling, contamination, or deterioration of the meat in any way

took place during transportation prior to storage and to conduct any other veterinary procedure necessary to ensure that the meat is safe and suitable for human consumption.

4. PURPOSE

The purpose is to clarify on the veterinary procedures on good practices for sample collection, transportation, and handling at the cold store and upon arrival at laboratories. Establishments must have procedures and sampling plans that define sampling sites.

5. SCOPE

These guidelines apply to abattoirs, import and export cold stores, cutting, deboning, and processing plants linked to an export abattoir and food safety laboratories (government, on-plant, and independent laboratories).

6. SAMPLE HANDLING AND TRANSPORTATION TO THE ANALYSING LABORATORY

6.1. General

The establishment must document a standard operating procedure for the collection, preparing, handling and transportation of samples to the testing laboratories.

The transportation of samples must ensure that the integrity of the samples is always maintained. The authorised veterinarian responsible for the point of sampling may allow a third party (e.g. laboratory, cold store or courier service with compliant facilities to courier frozen or chilled products) to transport samples between point of sampling and laboratories.

Samples must be delivered at the testing laboratory within 3 working days of being taken. If a delay in transport of the samples is expected, the product must be put aside and sampled at a time when the transport time and temperature requirements can be met. Any samples that do not reach the testing laboratory within the stipulated time after being taken, must be reported to the authorised veterinarian for a decision.

The testing of samples at the laboratory must be carried out within 48 hours after receipt.

Bags containing sample sponges must be firmly secured to prevent leakage.

6.2. Temperature requirements

The temperature of the frozen meat samples must be maintained below 7ºC in the case of red meat and below 4ºC in the case of poultry, offal, and all other product samples at all times. Control limits as set in ISO7218 are highly recommended. It is recommended that the air

temperatures within the transporting compartment be maintained below 2ºC. Samples from warm carcases may be harvested and submitted to the on-site lab immediately for analysis.

The temperature of carcase swab samples must be maintained between 0°C and 4°C. Carcase swabs must not be frozen for transportation to the laboratories.

The temperature of the meat must be taken during sampling by the authorised person and again at the laboratory upon arrival by the responsible laboratory person. The responsible laboratory person must also inspect the condition of the samples to confirm that they have been handled properly until receipt at the laboratory.

6.3. Maintenance of the microbiological status of the samples

The samples must be handled in such a manner to ensure that they are not contaminated in any way.

6.4. Maintenance of the identity / traceability of the samples

Each sample must be labelled, handled, and packaged in such a manner to ensure that the traceability of the samples to the relevant specific source or consignment is maintained. This must include ensuring that the samples cannot be manipulated (altered / swapped / treated) at any stage of transportation.

6.5. Security of the samples

Samples must always be secured to ensure their integrity and to ensure that they are not manipulated. When samples are kept at the sampling establishment for a period until collection by a third party, the samples must be placed in a sealable container, sealed by or under direct supervision of an authorised person and the cold chain maintained until collection.

If the samples must be transferred to a different container for transportation, the seal must be broken by or under direct supervision of an authorised person and the new container(s) sealed by or under direct supervision of an authorised person.

The transporter must verify the number of samples or sealed containers and seal numbers as recorded in the laboratory sample submission form.

6.6. Transportation

Samples must be transported in appropriate packaging and containers (clean, sanitised, dust-proof, sealable, etc.) which ensure that they remain hygienic and within temperature requirements during transport such that on receipt at laboratory, the temperature of the sample does not preclude their testing.

The transportation of the samples must comply with the regulations as set out in the National Road Traffic Act, 1996 (Act No. 93 of 1996) for the safe transportation of hazardous material through the effective management of systems and processes. Standard operating procedures for collection and transportation of samples for diagnosis should be in accordance with

Chapter 1.1.1 and Chapter 1.1.2 of the recent OIE Manual of Diagnostic Tests and Vaccines for Terrestrial Animals (Terrestrial Manual). Where samples are sent to network laboratories, additional compliance, packaging, transportation, and sample submission forms may be required such as courier(s) certified by IATA for the transportation of biological samples.

