Thermo Scientific
Food Testing Solutions

Solutions for the detection of foodborne pathogens

Easily and accurately identify foodborne pathogens using Thermo Scientific culture and rapid biochemical test products.

Thermo SCIENTIFIC

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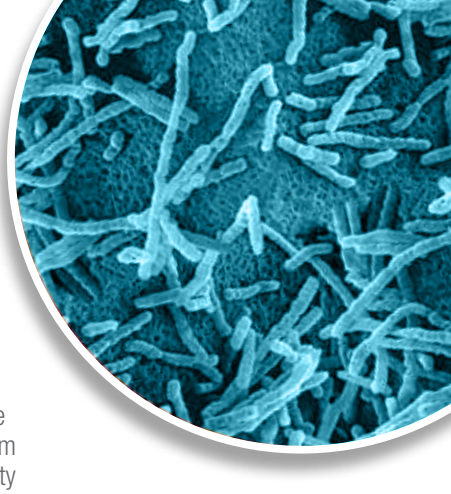
Contents of Foodborne Organisms

Products available for the detection, isolation and identification of foodborne pathogens include but are not limited to the organisms listed in this reference. For more information on our complete range of Thermo Scientific microbiology solutions, please contact your local sales representative at 1-800-255-6730, or visit www.thermoscientific.com/remel.



Thermo Scientific

Food Testing Solutions

The Thermo Scientific microbiology portfolio includes an extensive range of products for the isolation, identification and enumeration of foodborne pathogens. These products range from culture media and diagnostic kits to quality control organisms. Our focus on providing quality products, on-time delivery and superior support is matched by our commitment to provide complete solutions that meet your testing needs.

The Thermo Scientific Food Testing Solutions guide illustrates how our Oxoid and Remel brand microbiology products fit into the workflow of a food testing laboratory. With the recent publicity regarding food-related outbreaks and illnesses, now is the time to respond with accurate and reliable solutions.

Culture Media

Utilizing the latest technology in our state-of-the-art, FDA and ISO compliant manufacturing facility and backed by a team of experts dedicated to microbiology, we deliver the high-quality culture media your laboratory can depend on.

- Thermo Scientific Oxoid Dry-Bags™ save time in bulk preparation and dispensing of media in food laboratories. Oxoid irradiated, dehydrated culture media is supplied in lightweight, transparent plastic bags—all that you need to do is add water and the medium is ready for use.

Diagnostic Kits

Our selection of rapid, easy-to-use identification systems is ideal for manual testing or as confirmation for automated test systems.

- The AOAC approved Micro-ID™ offers rapid enzymatic identification of Enterobacteriaceae to the genus and species level within four hours. Micro-ID™ Listeria screens for *Listeria monocytogenes* within 4 hours, giving confirmation of Listeria within 24 hours. Micro-ID™ has a 95% or greater correlation as compared to conventional overnight identification systems, giving you confidence in the accuracy of your results.

Quality Control Organisms

Stringent quality control ensures accurate and consistent test results in your food microbiology laboratory. Our dedication to quality control has driven us to develop a wide selection of reliable, easy-to-use products.

- Culti-Loops™ are ready to use, disposable inoculation loops which contain stabilized, preserved, viable microorganisms, for simple and convenient performance testing.

We provide the quality, accuracy, service, support, reliability and innovation that can only come from being part of Thermo Fisher Scientific. Trust Thermo Scientific microbiology products to deliver the science, service, and confidence you need to get your job done.

Salmonella

Salmonella is a Gram-negative, rod-shaped, motile bacterium that can cause diarrheal illness in humans.[1]

Salmonellosis is the most frequently reported cause of foodborne illness. An estimated 1.2 million cases occur annually in the United States; of these, approximately 42,000 are laboratory-confirmed cases reported to Centers for Disease Control and Prevention.[2]

Foods often contaminated with *Salmonella* include meat, poultry, milk and dairy products, eggs, seafood, and some fruits and vegetables.

Testing Protocol for Salmonella in Most Food Types[3]

ENRICHMENT

Test Portion + Buffered Peptone Water, Lactose Broth, Trypticase Soy Broth, Nutrient Broth or Dey/Engley Broth (dependent on food type)
Incubate for 24 hr ± 2 hr at 35°C

ISOLATION

0.1mL inoculated enrichment + 10mL Rappaport-Vassiliadis (RV) medium
Incubate for 24 hr ± 2 hr at 42°C

1mL inoculated enrichment + 10mL Tetrathionate Broth
Incubate for 24 hr ± 2 hr at 35°C or 43°C (dependent on microbial load)

Plate on Bismuth Sulfite (BS) Agar, Xylose Lysine Desoxycholate (XLD) Agar and Hektoen Enteric (HE) Agar
Incubate for 24 hr ± 2 hr at 35°C

IDENTIFICATION

BIOCHEMICAL TEST OPTIONS
Urease Test
Indole Test
Voges-Proskquer (VP) Test
Micro-ID™ Identification System

SEROLOGICAL CONFIRMATION
Polyvalent Somatic (O) Test
Polyvalent Flagellar (H) Test

1. United States Food and Drug Administration. Bad Bug Book: Foodborne pathogenic microorganisms and natural toxins handbook: Salmonella. Available at: http://www.fda.gov/Food/FoodSafety/FoodborneIllness/FoodborneIllnessFoodbornePathogensNaturalToxins/BadBugBook/ucm069966.htm
2. Centers for Disease Control and Prevention. Salmonella. Available at: http://www.cdc.gov/salmonella/general/technical.html
3. United States Food and Drug Administration. Bacteriological Analytical Manual (BAM). Chapter 5. Salmonella. Available at: http://www.fda.gov/Food/ScienceResearch/LaboratoryMethods/BacteriologicalAnalyticalManualBAM/ucm070149.htm

Salmonella

Enrichment

Product Description	Format	Ref #
Buffered Peptone Water	500g	R452672
Buffered Peptone Water, Dry-Bag w/ filter	10/pk, 20L bag	DB0509M
Buffered Peptone Water, Dry-Bag w/o filter	10/pk, 20L bag	DB0509W
Lactose Broth	500g	R453652
Lactose Broth, Dry-Bag w/o filter	10/pk, 20L bag	DB0137W
Tryptic Soy Broth	500g	R455052
Nutrient Broth	500g	R454202
D/E Neutralizing Broth	500g	R453042

Isolation

Product Description	Format	Ref #
Rappaport-Vassiladis Enrichment Broth	500g	R455432
Tetrathionate Broth Base	500g	R454822
Bismuth Sulfite Agar	500g	R452402
Bismuth Sulfite Agar, RapiDCM™	20/pk, 1L pouch	R4524001
Hektoen Enteric Agar	500g	R453572
Hektoen Enteric Agar	10/pk, monoplate	R01480
Xylose Lysine Desoxycholate (XLD) Agar	500g	R459902
Xylose Lysine Desoxycholate (XLD) Agar	10/pk, monoplate	R01980

