


VetMAX™ *S. enterica* spp. Kit


TaqMan® real-time PCR for detecting *Salmonella enterica* spp.

Catalog Numbers SALMSPP, SALMSPP50

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Technology	Species	Nucleic acid isolated from matrices	Test type
Real-time PCR (DNA) – Duplex – Exogenous IPC	Poultry	Cloacal swabs and footpads Bedding, bottom cage compartments, and soil Organs and embryos	Individual
	Bovines	Organs (placenta biopsy, fetus) Swabs (cervical, placental) Vaginal mucus Feces Milk	Individual

 **WARNING!** Read the Safety Data Sheets (SDSs) and follow the handling instructions. Wear appropriate protective eyewear, clothing, and gloves. Safety Data Sheets (SDSs) are available from thermofisher.com/support.

 **WARNING! POTENTIAL BIOHAZARD.** Read the biological hazard safety information at this product's page at thermofisher.com. Wear appropriate protective eyewear, clothing, and gloves.

Information about the product

Description of the product

The Applied Biosystems™ VetMAX™ *S. enterica* spp. Kit is a molecular diagnostic tool for detecting all *Salmonella enterica* spp. serovars through real-time PCR at animal rearing sites as well as the surrounding areas. These serovars are isolated from different samples taken during rearing site inspection or from specimens of animal origin—ruminants, poultry, porcines. (A list of the serovars is available upon request from Technical Support.)

Each DNA sample obtained after extraction is analyzed in a single well: the same well is used for specific detection of the bacterial DNA of *Salmonella enterica* spp. and for the detection of an IPC (Internal Positive Control). A positive IPC signifies both successful extraction and the absence of inhibitor in the samples.

The kit can be used on bacterial DNA extracted from poultry samples (cloacal swabs, footpads, bedding, bottom cage compartments, soil, organs, and embryos) or from bovine samples (placenta biopsies, fetus, cervical or placental swabs, vaginal mucus, milk, and feces). Complete protocols for bacterial DNA extraction from these matrices are available upon request from Technical Support.

Kit contents and storage

The VetMAX™ *S. enterica* spp. Kit contains components that can be used for detecting both *Salmonella enterica* spp. and an internal control IPC. Upon receipt, the whole kit should be stored between –30°C and –10°C. After initial use of a component, store it according to the following recommendations:

Component	Description	Volume		Storage	
		SALMSPP (100 reactions)	SALMSPP50 (50 reactions)	Upon receipt	After initial use
1 - Sequences Salmo (Green tube)	Sequence pool (primers and probes). Contains: • The detection system for the <i>Salmonella enterica</i> spp. target, including a TaqMan® probe labeled FAM™ - NFQ (Non-Fluorescent Quencher). • The detection system for IPC, including a TaqMan® probe labeled VIC™ - TAMRA™ .	2 × 100 µL	100 µL	–30°C to –10°C	–30°C to –10°C
2 - Master Mix Salmo (White tube)	Mix for TaqMan® real-time PCR. Contains the buffer and the real-time PCR enzyme.	2 × 625 µL	625 µL	–30°C to –10°C	2°C to 8°C
4a - EPC Salmo (Brown tube)	External Positive Control: Positive control for <i>Salmonella enterica</i> spp. It consists of already extracted nucleic acid to be amplified during real-time PCR.	2 × 90 µL	90 µL	–30°C to –10°C	–30°C to –10°C
5 - IPC Salmo (Yellow tube)	Internal Positive Control: Exogenous internal control to be added to each sample and each control in the lysis step of the extraction.	500 µL	500 µL	–30°C to –10°C	–30°C to –10°C

NOTE: For small extraction series, it is recommended that the IPC Salmo be aliquoted upon first use to avoid more than 3 cycles of freezing/thawing (a minimum volume of 50 µL).

Extraction and amplification controls

The VetMAX™ *S. enterica* spp. Kit contains two controls, enabling validation of the extraction and amplification of the bacterial DNA.

4a - EPC Salmo: positive control for *Salmonella enterica* spp.

Already extracted positive control to be amplified during real-time PCR.

A positive result within the specified C_t range validates the amplification of the *Salmonella enterica* spp. target by real-time PCR.

5 - IPC Salmo: internal extraction control

Positive control **to be added to each sample in the lysis step** of the nucleic acid extraction.

