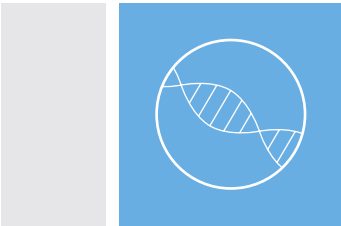
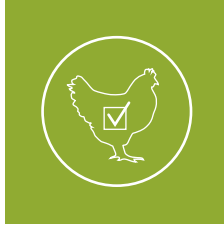


Food and Environmental Testing



Food Safety and Quality Reference Guide

BIO-RAD

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ISO Standards

ISO 6887-1:2017

Preparation of test samples, initial suspension, and tenfold dilutions for microbiological examination

Part 1: General rules for preparation of dilutions for microbiological examination

m g or v ml sample
+
 $9 \times m$ g or $9 \times v$ ml
Tryptone Salt Diluent or **BPW**
(and following dilutions)



Dilution 10^{-1}



(and following dilutions)

ISO 4833-1:2013

Horizontal method for the enumeration of microorganisms

Part 1: Colony count at 30°C by the pour-plate technique

Sample/initial suspension




Dilutions



PCA



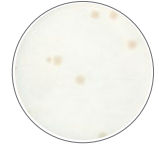
 $30 \pm 1^{\circ}\text{C}$
 72 ± 3 hr

Enumeration of microorganisms

Total Flora



Bacteria



PCA

ISO Standard

ISO 4833-2:2013

Horizontal method for the enumeration of microorganisms

Part 2: Colony count at 30°C by the surface-plating technique

Sample/initial suspension

↓ Dilutions



PCA

↓  30 ± 1°C
72 ± 3 hr

Enumeration of microorganisms

Ordering Information

Catalog # Description

Buffered Peptone Water (BPW)

BPW Plus

Ready to use

3554179	225 ml x 6 bottles
3555795	3 L x 4 bags
3555790	5 L x 2 bags

Dehydrated

3564684	500 g
3564686	5 kg

BPW Standard

Ready to use

12013260	5 L x 2 bags
----------	--------------

Dehydrated

12013259	500 g
12013258	5 kg

Plate Count Agar (PCA)

Ready to use

3554459	100 ml x 6 bottles
3554457	200 ml x 6 bottles
3563989	90 mm x 20 dishes

Dehydrated

3564475	500 g
---------	-------

Tryptone Salt Diluent

Ready to use

3555732	225 ml x 6 bottles
3555754	9 ml x 25 tubes
3555756	90 ml x 6 bottles
3555796	3 L x 4 bags

Dehydrated

3564544	500 g
---------	-------

Escherichia coli

ISO Standards

ISO 16649-1:2018

Horizontal method for the enumeration of β -glucuronidase-positive *E. coli*

Part 1: Colony-count technique at 44°C using membranes and 5-bromo-4-chloro-3-indolyl β -D-glucuronide

Sample/initial suspension

Dilutions ↓

Minerals modified glutamate agar with membrane

Resuscitation ↓  Room temperature
15 min and 37°C
4 hr ± 15 min



TBX

↓  44°C
20–24 hr

Direct enumeration

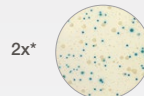
ISO 16649-2:2001

Horizontal method for the enumeration of β -glucuronidase-positive *E. coli*

Part 2: Colony-count technique at 44°C using 5-bromo-4-chloro-3-indolyl β -D-glucuronide

Sample/initial suspension

Dilutions ↓



TBX

↓  44°C
18–24 hr

Direct enumeration

* Please refer to ISO 7218:2007.

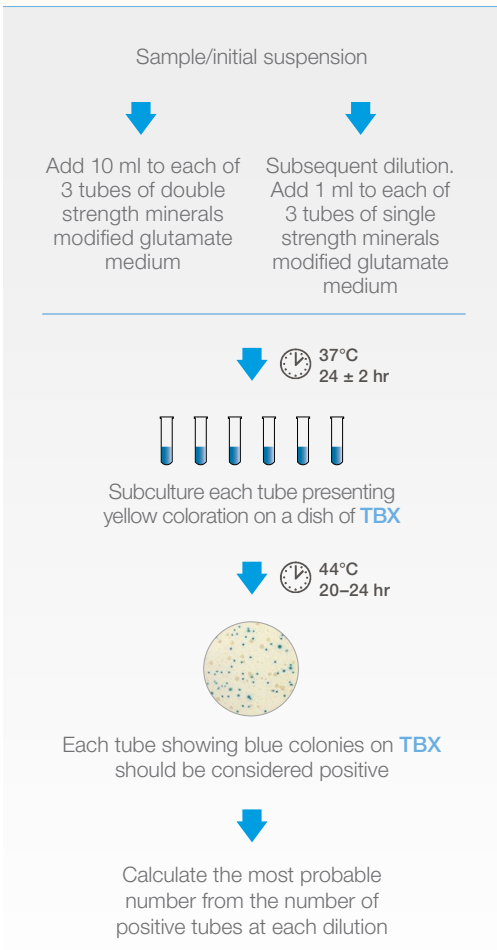
Escherichia coli

ISO Standards

ISO 16649-3:2015

Horizontal method for the enumeration of β -glucuronidase-positive *E. coli*

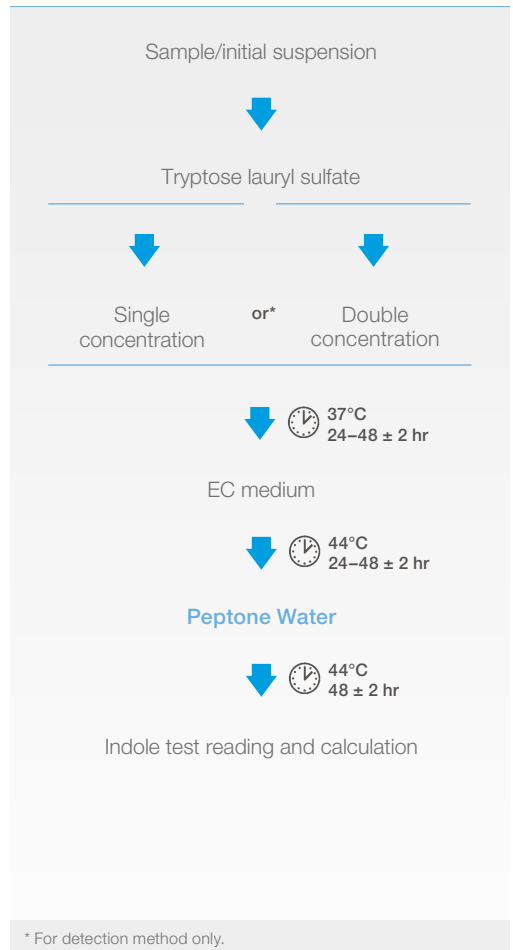
Part 3: Most probable number technique using 5-bromo-4-chloro-3-indolyl β -D-glucuronide



ISO 7251:2005

General guidance for detection and enumeration of presumptive *E. coli*

Most probable number technique



Escherichia coli

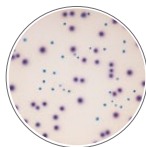


E. coli



Other Coliforms

Total Coliforms



RAPID'*E.coli* 2

Alternative Method

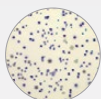
RAPID'*E.coli* 2

Enumeration of *E. coli*



Sample/initial suspension

Dilutions



RAPID'*E.coli* 2



37 or 44°C
18–24 hr

Direct enumeration of typical colonies*

Ordering Information

Catalog # Description

Buffered Peptone Water (BPW)

BPW Plus

Ready to use

3554179 225 ml x 6 bottles

3555795 3 L x 4 bags

3555790 5 L x 2 bags

Dehydrated

3564684 500 g

3564686 5 kg

BPW Standard

Ready to use

12013260 5 L x 2 bags

Dehydrated

12013259 500 g

12013258 5 kg

Kovacs Reagent

(for indole detection)

3555313 15 ml x 2 bottles

Peptone Water (indole free) Broth

Ready to use

3554180 9 ml x 25 tubes

Dehydrated

3564334 500 g

RAPID'*E.coli* 2 Agar

Ready to use

3555297 200 ml x 6 bottles

3555299 100 ml x 6 bottles

Dehydrated

3564024 500 g

Tryptone Bile X-Glucuronide

(TBX) Agar

Ready to use

3555309 100 ml x 6 bottles

Dehydrated

3564035 500 g

Tryptone Salt Diluent

Ready to use

3555732 225 ml x 6 bottles

3555754 9 ml x 25 tubes

3555756 90 ml x 6 bottles

3555796 3 L x 4 bags

Dehydrated

3564544 500 g

* Enumeration of typical colonies for *E. coli* and coliforms at 37°C; *E. coli* at 44°C.

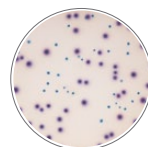
Coliforms



E. coli



Other Coliforms



Total Coliforms

RAPID *E. coli* 2

Alternative Method

RAPID *E. coli* 2

Enumeration of coliforms



Sample/initial suspension

Dilutions ↓



RAPID *E. coli* 2

↓ ⌚ 37°C
18–24 hr

Direct enumeration of typical colonies*

Ordering Information

Catalog # Description

Brilliant Green Bile

Lactose Broth (BGBLB)

Ready to use

3578024 10 ml x 25 tubes

Buffered Peptone Water (BPW)

BPW Plus

Ready to use

3554179 225 ml x 6 bottles

3555795 3 L x 4 bags

3555790 5 L x 2 bags

Dehydrated

3564684 500 g

3564686 5 kg

BPW Standard

Ready to use

12013260 5 L x 2 bags

Dehydrated

12013259 500 g

12013258 5 kg

RAPID *E. coli* 2 Agar

Ready to use

3555297 200 ml x 6 bottles

3555299 100 ml x 6 bottles

Dehydrated

3564024 500 g

Tryptone Salt Diluent

Ready to use

3555732 225 ml x 6 bottles

3555754 9 ml x 25 tubes

3555756 90 ml x 6 bottles

3555796 3 L x 4 bags

Dehydrated

3564544 500 g

Violet Red Bile Lactose (VRBL) Agar

Ready to use

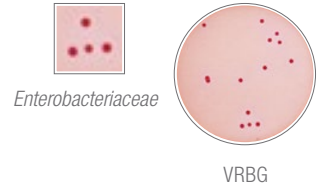
3554799 100 ml x 6 bottles

Dehydrated

3564594 500 g

* Enumeration of typical colonies for *E. coli* and coliforms at 37°C; *E. coli* at 44°C.