Identification

Product Description	Format	Ref #
Urea Broth, Rapid	3mL/vial	R20388
BactiDrop™ Indole, Kovacs	50/pk, 0.75mL/ampule	R21522
Indole Reagent, Kovacs	Each, 25mL/bottle	R21227
Micro-ID Identification System (AOAC)	10 units/pk	R38145
Salmonella O Polyvalent Agglutinating Sera (Group A-G)	2mL/vial	R30858101
Salmonella O Polyvalent Agglutinating Sera (Group A-S)	2mL/vial	R30858201
Salmonella H (r) Agglutinating Sera	2mL/vial	R30162201
Decarboxylase Broth Lysine	20/pk, 15x103mm, 5mL tube	R060760
Phenol Red Broth w/1% Dulcitol	20/pk, 15x103mm, 5mL tube	R062252
Malonate Broth	20/pk, 15x103mm, 5mL tube	R061326
MR-VP Broth, 2mL	20/pk, 15x103mm, tube	R061432
MR-VP Medium	500g	R454072

Quality Control

Product Description	Format	Ref #
Culti-Loops™ *Salmonella enterica* subsp. enterica serovar Typhimurium ATCC® 14028™†	5 loops/pk	R4606000
Culti-Loops *Salmonella enterica* subsp. enterica serovar Enteritidis ATCC® 13076™†	5 loops/pk	R4608200
Culti-Loops *Salmonella enterica* subsp. enterica serovar Typhi ATCC® 6539™†	5 loops/pk	R4608203

† ATCC Licensed Derivative ®

Listeria monocytogenes

Listeria monocytogenes is a Gram-positive, non-spore forming rod with flagella.[1]

There are approximately 1,600 Listeriosis cases reported annually in the United States. In 2011, contaminated cantaloupes caused 30 deaths and infected 146 persons with four outbreak-associated strains of *Listeria monocytogenes.*[2]

Listeria monocytogenes has previously contaminated a wide variety of foods such as uncooked meats, vegetables, cooked and processed foods, hot dogs, deli meat, smoked seafood, unpasteurized (raw) milk and cheeses.

Testing Protocol for Listeria monocytogenes in Most Food Types[3]

ENRICHMENT

Test Portion + Buffered Listeria Enrichment Broth (BLEB)
Incubate for 4 hr at 30°C

Add Selective Agents (Cycloheximide, Natamycin)
Incubate for 48 hr at 30°C

ISOLATION

At 24 and 48 hr streak BLEB culture onto either:
Oxford Medium, Modified Oxford Medium, PALCAM Agar or
Lithium Chloride Phenylethanol-Moxlactam (LPM) Agar
Incubate for 24–48 hr at 30°C or 35°C (depending on media)

Transfer five or more typical colonies from each medium onto
Trypticase Soy Agar with Yeast Extract (TSAye)
Incubate for 24–48 hr at 30°C

IDENTIFICATION

MICROBIOLOGICAL AND BIOCHEMICAL TEST OPTIONS
Gram Stain
Nitrate Reduction Test
Micro-ID Listeria Identification System

SUBTYPING (REQUIRED)
Use Tryptone Soya Broth-Yeast Extract to inoculate Tryptose Broth
Incubate for 24 hr at 35°C

Perform test for Somatic (O) Test and Flagellar (H) sub-factor serotype

1. *United States Food and Drug Administration. Bad Bug Book: Foodborne pathogenic microorganisms and natural toxins handbook: Listeria monocytogenes. Available at: http://www.fda.gov/Food/FoodSafety FoodborneIllness/FoodborneIllnessFoodbornePathogensNaturalToxins/BadBugBook/ucm070064.htm*
2. *Centers for Disease Control and Prevention. Listeriosis (Listeria infection). Available at: http://www.cdc.gov/listeria/index.html*
3. *United States Food and Drug Administration. Bacteriological Analytical Manual (BAM). Chapter 10. Listeria monocytogenes. Available at: http://www.fda.gov/Food/ScienceResearch/LaboratoryMethods/ BacteriologicalAnalyticalManualBAM/ucm071400.htm*

Listeria monocytogenes

Enrichment

Product Description	Format	Ref #
Buffered Listeria Enrichment Broth	500g	CM0897B
Listeria Selective Enrichment Supplement	10/pk	SR0141E

Isolation

Product Description	Format	Ref #
Oxford Agar Base, Modified	500g	R454232
Oxford Agar, Modified	10/pk, monoplate	R01613
PALCAM Agar Base	500g	CM0877B
PALCAM Selective Supplement	10/pk	SR0150E
LPM Agar Base	500g	R453762
LPM Agar	10/pk, monoplate	R01525
Listeria Selective Agar Base	500g	CM085B
Listeria Selective Supplement	10/pk	SR0140E
Tryptic Soy Agar	500g	R455002
Yeast Extract	500g	R451202

Identification

Product Description	Format	Ref #
Gram Stain Kit	4/pk, 250mL/bottle	R40080
Nitrate Broth, 5mL	20/pk, 15x103mm, tube	R061532
Gram Stain Kit Plastic Tray	Each	R40081
Nitrate Broth, 5mL	100/pk, 15x103mm, tube	R06152
Micro-ID Listeria Identification System	10 units/pk	R38370
SIM Medium	20/pk, 15x103mm, tube	R064542

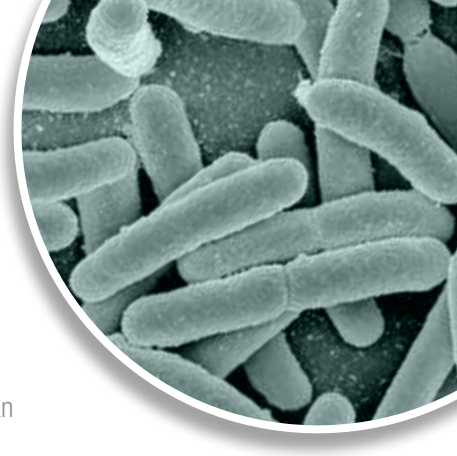
Subtyping

Product Description	Format	Ref #
Tryptone Soya Broth	500g	CM0129B
Tryptose Broth	500g	R455162
Yeast Extract	500g	R451202
Listeria Antisera Set (8 O-antisera & 4 H-antisera)	Each, 2mL/vial	R679616

Quality Control

Product Description	Format	Ref #
Culti-Loops *Listeria monocytogenes* ATCC® 7644™†	5 loops/pk	R4603970
Culti-Loops *Listeria innocua* ATCC® 33090™†	5 loops/pk	R4609005
Culti-Loops *Listeria grayi* ATCC® 25401™†	5 loops/pk	R4603959

Escherichia coli and Coliforms



Escherichia coli are Gram-negative, facultative anaerobe, rod-shaped bacteria. *E. coli* are commonly found in the intestine of humans and warm-blooded animals. Most strains of *E. coli* are not pathogenic; however presence of *E. coli* in food is an indicator of fecal contamination. Coliforms are a group of Gram-negative, facultative anaerobic rod-shaped bacteria that ferment lactose to produce acid and gas under certain conditions. The detection of coliforms is used as an indicator of sanitary conditions in a food-processing facility.

In the United States, *E. coli* contaminated food causes approximately 1,000 reported disease outbreaks and an estimated 48 million illnesses, 128,000 hospitalizations, and 3,000 deaths annually.[1]

Undercooked ground beef and unpasteurized milk are well-recognized sources of *E. coli*. A variety of other foods have been identified as vehicles for transmission: roast beef, cooked meats, venison, jerky, salami, milk, yogurt, cheese, unpasteurized cider, orange juice, cantaloupe, handling potatoes, radish, sprouts, alfalfa sprouts, fruit/vegetable salad (lettuce & spinach), and coleslaw.