A positive result within the specified C_t range in a sample validates the extraction of this sample, whether positive or negative for the target pathogen, thus eliminating false negatives and verifying the effect of inhibitors.

We recommend including two negative controls to confirm correct analysis:

NCS: negative extraction control

This control consists of reagents used in the extraction, without addition of the sample (the sample volume can be replaced by the buffer used in the sample preparation or by DNase/RNase-free water). The control undergoes the same treatment as the samples, namely nucleic acid extraction and real-time PCR.

A negative result for *Salmonella enterica* spp. confirms proper lysis progression and the absence of contamination during both extraction and real-time PCR.

NC: negative amplification control

This is the amplification mix deposited on the plate during the preparation of the real-time PCR, with 5 µL of DNase/RNase-free water added to adjust the reaction to 25 µL.

A negative result for *Salmonella enterica* spp. and IPC confirms the absence of contamination during real-time PCR reaction preparation.

Materials required but not provided

Unless otherwise indicated, all materials are available through thermofisher.com.

- Adjustable micropipettes (range of 1 µL to 1000 µL) with DNase/RNase-free filtered tips
- DNase/RNase-free water
- 1X TE buffer
- 1X PBS buffer
- A real-time PCR thermal cycler capable of detecting the following fluorophores:
 - FAM™ (emission maximum: λ515 nm)
 - VIC™ (emission maximum: λ554 nm)
- Optical-quality consumables compatible with the thermal cycler used: PCR 96-well plates, PCR strips (8 or 12 wells), microtubes or capillaries; suitable plate covers or caps for capping

Analysis procedure

The real-time PCR reaction volume is 25 µL:

- **Mix Salmo:** 20 µL per reaction. To be reconstituted extemporaneously before real-time PCR.
- **Extracted DNA:** 5 µL per reaction.

Extraction of bacterial DNA

DNA must be isolated from the samples for real-time PCR analysis.

Add **5 µL of 5 - IPC Salmo** to each sample to be extracted and to the NCS in the lysis step of the nucleic acid extraction.

NOTE: For information about extraction methods that are compatible with and validated for the VetMAX™ *S. enterica* spp. Kit, please contact Technical Support.

Reconstitution of the reaction mix

Reconstitute the **Mix Salmo** just before use, in a room dedicated to preparation of the mix:

1. On first use, thaw **2 - Master Mix Salmo** at **2°C to 8°C, on ice** or on a refrigerated rack. Store and maintain at **2°C to 8°C** for each subsequent use.
2. Thaw **1 - Sequences Salmo** at room temperature. Return it to between **-30°C and -10°C** after use.
3. Reconstitute the reaction mix **Mix Salmo** at **2°C to 8°C, on ice** or on a refrigerated rack according to the following calculation tables:

Component	For 1 reaction	For N reactions ⁽¹⁾
1 - Sequences Salmo	2 µL	N × 2 µL
2 - Master Mix Salmo	12.5 µL	N × 12.5 µL
DNase/RNase-free water	5.5 µL	N × 5.5 µL
Total volume	20 µL	N × 20 µL

⁽¹⁾ It is recommended to allow for an additional reaction with respect to the total number of reactions to be carried out during the analysis (samples and controls). Never mix reagents from different lots of kits (see Certificate of Analysis).

- After reconstitution, start the real-time PCR immediately. Keep the **Mix Salmo** at 2°C to 8°C on ice or on a refrigerated rack until use.

Preparation of the real-time PCR

- Create an analysis plan for the distribution of mixes and samples. Keep the positive control (EPC) away from the other samples if possible.
- Mix **Mix Salmo** by gentle agitation, then centrifuge briefly.
- Add 20 µL of **Mix Salmo** to each PCR plate well, PCR strip or capillary used.
- Add the DNA from samples and controls to the mix solution, according to the following preset analysis plan:

Type of analysis	Component	Sample volume
Sample for analysis	DNA extracted from the sample	5 µL
Positive amplification control	4a - EPC Salmo	5 µL
Negative extraction control (NCS)	Extracted NCS	5 µL
Negative amplification control (NC)	DNase/RNase-free water	5 µL

- Cover the PCR plate, PCR strips or capillaries with an adhesive plate cover or suitable caps.