Enterobacteriaceae



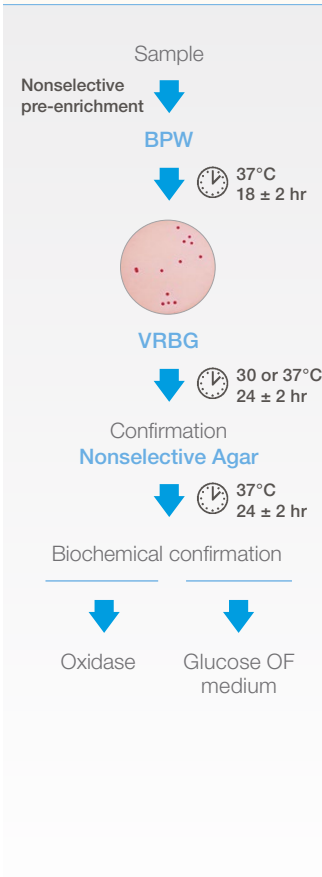
ISO Standards

ISO 21528-1:2017

Horizontal methods for the detection and enumeration of *Enterobacteriaceae*

Microbiology of food and animal feeding stuffs

Part 1: Detection and enumeration by MPN technique with pre-enrichment

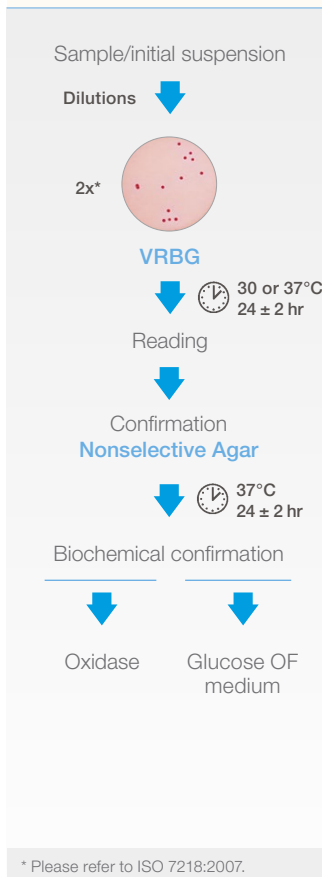


ISO 21528-2:2017

Horizontal methods for the detection and enumeration of *Enterobacteriaceae*

Microbiology of food and animal feeding stuffs

Part 2: Colony-count technique



* Please refer to ISO 7218:2007.

Ordering Information

Catalog # Description

Buffered Peptone Water (BPW)

BPW Plus

Ready to use

3554179	225 ml x 6 bottles
3555795	3 L x 4 bags
3555790	5 L x 2 bags

Dehydrated

3564684	500 g
3564686	5 kg

BPW Standard

Ready to use

12013260	5 L x 2 bags
----------	--------------

Dehydrated

12013259	500 g
12013258	5 kg

Nutrient (2.8%) Agar

Ready to use

3554478	8 ml x 25 tubes
---------	-----------------

Dehydrated

3564484	500 g
---------	-------

Violet Red Bile Glucose (VRBG) Agar

Ready to use

3554239	100 ml x 6 bottles
---------	--------------------

Dehydrated

3564584	500 g
---------	-------

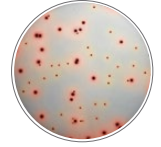
Enterobacteriaceae



Enterobacteriaceae



Non-Enterobacteriaceae



RAPID[®] Enterobacteriaceae

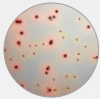
Alternative Methods

RAPID[®] Enterobacteriaceae Enumeration of Enterobacteriaceae



Sample/initial suspension

Dilutions



RAPID[®] Enterobacteriaceae

37* ± 1°C
24 ± 2 hr

Direct enumeration**

iQ-Check Enterobacteriaceae Real-Time PCR Kit

Detection of *Enterobacteriaceae* in powdered infant formula with and without probiotics or in ingredients



Up to 10 g
sample

Up to 375 g
sample

BPW
1:10
dilution +
PIF
Supplement

BPW
1:4
dilution +
PIF
Supplement

37°C
18–22 hr

Screening
iQ-Check
Enterobacteriaceae

Confirmation

RAPID[®] Enterobacteriaceae

Ordering Information

Catalog # Description

Buffered Peptone Water (BPW)

BPW Plus

Ready to use

3554179	225 ml x 6 bottles
3555795	3 L x 4 bags
3555790	5 L x 2 bags

Dehydrated

3564684	500 g
3564686	5 kg

BPW Standard

Ready to use

12013260	5 L x 2 bags
----------	--------------

Dehydrated

12013259	500 g
12013258	5 kg

iQ-Check Enterobacteriaceae Kit

12003068	96 tests
----------	----------

iQ-Check Free DNA Removal Solution

3594970	175 mg
---------	--------

PIF Supplement

12013322	2 g
----------	-----

RAPID[®] Enterobacteriaceae Agar Ready to use

3554012	200 ml x 6 bottles
---------	--------------------

Dehydrated

3564004	500 g
---------	-------

Tryptone Salt Diluent

Ready to use

3555732	225 ml x 6 bottles
3555754	9 ml x 25 tubes
3555756	90 ml x 6 bottles
3555796	3 L x 4 bags

Dehydrated

3564544	500 g
---------	-------

* Alternatively, a temperature of 30 or 35°C can be chosen.

** Suitable with an automatic plate counter.

Salmonella spp.

ISO Standard

ISO 6579-1:2017

Horizontal method for the detection, enumeration, and serotyping of *Salmonella* spp.

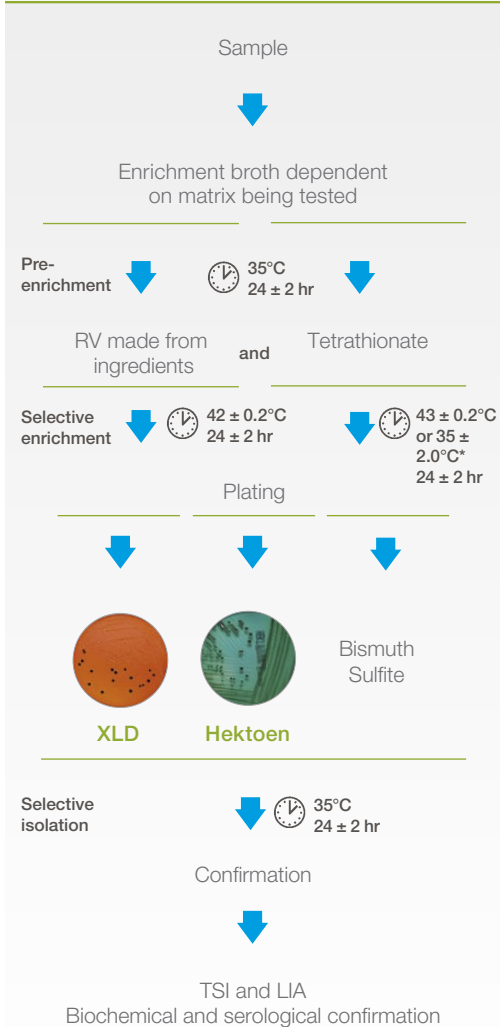
Microbiology of the food chain

Part 1: Detection of *Salmonella* spp.

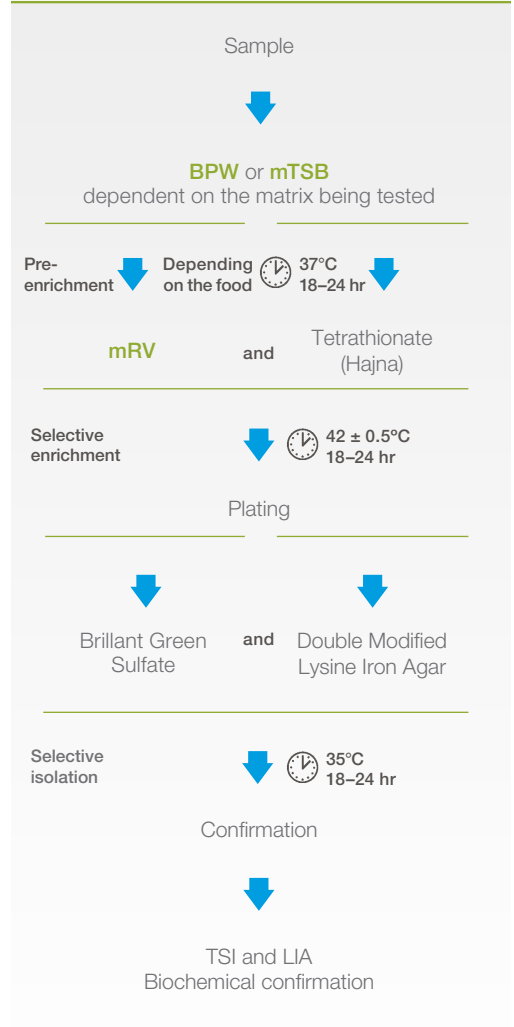


Salmonella spp.

FDA BAM Protocol



USDA FSIS MLG Protocol



* Temperature based on low or high microbial load.

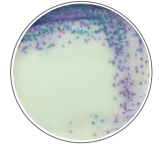
Salmonella spp.



Salmonella spp.



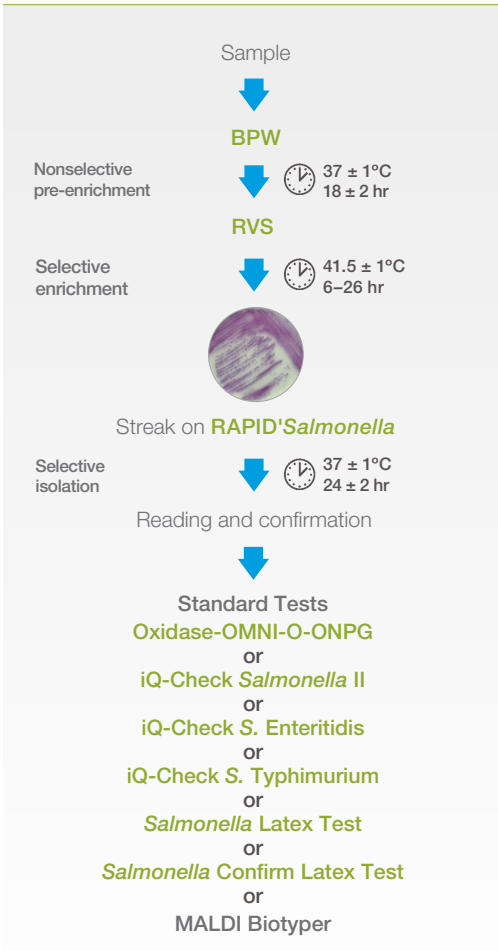
Other Enterobacteriaceae



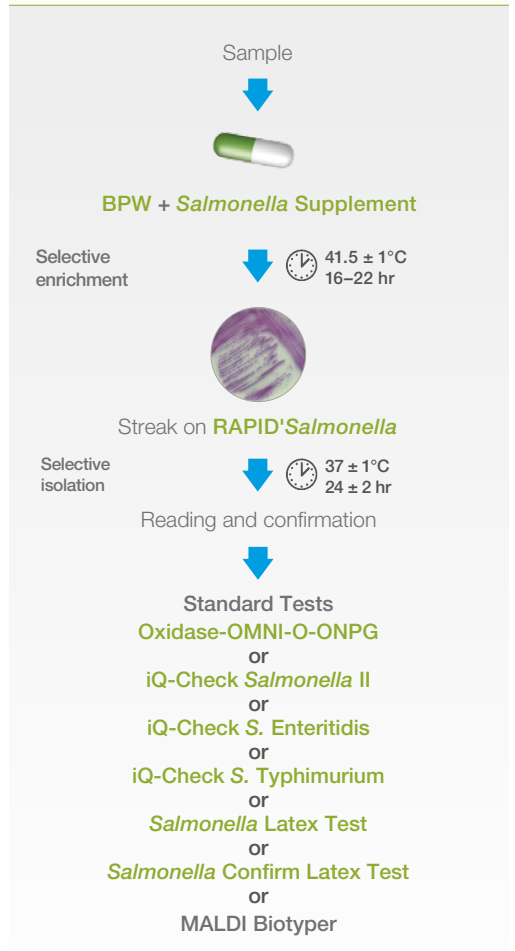
RAPID Salmonella

Alternative Methods

RAPID Salmonella Double Enrichment Protocol Detection of Salmonella spp.



