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INTENDED USE

Fraser Broth Supplement is used with Fraser Broth Base in selectively enriching and detecting *Listeria*.

SUMMARY AND EXPLANATION

First described in 1926 by Murray, Webb and Swann,¹ *Listeria monocytogenes* is a widespread problem in public health and the food industries. This organism has the ability to cause human illness and death, particularly in immunocompromised individuals and pregnant women.² The first reported food-borne outbreak of listeriosis was in 1985,³ and since then, microbiological and epidemiological evidence from both sporadic and epidemic cases of listeriosis has indicated that the principle route of transmission is via the consumption of foods contaminated with *L. monocytogenes*.⁴

Implicated vehicles of transmission include turkey frankfurters,⁵ coleslaw, pasteurized milk, Mexican-style cheese, paté, and pickled pork tongue. The organism has been isolated from commercial dairy and other food processing plants, and is ubiquitous in nature, being present in a wide range of unprocessed foods as well as in soil, sewage, silage and river water.⁶

Fraser Broth Base and Fraser Broth Supplement are based on the formulation of Fraser and Sperber.⁷ The medium is used in the rapid detection of *Listeria* from food⁸ and environmental samples.

Many common food contaminants such as streptococci, enterococci, *Bacillus* spp., *Escherichia coli*, *Pseudomonas aeruginosa* and *Proteus vulgaris* interfere with the isolation of *L. monocytogenes*.⁹

Listeria species grow on laboratory media over a pH range of 4.4–9.6, and can survive in foods of similar acidity for days or weeks.¹⁰ *Listeria* spp. are microaerophilic, gram-positive, asporogenous, non-encapsulated, non-branching, regular, short, motile rods. Motility is most pronounced at 20 °C.

Identification of *Listeria* is based on successful isolation of the organism, biochemical characterization and serological confirmation.

PRINCIPLES OF THE PROCEDURE

Differentiation of *Listeria* from other bacteria, is aided by including ferric ammonium citrate (Difco Fraser Broth Supplement) in the final medium. Since all *Listeria* species hydrolyze esculin, the addition of ferric ions to the medium will detect the reaction. A blackening of the medium by cultures containing esculin-hydrolyzing bacteria is the result of the formation of 6,7-dihydroxycoumarin which reacts with the ferric ions.⁷

REAGENTS

Fraser Broth Supplement

Approximate Formula* Per 10 mL

Ferric Ammonium Citrate. 0.5 g

*Adjusted and/or supplemented as required to meet performance criteria.

Warnings and Precautions:

For Laboratory Use

Consult product labels and material safety data sheets for safety information and first aid.

Follow proper, established laboratory procedures in handling and disposing of infectious materials.

Warning



H315 Causes skin irritation. **H319** Causes serious eye irritation. **H335** May cause respiratory irritation.

P264 Wash thoroughly after handling. **P280** Wear protective gloves/protective clothing/eye protection/face protection. **P312** Call a POISON CENTER or doctor/physician if you feel unwell. **P403+P233** Store in a well-ventilated place. Keep container tightly closed.

P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

Instructions:

Store Fraser Broth Supplement at 2–8 °C.

PROCEDURE

Material Provided: Difco Fraser Broth Supplement.

Materials Required But Not Provided: Ancillary culture media, reagents, quality control organisms and laboratory equipment as required for this procedure.

Test Procedure: Observe aseptic techniques.

Aseptically add 10 mL of Difco Fraser Broth Supplement to 1 L Difco Fraser Broth Base prepared according to label directions.

To isolate *L. monocytogenes* from processed meats and poultry, the following procedure is recommended by the U.S. Department of Agriculture.⁸

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

USER QUALITY CONTROL**Identity Specifications**

Solution Appearance: Dark brown solution

Cultural Response

Prepare Fraser Broth Base per label directions. Add Fraser Broth Supplement. Inoculate and incubate at 35 ± 2 °C and read for growth and blackening at 18–24 and 42–48 h.

ORGANISM	ATCC®	INOCULUM CFU	RECOVERY	ESCULIN REACTION
<i>Enterococcus faecalis</i>	29212	10 ³ – 2 x 10 ³	Marked to complete inhibition	–
<i>Escherichia coli</i>	25922	10 ³ – 2 X 10 ³	Marked to complete inhibition	–
<i>Listeria monocytogenes</i>	19114	10 ² – 10 ³	Good	+
<i>Listeria monocytogenes</i>	19115	10 ² – 10 ³	Good	+
<i>Staphylococcus aureus</i>	25923	10 ³ – 2 x 10 ³	Marked to complete inhibition	–

RESULTS

1. Examine agar plates for suspect colonies. For further identification and confirmation of *Listeria* spp., consult appropriate references.^{8,10-12}
2. Rapid slide and macroscopic tube tests can be used for definitive serological identification.

LIMITATIONS OF THE PROCEDURE

1. Since *Listeria* species other than *L. monocytogenes* can grow on these media, an identification of *L. monocytogenes* must be confirmed by biochemical and serological testing.^{11,12}
2. Poor growth and a weak esculin reaction may be seen after 40 h incubation for some enterococci.

AVAILABILITY

Cat. No.	Description
211742	Difco Fraser Broth Supplement, 6 x 10 mL.
211767	Difco Fraser Broth Base, 500 g.
211766	Difco Fraser Broth Base, 2 kg.
222530	Difco Oxford Medium Base, 500 g.
222510	Difco Oxford Medium Base, 2 kg.
211763	Difco Modified Oxford Antimicrobial Supplement, 6 x 10 mL.
222120	Difco LPM Agar Base, 500 g.
222110	Difco LPM Agar Base, 2 kg.
222220	Difco Listeria Enrichment Broth, 500 g.
222210	Difco Listeria Enrichment Broth, 10 kg.
222330	Difco UVM Modified Listeria Enrichment Broth, 500 g.
222310	Difco UVM Modified Listeria Enrichment Broth, 2 kg.
222320	Difco UVM Modified Listeria Enrichment Broth, 10 kg.
223001	Difco Listeria O Antiserum, Type 1, 1 mL.
223011	Difco Listeria O Antiserum, Type 4, 1 mL.
223021	Difco Listeria O Poly Types, 1 & 4, 1 mL.

REFERENCES

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 AAAA-MM-DD / AAAA-MM (MM = slutning af måned)
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 EEEE-MM-HH / EEEE-MM (MM = τέλος του μήνα)
 AAAA-MM-DD / AAAA-MM (MM = fin del mes)
 AAAA-KK-PP / AAAA-KK (KK = kuu lõpp)
 AAAA-MM-JJ / AAAA-MM (MM = fin du mois)
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 AAAA-MM-GG / AAAA-MM (MM = fine mese)
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 MMMM-MM-DD / MMMM-MM (MM = mēnesio pabaiga)
 GGGG-MM-DD/GGGG-MM (MM = mėneša beigas)
 JJJJ-MM-DD / JJJJ-MM (MM = einde maand)
 AAAA-MM-DD / AAAA-MM (MM = sluten av måneden)
 RRRR-MM-DD / RRRR-MM (MM = koniec miesiąca)
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 AAAA-MM-DD / AAAA-MM (MM = slutet av månaden)
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