6.7. Documents management

All relevant documentation pertaining to the samples must be sent with the samples to ensure adequate identification of samples and notification of testing requirements to the laboratory. The required information must be included in the sample submission form.

The establishments must document their procedure of packaging of samples or adopt the International Air Transport Association (IATA) or a similar packaging and dispatch methodology.

Records must be kept for at least 5 years and must be made available to the authorised persons and NEO upon request. Minimum details that must be in the logbook are as per Veterinary Procedural Notice (VPN) 56 – *Requirements for registration of testing laboratories responsible for the analysis of samples for monitoring and verification of hygiene of meat and products of animal origin,* and the sample submission form.

7. HANDLING OF SAMPLES AT THE LABORATORY

7.1. Temperature

Where samples arrive at the laboratory at a temperature >7°C but <10°C in the case of red meat and >4°C but <8°C in the case of poultry and offal, analysis can proceed if the requested test is for detection and or serotyping of the organism(s). The samples outside the stipulated temperature limits must be disgarded if the requested test is for enumeration.

Analysis should not be carried out on samples that arrive at temperatures outside the limits stated in the paragraph above. Should the temperature requirements not be complied with, the laboratory must reject the samples and immediately notify the authorised person responsible for the establishment/cold store.

In all cases where high temperature precludes analysis the laboratory must notify the official responsible for the sampling and establishment. Another new sample from the same batch must be taken for replacement.

Based on the reasons for the noncompliance of the samples to the temperature requirements, the authorised veterinarian may authorise another sampling of the product and may impose additional control measures to ensure the integrity of the samples

7.2. Laboratory processes

Prior arrangement with the laboratory must be made to ensure that the testing can be carried within 48 hrs of receiving samples and where not applicable deviation must be risk based on available relevant international best practices.

On arrival at the laboratory, laboratory personnel must:

- where determined, ensure that they are not accepting samples beyond their effective and maximum capacity for official testing.
- verify the integrity and temperature of the samples; and
- in the case of enumeration tests, determine that analysis of the sample can commence immediately upon arrival or not later than 48 hrs following the time of receipt of the sample(s).

Laboratory analysing methods must operate according to a laboratory management system within the registration framework of the respective laboratory such as the VPN56 and other recognised government laboratory systems.

7.3. Reporting of results

The presentation of results must take cognisance of the sampling method.

In addition to all the information provided in the sample submission form, the laboratory report must contain the following details:

- Time and date of receipt of the sample(s) at the laboratory and temperature of sample(s).
- Proper identification of the sample(s) especially pertaining to the point/source of collection.
- Date and time of testing at the laboratory.
- Results of the analysis
- Name and professional registration number of the person approving the results.
- Range of criteria for evaluation of the results.

8. REPORTING OF NON COMPLIANCES BY THE ESTABLISHMENT MANAGEMENT

Establishments must report any non-compliances to these guidelines to the authorised person and put measures in place to prevent further non-compliances from occurring.

9. SAMPLING

9.1. SAMPLING PERIOD

9.1.1. Carcases

Samples are to be collected prior to final chilling or freezing and where feasible prior to dispatch.

9.1.2. Primal cuts

Samples are to be collected prior to final chilling or freezing, before packaging, wrapping or bulk packing into cartons.

9.1.3. Packed meat including trimmings, mechanically deboned meat / mechanically recovered meat (MDM/MRM), offal and other meat products.

In the case of cutting plants, samples are to be collected immediately prior to closing and sealing of packages. In the case of abattoirs, samples are to be collected prior to chilling or freezing.

9.1.4. Chilled and frozen meat (carcases, cuts, MDM/MRM, trimmings offal and other meat products) at cold stores

Samples are to be collected prior to release.