RAPID Salmonella Short Protocol Detection of Salmonella spp.



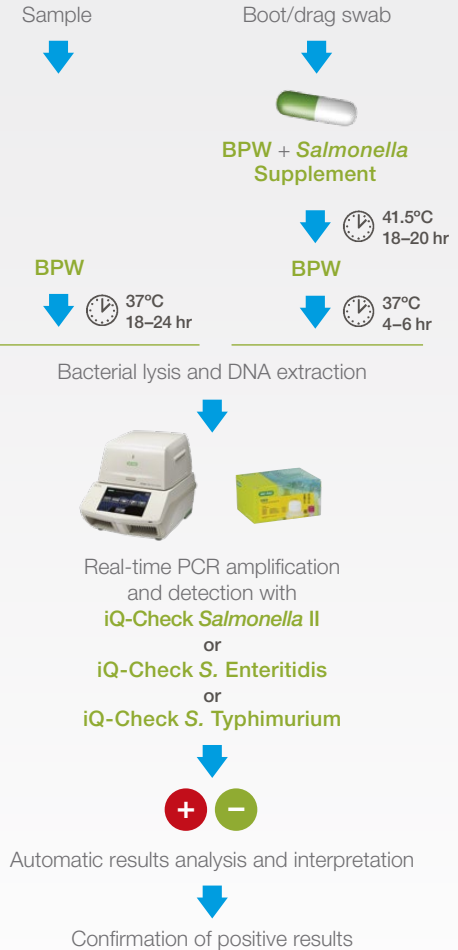
Salmonella spp.

Alternative Methods

iQ-Check *Salmonella* II Real-Time PCR Kit Detection of *Salmonella* spp.



iQ-Check *Salmonella* II, iQ-Check *S. Enteritidis*, and iQ-Check *S. Typhimurium* Real-Time PCR Kits Detection of *S. Enteritidis* and *S. Typhimurium*



* NF Validation on iQ-Check *Salmonella* II Real-Time PCR Kit only.

** Can be used as part of an overall confirmation method.

Salmonella spp.

Ordering Information

Catalog #	Description	Catalog #	Description	Catalog #	Description	
Antiserum <i>Salmonella</i> Omnivalent OMNI-O (A60)			Muller Kauffmann Tetrathionate Novobiocin (MKTTN) Broth			
3560781	3 ml dropper bottle			3564709	Enough for 2.5 L x 100 capsules	
Brilliant Green (Kristensen) Agar Dehydrated			3556140	10 ml x 50 tubes	3564710	Enough for 250 ml x 100 capsules
3564464	500 g			3564712	Enough for 100 analyses x 1 pk	
Buffered Peptone Water (BPW)			Dehydrated base			
BPW Plus			3564714	500 g		
Ready to use			Modified Semi-Solid Rappaport Vassiliadis			
3554179	225 ml x 6 bottles			(MSRV, mRV) Medium		
3555795	3 L x 4 bags			Ready to use		
3555790	5 L x 2 bags			3556139	200 ml x 6 bottles	
Dehydrated			Dehydrated			
3564684	500 g			3564325	500 g	
3564686	5 kg			Modified Tryptic Soy Broth (mTSB)		
BPW Standard			Ready to use (containing novobiocin)			
Ready to use			3555426	225 ml x 6 bottles		
12013260	5 L x 2 bags			Dehydrated base		
Dehydrated			3564426	500 g		
12013259	500 g			Nutrient (2.1%) Agar		
12013258	5 kg			Dehydrated		
Hektoen Agar			3564485	500 g		
Ready to use			ONPG Test			
3563894	90 mm x 20 dishes			3553822	50 disks	
Dehydrated			Oxidase			
3564284	500 g			35934260	100 strips	
iQ-Check Free DNA Removal Solution			PIF Supplement			
3594970	175 mg			12013322	2 g	
iQ-Check Purification Reagent			RAPID'Salmonella Agar			
12012383	2.5 g			Ready to use		
iQ-Check Salmonella II Kit			3563961	90 mm x 20 dishes		
3578123	96 tests			3563963	90 mm x 120 dishes	
iQ-Check S. Enteritidis Kit			Dehydrated			
3578142	96 tests			3564705	500 g	
iQ-Check S. Typhimurium Kit						
12004306	96 tests					

Visit bio-rad.com/antisera for a complete list of our *Salmonella* antisera (not available for sale in the United States).

Cronobacter spp.

ISO Standard

ISO 22964:2017

Horizontal method for the detection of *Cronobacter* spp.

Microbiology of the food chain

Sample preparation
Weigh 10 g or 10 ml test portion in 90 ml
BPW



Selective enrichment
Transfer 0.1 ml into 10 ml *Cronobacter*
Selective Broth



Streak on Chromogenic *Cronobacter*
Isolation Agar



Transfer 1 to 5 colonies
on **Nonselective Agar**



Biochemical confirmation

FDA BAM Protocol

Sample



1:10
BPW



40 ml



Centrifuge 3,000 x g for 10 min
Decant supernatant
Resuspend pellet in 200 µl
phosphate buffered saline



Spread and
streak plates
100 µl



DFI R&F PCR
agar agar



Typical colonies from each
plate are confirmed with real-time
PCR and other techniques

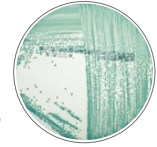
Cronobacter spp.



Cronobacter spp.



Other *Enterobacteriaceae*



RAPID' *Sakazakii*

Alternative Methods

RAPID' *Sakazakii*

Detection of *Cronobacter* spp.



Sample preparation
Weigh *m* g of the test portion
in *v* ml
BPW

↓ 37°C
18 ± 2 hr



Streak on
RAPID' *Sakazakii*

↓ 44 ± 1°C
24 ± 2 hr

Reading and confirmation

↓
Standard Tests
or
iQ-Check *Cronobacter*

iQ-Check *Cronobacter* spp. Real-Time PCR Kit

Detection of *Cronobacter* spp.



Environmental sample

Infant formula (up to 30 g)



BPW

Supplemented
BPW + Vancomycin

↓ 37°C
18 hr

↓ 30°C
20 ± 2 hr

BPW

↓ 37°C
4 ± 1 hr

Bacterial lysis and DNA extraction



Real-time PCR amplification and detection with
iQ-Check *Cronobacter* spp.



Automatic results analysis and interpretation



Confirmation of positive result with
RAPID' *Sakazakii*

Cronobacter spp. and Salmonella spp.

Alternative Method

iQ-Check *Cronobacter* and iQ-Check *Salmonella* Real-Time PCR Kits or RAPID[®] *Sakazakii* and RAPID[®] *Salmonella*
Simultaneous detection of *Salmonella* and *Cronobacter* in powdered infant formula and cereals with and without probiotics and in ingredients



Up to 375 g of sample



BPW 1:4 dilution +
PIF Supplement



37°C
18–24 hr (RAPID[®])
18–26 hr (iQ-Check)

Screening*



Salmonella spp.

iQ-Check
Salmonella
or
RAPID[®] *Salmonella*



Cronobacter spp.

iQ-Check
Cronobacter
or
RAPID[®] *Sakazakii*

Ordering Information

Catalog # Description

Buffered Peptone Water (BPW)

BPW Plus

Ready to use

3554179	225 ml x 6 bottles
3555795	3 L x 4 bags
3555790	5 L x 2 bags

Dehydrated

3564684	500 g
3564686	5 kg

BPW Standard

Ready to use

12013260	5 L x 2 bags
----------	--------------

Dehydrated

12013259	500 g
12013258	5 kg

iQ-Check *Cronobacter* spp.

3578137	96 tests
---------	----------

iQ-Check Free DNA Removal Solution

3594970	175 mg
---------	--------

iQ-Check Purification Reagent

12012383	2.5 g
----------	-------

iQ-Check *Salmonella* II Kit

3578123	96 tests
---------	----------

PIF Supplement

12013322	2 g
----------	-----

RAPID[®] *Sakazakii* Agar

Ready to use

3563971	90 mm x 20 dishes
---------	-------------------

Dehydrated

3564976	500 g
---------	-------

RAPID[®] *Salmonella* Agar

Ready to use

3563961	90 mm x 20 dishes
3563963	90 mm x 120 dishes

Dehydrated

3564705	500 g
---------	-------

Trypto-Casein Soy Agar (TSA)

Ready to use

3563884	90 mm x 20 dishes
3555947	200 ml x 6 bottles
3555944	8 ml x 25 inclined tubes

Vancomycin Supplement

3564145	5 g
---------	-----

* AOAC approved for screening with iQ-Check *Enterobacteriaceae*.