Testing Protocol for Escherichia coli and Coliforms in Most Food Types[2]

MOST PROBABLE NUMBER (MPN) METHOD

PREPARATION

Test Portion + Butterfield's Phosphate-Buffered Water
Blend and prepare dilutions

ENRICHMENT

Transfer 1mL of each dilution to Lauryl Tryptose Broth (LST)
Incubate for 24–48 hr at 35°C

CONFIRMATION FOR COLIFORMS

Transfer a loopful of suspension from gassing LST tubes to Brilliant Green Lactose Bile Broth
Incubate for 48 hr ± 2 hr at 35°C

CONFIRMATION FOR FECAL COLIFORMS

Transfer a loopful of suspension from gassing LST tubes to EC Broth
Incubate for 24–48 hr at 45.5°C

CONFIRMATION OF *E. COLI*

Streak a loopful of gassing EC Broth onto Levine's Eosine-Methylene Blue (L-EMB) Agar
Incubate for 18–24 hr at 35°C

Transfer up to 5 suspicious colonies from each L-EMB plate to Plate Count Agar Slants
Incubate for 18–24 hr at 35°C

IDENTIFICATION OF *E. COLI*

Gram Stain
Indole Test
Vogues-Proskauer reactive compound test

Testing Protocol for Escherichia coli and Coliforms in Most Food Types[2]

SOLID MEDIUM METHOD - COLIFORMS

PREPARATION

Test Portion + Butterfield's Phosphate-Buffered Water
Blend and prepare dilutions

ISOLATION

Transfer 2mL of each dilution into a petri dish and follow one of the two pour plate methods using Violet Red Bile Agar (VRBA) and/or Tryptic Soy Agar
Incubate for 18–24 hr at 35°C

CONFIRMATION

Pick 10 representative colonies and transfer to Brilliant Green Lactose Bile Broth
Incubate for 24–48 hr at 35°C

IDENTIFICATION

Gram Strain

LST-MUG METHOD FOR DETECTING *E. COLI* IN MOST CHILLED OR FROZEN FOODS

PREPARATION

Test Portion + Butterfield's Phosphate-Buffered Water
Blend and prepare dilutions

ENRICHMENT

Transfer 1mL of each dilution to Lauryl Tryptose Broth with MUG (LST-MUG)
Incubate for 24–48 hr at 35°C

CONFIRMATION

Examine tubes for growth and fluorescence under ultraviolet light.
Transfer a loopful of suspension from each fluorescing tube to L-EMB Agar.
Incubate for 24 hr ± 2 hr at 35°C

IDENTIFICATION

Gram Stain
Indole Tests
Vogues-Proskauer (VP) reactive compound test

1. Centers for Disease Control and Prevention. Estimates of Foodborne Illness in the United States. Available at: http://www.cdc.gov/foodborneburden/2011-foodborne-estimates.html
2. United States Food and Drug Administration. Bacteriological Analytical Manual (BAM). Chapter 4. Enumeration of Escherichia coli and the Coliform Bacteria. Available at: http://www.fda.gov/Food/ScienceResearch/LaboratoryMethods/BacteriologicalAnalyticalManualBAM/ucm064948.htm

Escherichia coli and Coliforms

Preparation

Product Description	Format	Ref #
Phosphate Buffer, Butterfield's, 90mL	72/cs, 90mL/bottle	R23700
Phosphate Buffer, Butterfield's, 99mL	72/cs, 99mL/bottle	R23701
Phosphate Buffer, Butterfield's, 225mL	20/pk, 225mL/bottle	R112037

Enrichment/Isolation

Product Description	Format	Ref #
Lauryl Tryptose Broth	500g	R453662
Lauryl Tryptose Broth - RapiDCM	20/pk, 1L/pouch	R4536601
Lauryl Tryptose Broth	1x, 100/pk, 10mL w/durham, 16x125mm, tube	R117260
Lauryl Tryptose Broth	2x, 100/pk, 10mL w/durham, 20x150mm, tube	R09450
Violet Red Bile Agar, 200mL	10/pk, 200mL/bottle	R112871
Violet Red Bile Agar	500g	R455282
Violet Red Bile Agar - RapiDCM	20/pk, 1L/pouch	R4552801

Confirmation

Product Description	Format	Ref #
Brilliant Green Bile Broth (w/Lactose), 2%	500g	R452602
Brilliant Green Bile Broth (w/Lactose), 2%	20/pk, 1L/pouch	R4526001
Brilliant Green Bile Broth, 2%	20/pk, 16x125mm, tube w/durham	R07022
EC Medium	500g	R453302
EC Medium, 10mL	20/pk, 16x125mm, tube w/durham	R07102
EMB Agar, Levine	10/pk, monoplate	R01400
EMB Agar, Levine	500g	R453402
Plate Count Agar	10/pk, monoplate	R01685
Plate Count Agar (Standard Method Agar)	500g	R454702

Identification

Product Description	Format	Ref #
Gram Stain Kit	4/pk, 250mL/bottle	R40080
Gram Stain Kit Tray	Each	R40081
BactiDrop Indole, Kovacs	50/pk, 0.75mL/ampule	R21522
Indole Reagent, Kovacs	Each, 25mL/bottle	R21227
MR-VP Broth, 2mL	20/pk, 15x103mm, tube	R061432
MR-VP Medium	500g	R454072

Quality Control

Product Description	Format	Ref #
Culti-Loops Escherichia coli ATCC® 25922™†	5 loops/pk	R4607050
Culti-Loops Escherichia coli ATCC® 35218™†	5 loops/pk	R4601971
Culti-Loops Escherichia coli ATCC® 43888™†	5 loops/pk	R4601965

Diarrheagenic Escherichia coli

Diarrheagenic *E. coli* (commonly known as pathogenic *E. coli*), are a group of *E. coli* which cause diarrheal disease in humans. There are four groups of diarrheagenic *E. coli* which have previously been associated with foodborne illness; enterotoxigenic *E. coli* (ETEC), enteropathogenic *E. coli* (EPEC), enterohemorrhagic *E. coli* (EHEC) and enteroinvasive *E. coli* (EIEC). These groups are classified by their virulence factors and can be identified by their virulence traits.

These pathogenic *E. coli* groups have been associated with the following food types:

- Enterotoxigenic *E. coli* (ETEC): soft cheeses, Mexican-style foods, raw vegetables and water.
- Enteropathogenic *E. coli* (EPEC): meat products and contaminated drinking water.
- Enterohemorrhagic *E. coli* (EHEC): undercooked ground beef, raw milk, cold sandwiches, water, unpasteurized apple juice, sprouts and vegetables.
- Enteroinvasive *E. coli* (EIEC): hamburger meat and milk.

