

Microbiology Testing Guide



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Disclaimer

The guidelines set out in this document is the **opinion** of SMT LABS. The guidelines contained in this document are not standards or requirements, nor does it replace any laws or regulations. Each company must determine which guidelines are appropriate and most effective for the products it manufactures or distributes. This document shall not be substituted for legal advice. Companies should consult with their legal counsel to ensure compliance with applicable laws and regulations.

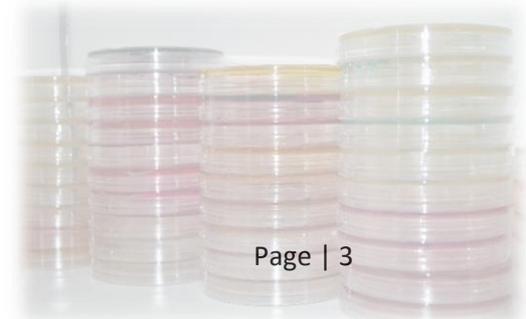
Introduction

As a testing laboratory, we often get asked the question: What should I test for? Although there are legislations and guidelines that specific industries should adhere to, there are also basic guidelines to help you ensure that your product and facility complies with good hygiene and food handling practises. This will differ, of course, based on your application. Should you endeavour in exporting, for example, you will have to comply with legislation and standards supplied by the country you are exporting to, as well as the country you are manufacturing in. The main focus for food manufacturers should always be to deliver safe product to the consumer, be it in the country of manufacturing or the country it is exported to. This may mean monitoring of the product throughout the entire process, from farm to processing and packing to storage and distribution. Depending on the application, chemical and microbiological testing can be required. This guideline will focus on microbiological tests.

Deciding factors

There are various factors to consider before deciding what to test for. These include questions such as:

- ✓ What is my application for the product?
- ✓ Is the product prone to infections by specific organisms, e.g. chickens that are prone to *Salmonella* infections?
- ✓ What are the consumer health risks associated with these organisms?
- ✓ Will the product be kept in storage, e.g. maize?
- ✓ What is the volume of product manufactured, e.g. how many carcasses are slaughtered in an abattoir?
- ✓ How will the volume of product manufactured influence the sampling and testing frequency?
- ✓ What are the specifications (legislation or regulation) that I have to adhere to?
- ✓ Do I want to supply to a specific company or export (what are the specifications that are required to do so)?



What to test

- Food Products

- ✓ Poultry

Chickens are especially prone to infection by *Salmonella* species. Even eggs can be contaminated with *Salmonella*. Four specific strains (*Salmonella enteritidis*, *Salmonella heidelberg*, *Salmonella infantis* and *Salmonella typhimurium*) are especially harmful and should be monitored by serotyping (when positive results are obtained for the presence of *Salmonella* during initial testing). The table below indicates suggested tests for the poultry industry. Although *Listeria monocytogenes* is the main concern, testing for *Listeria* species can be beneficial. The presence of *Listeria* species indicate that the environment is suitable to sustain *Listeria monocytogenes*. Lactic acid bacteria and *Clostridium perfringens* testing can be considered, especially when the product will be vacuum packed.

Fresh (Whole, Portions, Free Range), Frozen (IQF), Marinated Fresh & Frozen, Offal	Processed (Crumbed, Partially Cooked), Minced & Spiced	Eggs
Total Plate Count	Total Plate Count	TPC
Enterobacteriaceae	Enterobacteriaceae	Coliforms
Coliforms	Coliforms	Yeast & Mould
<i>Escherichia coli</i>	<i>Escherichia coli</i>	<i>Staphylococcus aureus</i>
<i>Staphylococcus aureus</i>	<i>Staphylococcus aureus</i>	<i>Salmonella</i> species
<i>Salmonella</i> species	<i>Salmonella</i> species	
<i>Campylobacter</i> species	<i>Campylobacter</i> species	
<i>Pseudomonas aeruginosa</i>	<i>Listeria monocytogenes</i>	

- ✓ Red Meat

The table below gives a basic guideline for microbiology testing in red meat. Lactic acid bacteria and *Clostridium perfringens* testing can be considered, especially when the product will be vacuum packed. *Listeria monocytogenes* testing should also be considered.