Listeria monocytogenes

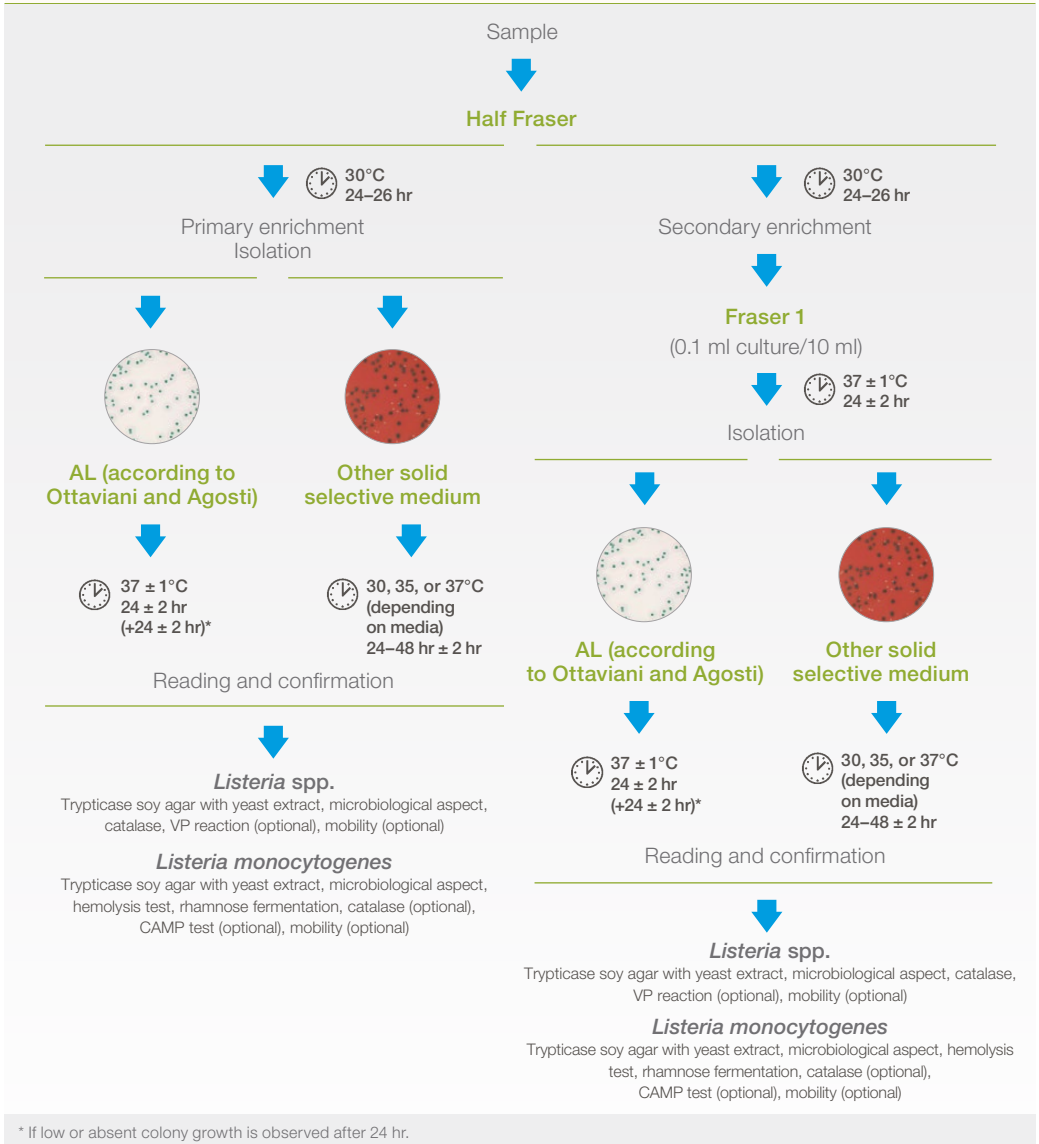
ISO Standard

ISO 11290-1:2017

Horizontal method for the detection and enumeration of *L. monocytogenes*

Microbiology of the food chain

Part 1: Detection method



* If low or absent colony growth is observed after 24 hr.

Listeria monocytogenes

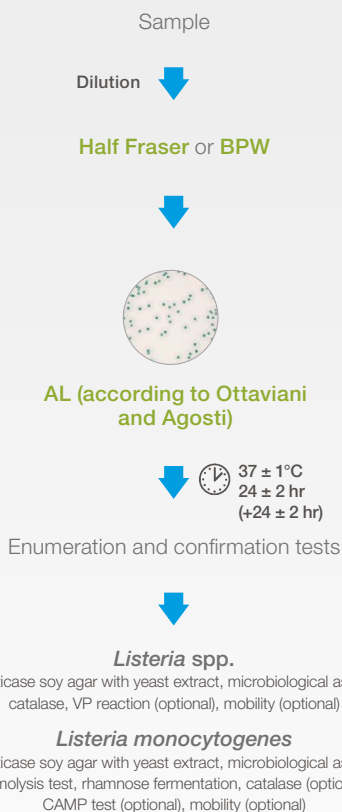
ISO Standard

ISO 11290-2:2017

Horizontal method for the detection and enumeration of *L. monocytogenes*

Microbiology of the food chain

Part 2: Enumeration method

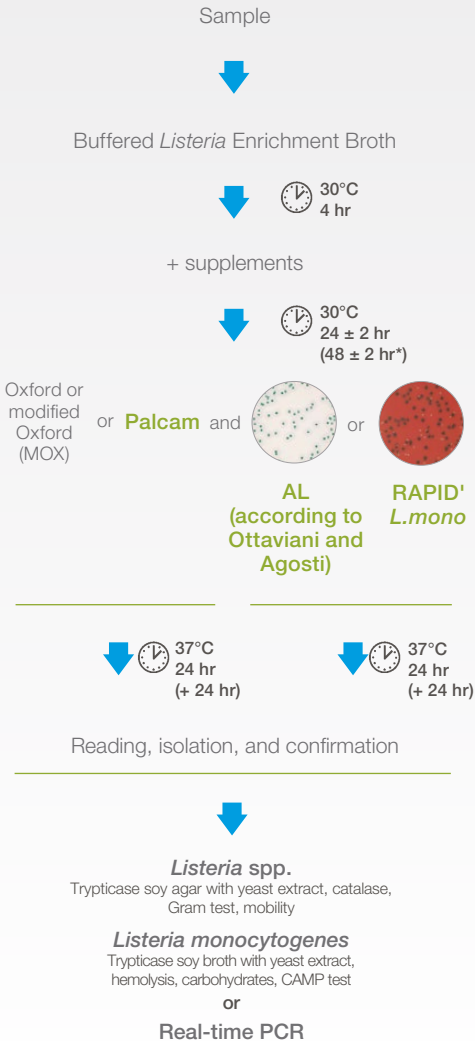


Ordering Information

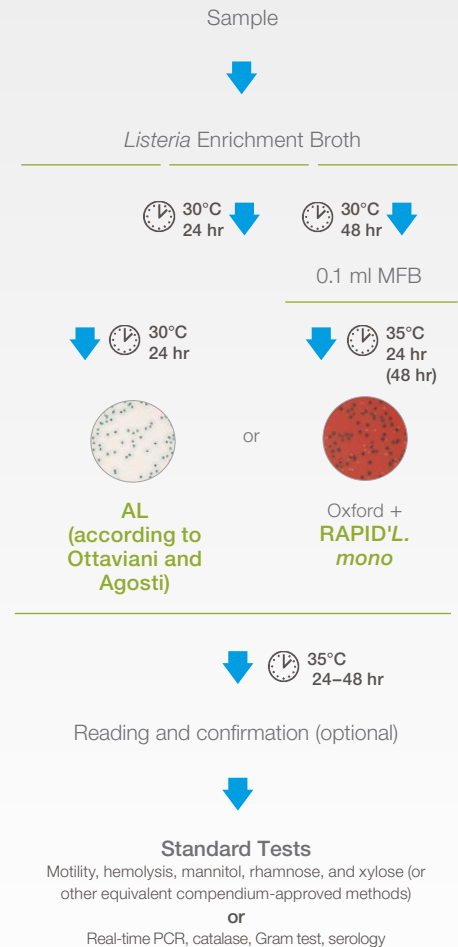
Catalog #	Description
AL (Agar <i>Listeria</i> according to Ottaviani and Agosti) Agar Ready to use	
3563695	90 mm x 20 dishes
3563965	90 mm x 120 dishes
Dehydrated base	
3564043	500 g
Base in vials (to be supplemented)	
3555200	237.5 ml x 6 bottles
Supplement 1	
3564041	10 vials
Supplement 2	
3564042	10 vials
Buffered Peptone Water (BPW)	
BPW Plus	
Ready to use	
3554179	225 ml x 6 bottles
3555795	3 L x 4 bags
3555790	5 L x 2 bags
Dehydrated	
3564684	500 g
3564686	5 kg
BPW Standard	
Ready to use	
12013260	5 L x 2 bags
Dehydrated	
12013259	500 g
12013258	5 kg
Half Fraser	
Complete medium	
3555797	225 ml x 6 bottles
3555794	3 L x 4 bags
Dehydrated base	
3564604	500 g
Supplement	
3564616	10 vials
Fraser 1	
Complete medium	
3554569	10 ml x 25 tubes
Dehydrated base	
3564604	500 g
Supplement	
3564615	10 vials
Palcam Agar	
Dehydrated base	
3564754	500 g
Supplement	
3564752	10 vials

Listeria monocytogenes

FDA BAM Protocol



Health Canada Protocol



* If low or absent colony growth is observed after 24 hr.

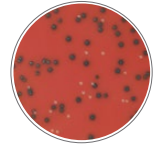
Listeria monocytogenes



L. mono



L. ivanovii



RAPID'*L. mono*



L. innocua



L. welshimeri

Alternative Methods

RAPID'*L. mono*

Detection of *Listeria monocytogenes*

RAPID'*L. mono*

Enumeration of *Listeria monocytogenes*



Sample



Half Fraser



30°C
24 ± 2 hr



Isolation on RAPID'*L. mono*



37°C
24 ± 2 hr

Reading and confirmation



Standard Tests
or
iQ-Check *Listeria monocytogenes* II
or
Rhamnose Test

Sample



BPW



20°C
1 hr
(optional)



Isolation on RAPID'*L. mono*



37°C
24 ± 2 hr

Direct enumeration



Standard Tests
or
iQ-Check *Listeria monocytogenes* II
or
Rhamnose Test

Listeria monocytogenes



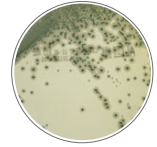
L. monocytogenes



Listeria spp.



