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* in a laboratory setting. Lauryl Sulfate Broth W/ MUG is not intended for use in the diagnosis of disease or other conditions in humans.

**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. 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**

<table>
<thead>
<tr>
<th>Component</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enzymatic Digest of Casein</td>
<td>20 g</td>
</tr>
<tr>
<td>Lactose</td>
<td>5 g</td>
</tr>
<tr>
<td>Monopotassium Phosphate</td>
<td>2.75 g</td>
</tr>
<tr>
<td>Disodium Phosphate</td>
<td>2.75 g</td>
</tr>
<tr>
<td>Sodium Chloride</td>
<td>5 g</td>
</tr>
<tr>
<td>Sodium Lauryl Sulfate</td>
<td>0.1 g</td>
</tr>
<tr>
<td>4-Methylumbelliferyl-β-D-glucuronide</td>
<td>0.05 g</td>
</tr>
<tr>
<td><strong>Final pH:</strong></td>
<td>6.8 ± 0.2</td>
</tr>
</tbody>
</table>

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 Only.
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.

<table>
<thead>
<tr>
<th>Microorganism</th>
<th>Approx. Inoculum (CFU)</th>
<th>Expected Results</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Enterobacter aerogenes ATCC® 13048</strong></td>
<td>10 - 300</td>
<td>Growth + *</td>
</tr>
<tr>
<td><strong>Staphylococcus aureus ATCC® 25923</strong></td>
<td>10 - 300</td>
<td>Inhibited N/A</td>
</tr>
<tr>
<td><strong>Escherichia coli ATCC® 25922</strong></td>
<td>10 - 300</td>
<td>Growth +</td>
</tr>
<tr>
<td><strong>Salmonella typhimurium ATCC® 14028</strong></td>
<td>10 - 300</td>
<td>Growth --</td>
</tr>
</tbody>
</table>

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

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.