Isolation & Identification of Pathogenic E. coli (except EHEC of serotype O157:H7) – Most Food Types[1]

ENRICHMENT

Test Portion + Brain Heart Infusion (BHI) Broth
Incubate for 10 min at room temperature or 3 hr at 35°C to resuscitate injured cells

Transfer to double-strength Tryptose Phosphate (TP) Broth
Incubate for 20 hr at 44°C

Streak to Levine's Eosin-Methylene Blue (L-EMB) Agar and MacConkey Agar
Incubate for 20 hr at 35°C

IDENTIFICATION

Primary Screening
Transfer suspicious colonies to Triple Sugar Iron (TSI) Agar, Blood Agar Base (BAB) Slant, Tryptone Broth, Arabinose Broth and Urea Broth
Incubate for 20 hr at 35°C

Test for O-nitrophenyl-ß-D-galactopyronoside (ONPG) reaction using TSI and ONPG disks

Secondary Screening
Indole Test
Voges-Proskauer (VP) reactive compound test
Lysine decarboxylase, mucate and acetate reactions

Additional Tests for ETEC, EIEC and EPEC, refer to United States Food & Drug Administration (FDA) Bacteriological Analytical Manual (BAM) Chapter 4A

Screening Method for E. coli of Serotype O157:H7 from Foods[1]

ENRICHMENT

Test Portion + Butterfield's Phosphate Buffer or Modified Buffered Peptone Water with Pyruvate (depending on food type)
Incubate for 5 hr at 37°C

Add Acriflavin-Cefsulodin-Vancomycin (ACV) supplements
Incubate for 18–24 hr at 42°C

Real-Time PCR Screening
Note: Enrichment samples found positive by PCR require cultural confirmation (as per procedure below)

ISOLATION

Spread inoculated Bufferfield's Phosphate Buffer on Tellurite Cefixime – Sorbital MacConkey Agar (TC-SMAC) and one Chromogenic Agar
Incubate for 18–24 hr at 37°C

Screen typical colonies for O157 antigen by latex agglutination (Remel kit)

Pick typical colonies that screen positive and streak onto Trypticase Soy Agar with Yeast Extract (TSAYE) with appropriate discs
Incubate for 18–24 hr at 37°C

Perform spot indole test with Kovac's Reagent

CONFIRMATION

Confirm typical colonies with RIM™ *E. coli* O157:H7 latex test, or equivalent. Additional Polymerase Chain Reaction (PCR), pulsed field gel electrophoresis (PFGE) biochemical tests may need to be performed.

1. United States Food and Drug Administration. Bacteriological Analytical Manual (BAM). Chapter 4A. Diarrheagenic Escherichia coli. Available at: http://www.fda.gov/Food/ScienceResearch/LaboratoryMethods/BacteriologicalAnalyticalManualBAM/ucm070080.htm

Diarrheagenic Escherichia coli

Screening Method for non–O157 STEC[1]

ENRICHMENT

Test Portion + Butterfield's Phosphate Buffer or Modified Buffered Peptone Water with Pyruvate (depending on food type)
Incubate for 5 hr at 37°C

Add Acriflavin-Cefsulodin-Vancomycin (ACV) supplements
Incubate for 18–24 hr at 42°C

Real-Time PCR Screening
NB: Enrichment samples found positive by PCR require cultural confirmation (as per procedure below)

ISOLATION

Spread inoculated Levine's Eosin-Methylene Blue (L-EMB) and one Chromogenic Agar
Incubate for 18–24 hr at 37°C

Pick typical colonies that screen positive and streak onto Trypticase Soy Agar with Yeast Extract (TSAYE) with appropriate discs
Incubate for 18–24 hr at 37°C

CONFIRMATION

Additional Polymerase Chain Reaction (PCR), pulsed field gel electrophoresis (PFGE), or biochemical tests may need to be performed

1. United States Food and Drug Administration. Bacteriological Analytical Manual (BAM). Chapter 4A. Diarrheagenic Escherichia coli. Available at: http://www.fda.gov/Food/ScienceResearch/LaboratoryMethods/BacteriologicalAnalyticalManualBAM/ucm070080.htm

Diarrheagenic Escherichia coli

Enrichment

Product Description	Format	Ref #
Brain Heart Infustion (BHI) Broth	10/pk, 500mL	R112022
Brain Heart Infustion (BHI) Broth	500g	R452472
Phosphate Buffer, Butterfield's, 90mL	72/cs, 90mL/bottle	R23700
Phosphate Buffer, Butterfield's, 99mL	72/cs, 99mL/bottle	R23701
Phosphate Buffer, Butterfield's, 225mL	20/pk, 225mL/bottle	R112037
Buffered Peptone Water	500g	R452672
Buffered Peptone Water, Dry-Bag w/ filter	10/pk, 20L bag	DB0509M
Buffered Peptone Water, Dry-Bag w/o filter	10/pk, 20L bag	DB0509W
Tryptose Phosphate (TP) Broth	500g	R455192

Isolation

Product Description	Format	Ref #
Levine's Eosin-Methylene Blue (L-EMB) Agar	10/pk, monoplate	R01400
Levine's Eosin-Methylene Blue (L-EMB) Agar	500g	R453402
Tryptic Soy Agar	500g	R455002
Yeast Extract	500g	R451202
MacConkey Agar w/ Sorbitol, Cefixime, Tellurite (CT-SMAC)	10/pk, monoplate	R110241

Identification

Product Description	Format	Ref #
Triple Sugar Iron (TSI) Agar	500g	R454982
Triple Sugar Iron (TSI) Agar, Slant	20/pk, 15x103mm	R064852
Blood Agar Base No. 2	500g	R452412
Tryptone	500g	LP0042B
Purple Broth with 1% Arabinose, 7mL	20/pk, 15x103mm, tube w/durham	R062776
Urea Broth (Stuart's), 2mL	20/pk, 15x103mm, tube	R065232
ONPG Disc	1 cart/pk	DD0013T
BactiDrop Indole, Kovacs	50/pk, 0.75mL/ampule	R21522
Indole Reagent, Kovacs	Each, 25mL/bottle	R21227
Voges-Proskauer A	Each, 12mL/bottle	R21200
Voges-Proskauer B	Each, 25mL/bottle	R21281
Decarboxylase Broth Lysine, 5mL	20/pk, 15x103mm, tube	R060760
Acetate Differential Agar, Slant	20/pk, 15x103mm	R060022
Mucate Medium, 4mL	20/pk, 15x103mm, tube	R061462

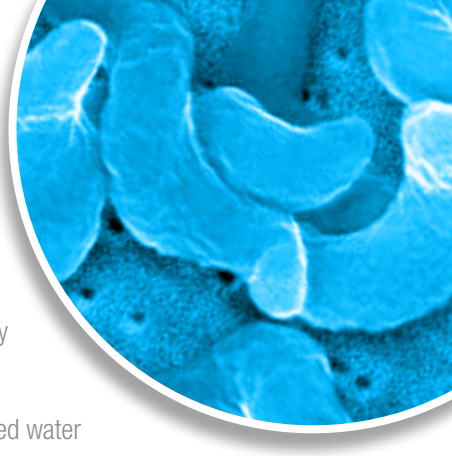
Confirmation

Product Description	Format	Ref #
RIM™ E. coli O157:H7 Latex Kit	50 test/kit	R24250

Quality Control

Product Description	Format	Ref #
Culti-Loops Escherichia coli serotype O157:H7, ATCC® 43888™†	5 loops/pk	R4601965
Culti-Loops Escherichia coli ATCC® 25922™†	5 loops/pk	R4607050

Campylobacter



Campylobacter are Gram-negative, spiral-shaped rods (curved appearance) with flagella.