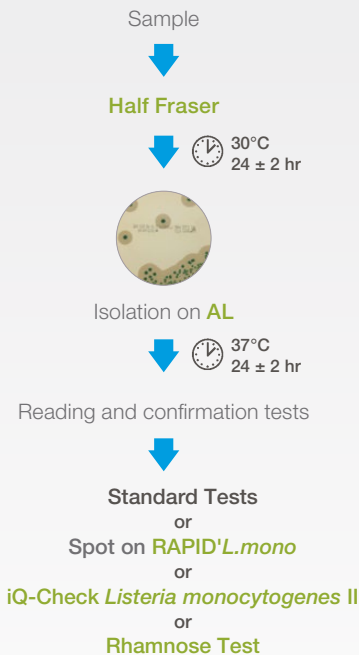
Non-*Listeria*



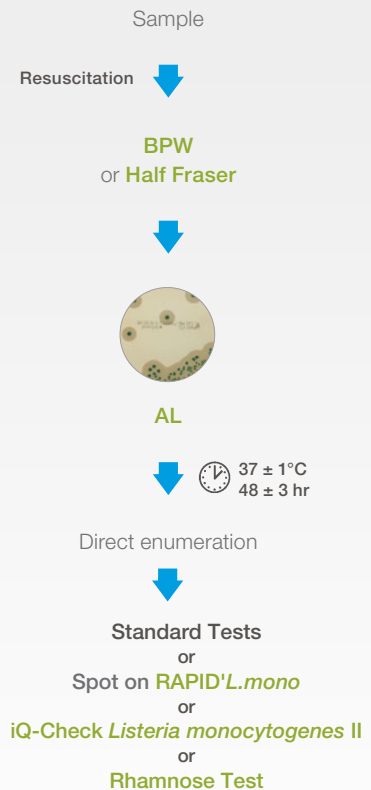
AL (Agar *Listeria* according to Ottaviani and Agosti)

Alternative Methods

AL (Agar *Listeria* according to Ottaviani and Agosti) Detection of *Listeria monocytogenes*



AL (Agar *Listeria* according to Ottaviani and Agosti) Enumeration of *Listeria monocytogenes*



Listeria monocytogenes

Alternative Method

iQ-Check *Listeria monocytogenes* II Real-Time PCR Kit Detection of *Listeria monocytogenes*



Sample



LSB or Half Fraser



30°C
18–26 hr (LSB)
or 25 ± 1 hr
(Half Fraser
broth and LSB)

Bacterial lysis and DNA extraction standard (Half Fraser and LSB) or easy (LSB)



Real-time PCR amplification and detection with
iQ-Check *Listeria monocytogenes* II



Automatic results analysis and interpretation



Confirmation of positive results with
RAPID[®] *Listeria* spp.
or
RAPID[®] *L.mono*

Listeria monocytogenes

Ordering Information

Catalog # Description

AL (Agar *Listeria* according to Ottaviani and Agosti)

Ready to use

3563695 90 mm x 20 dishes
3563965 90 mm x 120 dishes

Dehydrated base

3564043 500 g

Base in vials (to be supplemented)

3555200 237.5 ml x 6 bottles

Supplement 1

3564041 10 vials

Supplement 2

3564042 10 vials

Buffered Peptone Water (BPW)

BPW Plus

Ready to use

3554179 225 ml x 6 bottles
3555795 3 L x 4 bags
3555790 5 L x 2 bags

Dehydrated

3564684 500 g
3564686 5 kg

BPW Standard

Ready to use

12013260 5 L x 2 bags

Dehydrated

12013259 500 g
12013258 5 kg

Fraser 1

Complete medium

3554569 10 ml x 25 tubes

Dehydrated base

3564604 500 g

Supplement

3564615 10 vials

Catalog # Description

Half Fraser

Ready to use

3555797 225 ml x 6 bottles
3555794 3 L x 4 bags

Dehydrated base

3564604 500 g

Supplement

3564616 10 vials

iQ-Check Free DNA Removal Solution

3594970 175 mg

iQ-Check

Listeria monocytogenes II Kit

3578124 96 tests

iQ-Check Purification Reagent

12012383 2.5 g

Listeria Special Broth (LSB)

Ready to use

3555703 225 ml x 6 bottles
3555793 5 L x 2 bags

Dehydrated

3564703 500 g
3564753 5 kg

RAPID'*Listeria* spp. Agar

Dehydrated base

3564744 500 g

Supplement 1

3564745 10 vials

Supplement 2

3564746 10 vials

Catalog # Description

RAPID'*L.mono* Agar

Ready to use

3563964 90 mm x 120 dishes
3563694 90 mm x 20 dishes
3555294 Kit: 190 ml agar + 2 suppl.

Dehydrated base

3564293 500 g

Supplement 1

3564294 10 vials

Supplement 2

3564746 10 vials

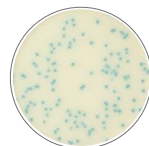
Rhamnose Test

3553669 28 tests

Listeria spp.



Listeria spp.



RAPID'Listeria spp.

Alternative Methods

RAPID'L.mono

Detection of *Listeria* spp.



Sample



Half Fraser



30°C
24 ± 2 hr



Isolation on **RAPID'L.mono**



37°C
(24 hr)
48 hr

Reading and confirmation tests



Standard Tests
or
iQ-Check *Listeria* spp.
or
Spot on **Palcam**
or
Spot on **AL**

RAPID'Listeria spp.

Detection of *Listeria* spp.



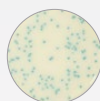
Sample



Half Fraser or UVM



30°C
24 ± 2 hr



Isolation on **RAPID'Listeria spp.**



37°C
24 ± 2 hr

Reading and confirmation tests



Standard Tests
or
Spot on **RAPID'L.mono**
or
Spot on **Palcam**
or
iQ-Check *Listeria* spp.

Listeria spp.

Alternative Methods

AL (Agar *Listeria* according to Ottaviani and Agosti) Detection of *Listeria* spp.



Sample



Half Fraser



30°C
24 ± 2 hr



Isolation on **AL**



37°C
24 ± 2 hr

Reading and confirmation tests



Standard Tests
or
iQ-Check *Listeria* spp.
or
Streak on **Palcam**

iQ-Check *Listeria* spp. Real-Time PCR Kit Detection of *Listeria* spp.



Sample



LSB



18–26 hr

Bacterial lysis and DNA extraction
standard or easy protocol



Real-time PCR amplification and detection with
iQ-Check *Listeria* spp.



Automatic results analysis and interpretation



Confirmation of positive results with
RAPID'*Listeria* spp. or **RAPID'*L. mono***

Listeria spp.

Ordering Information

Catalog # Description

AL (Agar *Listeria* according to Ottaviani and Agosti)

Ready to use

3563695 90 mm x 20 dishes
3563965 90 mm x 120 dishes

Dehydrated base

3564043 500 g

Base in vials (to be supplemented)

3555200 237.5 ml x 6 bottles

Supplement 1

3564041 10 vials

Supplement 2

3564042 10 vials

Half Fraser

Ready to use

3555797 225 ml x 6 bottles
3555794 3 L x 4 bags

Dehydrated base

3564604 500 g

Supplement

3564616 10 vials

iQ-Check Free DNA Removal Solution

3594970 175 mg

iQ-Check *Listeria* spp. Kit

3578113 96 tests

iQ-Check Purification Reagent

12012383 2.5 g

Catalog # Description

***Listeria* Special Broth (LSB)**

Ready to use

3555703 225 ml x 6 bottles
3555793 5 L x 2 bags

Dehydrated

3564703 500 g
3564753 5 kg

Palcam Agar

Dehydrated base

3564754 500 g

Supplement

3564752 10 vials

RAPID'*Listeria* spp. Agar

Dehydrated base

3564744 500 g

Supplement 1

3564745 10 vials

Supplement 2

3564746 10 vials

RAPID'*L.mono* Agar

Ready to use

3563964 90 mm x 120 dishes
3563694 90 mm x 20 dishes
3555294 Kit: 190 ml agar + 2 suppl.

Dehydrated base

3564293 500 g

Supplement 1

3564294 10 vials (10 x 500 ml medium)

Supplement 2

3564746 10 vials (10 x 500 ml medium)

Shiga Toxin–Producing *Escherichia coli* (including O157:H7)

Standard Method

USDA FSIS MLG Protocol

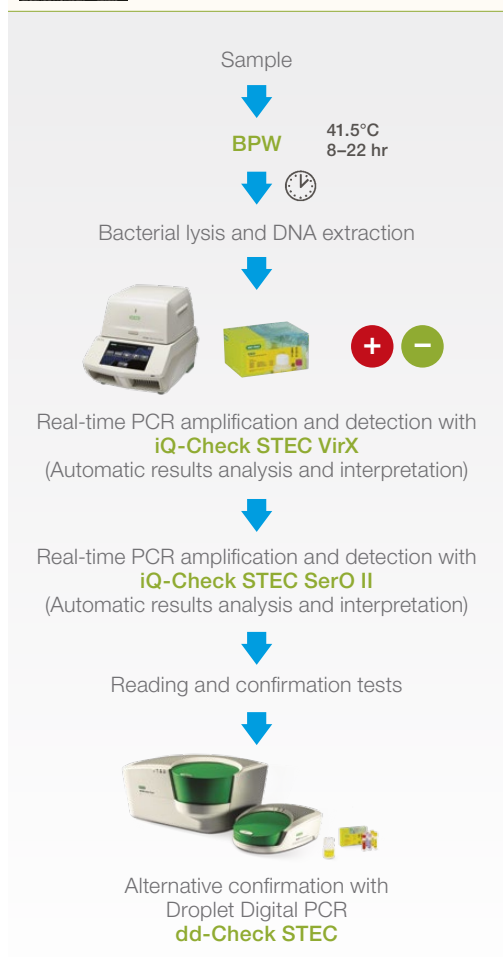
Detection, isolation, and identification of the top seven Shiga toxin–producing *E. coli* (STEC) from meat products, carcass, and environmental sponges



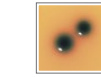
Alternative Method

iQ-Check STEC VirX and SerO II Real-Time PCR Kits

Detection of *stx/eah* virulence genes and identification of Shiga toxin–producing *E. coli* (STEC) major O-groups: O157:H7, O111, O26, O103, O145, O121, and O45



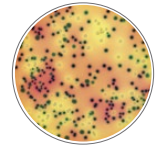
Shiga Toxin–Producing *Escherichia coli* (including O157:H7)



E. coli O157:H7



Other *E. coli*



RAPID'*E.coli* O157:H7

Alternative Methods

dd-Check STEC Kit

Detection of colocalized genetic markers of Shiga toxin-producing *E. coli* (STEC)

RAPID'*E.coli* O157:H7

Detection of *Escherichia coli* O157:H7



Sample



BPW + STEC Supplement



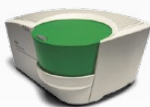
Sample preparation
(filtration/centrifugation)



Droplet generation/sample partitioning



PCR amplification with **dd-Check STEC**



Droplet reading and automatic determination of linked genetic markers

RAPID'*E.coli* O157:H7 can also be used as a second medium in the ISO 16654 standard.

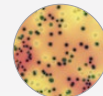
Sample



mTSB + Novobiocin



Immunogenic separation



Isolation on **RAPID'*E.coli* O157:H7**



Reading and confirmation tests



Standard Tests

or
Latex
or

iQ-Check *E. coli* O157:H7

* For AOAC, incubate at 35 ± 2°C for 16 hr for ground beef and 37 ± 0.5°C for 24 hr for fresh spinach.

Shiga Toxin–Producing *Escherichia coli* (including O157:H7)

Alternative Method

iQ-Check *E. coli* O157:H7 Real-Time PCR Kit Detection of *Escherichia coli* O157:H7



Ordering Information

Catalog # Description

Buffered Peptone Water (BPW)

BPW Plus

Ready to use

3554179	225 ml x 6 bottles
3555795	3 L x 4 bags
3555790	5 L x 2 bags

Dehydrated

3564684	500 g
3564686	5 kg

BPW Standard

Ready to use

12013260	5 L x 2 bags
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Dehydrated

12013259	500 g
12013258	5 kg

dd-Check STEC Solution (includes kit and oil)

17004826

iQ-Check *E. coli* O157:H7 Kit

3578114 96 tests

iQ-Check Free DNA Removal Solution

3594970 175 mg

iQ-Check Purification Reagent

12012383 2.5 g

iQ-Check STEC SerO II

12013174 32 tests

iQ-Check STEC VirX

3578139 96 tests

Modified Tryptic Soy Broth (mTSB)

Ready to use (containing novobiocin)

3555426 225 ml x 6 bottles

Dehydrated base

3564426 500 g

RAPID'E.coli O157:H7 Agar

Dehydrated base

3564748 100 g

Selective STEC Supplement

3564005 1 g

Campylobacter spp.

