UVM Modified Listeria Enrichment Broth

Intended Use

UVM Modified Listeria Enrichment Broth is used for rapidly isolating *Listeria monocytogenes*.

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 can 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 shown that the principal route of transmission is via the consumption of foodstuffs contaminated with *Listeria 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 and in soil, sewage, silage and river water.[6]

Listeria species grow over a pH range of 4.4-9.6 and survive in food products with pH levels outside these parameters.[7] *Listeria* spp. are microaerophilic, gram-positive, asporogenous, non-encapsulated, non-branching, regular, short, motile rods. Motility is most pronounced at 20°C.

User Quality Control

Identity Specifications

Difco™ UVM Modified Listeria Enrichment Broth

Dehydrated Appearance:	Beige, free-flowing, homogeneous.
Solution:	5.2% solution, soluble in purified water upon boiling. Solution is light to medium amber with a faint bluish-green ring at the surface, clear to very slightly opalescent with a fine precipitate.
Prepared Appearance:	Light to medium amber, slightly opalescent with a fine precipitate.
Reaction of 5.2% Solution at 25°C:	pH 7.2 ± 0.2

Cultural Response

Difco™ UVM Modified Listeria Enrichment Broth

Prepare the medium per label directions. Inoculate and incubate at 35 ± 2°C for 18-48 hours.

ORGANISM	ATCC™	INOCULUM CFU	RECOVERY
Enterococcus faecalis	29212	10^3-2×10^3	Suppressed at 18-24 hours; good at 40-48 hours
Escherichia coli	25922	10^3-2×10^3	Marked to complete inhibition
Listeria monocytogenes	19114	10^2-10^3	Good

The most common contaminating bacteria found in food sources potentially containing *Listeria* are: streptococci, especially the enterococci, micrococci and *Bacillus* species, *Escherichia coli*, *Pseudomonas aeruginosa* and *Proteus vulgaris*.[8]

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

UVM Modified Listeria Enrichment Broth is a modification of the formula described by Donnelly and Baigent.[9] It is used for selective enrichment of *Listeria* spp. from food[7,10] and clinical specimens.[11]

Principles of the Procedure

Peptones, beef extract and yeast extract in UVM Modified Listeria Enrichment Broth provide nitrogen, vitamins and minerals. Sodium chloride maintains the osmotic balance of the medium. Phosphate acts as a buffering agent. Nalidixic acid inhibits growth of gram-negative organisms. Acriflavine hydrochloride inhibits many gram-positive bacteria. Esculin is hydrolyzed by *Listeria* species.

Formula

Difco™ UVM Modified Listeria Enrichment Broth

Approximate Formula* Per Liter		
Pancreatic Digest of Casein	5.0	g
Proteose Peptone No. 3	5.0	g
Beef Extract	5.0	g
Yeast Extract	5.0	g
Sodium Chloride	20.0	g
Disodium Phosphate	9.6	g
Monopotassium Phosphate	1.35	g
Esculin	1.0	g
Nalidixic Acid	0.02	g
Acriflavine HCl	12.0	mg

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

Directions for Preparation from Dehydrated Product

1. Suspend 52 g of the powder in 1 L of purified water. Mix thoroughly.
2. Heat with frequent agitation and boil for 1 minute to completely dissolve the powder.
3. Autoclave at 121°C for 15 minutes.
4. Test samples of the finished product for performance using stable, typical control cultures.

Procedure

The USDA method[11] involves enrichment of the specimen in UVM Modified Listeria Enrichment Broth (one part sample in nine parts broth) at 30°C. After incubation, a portion of the enrichment mixture is added to an enrichment broth or plated onto the final isolation agar.[7] For further information when testing food samples or clinical specimens, refer to appropriate references.[7,10-12]

Expected Results

Refer to appropriate references and procedures for results.

References

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4. Bremer and Osborne. 1995. J. Food Prot. *58*:604.
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7. Ryser and Donnelly. 2001. *In* Downes and Ito (ed.), Compendium of methods for the microbiological examination of foods, 4th ed. American Public Health Association, Washington, D.C.
8. Kramer and Jones. 1969. J. Appl. Bacteriol. *32*:381.
9. Donnelly and Baigent. 1986. Appl. Environ. Microbiol. *52*:689.
10. McClain and Lee. May 24, 1989. Laboratory communication No. 57. Microbiology Division, Food Safety and Inspection Service, U.S. Department of Agriculture, Beltsville, Md.
11. Bille, Rocourt and Swaminathan. 1999. *In* Murray, Baron, Pfaller, Tenover and Yolken (ed), Manual of clinical microbiology, 7th ed. American Society for Microbiology, Washington, D.C.
12. Hayes, Graves, Swaminathan, Ajello, Marcolm, Weaver, Ransom, Deaver, Plikaytis, Schuchat, Wenger, Pinner, Broome and The *Listeria* Study Group. 1992. J. Food. Prot. *55*:952.

Availability

Difco™ UVM Modified Listeria Enrichment Broth

AOAC CCAM COMPF USDA

Cat. No.	222330	Dehydrated – 500 g
	222310	Dehydrated – 2 kg
	222320	Dehydrated – 10 kg