

# 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.<sup>1</sup> 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.<sup>1-4</sup>

Lauryl Sulfate Broth, also referred to as Lauryl Tryptose Broth, is prepared according to the formula of Mallmann and Darby.<sup>5</sup> During their investigation, Sodium Lauryl Sulfate produced the best results for inhibition of organisms other than coliforms.<sup>5</sup> Feng and Hartman<sup>6</sup> 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.<sup>3,4</sup>

LSB w/ MUG is recommended by the American Public Health Association (APHA) and the Association of Official Analytical Chemists (AOAC).<sup>3,4,6</sup>

## **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
Dipotassium 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. Heat with frequent agitation and boil for one minute to completely dissolve the medium.
3. Dispense into tubes containing inverted fermentation Durham tubes. Autoclave at 121°C for 15 minutes.

## **Quality Control Specifications**

**Dehydrated Appearance:** Powder is homogeneous, free flowing, and 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 at 35°C after 24 hours incubation.

Microorganism	Response	Reactions	
		Gas	Fluorescence
<i>Enterobacter aerogenes</i> ATCC® 13048	good growth	positive	negative
<i>Staphylococcus aureus</i> ATCC® 25923	inhibited	----	----
<i>Escherichia coli</i> ATCC® 25922	good growth	positive	positive
<i>Proteus mirabilis</i> ATCC® 12453	good growth	negative	negative

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

**Test Procedure**

Refer to appropriate references for specific procedures using Lauryl Sulfate Broth w/ MUG.<sup>3,4,6</sup>

**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.

**Limitations of the Procedure**

1. Due to varying nutritional requirements, some strains may grow poorly or fail to grow on this medium.
2. 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**

<b>Lauryl Sulfate Broth w/ MUG</b>	<b>Code No.</b>	<b>7300A</b>	<b>500 g</b>
		<b>7300B</b>	<b>2 kg</b>
		<b>7300C</b>	<b>10 kg</b>

**References**

1. **Marshall, R. T. (ed.).** 1993. Standard methods for the examination of dairy products, 16<sup>th</sup> 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, 19<sup>th</sup> 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, 3<sup>rd</sup> ed. American Public Health Association, Washington, D.C.
4. **U.S. and Drug Administration.** 1995. Bacteriological analytical manual, 8<sup>th</sup> 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, 16<sup>th</sup> ed. AOAC International, Gaithersburg, MD.

**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.