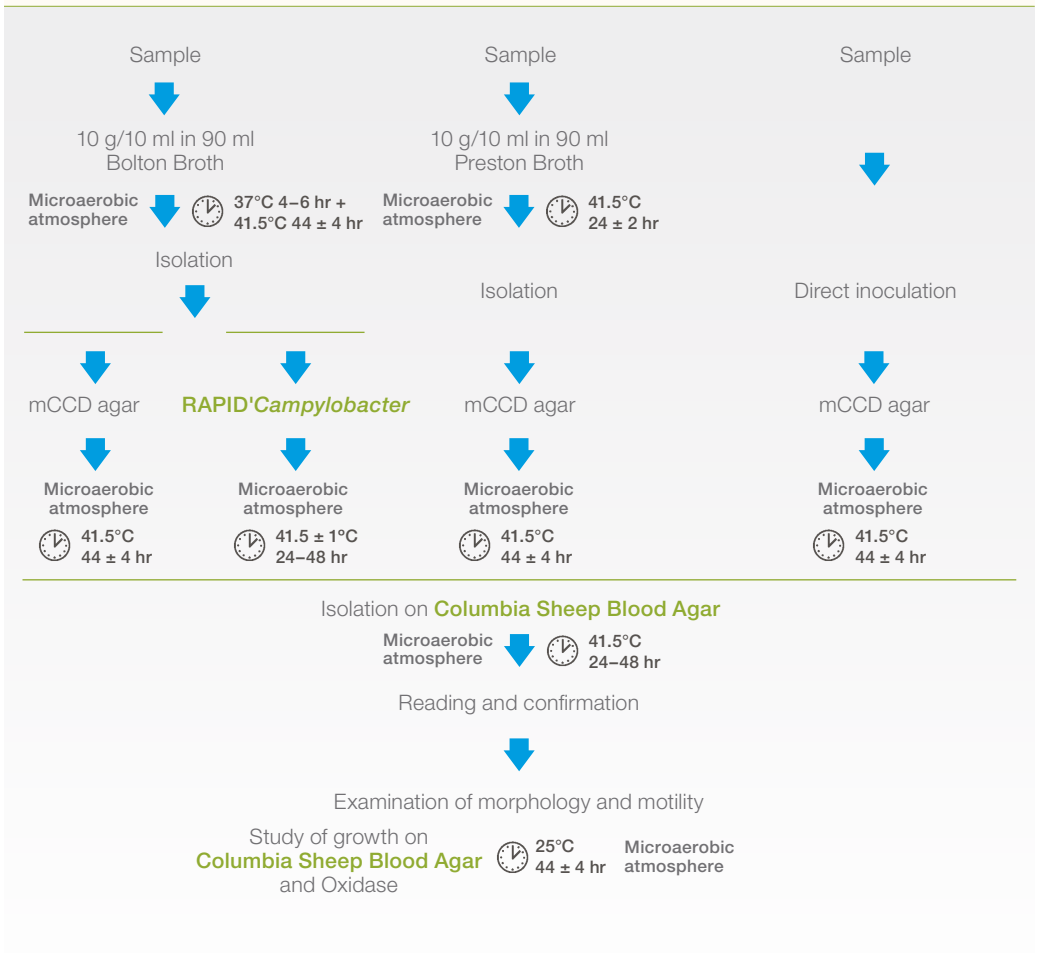
ISO Standard

ISO 10272-1:2017

Horizontal method for detection and enumeration of *Campylobacter* spp.

Part 1: Detection method

Microbiology of the food chain



Campylobacter spp.

ISO Standard

ISO 10272-2:2017

Horizontal method for detection and enumeration of *Campylobacter* spp.

Part 2: Enumeration method

Microbiology of the food chain

Initial suspension
(decimal dilutions)



mCCD agar

Microaerobic atmosphere   41.5°C
44 ± 4 hr

Enumeration and confirmation



Columbia Sheep Blood Agar

  41.5°C
24–48 hr

Examination of morphology and motility

Growth at 25°C, in a microaerobic atmosphere

Oxidase

USDA FSIS MLG Protocol

Poultry sample (raw/rinsed/sponge)



BPW



Plate 1 ml over 4 Campy-Cefex plates
and spread evenly



Incubate

Microaerobic atmosphere   42 ± 1°C
48 ± 2 hr

Absence of growth or growth of atypical
colonies can be reported as negative



Pick up to 3 well-isolated colonies
for *Campylobacter*



Latex Agglutination Test

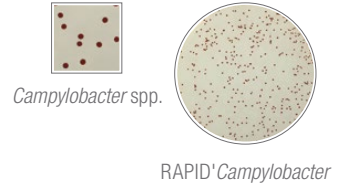


Negative
(Can be reported
as negative)



Positive
(Confirm isolates
and report as positive)

Campylobacter spp.



Alternative Methods

iQ-Check *Campylobacter* Real-Time PCR Kit Detection of *C. jejuni*, *C. coli*, and *C. lari*

RAPID'Campylobacter Detection of *Campylobacter* spp.



Food sample
suppl. Bolton

37 ± 1°C 4–6 hr +
41.5 ± 1°C 20–24 hr

Carcass rinse or sponge
2x Blood-Free Bolton
Enrichment Broth

42°C
24 hr



Bacterial lysis and DNA extraction



Real-time PCR amplification and detection
with **iQ-Check *Campylobacter***



Results analysis and interpretation

Sample enrichment



Preston broth



41.5 ± 1°C
24 ± 2 hr



Isolation on **RAPID'Campylobacter**

Microaerobic
atmosphere



41.5 ± 1°C
24–48 hr

Reading and confirmation tests



Standard Tests

or

Campylobacter Confirm Latex

or

iQ-Check *Campylobacter*

Campylobacter spp.

Alternative Method

RAPID[®] Campylobacter

Enumeration of *Campylobacter* spp.



Suspension/dilution



Isolation on **RAPID[®] Campylobacter**

Microaerobic
atmosphere



41.5 ± 1°C
(24 hr)
48 ± 4 hr

Reading and confirmation tests



Standard Tests
or

Campylobacter Confirm Latex

or

iQ-Check Campylobacter

Ordering Information

Catalog # Description

Buffered Peptone Water (BPW)

BPW Plus

Ready to use

3554179	225 ml x 6 bottles
3555795	3 L x 4 bags
3555790	5 L x 2 bags

Dehydrated

3564684	500 g
3564686	5 kg

BPW Standard

Ready to use

12013260	5 L x 2 bags
----------	--------------

Dehydrated

12013259	500 g
12013258	5 kg

Confirmation

3563784	Columbia Sheep Blood Agar, 90 mm x 20 dishes
3554164	Physiologic Sterile Water (0.85%), 9 ml x 25 tubes
3554154	Sterile Distilled Water, 9 ml x 25 tubes
3564297	<i>Campylobacter</i> Confirm Latex Kit, 50 tests

iQ-Check *Campylobacter* Kit

3578135	96 tests
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iQ-Check Free DNA Removal Solution

3594970	175 mg
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iQ-Check Purification Reagent

12012383	2.5 g
----------	-------

RAPID[®] Campylobacter Agar

Ready to use

12012036	90 mm x 20 dishes
----------	-------------------

Dehydrated base

3564295	500 g
---------	-------

Supplement

3564296	10 vials (10 x 400 ml)
---------	------------------------

Tryptone Salt Diluent

Ready to use

3555756	90 ml x 6 bottles
3555754	9 ml x 25 tubes
3555796	3 L x 4 bags
3664554	225 ml x 6 bottles

Dehydrated

3564544	500 g
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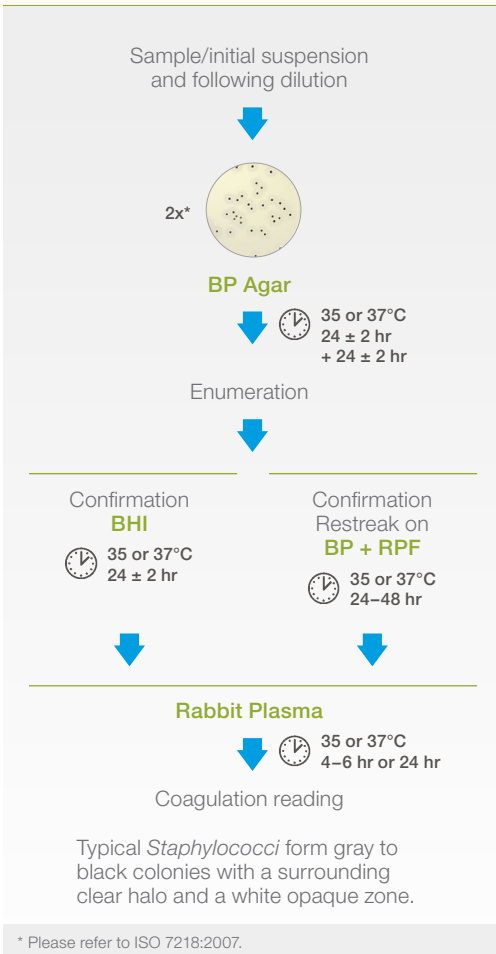
Staphylococcus aureus

ISO Standards

ISO 6888-1/A1:2004/A2:2018

Horizontal method for the enumeration of coagulase-positive *Staphylococci* (*S. aureus* and other species)

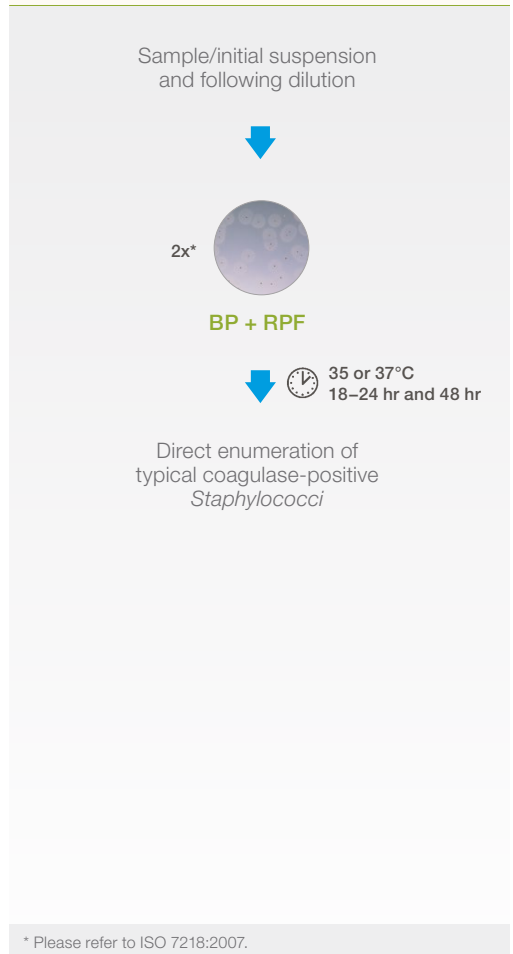
Technique including confirmation of colonies



