



PRODUCT SPECIFICATION SHEET

Listeria Enrichment Medium Base (UVM) (DM521)

Intended Use

Listeria Enrichment Medium Base (UVM) (DM521) is recommended for selective isolation and cultivation of *Listeria monocytogenes* from clinical specimen.

Product Summary and Explanation

Listeria monocytogenes, first described in 1926 by Murray, Webb and Swann, is a widespread problem in public health and the food industries.⁽¹⁾ This organism has the ability to cause human illness and death, particularly in immunocompromised individuals and pregnant women.⁽²⁾ Food-borne outbreak of listeriosis was first reported 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, coleslaw, pasteurized milk, Mexican-style cheese, paté and pickled pork tongue.⁽⁵⁾ 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⁾ *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. Identification of *Listeria* is based on successful isolation of the organism, biochemical characterization, and serological confirmation.

Listeria Enrichment Medium Base is used for the selective cultivation and isolation of *L. monocytogenes* from clinical samples. The medium was originally formulated by Donnelly and Baigent.⁽⁸⁾ It was later modified by decreasing the nalidixic acid concentration in the selective supplements and subsequently increasing the acriflavin concentration.⁽⁹⁾ University of Vermont Modification Medium (UVM) used a two-step selective enrichment medium resulting in a higher isolation rate of *L. monocytogenes* from meat products within 3-4 days. This Listeria Enrichment Medium Base (UVM) Broth is recommended as a primary enrichment broth for recovery of heat-injured *Listeria*.⁽¹⁰⁾

Principles of the Procedure

Casein enzymic hydrolysate, proteose peptone, beef extract and yeast extract serves as nitrogen, vitamins, minerals sources necessary nutrients, while esculin offers differential properties to the medium. The Phosphates are the buffering agents, Sodium Chloride maintains osmotic balance. Nalidixic acid and acriflavin hydrochloride together with higher concentration of phosphate render the medium selective for *Listeria*. Gram-negative and gram-positive organisms are inhibited by nalidixic acid and acriflavin hydrochloride respectively. Esculin is hydrolyzed by *Listeria* spp. A blackening of the medium by cultures containing esculin-hydrolyzing bacteria is the result of the formation of 6, 7-dihydroxycoumarin that reacts with the ferric ions. The high salt tolerance of *Listeria* is used as a means to inhibit growth of enterococci.

Formula / Liter

Ingredients	Gms / Liter
Casein enzymic hydrolysate	5.00
Proteose peptone	5.00
Beef extract	5.00
Yeast extract	5.00
Sodium chloride	20.00
Monopotassium dihydrogen phosphate	1.35
Disodium hydrogen phosphate	12.00





PRODUCT SPECIFICATION SHEET

Esculin	1.00
Final pH: 7.4 ± 0.2 at 25°C	
Formula may be adjusted and/or supplemented as required to meet performance specifications	

Precautions

1. For Laboratory Use only.
2. IRRITANT. Irritating to eyes, respiratory system, and skin.
3. Broth cultures of *Listeria* are more dangerous than colonies on agar plates, so proper precautions should be taken while handling.

Directions

1. Suspend 54.35 grams of the medium in one liter of distilled water.
2. Heat if necessary, to dissolve the medium completely.
3. Autoclave at 121°C, 15 psi pressure, for 15 minutes / validated cycle.
4. Cool to 50°C and aseptically add rehydrated contents of 1 vial of *Listeria* UVM Supplement I (MS169) for primary enrichment or 1 vial of *Listeria* UVM Supplement II (MS170) for secondary enrichment.
5. Mix well and distribute into final containers.

Quality Control Specifications

Dehydrated Appearance	Cream to light tan homogeneous free flowing powder
Prepared Medium	Medium amber coloured, slightly opalescent solution with a bluish tinge
Reaction of 5.43% Solution	pH : 7.4 ± 0.2 at 25°C
Gel Strength	Not Applicable

Expected Cultural Response: Cultural characteristics observed after an incubation at 35-37°C for 24-48 hours.

Sr. No.	Organisms	Results to be achieved	
		Inoculum (CFU)	Growth (On addition of MS169 or MS170)
1.	<i>Escherichia coli</i> ATCC 25922	50 -100	none to poor
2.	<i>Listeria monocytogenes</i> ATCC 19111	50 -100	good-luxuriant
3.	<i>Listeria monocytogenes</i> ATCC 19112	50-100	good-luxuriant
4.	<i>Listeria monocytogenes</i> ATCC 19117	50-100	good-luxuriant
5.	<i>Listeria monocytogenes</i> ATCC 19118	50 -100	good-luxuriant
6.	<i>Staphylococcus aureus</i> ATCC 25923	50 -100	none to poor

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



Listeria Enrichment Medium-UVM (DM521)





PRODUCT SPECIFICATION SHEET

1. Control
2. *Listeria monocytogenes* ATCC 19111
3. *Escherichia coli* ATCC 25922
4. *Enterococcus faecalis* ATCC 29212

Test Procedure

Refer to appropriate references for specific procedures for selective isolation and cultivation of *Listeria monocytogenes* from clinical specimen.

1. For primary isolation inoculate 25 gm or 25 ml specimen in 225 ml Listeria Enrichment Medium Base (DM521) with added Listeria UVM Supplement I (MS169).
2. After 24 hours incubation, spread 0.2 ml of this medium on Listeria Selective Agar (DM931) plate.
3. Simultaneously transfer 0.1 ml of Enrichment broth to 10 ml of fresh Listeria Enrichment Medium Base with added Listeria UVM Supplement II (MS170).
4. For secondary enrichment after 24 hours spread 0.2 ml of this medium on Listeria Selective Agar (DM931) plate.

Results

Refer to appropriate references and procedures for results.

Storage

Store the sealed bottle containing the dehydrated medium at 10 - 30°C. Once opened and recapped, place container in a low humidity environment at the same storage temperature. Protect from moisture and light.

Expiration

Refer to the expiration date stamped on the container. The dehydrated medium should be discarded if not free flowing, or if the appearance has changed from the original color. Expiry applies to medium in its intact container when stored as directed.

Limitations of the Procedure

1. *Listeria* spp., other than *Listeria monocytogenes*, can grow on isolation media. An identification of *Listeria monocytogenes* must be confirmed through biochemical and serological testing.
2. For identification, organisms must be in pure culture. Morphological, biochemical and/or serological tests should be performed for final identification.
3. Consult appropriate texts for detailed information and recommended procedures.

Packaging

Product Name : Listeria Enrichment Medium Base (UVM)

Product Code : DM521

Available Pack sizes : 100gm / 500gm

References

1. Murray, Webb and Swann. 1926. J. Pathol. Bacteriol. 29:407.
2. Monk, Clavero, Beuchat, Doyle and Brackett. 1994. J. Food Prot. 57:969.
3. Wehr. 1987. J. Assoc. Off. Anal. Chem. 70:769.
4. Bremer and Osborne. 1995. J. Food Prot. 58:604.
5. Grau and Vanderlinde. 1992. J. Food Prot. 55:4.
6. Patel, Hwang, Beuchat, Doyle and Brackett. 1995. J. Food Prot. 58:244.





PRODUCT SPECIFICATION SHEET

- 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.
- Donnelly and Baigent. 1986. Appl. Environ. Microbiol. 52:689.
- McClain D. and Lee W. H., 1988, J. Assoc. off Anal. Chem., 71:660.
- Bailey J. S., Fletcher D. L. and Cox N. A., 1990, J. Food Prot., 53:473.

Further Information

For further information please contact your local MICROMASTER Representative.



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