

LAURYL SULFATE BROTH W/ MUG (7300)

Intended Use

Lauryl Sulfate Broth W/ MUG is used for the detection of coliforms and the fluorogenic detection of *Escherichia coli*.

Product Summary and Explanation

The coliform group of bacteria includes aerobic and facultative anaerobic, Gram-negative, non-sporeforming bacilli that ferment lactose and form acid and gas at 35°C within 48 hours.¹ Members of the *Enterobacteriaceae* comprise the majority of this group, but organisms such as *Aeromonas* spp. may also be included. Procedures to detect and confirm coliforms are used in testing water, foods, dairy products, and other materials.¹⁻⁴

Lauryl Sulfate Broth, also referred to as Lauryl Tryptose Broth, is prepared according to the formula of Mallmann and Darby.⁵ During their investigation, Sodium Lauryl Sulfate produced the best results for inhibition of organisms other than coliforms.⁵ Feng and Hartman⁶ developed a rapid assay for *E. coli* by incorporating 4-methylumbelliferyl-β-D-glucuronide (MUG) at a final concentration of 100 µg/mL into Lauryl Sulfate Broth. Incorporating MUG into Lauryl Sulfate Broth (LSB) permits the detection of *E. coli* among the coliform colonies.^{3,4}

LSB W/ MUG is recommended by the American Public Health Association (APHA) and the Association of Official Analytical Chemists (AOAC).^{3,4,6}

Principles of the Procedure

Enzymatic Digest of Casein provides nitrogen, vitamins, minerals, and amino acids in Lauryl Tryptose Broth. Lactose is the fermentable carbohydrate for coliforms. Potassium Phosphates are the buffering agents, and Sodium Chloride is used to maintain the osmotic balance of the medium. Sodium Lauryl Sulfate is the selective agent used to inhibit non-coliform organisms.

The addition of MUG (4-methylumbelliferyl-β-D-glucuronide) provides another criterion to determine the presence of *E. coli* in food and environmental samples. *E. coli* produces the enzyme glucuronidase that hydrolyzes MUG to yield a fluorogenic product that is detectable under long-wave (366 nm) UV light.

Formula / Liter

Enzymatic Digest of Casein	20 g
Lactose	5 g
Monopotassium Phosphate.....	2.75 g
Disodium Phosphate	2.75 g
Sodium Chloride	5 g
Sodium Lauryl Sulfate	0.1 g
4-Methylumbelliferyl-β-D-glucuronide.....	0.05 g

Final pH: 6.8 ± 0.2 at 25°C

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

Precautions

1. For Laboratory Use.
2. IRRITANT. Irritating to eyes, respiratory system, and skin.

Directions

1. Dissolve 35.7 g of the medium in one liter of purified water.
2. Mix thoroughly.
3. Distribute into tubes containing inverted Durham tubes.
4. Autoclave at 121°C for 15 minutes.

Quality Control Specifications

Dehydrated Appearance: Powder is homogeneous, free flowing, and white to off-white.

Prepared Appearance: Prepared medium is yellow to gold and clear to trace hazy.

Expected Cultural Response: Cultural response in Lauryl Sulfate Broth W/ MUG incubated aerobically at 35 ± 2°C and examined for growth gas production and fluorescence after 24 ± 2 hours incubation.

Microorganism	Approx. Inoculum (CFU)	Expected Results		
		Growth	Gas	Fluorescence
<i>Enterobacter aerogenes</i> ATCC® 13048	10 - 300	Growth	+ *	--
<i>Staphylococcus aureus</i> ATCC® 25923	10 - 300	Inhibited	N/A	N/A
<i>Escherichia coli</i> ATCC® 25922	10 - 300	Growth	+	+
<i>Salmonella typhimurium</i> ATCC® 14028	10 - 300	Growth	--	--

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

* Gas production positive within 48 hours.

Test Procedure

Refer to appropriate references for specific procedures using Lauryl Sulfate Broth W/ MUG.^{3,4,6}

Results

After incubation of the tubes at 35°C for 24 hours, examine for turbidity, gas production, and fluorescence. Positive MUG reactions exhibit a bluish fluorescence under long-wave (approximately 366 nm) UV light. Typical strains of *E. coli* are positive for both gas production and fluorescence. Non-*E. coli* coliforms that grow may exhibit fluorescence, but will not produce gas.

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 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.

Limitation of the Procedure

Strains of *E. coli* that fail to grow in LSB W/ MUG, fail to produce gas, or fail to produce glucuronidase may infrequently be encountered. Strains of *Salmonella*, *Shigella*, and *Yersinia* that produce glucuronidase may be encountered. These strains must be distinguished from *E. coli* on the basis of other parameters; gas production, growth at 44°C.

Packaging

Lauryl Sulfate Broth W/ MUG	Code No.	7300A	500 g
		7300B	2 kg
		7300C	10 kg

References

1. Marshall, R. T. (ed.). 1993. Standard methods for the examination of dairy products, 16th ed., American Public Health Association, Washington, D.C.
2. Eaton, A. D., L. S. Clesceri, and A. E. Greenberg (eds.). 1995. Standard methods for the examination of water and wastewater, 19th ed. American Public Health Association, Washington, D.C.
3. Vanderzant, C., and D. F. Splittstoesser (eds.). 1992. Compendium of methods for the microbiological examination of foods, 3rd ed. American Public Health Association, Washington, D.C.
4. U.S. and Drug Administration. 1995. Bacteriological analytical manual, 8th ed., AOAC International, Gaithersburg, MD.
5. Mallmann, W. L., and C. W. Darby. 1941. Uses of a lauryl sulphate tryptose broth for the detection of coliform organisms. Am J. Public Health. 31:127.
6. Feng, P. C. S., and P. A. Hartman. 1982. Fluorogenic assays for immediate confirmation of *Escherichia coli*. Appl. Environ. Microbiol. 43:1320-1329.
7. Cunniff, P. (ed.). 1995. Official Methods of Analysis AOAC International, 16th ed. AOAC International, Gaithersburg, MD.

Technical Information

Contact Acumedia Manufacturers, Inc. for Technical Service or questions involving dehydrated culture media preparation or performance at (517)372-9200 or fax us at (517)372-2006.