FRASER BROTH (7626)

Intended Use

Fraser Broth is used with acriflavin, nalidixic acid and ferric ammonium citrate for the selective enrichment of *Listeria* spp.

Product Summary and Explanation

Listeria monocytogenes, described first in 1926 by Murray, Webb and Swann, is an extensive problem in public health and food industries.[1] This organism has the ability to cause human illness and death, particularly in immunocompromised individuals and pregnant women.[2] Epidemiological evidence from outbreaks of listeriosis indicated the principle route of transmission is via the consumption of foodstuffs contaminated with *Listeria monocytogenes*.[3] Implicated vehicles of transmission include turkey frankfurters, coleslaw, pasteurized milk, Mexican style cheese and pate′.[4] *Listeria* spp. are ubiquitous in nature, present in a wide range of unprocessed foods and in soil, sewage, and river water.[5]

Fraser Broth is based on the formulation of Fraser and Sperber.[6] This medium is used in rapid detection of *Listeria* from food[7] 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.[8] *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.

Principles of the Procedure

Enzymatic Digest of Casein, Enzymatic Digest of Animal Tissue, Beef Extract, and Yeast Extract provide nitrogen, vitamins and minerals in Fraser Broth. The Phosphates are the buffering agents, Sodium Chloride maintains osmotic balance. Differentiation is aided by including Ferric Ammonium Citrate in the final medium. Since all *Listeria* species hydrolyze esculin, the addition of ferric ions to the medium will detect the reaction. Blackening of the medium by esculin-hydrolyzing bacteria is a result of formation of 6,7-dihydroxycoumarin that reacts with ferric ions.[6] Selectivity is provided by the presence of Lithium Chloride, Nalidixic Acid and Acriflavin in the formula. The high salt tolerance of *Listeria* spp. is used to inhibit growth of enterococci.

Formula / Liter	
Enzymatic Digest of Casein	5 g
Enzymatic Digest of Animal Tissue	5 g
Beef Extract	5 g
Yeast Extract	5 g
Sodium Chloride	20 g
Disodium Phosphate	12 g
Monopotassium Phosphate	1.35 g
Esculin	1 g
Lithium Chloride	3 g

Final pH: 7.2 ± 0.2 at 25°C

Supplement / 10 mL
Ferric Ammonium Citrate, 0.5 g
Nalidixic Acid, 20 mg
Acriflavin, 25 mg

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

Precautions

1. For Laboratory Use.
2. **TOXIC**. IRRITATING TO EYES, RESPIRATORY SYSTEM, AND SKIN.

Directions

1. Dissolve 57.4 g of the medium in one liter of purified water.
2. Heat gently in a 50°C waterbath to dissolve completely. DO NOT OVERHEAT.
3. Autoclave at 121°C for 15 minutes. Cool broth to room temperature.
4. Aseptically add 10 mL of a filter sterilized solution containing 0.5 g ferric ammonium citrate, 20 mg nalidixic acid, and 25 mg acriflavin.

Quality Control Specifications

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

Prepared Appearance: Prepared medium is medium amber, clear to slightly opalescent with a fine precipitate.

Expected Cultural Response: Cultural response in Fraser Broth at 35°C after 18 - 48 hours incubation.

Microorganism	Response
Escherichia coli ATCC® 25922	inhibited
Listeria monocytogenes ATCC® 7644	growth w/blackening
Listeria monocytogenes ATCC® 15313	growth w/blackening
Staphylococcus aureus ATCC® 25923	inhibited (@ 18-24 hrs)

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

Test Procedure

To isolate *Listeria monocytogenes* from processed meats and poultry, the following procedure is recommended by the U.S.D.A.[7]

1. Add 25 g of test material to 225 mL of UVM Modified Listeria Enrichment Broth and mix or blend thoroughly. Incubate for 20 - 24 hours at 30°C.
2. Transfer 0.1 mL of the incubate broth to Fraser Broth. Incubate at 35°C for 26 ± 2 hours.
3. At 24 and 48 hours, streak the Fraser Broth culture to Modified Oxford Agar. Incubate the Modified Oxford plates at 35°C for 24 - 48 hours.

Results

1. Examine agar plates for suspect colonies. For complete identification and confirmation of *Listeria* spp., consult appropriate references.[7-10]
2. Rapid slide and macroscopic tube tests can be used for definitive serological identification.

Storage

Store sealed bottle containing the dehydrated medium at 2 - 30°C. Once opened and recapped, place container in a low humidity environment at the same storage temperature. Protect from moisture and light by keeping container tightly closed.

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. Expiry applies to medium in it's intact container when stored as directed.

Limitation of the Procedure

An identification of *Listeria monocytogenes* must be confirmed by biochemical and serological testing.[9,10]

Packaging

Fraser Broth	**Code No.**	**7626A**	**500 g**
		7626B	**2 kg**
		7626C	**10 kg**

References

1. **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.
2. **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.
3. **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.
4. **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.
5. **Patel, J. R., C. A. Hwang, L. R. Beuchat, M. P. Doyle, and R. E. Brackett.** 1995. Comparison of oxygen scavengers for their ability to enhance resuscitation of heat-injured *Listeria monocytogenes*. J. Food Prot. **58:**244-250.
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.
7. **Lee, W. H., and D. McClain.** 1994. Laboratory Communication No. 57, U.S.D.A., F.S.I.S. Microbiology Division, Bethesda, MD.
8. **Vanderzant, C., and D. F. Splittstoesser (eds.).** Compendium of methods for the microbiological examination of foods, 3rd ed. American Public Health Association, Washington, D.C.
9. **Murray, P. R., E. J. Baron, M. A. Pfaller, F. C. Tenover, and R. H. Yolken (eds.).** Manual of clinical microbiology, 6th ed. American Society for Microbiology, Washington, D.C.
10. **Marshall, R. T. (ed.).** Standard methods for the examination of dairy products 16th ed., American Public Health Association, Washington D.C.

Technical Information

Contact Acumedia Manufacturers, Inc. for Technical Service or questions involving dehydrated culture media preparation or performance at (410)780-5120 or fax us at (410)780-5470.