ISO 6888-2/A1:2003

Horizontal method for the enumeration of coagulase-positive *Staphylococci* (*S. aureus* and other species)

Technique using rabbit plasma fibrinogen agar medium



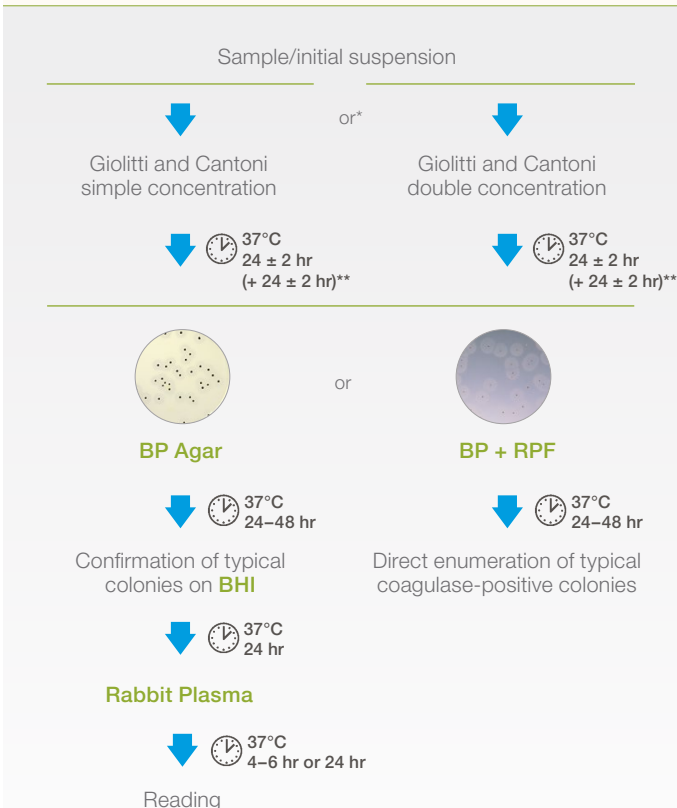
Staphylococcus aureus

ISO Standard

ISO 6888-3:2003

Horizontal method for the enumeration of coagulase-positive *Staphylococci* (*S. aureus* and species)

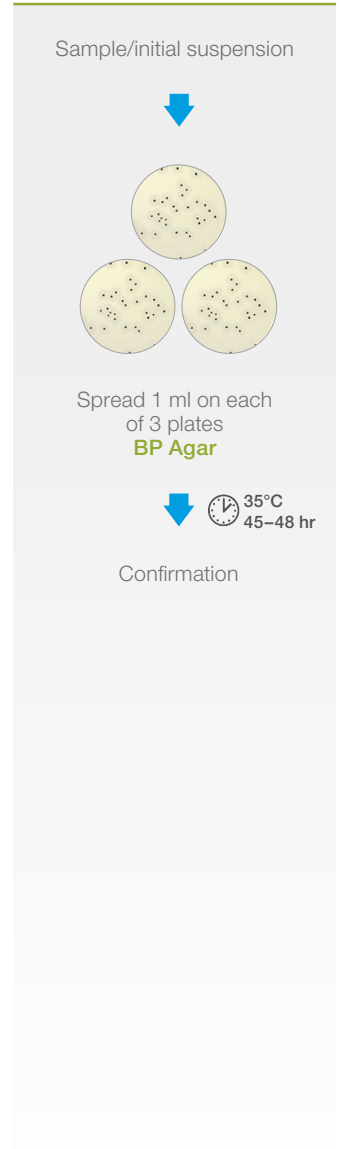
Detection and MPN technique for low numbers



* For MPN enumeration technique, inoculate single and double concentration broth.

** For detection method only, if low or absent colony growth observed after 24 hr.

FDA BAM Protocol



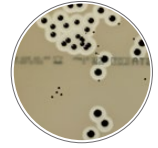
Staphylococcus aureus



Staphylococcus
coagulase-positive



Staphylococcus
coagulase-negative



RAPID'Staph agar

Alternative Method

RAPID'Staph

Enumeration of coagulase-positive *Staphylococci*



Sample/initial suspension



RAPID'Staph



37°C
24 ± 2 hr

Enumeration and confirmation



Pastorex *Staph* Plus Latex
or
Spot on Baird-Parker for RPF

Ordering Information

Catalog # Description

Additives

Egg yolk with potassium tellurite

3554201 5 ml x 1 vial

3554205 25 ml x 1 bottle

Sulfamethazine solution (0.2%)

3562682 2.5 ml x 1 vial

Baird-Parker (BP) Agar

Complete medium

3563991 90 mm x 20 dishes

Base

3564814 500 g

Baird-Parker for RPF Agar
(BP + RPF)

Complete medium

3578618 90 ml x 6 bottles

+ 6 vials of suppl.

3563996 90 mm x 20 dishes

Dehydrated base

3564814 500 g

RPF Supplement

3564618 10 vials

Brain Heart Infusion (BHI) Broth

Ready to use

3553664 10 ml x 25 tubes

Dehydrated

3564014 500 g

Pastorex *Staph* Plus Latex

3556356 50 tests

3556353 5 x 50 tests

Rabbit Plasma

Freeze-dried

3556352 Pack for 20 reactions

Staphylocoagulase Broth

53544 9 ml x 25 tubes

RAPID'Staph Agar

Ready to use

3563960 90 mm x 20 dishes

Dehydrated base

3564704 500 g

Vibrio spp.

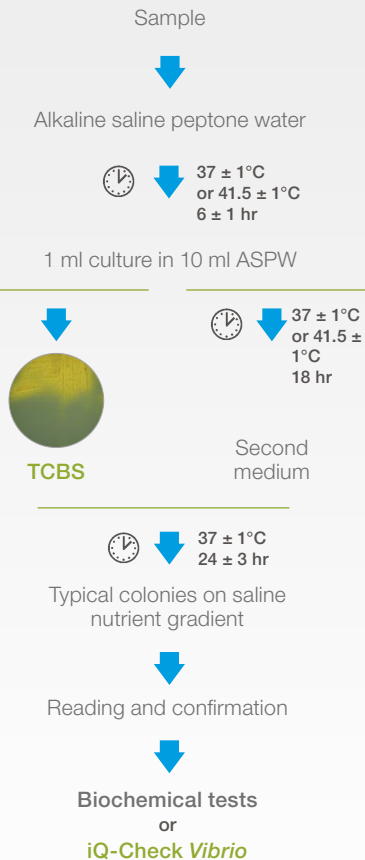
ISO Standard

ISO 21872-1:2017

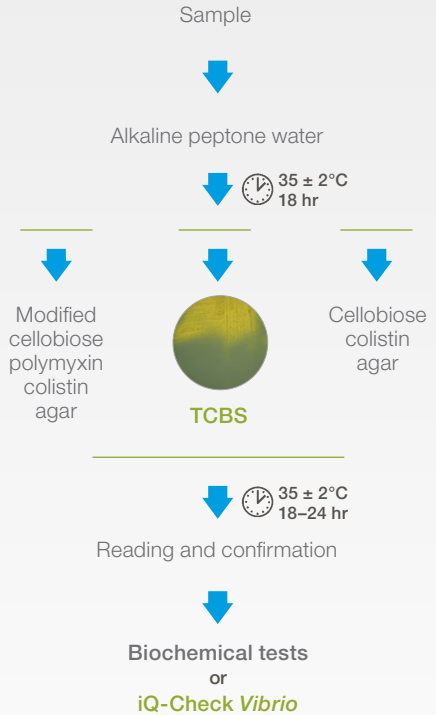
Horizontal method for the determination of *Vibrio* spp.

Microbiology of the food chain

Part 1: Detection of potentially enteropathogenic *V. parahaemolyticus*, *V. cholerae*, and *V. vulnificus*



FDA BAM Protocol



Vibrio spp.

Alternative Method

iQ-Check *Vibrio* Real-Time PCR Kit

Detection of *V. cholerae*, *V. parahaemolyticus*, *V. vulnificus*



Ordering Information

Catalog # Description

iQ-Check Free DNA Removal Solution

3594970 175 mg

iQ-Check *Vibrio*

12006574 96 tests

Thiosulfate Citrate Bile Saccharose (TCBS)

3555933 100 ml x 6 bottles

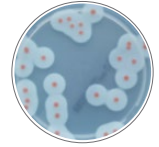
***Vibrio* Enrichment Broth Dehydrated**

12007405 500 g

Bacillus cereus



Bacillus cereus



RAPID'B.cereus

ISO Standard

ISO 7932:2005

General guidance for the enumeration of *B. cereus*

Colony-count technique at 30°C

Sample/initial suspension and following dilution



2x*

Mossel (MYP)



30°C
18–24 hr
(+ 24 hr)

Confirmation test on
5 well-isolated colonies



Columbia Sheep Blood Agar



30°C
24 ± 2 hr

Reading and interpretation

Alternative Method

RAPID'B.cereus

Enumeration of *Bacillus cereus* group



Initial suspension
(decimal dilutions)



RAPID'B.cereus



30 ± 1°C
24 ± 3 hr

Direct enumeration

Ordering Information

Catalog # Description

Columbia Sheep Blood Agar

Ready to use

3563784 90 mm x 20 dishes

Mossel Agar

(Mannitol Egg Yolk Polymixin)

Dehydrated base

3569604 500 g

RAPID'B.cereus

Ready to use

12007304 90 mm x 20 dishes

Dehydrated base

12007305 500 g

Supplement 1

12007306 10 vials

Supplement 2

12007307 10 vials

* Please refer to ISO 7218:2007.

Aspergillus spp.