9.2. SAMPLING SITES AND SIZE

Samples may be collected through the destructive or non-destructive methods. The destructive method involves cutting a piece of the product for testing at a laboratory, whereas the non-destructive method involves the usage of swabs to collect samples from the the product.

In general, the destructive method is the preferred method for sample collection. A sample size of <2 mm depth from the surface must be collected when collecting muscle and/or tissue samples. Depending on the required analysis, pooled samples in a sterile bag must weigh 100 - 650 grams each.

The non-destructive method is commonly used for carcases and high value large intact cuts. When using the non-destructive method (swabbing) for this purpose, the sampling area from each of the carcass site must cover a minimum of 100 cm^2 and where not feasible, a minimum of 25 cm^2 of which a minimum of 4 sampling sites are required per carcase. Further guidelines on sampling sites can be obtained in ISO 17604.

When sampling for microbiological analyses, four or more risk-based sites of each consignment must be sampled, however risk based deviation is permitted

In the case of sampling of lots or consignments at arrival or dispatch, at least five units (of which the unit may be a carcasse, carton, cut or package) must be sampled at random during each sampling session. The sample size must take into consideration the number of units being in the lot and/or consignment.

large number of samples maybe be composited before examination if indicated in the sample submission form.

The authorised person may collect additional samples or a larger sample size to be tested as required.

9.3. SANITATION DURING HANDLING OF SAMPLES

Sampling personnel are to use aseptic procedures when collecting samples. The personnel must use effective cleaning, disinfection, and sterilisation practices to prevent cross-contamination during samples collection and packaging.

Sanitize all non-disposable equipment before collecting samples. Immerse equipment e.g. chisel, template, bits, scalpels and forceps in 82°C water for 10 seconds or by using flaming method with denatured alcohol. Allow the equipment to cool before drilling so there is no heat damage to the bacteria in the collected samples.

9.4. SELECTING PRODUCTS TO BE SAMPLED

In case of imported meat, the authorised person must identify each shipping container to be sampled.

The authorised person must select random cartons, packages or carcases of meat and monitor the process of conveying the selected items to the sampling area.

The carton(s)/packages or carcases from which the laboratory sample was obtained must be identified by labelling with the sample label number.

9.5. SAMPLING PROCEDURE

9.5.1. DESTRUCTIVE METHOD

a. Equipment

The minimum equipment required are listed below:

i. sterile gloves.

ii. sterile sample bags.

iii. electric or hand drill with drill bit (22 mm or larger) and cork borer.

iv. electric saw.

v. sterile samples bags.

vi. template (50 x 50 mm, preferably of stainless-steel wire);

vii. forceps, and scalpel, scissor, or knife.

viii. hammer and chisel (19 mm or wider).

ix. denatured alcohol (methylated spirits) and lamp or lighter/ alcohol wipes.

x. depending on the arrangement and agreement, frozen chiller packs and foam polystyrene box provided by the establishment or cold store or laboratory.

xi. permanent marking pen

The following equipment must be used for the product specified:

i. Scalpel and forceps or cork borer: Applicable to chilled meat and offal

ii. Hammer and Chisel method: Applicable to frozen meat and offal

iii. Electric saw, electric/hand drill, and other appropriate equipment: Applicable to frozen meat and offal

b Sampling of muscles and tissues

Samples must be collected from different sites in cartons/packages/carcases to be sampled.

The following procedure must be followed to sample frozen product (except frozen poultry carcases):

i. Loosen the enclosed frozen product by hitting the carton against a hard protected surface whilst ensuring that the package material is not torn during the process.
ii. Open the outer packaging.
iii. Disinfect the surface of the plastic wrapping the product with a disinfectant.
vi Wash and scrub hands thoroughly to the mid-forearm using antibacterial hand soap (or a hand sanitizer at 50 ppm chlorine equivalency).
v. Wear a pair of disposable gloves. A new pair of sterile gloves should be worn every time the sample is removed by means of hands to avoid cross contamination. The gloves must be worn as follows:

- Peel and open the package of sterile gloves from the top without contaminating the exterior of the gloves.
- Remove a glove by holding it from the wrist side opening inner surface. Avoid any contact with the outer surface of the glove.
- Insert hand without puncturing the glove. Discard glove and use another sterile glove if there is a concern that it may have been contaminated.

vi. Carefully cut the plastic wrapping with a sterile scalpel. Care should be taken not to let the outer surface of the plastic wrapping touch the product.
vii. Cut the surface of the meat or offal at a depth of approximately 2mm thickness.

viii. For individually frozen portions not loosened, loosen the portions using a sterilized chisel and hammer and place the whole portion(s) inside a sterile sample collection bag.
ix. Open the sample collection bag without contaminating the interior, by grasping the side with fingers and pulling outwards.
x. Collect the sample with the gloved hand. Place the sample into the sample collection bag and close and label the bag and discard the glove.
xi. Properly label the sample and mark the carton/ carcase from which the sample was collected with the same sample label identity.
xii. Place the sample in a cooler-box/container between layers of ice.

c. Sampling of frozen poultry carcases

The following procedure must be followed:

i. Open the outer packaging as explained above at point b.
ii. When carcases are individually packed, aseptically remove a wrapped carcase randomly from the box and place it in a sample bag. Alternatively separate the packed carcase from the rest and submit the carcase as an individual sample.
iii. When poultry carcasses are not individually packed, the sampling sites may include the neck skin, wings, back, thighs, drumstick, and breast.

At the laboratory, sample preparation of poultry carcases must ensure that the neck skin, wings, back, thighs, drumstick and breast are included in the sample to be tested.

The fully completed sample submission form must accompany the sample.

9.5.2 NON-DESTRUCTIVE SAMPLING (SWAB SAMPLES)

a. Equipment

The following equipment and materials must be used:

i. Container for carrying supplies
ii. Sterile gloves (optional with the alternate method)
iii. Sterile template
iv. Whirl-pack™ type Collection method: Sterile specimen sponge in sterile Whirl-pack™ -type bag or equivalent; or Microdiagnostics™ Collection Bag or equivalent (alternate method)

b. Diluents

The following diluents must be used:

i. For *E. coli* and APC sampling use:
    - 25 ml sterile Butterfield's Phosphate Diluent; or

- 25 ml of 0.1% Peptone Salt Solution[1] or Buffered Peptone Water.

ii. For *Salmonella* sampling use 25 mL of Buffered Peptone Water.

c. Whirl-pack™ Method

A sampling sponge (which usually comes dehydrated and prepacked in a sterile bag) must be used to sample all the sampling sites on the carcase as follows:

i. Ensure that all bags have been pre-labelled, and all supplies are on hand, including the sampling template.

ii. If a reusable template is used, it must be sterilised between each carcase

iii. Locate the sampling sites using relevant illustrations and directions as in the establishment procedures.

iv. While holding the sponge bag at the top corner by the wire closure, tear off the clear, perforated strip at the top of the bag.

v. Remove the cap from sterile diluent water bottle (diluents may differ depending on the target organism).

vi. Carefully pour about half the contents of the sterile diluent (approximately 10 ml) into the sponge bag to moisten the sponge. Recap the bottle.

vii. Close the top of the bag by pressing the wire closure together. Use hand pressure from outside of the bag and carefully massage the sponge until it is fully hydrated (moistened). Sponges may be pre-moistened prior to sampling the carcases.

viii. Prior to collecting the sample, carefully push the moistened sponge to the upper portion of the bag orienting one narrow end of the sponge up toward the opening. DO NOT open the bag or touch the sponge with your fingers.

ix. While holding the bag, gently squeeze any excess fluid from the sponge using hand pressure from the outside. The whole sponge should sit in the bag.

x. Open the bag containing the sponge, being careful not to touch the inner surface of the bag with your fingers. The wire closure at the top of the bag should keep the bag open. Set the bag aside.

xi. Put on a pair of sterile gloves.

xii. Carefully remove the moistened sponge from the bag with the thumb and fingers (index and middle) of your sampling hand.

xiii. With your free hand, retrieve the template by the outer edge, taking care not to contaminate the inner edges of the sampling area of the template.

xiv. Locate the sample site e.g. flank for beef and small stock; belly for pigs and place the template over this location.