Campylobacterosis is one of the most common causes of diarrheal illness in the United States. It is estimated to affect over 2.4 million persons every year, and occurs much more frequently in the summer months than in the winter. Although *Campylobacter* does not commonly cause death, it has been estimated that approximately 124 persons with *Campylobacter* infections die each year.[1]

Undercooked/raw poultry and dairy products are the major sources of *Campylobacter* infection. Non-chlorinated water has been identified as a source of infection along with sausage and other meats, shellfish, fruits and mushrooms.

Testing Protocol for Campylobacter in Most Food Types[2]

ENRICHMENT

Test portion + Bolton Broth with antibiotics
Rinse gently (5 mins) and incubate for 4 hr at 37°C in microaerobic conditions

Transfer enrichment to a 42°C incubator or waterbath
Incubate for 23–29 hr in microaerobic conditions

ISOLATION

Streak undiluted and 1/100 dilution of inoculated enrichment culture onto Abeyta-Hunt-Bark or mCCDA Agar
Incubate for 24–48 hr at 42°C in microaerobic conditions

IDENTIFICATION

Pick one typical colony from each plate and prepare wet mount slide. Examine under microscope.

BIOCHEMICAL TEST OPTIONS
Catalase Test • Oxidase Test • Nitrate Reduction Test • Glucose Utilization Test (O-F Media) • Triple Sugar Iron (TSI) Reaction • Hipputate Hydrolysis Test (Ninhydrin)

1. Centers for Disease Control and Prevention. Campylobacter. Available at: http://www.cdc.gov/nczved/divisions/dfbmd/diseases/campylobacter/technical.html
2. United States Food and Drug Administration. Bacteriological Analytical Manual (BAM). Chapter 7. Campylobacter. Available at: http://www.fda.gov/Food/ScienceResearch/LaboratoryMethods/BacteriologicalAnalyticalManualBAM/ucm072616.htm

Campylobacter

Enrichment

Product Description	Format	Ref #
Bolton Broth Base	500g	CM0983B
Modified Bolton Broth Selective Supplement	10/pk	SR0208E

Isolation

Product Description	Format	Ref #
Campylobacter Blood-Free Selective Agar Base	500g	R452722
Hunt Medium Base	500g	R453562

Identification

Product Description	Format	Ref #
Gram Stain Kit	4/pk, 250mL/bottle	R40080
Gram Stain Kit Tray	Each	R40081
BactiDrop Oxidase	50/pk, 0.75mL/ampule	R21540
Nitrate Broth, 5mL	20/pk, 15x103mm, tube	R061532
Hippurate Disk	25 disks/vial	R21085
BactiDrop Ninhydrin (Hippurate Hydrolysis)	50/pk, 0.75mL/ampule	R21534
OF Medium w/1% Dextrose, 4mL	20/pk, 15x103mm, tube	R061918
Triple Sugar Iron (TSI) Agar	500g	R454982
Triple Sugar Iron (TSI) Agar, Slant	20/pk, 15x103mm	R064852

Quality Control

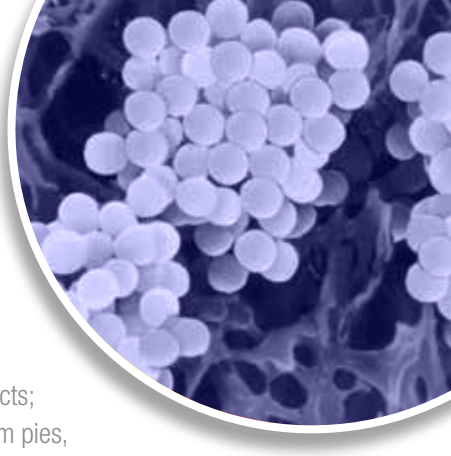
Product Description	Format	Ref #
Culti-Loops *Campylobacter jejuni* ATCC® 33291™†	5 loops/pk	R4601400
Culti-Loops *Campylobacter jejuni* ATCC® 33292™†	5 loops/pk	R4607070
Culti-Loops *Campylobacter coli* ATCC® 43478™†	5 loops/pk	R4609387

Environmental Systems

Product Description	Format	Ref #
AnaeroPack Rectangular Jar	Each, 2.5L	R685025
AnaeroPack Rectangular Jar	Each, 7.0L	R685070
AnaeroPack – Anaero	20/pk	R681001
AnaeroPack – MicroAero	20/pk	R681005
AnaeroPouch – Anaero	20/pk	R682001
AnaeroPouch – MicroAero	20/pk	R682005
AnaeroJar™ 2.5L Jar	Each	AG0025A
Anaerobic 3.5L Jar Modified	Each	HP0031A
CampyGen™ Sachet	2.5L	CN0025A
CampyGen Sachet	3.5L	CN0035A

† ATCC Licensed Derivative ®

Staphylococcus aureus



Staphylococcus aureus are Gram-positive, spherical bacterium (coccus) which on microscopic examination appear as pairs, short chains, or bunched, grape-like clusters. Some strains are capable of producing a highly heat-stable protein toxin that causes illness in humans.

The true incidence of staphylococcal food poisoning is unknown.[1]

Foods commonly associated with *Staphylococcus aureus* are meat and meat products; poultry and egg products; salads such as egg, tuna, chicken, potato, and macaroni; bakery products such as cream-filled pastries, cream pies, and chocolate eclairs; sandwich fillings; and milk and dairy products.

Testing Protocol for Staphylococcus aureus in Most Food Types[2]

PREPARATION

Test Portion + Butterfield's Phosphate-Buffered Water
Blend and prepare dilutions

ISOLATION

Streak each dilution onto Baird Parker Agar
Incubate for 45–48 hr at 35°C

COAGULASE TEST

Transfer suspect colonies into Brain Heart Infusion (BHI) Broth and emulsify. Inoculate Trypticase Soy Agar slant with BHI suspension.
Incubate for 18–24 hr at 35°C

Add coagulase plasma with EDTA to BHI culture and mix thoroughly
Incubate for 6 hr at 35°C

IDENTIFICATION

SOME ANCILLARY TEST OPTIONS
Catalase Test
Anaerobe Utilization of Glucose
Anaerobe Utilization of Mannitol

1. United States Food and Drug Administration. Bad Bug Book: Foodborne pathogenic microorganisms and natural toxins handbook: Staphylococcus aureus. Available at: http://www.fda.gov/Food/FoodSafety/FoodborneIllness/FoodborneIllnessFoodbornePathogensNaturalToxins/BadBugBook/ucm070015.htm
2. United States Food and Drug Administration. Bacteriological Analytical Manual (BAM). Chapter 12. Staphylococcus aureus. Available at: http://www.fda.gov/Food/ScienceResearch/LaboratoryMethods/BacteriologicalAnalyticalManualBAM/ucm071429.htm

Staphylococcus aureus

Preparation

Product Description	Format	Ref #
Phosphate Buffer, Butterfield's, 90mL	72/cs, 90mL/bottle	R23700
Phosphate Buffer, Butterfield's, 99mL	72/cs, 99mL/bottle	R23701
Phosphate Buffer, Butterfield's, 225mL	20/pk, 225mL/bottle	R112037