Alternative Method

iQ-Check *Aspergillus* Real-Time PCR Kit

Detection of *A. flavus*, *A. fumigatus*, *A. niger*, and *A. terreus* in cannabis and cannabis-infused products



Ordering Information

Catalog # Description

Buffered Peptone Water (BPW)

BPW Plus

Ready to use

3554179	225 ml x 6 bottles
3555795	3 L x 4 bags
3555790	5 L x 2 bags

Dehydrated

3564684	500 g
3564686	5 kg

BPW Standard

Ready to use

12013260	5 L x 2 bags
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Dehydrated

12013259	500 g
12013258	5 kg

iQ-Check *Aspergillus* Kit

12010806	96 tests
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iQ-Check Free DNA Removal

3594970	175 mg
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iQ-Check Purification Reagent

12012383	2.5 g
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iQ-Design Assay Kits

12015336	iQ-Design Assay <i>Aspergillus niger</i> , 100 reactions
12015337	iQ-Design Assay <i>Aspergillus flavus</i> , 100 reactions
12015260	iQ-Design Assay <i>Aspergillus fumigatus</i> , 100 reactions
12015330	iQ-Design Assay <i>Aspergillus</i> Identification Positive Control, 100 reactions
17006992	iQ-Design Assay <i>Aspergillus</i> Identification Solution, 100 samples
17007081	iQ Multiplex Powermix, 100 reactions

Confirm PCR results following AOAC SMPR 2019.001 Section 7(2)

Confirmation of species with
iQ-Design Assay *Aspergillus niger*
iQ-Design Assay *Aspergillus flavus*
iQ-Design Assay *Aspergillus fumigatus*

Sulfite-Reducing Bacteria

ISO Standard

ISO 15213:2003

Horizontal method for the enumeration of sulfite-reducing bacteria growing under anaerobic conditions

Microbiology of food and animal feeding stuffs

Ordering Information

Catalog # Description

**Tryptose Sulfite Cycloserine (TSC)
Agar without D-Cycloserine Agar
— Base Medium**


Ready to use (to be supplemented)

3554419 100 ml x 6 bottles

Dehydrated base

3569644 500 g

Food sample/initial suspension

↓  Heat treatment
20 min at 75°C

Dilution

↓

2x*



TSC

If suspicion of
thermophilous
bacteria
50°C 24–48 hr

↓  Anaerobic condition
37°C 24–48 hr

Reading

↓

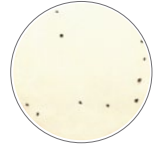
Confirmation

* Please refer to ISO 7218:2007.

Clostridium perfringens



Clostridium perfringens



TSC

ISO Standard

ISO 7937:2005

Horizontal method for the enumeration of *Clostridium perfringens*
Colony-count technique

Microbiology of food and animal feeding stuffs

Food sample/initial suspension



2x*

TSC

(add D-cycloserine)

Anaerobic condition 37°C
20 ± 2 hr

Enumeration of typical black colonies

Confirmation of 5 isolated colonies with
Thioglycolate + Resazurin Broth

37°C
18–24 hr

Lactose Sulfite Broth

C. perfringens
black precipitate/gas +

37°C
18–24 hr

Mobility
Nitrate

37°C
18–24 hr

C. perfringens
red coloration/gas +

37°C
18–24 hr

Lactose
Gelatin

37°C
18–24 hr

C. perfringens
yellow/gas +

Ordering Information

Catalog # Description

Lactose Sulfite Broth (LSB)

Base
3564914 100 g

Thioglycolate + Resazurin Broth

Ready to use
3563613 10 ml x 25 tubes

Tryptose Sulfite Cycloserine (TSC)

Agar without D-Cycloserine Agar
— Base Medium

Ready to use (to be supplemented)
3554419 100 ml x 6 bottles

Dehydrated base
3569644 500 g

* Please refer to ISO 7218:2007.

Shigella

ISO Standard

ISO 21567:2005

Horizontal method for the detection of *Shigella* spp.

Food sample/initial suspension



Shigella Broth + Novobiocin
pH 7 ± 0.2



41.5°C
16–20 hr

Plating



MacConkey



37°C
20–24 hr
(+ 48 hr)*



XLD



37°C
20–24 hr
(+ 48 hr)*



Hektoen



37°C
20–24 hr
(+ 48 hr)*

Spot on typical colonies on **Nutrient (2.1%)**



37°C
20–24 hr

Biochemical and serological confirmation

Ordering Information

Catalog # Description

Hektoen Agar

Ready to use

3563894 90 mm x 20 dishes

Dehydrated

3564284 500 g

MacConkey + Crystal Violet Agar

Ready to use

3563617 90 mm x 20 dishes

Dehydrated

3569084 500 g

Nutrient (2.1%) Agar

Dehydrated

3564485 500 g

Xylose Lysine Desoxycholate (XLD) Agar

Ready to use

3541751 90 mm x 20 dishes

Dehydrated

3569124 500 g

* If low or absent colony growth observed after 24 hr.

Validations



AOAC



NF VALIDATION*



Health Canada



NordVal

iQ-Check Real-Time PCR Methods

<i>Aspergillus</i> spp.	✓			
<i>Campylobacter</i> spp.	✓			
<i>Cronobacter</i> spp.		✓		
<i>Escherichia coli</i> O157:H7	✓	✓		
<i>Listeria monocytogenes</i>	✓	✓	✓	✓
<i>Listeria</i> spp.	✓	✓	✓	
<i>Salmonella</i> spp.	✓	✓	✓	✓
<i>S. Enteritidis</i>	✓			
<i>S. Typhimurium</i>	✓			
STEC 7 major O-groups**	✓			
STEC virulence genes**	✓			
<i>Vibrio</i> spp.	✓			

RAPID[®] Chromogenic Methods

<i>Bacillus cereus</i>		✓		
<i>Campylobacter</i> spp.		✓		
Coliforms	✓	✓	✓	✓
<i>Cronobacter</i> spp.		✓		
<i>Escherichia coli</i>	✓	✓	✓	✓
<i>Escherichia coli</i> O157:H7	✓	✓		
<i>Listeria monocytogenes</i>				
Detection	✓	✓	✓	✓
Enumeration		✓		✓
<i>Listeria</i> spp.	✓	✓		
<i>Salmonella</i> spp.	✓	✓		✓
<i>Staphylococcus aureus</i>				✓

* Alternative analytical methods for agrifood — nf-validation.afnor.org/en

** USDA No Objection Letter

✓ Approved

Summary

	Meat, Poultry, and Seafood	Dairy Products	Processed Foods	Fruits and Vegetables	Cannabis and Cannabis Products	Environment	Water and Wine Beverages
<i>Aspergillus</i> spp.					iQ		
<i>Bacillus cereus</i>	C R	R	R	C R		R	
<i>Campylobacter</i>	R iQ	R iQ				R iQ	
<i>Clostridium perfringens</i>	C						C
Coliforms	R	R	R	R	R		R
<i>Cronobacter sakazakii</i>		R iQ				R iQ	
<i>Enterobacteriaceae</i>	R	R iQ	R	R	R iQ	R iQ	R
<i>Escherichia coli</i>	R	R	R	R	R	R	R
<i>E. coli</i> O157:H7	R iQ	R iQ	R iQ	R iQ	R iQ	iQ	iQ
STEC	iQ	iQ	iQ	iQ	iQ	iQ	iQ
<i>Lactobacillus</i>	C	C					
<i>Listeria</i> spp.	R iQ	R iQ	R iQ	R iQ		R iQ	R iQ
<i>L. monocytogenes</i>	R iQ	R iQ	R iQ	R iQ	R iQ	R iQ	R iQ
<i>Pseudomonas aeruginosa</i>	C					C	C R
<i>Salmonella</i> spp.	R iQ	R iQ	R iQ	R iQ	R iQ	R iQ	R iQ
<i>S. Enteritidis</i>	iQ	iQ	iQ	iQ		iQ	iQ
<i>S. Typhimurium</i>	iQ	iQ	iQ	iQ		iQ	iQ
<i>Staphylococcus aureus</i>	R	R	R	R		R	
<i>Vibrio</i> spp.	iQ						
Yeasts and molds	C	C	C	C	C	C	C

C Classical media

R RAPID[®] Chromogenic method

iQ iQ-Check Real-Time PCR method

Quality and Certification

Our quality policy, which is the result of our dedicated efforts to food and water environmental and surface testing, is based on a constant commitment to improvement.

Within the scope of the CE labeling process for all of its medical diagnostic activities, a number of Bio-Rad sites received ISO 13485 certification in 2002. Bio-Rad's ISO 9001 version 2000 certification is also maintained for all of its activities.

United States Department of Agriculture (USDA) and Food and Drug Administration (FDA) inspections have confirmed Bio-Rad's quality systems' and products' compliance with U.S. regulatory standards.

Production

From the delivery of raw materials right up to marketing of the finished products, Quality Assurance applies to every product manufactured by Bio-Rad. Each batch of finished products undergoes strict quality control testing and is marketed only if it complies with acceptance criteria.

All documentation relating to the production and quality control of a given batch is archived.

ISO/IEC 17025 Certification

ISO/IEC 17025 certification allows solution manufacturers and user laboratories to demonstrate that they operate competently and use reliable and valid products for reliable and valid results. The accreditation (certificate number 1-6642) of the Bio-Rad culture media manufacturing facility and quality control laboratory was performed by Cofrac (French Accreditation Committee), an impartial independent third-party auditor, following strict requirements according to the ISO/IEC 17025 standard. (Cofrac Inspection Accreditation #1-6642; list of locations and scope available at cofrac.fr.)

Distribution

Stock is maintained in a temperature-controlled environment with barcode readings of code, batch, expiration date, product status, commercial validity, and country authorization verified at each step in product storage and distribution.

Normally, products are transported at room temperature. Bio-Rad takes shipping-related stress conditions into account when developing reagents. This allows reagents to be carried via standard shipping services. For those rare instances when a product's performance cannot be guaranteed under these conditions, Bio-Rad offers specialized methods of transport.

Traceability

All Bio-Rad products can be traced electronically, making it possible to identify the customer(s) linked with a specific product and/or batch or serial number.

As part of the company's "reagent vigilance," this traceability makes it possible to inform clients when there's a problem with a particular batch or lot number, to indicate any actions to be taken based on the results, and, where applicable, to recall a given product.

Documents and Certificates

Technical Data Sheets

For more information about our products, please refer to the technical data sheets.

Depending on the products, our technical sheets include:

- Applications of the product
- Corresponding standard references
- Product description
- Presentation or type(s) of packaging offered
- Stock status
- Typical formula
- Necessary product(s) or material(s) that are not supplied
- Detailed protocols
- Special precautions for use
- Quality controls indicating test strains and expected results

All of our technical data sheets are available on our website.

Quality Control Certificates

These certificates have been established for every product and indicate all the control tests carried out on the finished product, the expected specifications, and the results obtained.

These documents can be consulted online and can be downloaded in PDF format by using a product code and batch number.

Safety Data Sheets

These are established by our Department of Regulatory Affairs for every product containing hazardous substances and are recorded in the product reference information.

These safety data sheets are available upon request.

Certificates of Health and Origin

These documents, available during audit, are delivered to us by our suppliers for peptones of animal origin when they are elements in the composition of a product.

Brochures



RAPID[®] Chromogenic Media Brochure
Bulletin 16288



iQ-Check Real-Time PCR Solution Brochure
Bulletin 16439

Visit [bio-rad.com/foodscience](https://www.bio-rad.com/foodscience) for more information.

Videos



Visit the Bio-Rad Food Science video library, which includes product tutorials, technical information, and more.

[bio-rad.com/FoodScienceVideos](https://www.bio-rad.com/FoodScienceVideos)

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