Amplification by real-time PCR

- Create the following detectors on the thermal cycler:

	Reporter	Quencher
SALM	FAM™	NFQ (Non-Fluorescent Quencher)
IPC SALM	VIC™	TAMRA™ ⁽¹⁾
Passive reference: ROX™ ⁽¹⁾		

⁽¹⁾ The TAMRA™ and ROX™ fluorophores are obligatory for real-time PCR analysis if the thermal cycler is capable of detecting them. For other thermal cyclers, absence of the ability to detect these fluorophores does not compromise the analysis by real-time PCR.

- Assign the **Salmo** detector and the **IPC Salmo** to each sample well used in the analysis.
- Create the following real-time PCR program for the analysis:

	Step repetitions	Temperature	Duration
Step 1	×1	50°C	2 minutes
Step 2	×1	95°C	10 minutes
Step 3	×45	95°C	15 seconds
		60°C ⁽¹⁾	1 minute

⁽¹⁾ Collection of fluorescence data during the 60°C – 1 minute stage.

- Place the PCR plate, the PCR strips or the capillaries in the thermal cycler and run the real-time PCR.

Analysis of the results

Analysis of the raw data

Refer to the recommendations of the thermal cycler manufacturer for the analysis of the raw data.

- Position the threshold limits separately for each target of the real-time PCR.
- For each detector, interpret the results according to the sample C_t values obtained as recommended below.

Validation

The test is validated if the following criteria are met:

	Salmo detector	IPC Salmo detector	Validation
EPC Salmo	$C_t = C_{t\text{ac SALM of 4a - EPC Salmo}} \pm 3C_t^{(1)}$	$C_t < 45$ or $C_t > 45^{(2)}$	PCR validated
NCS	$C_t > 45$	$C_t = C_{t\text{ac IPC of 5 - IPC Salmo}} \pm 3C_t^{(3)}$	Extraction validated
NC	$C_t > 45$	$C_t > 45$	PCR reagents validated

⁽¹⁾ Please refer to the values listed in section 2.1 "EPC" of the Certificate of Analysis of the batch used for the test.

⁽²⁾ The IPC value in the EPC should not be used for test validation.

⁽³⁾ Refer to the values listed in section 2.2 "IPC" of the Certificate of Analysis of the batch used for the test.

Interpretation of results

For each sample analyzed, the results should be interpreted as shown below:

Salmo detector	IPC Salmo detector	Interpretation
$C_t < 45$	$C_t < 45$ or $C_t > 45$	<i>Salmonella enterica</i> spp. detected
$C_t > 45$	$C_t \leq C_t \text{ IPC of NCS} + 3C_t^{(1)}$	<i>Salmonella enterica</i> spp. not detected
$C_t > 45$	$C_t > C_t \text{ IPC of NCS} + 3C_t^{(1)}$	Not validated ⁽²⁾

⁽¹⁾ Refer to the IPC C_t value obtained for the NCS done during the same extraction series as the samples to be analyzed. The IPC C_t value obtained for this NCS must first be validated as described above.

⁽²⁾ The sample will be returned as not validated due to the non-compliant IPC value.

Action to be taken for non-validated samples

1. Dilute the sample DNA at a 1:10 dilution in 1X TE buffer.
2. Perform a new PCR analysis on 5 μ L of this dilution.
3. If the diluted DNA is positive for *Salmonella* or negative for *Salmonella* with a compliant IPC result, the obtained result is then validated.
4. If the diluted DNA is negative for *Salmonella* with a non-compliant IPC result, the obtained result is still not validated. In this case, repeat the nucleic acid extraction using a sample pre-diluted at 1:10 in 1X PBS buffer before extraction.
5. If the result is still not validated, repeat the analysis on a new sample.

Documentation and support

Customer and technical support

Technical support: visit thermofisher.com/askaquestion

Visit thermofisher.com/support for the latest in services and support, including:

- Worldwide contact telephone numbers
- Order and web support
- User guides, manuals, and protocols
- Certificates of Analysis
- Safety Data Sheets (SDSs; also known as MSDSs)

NOTE: For SDSs for reagents and chemicals from other manufacturers, contact the manufacturer.

Limited product warranty

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Revision history of Pub. No. MAN0008868 (English)

Revision	Date	Description
B.0	23 May 2017	Updated to the current document template, with associated updates to the warranty, trademarks, and logos.
A.0	20 February 2014	Baseline for revision history

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