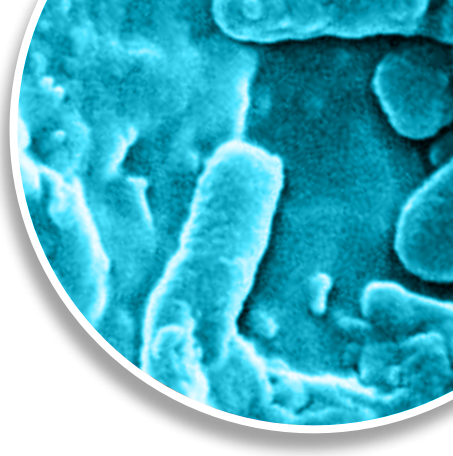
Isolation

Product Description	Format	Ref #
Baird Parker	10/pk, monoplate	R01108
Baird Parker	100/pk, monoplate	R01109
Baird Parker Agar Base	500g	R452342
Baird Parker Agar Base	2.5kg	R452344
Egg Yolk Tellurite, 100mL	Each	R450330
Brain Heart Infusion Broth	500g	R452472
Tryptic Soy Agar (TSA)	500g	R455002
Tryptic Soy Agar (TSA), Slant	20/pk, 15x103mm	R064862
Tryptic Soy Agar (TSA), Slant	20/pk, 20x113mm	R08932
Coagulase Plasma	5mL/vial	R21050
Coagulase Plasma	6x5mL/vial	R21060

Quality Control

Product Description	Format	Ref #
Culti-Loops *Staphylococcus aureus* subsp. *aureus*, ATCC® 25923™†	5 loops/pk	R4607010
Culti-Loops *Staphylococcus aureus* subsp. *aureus*, ATCC® 29213™†	5 loops/pk	R4607011
Culti-Loops *Staphylococcus epidermis*, ATCC® 12228™†	5 loops/pk	R4606500

Bacillus cereus



Bacillus cereus is a Gram-positive, aerobic, spore-forming, rod-shaped bacteria. Food poisoning caused by *Bacillus cereus* may occur when foods are prepared and held without adequate refrigeration for several hours before serving. This organism causes two distinct types of food poisoning: a diarrheal type caused by a large molecular weight protein, and an emetic type caused by a low molecular weight, heat-stable peptide.

Often *Bacillus cereus* outbreaks go unreported or are misdiagnosed because of symptomatic similarities to *Staphylococcus aureus* intoxication or *Clostridium perfringens* food poisoning.[1]

Foods previously contaminated with *Bacillus cereus* include raw and processed meat, stews, pies, soups, vegetables, custard and raw and processed foods.

Testing Protocol for Bacillus cereus in Most Food Types[2]

PREPARATION

Test Portion + Butterfield's Phosphate-Buffered Water
Blend and prepare dilutions

ISOLATION

PLATE COUNT METHOD
Inoculate MYP Agar with each dilution
Incubate for 24–48 hr at 30°C

Transfer presumptive positives colonies to Nutrient Agar Slants
Incubate 24 hr at 30°C

MPN METHOD
Inoculate 3 tubes of Trypticase Soy-Polymyxin Broth with each dilution
Incubate for 48 hr ± 2 hr at 30°C

Streak positive tubes onto MYP Agar
Incubate for 24–48 hr at 30°C

Transfer presumptive positive colonies to Nutrient Agar Slants
Incubate 24 hr at 30°C

CONFIRMATION

Gram Stain
Transfer loopful of culture to Phosphate-buffered dilution water, vortex and inoculate the following confirmatory media:
Phenol Red Glucose Broth • Nitrate Broth • Modified VP Medium • Tyrosine Agar
Lysozyme Broth • MYP Agar

1. United States Food and Drug Administration. Bad Bug Book: Foodborne pathogenic microorganisms and natural toxins handbook: Bacillus cereus and other Bacillus spp. Available at: http://www.fda.gov Food/FoodSafety/FoodborneIllness/FoodborneIllnessFoodbornePathogensNaturalToxins/BadBugBook/ucm070492.htm
2. United States Food and Drug Administration. Bacteriological Analytical Manual (BAM). Chapter 14. Bacillus cereus. Available at: http://www.fda.gov/Food/ScienceResearch/LaboratoryMethods/BacteriologicalAnalyticalManualBAM/ucm070875.htm

Bacillus cereus

Preparation

Product Description	Format	Ref #
Phosphate Buffer, Butterfield's, 90mL	72/cs, 90mL/bottle	R23700
Phosphate Buffer, Butterfield's, 99mL	72/cs, 99mL/bottle	R23701
Phosphate Buffer, Butterfield's, 225mL	20/pk, 225mL/bottle	R112037

Isolation

Product Description	Format	Ref #
MYP Agar (MEP Agar)	10/pk, monoplate	R01584
MYP Agar	500g	CM0929B
Supplements required with MYP Agar: Egg Yolk Suspension 50%	Each, 100mL	R450290
Bacillus Cereus Selective Supplement	10/pk	SR0099E
Nutrient Agar, Slant	20/pk, 15x103mm	R061572
Nutrient Agar, Slant	100/pk, 15x103mm	R061570
Nutrient Agar	500g	R454182

Confirmation

Product Description	Format	Ref #
Gram Stain Kit	4/pk, 250mL/bottle	R40080
Gram Stain Kit Tray	Each	R40081
Nitrate Broth, 5mL	20/pk, 15x103mm, tube	R061532
Voges-Proskauer A	Each, 12mL/bottle	R21200
Voges-Proskauer B	Each, 25mL/bottle	R21281
Phenol Red Broth w/Dextrose, 7mL	20/pk, 15x103mm, tube w/durham	R062242
Phenol Red Broth Base	500g	R454272
Phenol Red Dextrose Broth	500g	R454282
Tyrosine Agar, 25mL	20/pk, 20x150mm, pour tube	R09960
Lysozyme Broth, 5mL	20/pk, 15x103mm, tube	R061308

Quality Control

Product Description	Format	Ref #
Culti-Loops *Bacillus cereus* ATCC® 11778™†	5 loops/pk	R4601220
Culti-Loops *Bacillus cereus* ATCC® 14579™†	5 loops/pk	R4601217
Culti-Loops *Bacillus megaterium* ATCC® 14581™†	5 loops/pk	R4609395
Culti-Loops *Bacillus circulans* ATCC® 61™†	5 loops/pk	R4601216
Culti-Loops *Bacillus subtilis* ATCC® 6633™†	5 loops/pk	R4601221

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Clostridium perfringens

Clostridium perfingens is a Gram-positive, anaerobic, non-motile, sporulating bacillus. *Clostridium perfingens* is a natural inhabitant of the human gut; however it possesses a number of necrotizing and lethal enzymes and toxins which are potentially pathogenic in humans.

The Centers for Disease Control and Prevention estimates that about 10,000 actual cases of *Clostridium perfingens* poisoning occur annually in the United States. It is one of the most reported foodborne illnesses in the United States.[1]

Food poisoning caused by *Clostridium perfingens* may occur when foods such as meat or poultry are cooked and held without maintaining adequate heating or refrigeration before serving.