Fresh, Frozen & MAP packed, Aged, Fresh Mince	Clean Offal (Liver, Kidney, Tripe, etc)	Crumbed, Partially Cooked
Total Plate Count	Total Plate Count	Total Plate Count
Enterobacteriaceae	Enterobacteriaceae	Enterobacteriaceae
Coliforms	Coliforms	Coliforms
<i>Escherichia coli</i>	<i>Escherichia coli</i>	<i>Escherichia coli</i>
<i>Escherichia coli</i> O157*	<i>Staphylococcus aureus</i>	<i>Staphylococcus aureus</i>
<i>Staphylococcus aureus</i>	<i>Salmonella</i> species	<i>Salmonella</i> species
<i>Salmonella</i> species	<i>Campylobacter</i> species	<i>Campylobacter</i> species
<i>Campylobacter</i> species		

* Application/Industry specific

✓ Processed Meat

The table below gives a basic guideline on what to test for in various groups of processed meat. When products are to be vacuum packed, *Clostridium perfringens* and lactic acid bacteria should be considered.

Emulsion Products (Cold Meats, Sausages, Vienna, Polony, Spreads)	Salami & Fermented Products	Smoked & Pickled (Bacon, Gammon, Tongue, etc)
Total Plate Count	Total Plate Count	Total Plate Count
Coliforms	Coliforms	Coliforms
<i>Escherichia coli</i>	<i>Escherichia coli</i>	<i>Escherichia coli</i>
<i>Staphylococcus aureus</i>	<i>Escherichia coli</i> O157	<i>Clostridium perfringens</i>
<i>Salmonella</i> species	<i>Staphylococcus aureus</i>	<i>Staphylococcus aureus</i>
<i>Listeria</i> species	<i>Salmonella</i> species	<i>Salmonella</i> species
Lactic Acid Bacteria		<i>Listeria</i> species
		Lactic Acid Bacteria

Fresh & Frozen Sausages, Boerewors, Burgers	Raw Marinated, Spiced & Crumbed (Ribs, Kebabs, Schnitzels, etc)	Pre-Cooked (Ribs, Lamb Shank)
Total Plate Count	Total Plate Count	Total Plate Count
Coliforms	Coliforms	Coliforms
<i>Escherichia coli</i>	<i>Escherichia coli</i>	<i>Escherichia coli</i>
<i>Escherichia coli</i> O157	<i>Clostridium perfringens</i>	<i>Clostridium perfringens</i>
<i>Staphylococcus aureus</i>	<i>Staphylococcus aureus</i>	<i>Staphylococcus aureus</i>
<i>Salmonella</i> species	<i>Salmonella</i> species	<i>Salmonella</i> species
	<i>Listeria</i> species	<i>Listeria</i> species
	Lactic Acid Bacteria	Lactic Acid Bacteria

- Environmental Monitoring

Environmental monitoring ensures a clean and hygienic manufacturing plant/facility. There are various aspects of the environment in a facility that can be monitored, including cleanliness of surfaces, equipment, floors, drains and air quality. Having a clean, hygienic facility is of extreme importance in order to ensure safe products is delivered to consumers.

Surfaces	Equipment	Air
Total Plate Count	Total Plate Count	Total Plate Count
<i>Listeria</i> species	<i>Listeria</i> species	Yeast & Mould
<i>Salmonella</i> species*	<i>Salmonella</i> species*	
<i>Pseudomonas</i> species*	<i>Pseudomonas</i> species*	

* Application/Industry specific

- Hygiene: Hands

Recommended	Industry specific
Total Plate Count	<i>Listeria monocytogenes</i>
<i>Escherichia coli</i>	<i>Salmonella species</i>
<i>Staphylococcus aureus</i>	Yeast & Mould

- Water

Deciding what to test for in water, is highly application specific. Usually water testing requires various chemical tests in addition to microbiological tests. Drinking water, for example, has to comply with the specifications in the SANS241 guideline in order to be deemed safe for drinking. The table below is a guideline for recommended microbiology tests.

Drinking water	Industry specific
Total Plate Count	<i>Listeria monocytogenes</i>
Coliforms	<i>Salmonella species</i>
<i>Escherichia coli</i>	<i>Pseudomonas aeruginosa</i>
Faecal coliforms	

Conclusion

Determining the exact requirements for your specific application, sampling and sending samples for testing, might seem a tedious, expensive and unnecessary task, however it is very important to the food industry and the consumer. By adhering to the guidelines and regulations specific to your company, you enable safe food products to enter the market and reach the consumer. This should be the main focus throughout the entire process, from the farmer, to the manufacturer and finally the distributor. Regular testing and monitoring will ensure improvement and of course the one thing we all want to be true about our products... that it is of the best Quality!

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