[1] Peptone Salt Solution - Dissolve 1g Peptone and 8.5 g sodium chloride in 1L of deionized water. Autoclave at 121 ±1°C for 15 min, pH after sterilization 6.9 ± 0.2, store in the dark at 0-5°C for one month

xv. Hold the template in place with one gloved hand. Only the sponge should touch the sampling area. Take care not to contaminate this area with your hands.

xvi. With the other hand, wipe the sponge over the enclosed sampling area (10 cm × 10 cm or 5cm × 5 cm) for a total of approximately 10 times in the vertical and 10 times in the horizontal direction. The pressure of swabbing should be as if you were trying to remove a stubborn stain from the carcase. The pressure should not be so hard as to crumble or destroy the sponge. The template may need to be "rolled" from side to side during swabbing since the surface of the carcase may not be flat. This will ensure the 100 cm^2 or 25 cm^2 area is enclosed while swabbing.

xvii. Repeat these steps for the other sampling sites (brisket for beef and small stock; and leg part for pigs) using the same side of the sponge used to swab the previous site.

xviii. Reverse the sponge and swab the third site as detailed above (butt for beef; jowl for pigs; and mid-loin for small stock). For larger species, which would involve climbing the ladder or platform, ensure that you hold on to the rail with the hand used to hold the template, if necessary. Once at a convenient and safe height for sampling, transfer template back to climbing hand (hand used to hold onto the rail while climbing the ladder or platform) and take care not to contaminate the inner edges of the template.

xix. After swabbing all the sites, carefully place the sponge back in the sample bag. Avoid touching the sponge to the outside of the sample bag.

xx. Uncap the previously used diluent bottle. Add the additional diluent (about 15 ml) to the sample bag to bring the total volume to approximately 25 ml (this step can be carried out back in the lab; taking care to use the corresponding sample bottle used to initially moisten the individual sponge).

xxi. Expel excess air from the bag containing the sponge and fold down the top edge of the bag 3 to 4 times to close. Secure the bag by folding the attached wire tieback against the bag. Place closed sponge bag into the second bag and close the second bag securely.

xxii. If samples are to be analysed at a laboratory, begin sample preparation without delay. Ensure that intervals between collection and testing of samples are minimal.

xxiii. If samples are to be analysed at an outside (offsite) laboratory, follow procedures detailed in the previous section on transport of samples to laboratory.

d. Microdiagnostics™ Method (Alternate Method)

The proposed alternate method consists of a Microdiagnostics™ Collection plastic bag with a press clip closure which contains a polyurethane sponge. The bag and sponge are irradiated for sterility. The procedure for sponge sampling is as follows:

i. The sample number must be written on the label of the bag.

ii. Part opens the bag and pour in approximately 10 ml of diluent from a numbered bottle (25 ml).

iii. Moisten the sponge by squeezing the sponge a few times (from outside of the bag). Excess fluid should be squeezed out from the sponge.

iv. The bag is resealed and taken to the sampling site.

v. Open the plastic bag by holding the lugs above the seal.

vi. Hold the bottom of the bag and sponge in one hand then invert the bag over the hand with the other hand, making sure the inside of the bag does not contact any surface.

vii. Sponge the area to be sampled within the template (refer to methodology described above for Whirl-pack™).

viii. Invert the plastic bag, expel the air, and seal the top.

ix. The bag may be folded then tied with a rubber band.

x. Transfer the sample to the laboratory. Reopen the bag and add the rest of the diluent (~ 15 ml) from the same bottle to make total volume of 25 ml.

xi. Test sample without delay if analysed on-site; or forward sample to external laboratory following procedures detailed in the previous section on transport of samples to the laboratory.

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