Testing Protocol for Clostridium perfringens in Most Food Types[2]

PREPARATION

Test portion + Peptone Dilution Fluid
Homogenize

ISOLATION

Inoculate Cooked Meat Medium with each dilution
Incubate for 24–48 hr at 35°C

Transfer 1mL of each dilution onto TSC Agar with or without egg yolk emulsion (depending on plating technique)
Incubate in anaerobic jar for 20–24 hr at 35°C

PRESUMPTIVE CONFIRMATION TEST

Select 10 typical *C. perfringens* colonies from TSC Agar and inoculate Fluid Thioglycollate Broth
Incubate for 24–48 hr at 35°C

Gram Stain

Inoculate modified ironmilk medium with fluid Thioglycollate culture
Incubate in waterbath for 2–5 hr at 46°C

COMPLETED CONFIRMATION TEST

Inoculate Motility-Nitrate (Buffered) Media
Incubate for 24 hr at 35°C

Test for Nitrate Reduction using Nitrate reagent A and B

Inoculate Lactose-Gelatin Media
Incubate for 24 hr at 35°C

Additional cultural procedures may be required for sporulation and enterotoxin production

Refer to United States Food & Drug Administration (FDA) Bacteriological Analytical Manual (BAM) for cultural procedure on sporulation and enterotoxin production.

1. *United States Food and Drug Administration. Bad Bug Book. Foodborne pathogenic microorganisms and natural toxins handbook: clostridium perfringens. Available at: http://www.fda.gov/Food/FoodSafety/FoodborneIllness/FoodborneIllnessFoodbornePathogensNaturalToxins/BadBugBook/*
2. *United States Food and Drug Administration. Bacteriological Analytical Manual (BAM). Chapter 16. Clostridium perfringens. Available at: http://www.fda.gov/Food/ScienceResearch/LaboratoryMethods/BacteriologicalAnalyticalManualBAM/ucm070878.htm*

Clostridium perfringens

Preparation

Product Description	Format	Ref #
Phosphate Buffer, Butterfield's, 90mL	72/cs, 90mL/bottle	R23700
Phosphate Buffer, Butterfield's, 99mL	72/cs, 99mL/bottle	R23701
Phosphate Buffer, Butterfield's, 225mL	20/pk, 225mL/bottle	R112037

Isolation

Product Description	Format	Ref #
Cooked Meat Medium	500g	CM0081B
Perfringens Agar Base, TSC	500g	CM0587B
Perfringens TSC, Supplement	10/pk	SR0088E

Environmental Systems

Product Description	Format	Ref #
AnaeroPack Rectangular Jar	Each, 2.5L	R685025
AnaeroPack Rectangular Jar	Each, 7.0L	R685070
AnaeroPack – Anaero	20/pk	R681001
AnaeroPouch – Anaero	20/pk	R682001

Confirmation

Product Description	Format	Ref #
Fluid Thioglycollate Medium	500g	R453452
Fluid Thioglycollate Medium, 9mL	20/pk, 15x103mm, tube	R064692
Fluid Thioglycollate Medium, 10mL	20/pk, 16x125mm, tube	R07174
Gram Stain Kit	4/pk, 250mL/bottle	R40080
Gram Stain Kit Tray	Each	R40081
Nitrate Reagent A	Each, 25mL/bottle	R21239
Nitrate Reagent B	Each, 25mL/bottle	R21242

Quality Control

Product Description	Format	Ref #
BactiDisk *Clostridium perfringens* ATCC® 3626™†	10 disks/vial	R19176
Culti-Loops *Clostridium perfringens* ATCC® 13124™†	5 loops/pk	R4601600
Culti-Loops *Clostridium sporogens* ATCC® 3584™†	5 loops/pk	R4601701

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Shigella

Shigella is a Gram-negative, non-motile, rod-shaped bacterium. *Shigella* is closely related to *Escherichia coli* and is frequently found in water polluted with human feces.

There are approximately 300,000 cases of Shigellosis reported annually in the United States. However, it is unknown how many of these cases are attributable to food.[1]

Foods associated with *Shigella* include salads (potato, tuna, shrimp, macaroni, and chicken), raw vegetables, milk and dairy products, and poultry. The food source is usually spread among humans by unsanitary food handling practices.

Testing Protocol for Shigella in Most Food Types[2]

CONVENTIONAL CULTURE METHOD†

ENRICHMENT

Test portion + Shigella Broth with Novobiocin.
Hold suspension for 10 min and prepare supernatant.
Incubate anaerobic jar in waterbath for 20 hr at 44°C

Streak enrichment onto MacConkey Agar
Incubate for 20 hr at 35°C

ISOLATION

Inoculate the following media with suspicious colonies: Glucose Broth, Triple Sugar Iron (TSI) Agar Slant, Lysine Decarboxylase Broth, Motility Agar and Tryptone
Incubate for up to 48 hr at 35°C

CONFIRMATION

PHYSICAL CHARACTERIZATION TESTS
Gram stain, Urease, Glucose, Motility,
Lysine Decarboxylase, Sucrose, Adonitol, Inositol, Lactose, Potassium Cyonide,
Malonate, Citrate, and Salicin

Pick isolates with positive reactions for *Shigella* and streak to Veal Infusion Agar Slants

SEROLOGICAL CHARACTERIZATION
Use colonies from Veal Infusion Agar for serological characterization of polyvalent antiserum A-D

† *Also DNA Hybridization Method detailed in United States Food & Drug Administration (FDA) Bacteriological Analytical Manual (BAM), Chapter 6 for Shigella.*

1. *United States Food and Drug Administration. Bad Bug Book: Foodborne pathogenic microorganisms and natural toxins handbook: Shigella spp. Available at: http://www.fda.gov/Food/FoodSafety/FoodborneIllness/FoodborneIllnessFoodbornePathogensNaturalToxins/BadBugBook/ucm070563.htm*
2. *United States Food and Drug Administration. Bacteriological Analytical Manual (BAM). Chapter 6. Shigella. Available at: http://www.fda.gov/Food/ScienceResearch/LaboratoryMethods/BacteriologicalAnalyticalManualBAM/ucm070789.htm*

Shigella

Enrichment

Product Description	Format	Ref #
Novobiocin Selective Supplement	10/pk, 10mg/vial	SR0181E
MacConkey Agar	10/pk, Monoplate	R01550
MacConkey Agar	500g	R453802

Environmental Systems

Product Description	Format	Ref #
AnaeroPack Rectangular Jar	Each, 2.5L	R685025
AnaeroPack Rectangular Jar	Each, 7.0L	R685070
AnaeroPack – Anaero	20/pk	R681001
AnaeroPouch – Anaero	20/pk	R682001

Isolation

Product Description	Format	Ref #
Triple Sugar Iron (TSI) Agar, Slant	20/pk, 15x103mm, tube	R064852
Triple Sugar Iron (TSI) Agar	500g	R454982
Decarboxylase Lysine Broth, 5mL	20/pk, 15x103mm, tube	R060760
Motility Test Medium, 5mL	20/pk, 15x103mm, tube	R061410
Tryptone	500g	LP0042B

Confirmation

Product Description	Format	Ref #
Gram Stain Kit	4/pk, 250mL/bottle	R40080
Gram Stain Kit Tray	Each	R40081
Urea Broth (Stuart's), 2mL	20/pk, 15x103mm, tube	R065232
Malonate Broth, 5mL	20/pk, 15x103mm, tube	R061326
Malonate Broth, Modified	500g	R453882
Purple Broth with 1% Adonitol, 7mL	20/pk, 15x103mm, tube w/durham	R062766
Purple Broth with 1% Dextrose, 7mL	20/pk, 15x103mm, tube w/durham	R062796
Purple Broth with 1% Inositol, 7mL	20/pk, 15x103mm, tube w/durham	R062846
Purple Broth with 1% Lactose, 7mL	20/pk, 15x103mm, tube w/durham	R062866
Shigella Antisera Set 1 (Polyvalent A-D)	2mL/vial	R679821
McFarland Equivalence Turbidity Standard Set	Kit, 15x103mm	R20421

Quality Control

Product Description	Format	Ref #
Culti-Loops *Shigella dysenteriae* group A ATCC® 13313™†	5 loops/pk	R4608115
Culti-Loops *Shigella sonnei* group D ATCC® 9290™†	5 loops/pk	R4608151

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Vibrio

Vibrio is a Gram-negative, motile, straight or curved rod-shaped bacterium. Three *Vibrio* species are responsible for most foodborne infections: *V. cholerae, V. parahaemolyticus,* and *V. vulnificus.*

There have been over 200 confirmed cases of *Vibrio cholerae* in the United States to date. It is likely many cases of *Vibrio* infection are unreported. Outbreaks normally occur during warmer months and often along the coast.[1]

Seafood is the most common food group associated with *Vibrio* contamination.

