

Fraser Broth Base (NCM0066)

Intended Use

Fraser Broth Base is used with Acriflavin, Nalidixic Acid, and Ferric Ammonium Citrate for the selective enrichment of *Listeria* spp. Fraser Broth Base is not intended for use in the diagnosis of disease or other conditions in humans.

Description

Formulated according to MLG Appendix 1.09 (for the ISO 11290 formulation please use NCM0001). *Listeria monocytogenes*, described first in 1926 by Murray, Webb, and Swann, is an extensive problem in public health and food industries. This organism has the ability to cause human illness and death, particularly in immunocompromised individuals and pregnant women. Epidemiological evidence from outbreaks of listeriosis indicated the principle route of transmission is via the consumption of foodstuffs contaminated with *Listeria monocytogenes*. Implicated vehicles of transmission include turkey frankfurters, coleslaw, pasteurized milk, Mexican style cheese and pate.

Half Fraser (Demi Fraser) Broth Base is based on the formulation of Fraser and Sperber. This medium is used in rapid detection of *Listeria* from food and environmental samples. *Listeria* spp. grow over a pH range of 5.0 – 9.6, and survive in food products with pH levels outside these parameters. *Listeria* spp. are microaerophilic, Gram-positive, asporogenous, non-encapsulated, non-branching, short, motile rods. Motility is pronounced at 20°C. Identification of *Listeria* spp. is based on successful isolation of the organism, biochemical characterization, and serological confirmation.

Typical Formulation

Proteose Peptone	5.0 g/L
Tryptone	5.0 g/L
Beef Extract	5.0 g/L
Yeast Extract	5.0 g/L
Esculin	1.0 g/L
Disodium Hydrogen Phosphate	12.0 g/L
Potassium Dihydrogen Phosphate	1.35 g/L
Sodium Chloride	20.0 g/L
Lithium Chloride	3.0 g/L

pH: 7.2 ± 0.2 at 25°C

Formula may be adjusted and/or supplemented as required to meet performance specifications.

Supplements

Supplement / 10 mL (per 1L of Fraser Broth Base)

Acriflavin, 25 mg

Nalidixic Acid, 20 mg

NCM4009 Ferric Ammonium Citrate

Precaution

Refer to SDS

Preparation

1. Dissolve 57.4 grams of the medium in one liter of purified water.
2. Mix thoroughly.
3. Autoclave at 121°C for 15 minutes. Cool broth to room temperature.
4. Aseptically add 2 vials of NCM4009-0.5* Ferric Ammonium Citrate and 10 mL of a filter sterilized solution containing 20 mg Nalidixic acid and 25 mg Acriflavin.

Technical Specification Sheet



*Larger vials may be available. Please see appropriate supplement data sheet for availability and preparation instructions.

Test Procedure

To isolate *Listeria monocytogenes* and other *Listeria* spp., refer to appropriate references.

Quality Control Specifications

Dehydrated Appearance: Powder is homogeneous, free flowing, and beige.

Prepared Appearance: Prepared medium is amber, clear to slightly hazy with none to moderate precipitate.

Expected Cultural Response: Cultural response in Fraser Broth incubated at $37 \pm 1^\circ\text{C}$ and examined for growth after 18 - 48 hours.

Microorganism	Approx. Inoculum (CFU)	Expected Results
<i>Enterococcus faecalis</i> ATCC® 29212	$> 10^5$	<100 cfu on TSA
<i>Enterococcus faecalis</i> ATCC® 19433	$> 10^5$	<100 cfu on TSA
<i>Escherichia coli</i> ATCC® 25922	$> 10^5$	Complete inhibition
<i>Escherichia coli</i> ATCC® 8739	$> 10^5$	Complete inhibition
<i>Listeria monocytogenes</i> ATCC® 15313	10 – 100	>10 cfu on Agar Listeria
<i>Listeria monocytogenes</i> ATCC® 13932	10 – 100	>10 cfu on Agar Listeria
<i>Listeria monocytogenes</i> ATCC® 35152	10 – 100	>10 cfu on Agar Listeria
<i>Listeria ivanovii</i> ATCC® 19119	$> 10^4$	Growth w/ blackening
<i>Listeria innocua</i> ATCC® 33090	$> 10^4$	Growth w/ blackening
<i>Listeria seeligeri</i> ATCC® 35967	$> 10^4$	Growth w/ blackening
<i>Staphylococcus aureus</i> ATCC® 25923	$> 10^4$	Suppressed

The organisms listed are the minimum that should be used for quality control testing.

Results

1. Examine agar plates for suspect colonies. For complete identification and confirmation of *Listeria* spp., consult appropriate references.
2. Rapid slide and macroscopic tube tests can be used for definitive serological identification.

Expiration

Refer to expiration date stamped on the container. The dehydrated medium should be discarded if not free flowing, or if appearance has changed from the original color.

Limitations of the Procedure.

An identification of *Listeria monocytogenes* must be confirmed by biochemical and serological testing.

Storage

Store dehydrated culture media at $2 - 30^\circ\text{C}$ away from direct sunlight. Once opened and recapped, place the container in a low humidity environment at the same storage temperature. Protect from moisture and light by keeping container tightly closed.



References

1. USDA. 2017. Food Safety and Inspection Service, Media and Reagents, MLG Appendix 1.09, USDA/FSIS Microbiology Laboratory Guidebook, Washington D.C.
2. Murray, E. G. D., R. A. Webb, and M. B. R. Swann. 1926. A disease of rabbits characterized by large mononuclear leucocytosis caused by ahitherto undescribed bacillus *Bacterium monocytogenes*. J. Path. Bact. 29:407-439.
3. Monk, J. D., R. S. Clavero, L. R. Beuchat, M. P. Doyle, and R. E. Brackett. 1994. Irradiation inactivation of *Listeria monocytogenes* and *Staphylococcus aureus* in low and high fat, frozen refrigerated ground beef. J. Food Prot. 57:969-974.
4. Bremer, P. J., and C. M. Osborne. 1995. Thermal-death times of *Listeria monocytogenes* in green shell mussels prepared for hot smoking. J. Food Prot. 58:604-608.
5. Grau, F. H., and P. B. Vanderlinde. 1992. Occurrence, numbers, and growth of *Listeria monocytogenes* on some vacuum-packaged processed meats. J. Food Prot. 55:4-7.
6. Fraser, J., and W. Sperber. 1988. Rapid detection of *Listeria* in food and environmental samples by esculin hydrolysis. J. Food Prot. 51:762-765.