Testing Protocol for Vibrio cholerae in Most Food Types[2]

ENRICHMENT

Test portion + Alkaline Peptone Water
Mix and incubate for 6–8 hr at 35°C

ISOLATION

Streak inoculated enrichment onto Thiosulfate Citrate Bile Salts Surcose (TCBS) Agar
Incubate for 18–24 hr at 35°C

If colonies are crowded, streak onto 1% Tryptone w/ 1% NaCl (T1N1) Agar, 1% Tryptone w/ 3% NaCl (T1N3) Agar, or TSA w/ 2% NaCl
Incubate overnight at 35°C

Subculture colonies from each medium to T1N1 Agar Slants or Motility Test Medium
Incubate overnight at 35°C

CONFIRMATION

Inoculate suspect T1N1 colonies on the following confirmatory media: Arginine Glucose Slant (AGS), Tryptone Broth (T1N0) and 1% Tryptone w/ 3% NaCl (T1N3) Broth

Perform Oxidase and Serologicial Agglutination Test (O antigen)

Additional steps for Differentiation of Biotypes, Determination of Enterotoxigenity, and Genotypic Detection of the Cholera Toxin Gene by Polymerase Chain Reaction (PCR)

1. *United States Food and Drug Administration. Bad Bug Book: Foodborne pathogenic microorganisms and natural toxins handbook: Vibrio cholerae Serogroup O1. Available at: http://www.fda.gov/Food/FoodSafety/FoodborneIllness/FoodborneIllnessFoodbornePathogensNaturalToxins/BadBugBook/ucm070071.htm*
2. *United States Food and Drug Administration. Bacteriological Analytical Manual (BAM). Chapter 9. Vibrio. Available at: http://www.fda.gov/Food/ScienceResearch/LaboratoryMethods/BacteriologicalAnalyticalManualBAM/ucm070830.htm*

Disclaimer: This guide contains consolidated algorithms as an outline for testing methods used in the identification for specific foodborne pathogens isolated in the laboratory. Refer to approved methods for example, United States Food and Drug Administration (FDA) Bacteriological Analytical Manual (BAM), for more detailed information.

Vibrio

Enrichment

Product Description	Format	Ref #
Alkaline Peptone Water, 5mL	20/pk, 15x103mm, tube	R060052
Alkaline Peptone Water, 10mL	20/pk, 16x125mm, tube	R07006

Isolation

Product Description	Format	Ref #
Thiosulfate Citrate Bile Salts Sucrose (TCBS) Agar	10/pk, monoplate	R01865
Thiosulfate Citrate Bile Salts Sucrose (TCBS) Agar	20/pk, 20x150mm, pour tube	R08932
Tryptone	500g	LP0042B
Sodium Chloride (NaCl)	500g	LP0005B
Tryptic Soya Agar (TSA)	500g	R455002
Motility Test Medium, 5mL	20/pk, 15x103mm, tube	R061410

Confirmation

Product Description	Format	Ref #
BactiDrop Oxidase	50/pk, 0.75mL/ampule	R21540
Vibrio cholerae Antisera Set	2mL/vial	R679817
Vibrio cholerae Inaba Type Antisera	2mL/vial	R679824
Vibrio cholerae Ogawa Type Antisera	2mL/vial	R679848
Vibrio cholerae Polyvalent	2mL/vial	R679831

Quality Control

Product Description	Format	Ref #
Culti-Loops *Vibrio cholerae* serotype Inaba ATCC® 9459™†	5 loops/pk	R4609016
Culti-Loops *Vibrio vulnificus* ATCC® 27562™†	5 loops/pk	R4609017
Culti-Loops *Vibrio parahaemolyticus* ATCC® 17802™†	5 loops/pk	R4609000

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Yeast and Mold

Yeast and mold are widespread in nature and grow especially well in organic environments. Yeasts appear as single, separate, oval cells when mature, whereas molds tend to link together to form long, branding hyphae. Some yeast and mold may produce toxic metabolites known as mycotoxins. Most mycotoxins are resistant to destruction upon food processing or cooking. Food types particularly prone to yeast and mold infection include grains, nuts, beans and fruits.

Testing Protocol for Yeast and Mold in Most Food Types[†1]

DILUTION PLATING TECHNIQUE

PREPARATION

Test Portion + 0.1% Peptone Water
Mix and prepare dilutions

ISOLATION

Spread Plate Technique
Spread each dilution on solidified
Dichloran Rose Bengal Chloramphenicol (DRBC) Agar
Incubate for 5 days at 25°C

Pour-plate Technique
Place portion of each dilution into an empty petri dish and pour
Dichloran 18% Glycerol (DG18) over each dilution
Incubate for 5 days at 25°C

Count plates. If no growth, re-incubate for an additional 48 hr.

DIRECT PLATING TECHNIQUE - ENUMERATION OF MOLD IN FOODS

ISOLATION

Analysis of Non-surface Disinfected Foods
Transfer test portion onto surface of solidified DRBC or DG18 Agar
Incubate for 5 days at 25°C

Analysis of Surface Disinfected Foods
Prepare test portion using chlorine solution. Transfer test portion onto surface of solidified DRBC or DG18 Agar.
Incubate for 5 days at 25°C

Count plates. If no growth, re-incubate for an additional 48 hr.

[†] Fluorescence Microscopy Procedure also available. Refer to United States Food & Drug Administration (FDA) Bacteriological Analytical Manual (BAM), Chapter 18.

1. United States Food and Drug Administration. Bacteriological Analytical Manual (BAM). Chapter 18. Yeasts, Molds and Mycotoxins. Available at: http://www.fda.gov/Food/ScienceResearch/LaboratoryMethods/BacteriologicalAnalyticalManualBAM/ucm071435.htm

Yeast and Mold

Preparation

Product Description	Format	Ref #
Peptone Water	500g	R454242
Pepone Water	100g	R454241

Isolation

Product Description	Format	Ref #
DG-18 Agar	10/pk, monoplate	R110145
Dichloran-Glycerol (DG18) Agar Base	500g	CM0729B
Chloramphenicol Selective Supplement	10/pk	SR0078E
DRBC Agar Base	500g	CM0727B

Quality Control

Product Description	Format	Ref #
Culti-Loops *Saccharomyces cerevisiae* ATCC® 9763™†	5 loops/pk	R4608201
Culti-Loops *Aspergillus brasiliensis* ATCC® 16404™†	5 loops/pk	R4601100

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Notes

Notes

Notes

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