

Lauryl Tryptose Broth • Lauryl Sulfate Broth

Intended Use

Lauryl Tryptose Broth and Lauryl Sulfate Broth, which are also known as Lauryl Sulfate Tryptose (LST) Broth, are used for the detection of coliform organisms in materials of sanitary importance.

Summary and Explanation

Mallmann and Darby developed this medium for the detection of coliform organisms by American Public Health Association (APHA) procedures.¹ They incorporated sodium lauryl sulfate into the formulation since it proved to be selective but not inhibitory for coliforms.

This medium is used for the detection of coliforms in foods² and dairy products.³ It is now the medium of choice for use in the presumptive phase of the Standard Total Coliform Multiple-Tube (MPN) Test for the microbiological examination of water.⁴ It is also listed in the *Official Methods of Analysis of AOAC International*.⁵

Principles of the Procedure

Peptone provides essential growth substances, such as nitrogen and carbon compounds, sulfur and trace ingredients. The

potassium phosphates provide buffering capacity. Sodium chloride maintains osmotic equilibrium.

Lactose provides a source of fermentable carbohydrate for coliform organisms. The fermentation of lactose with gas formation is a presumptive test for coliforms. Sodium lauryl sulfate inhibits organisms other than coliforms.

Formulae

Difco™ Lauryl Tryptose Broth

Approximate Formula* Per Liter

Tryptose	20.0	g
Lactose	5.0	g
Dipotassium Phosphate	2.75	g
Monopotassium Phosphate	2.75	g
Sodium Chloride	5.0	g
Sodium Lauryl Sulfate	0.1	g

BBL™ Lauryl Sulfate Broth

Approximate Formula* Per Liter

Pancreatic Digest of Casein	20.0	g
Lactose	5.0	g
Dipotassium Phosphate	2.75	g
Monopotassium Phosphate	2.75	g
Sodium Chloride	5.0	g
Sodium Lauryl Sulfate	0.1	g

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

User Quality Control

NOTE: Differences in the Identity Specifications and Cultural Response testing for media offered as both **Difco™** and **BBL™** brands may reflect differences in the development and testing of media for industrial and clinical applications, per the referenced publications.

Identity Specifications

Difco™ Lauryl Tryptose Broth

Dehydrated Appearance:	Light beige, free-flowing, homogeneous.
Solution:	3.56% solution, soluble in purified water upon warming. Solution is light to medium amber, clear to very slightly opalescent.
Prepared Appearance:	Light to medium amber, clear to very slightly opalescent.
Reaction of 3.56% Solution at 25°C:	pH 6.8 ± 0.2

Cultural Response

Difco™ Lauryl Tryptose Broth

Prepare the medium per label directions. Inoculate and incubate at 35 ± 2°C for 24 ± 2 hours or longer, if necessary.

ORGANISM	ATCC™	INOCULUM CFU	RECOVERY	GAS
<i>Enterobacter aerogenes</i>	13048	30-300	Good	+*
<i>Escherichia coli</i>	25922	30-300	Good	+
<i>Salmonella choleraesuis</i> subsp. <i>choleraesuis</i> serotype Typhimurium	14028	30-300	Good	-
<i>Staphylococcus aureus</i>	25923	3 × 10 ² -10 ³	Marked to complete inhibition	-

*Gas production positive within 48 ± 3 hours.

Identity Specifications

BBL™ Lauryl Sulfate Broth

Dehydrated Appearance:	Fine, homogeneous, free of extraneous material.
Solution:	3.56% solution, soluble in purified water. Solution is pale to light, tan to yellow, clear to slightly hazy.
Prepared Appearance:	Pale to light, tan to yellow, clear to slightly hazy.
Reaction of 3.56% Solution at 25°C:	pH 6.8 ± 0.2

Cultural Response

BBL™ Lauryl Sulfate Broth

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

ORGANISM	ATCC™	INOCULUM CFU	RECOVERY	GAS
<i>Enterobacter aerogenes</i>	13048	10 ³ -10 ⁴	Good	+
<i>Enterococcus faecalis</i>	29212	10 ⁴ -10 ⁵	Partial to complete inhibition	-
<i>Escherichia coli</i>	25922	10 ³ -10 ⁴	Good	+
<i>Proteus mirabilis</i>	12453	10 ³ -10 ⁴	Good	-

Directions for Preparation from Dehydrated Product

Difco™ Lauryl Tryptose Broth

1. Suspend 35.6 g of the powder in 1 L of purified water. Mix thoroughly.
2. Warm slightly to completely dissolve the powder.
3. Dispense required amounts into tubes containing inverted fermentation vials (see table).
4. Autoclave at 121°C for 15 minutes. Cool the broth as quickly as possible.
5. Test samples of the finished product for performance using stable, typical control cultures.

BBL™ Lauryl Sulfate Broth

1. Suspend 35.6 g of the powder in 1 L of purified water.
2. Dispense in test tubes, containing inverted Durham tubes, in 10 mL amounts for testing samples of 1 mL or less. For testing 10 mL quantities of samples, dissolve 71.2 g of the powder in 1 L of purified water and distribute in 10 mL amounts. The concentration of the medium should be varied according to the size of the test samples (see table).
3. Autoclave at 121°C for 15 minutes. After autoclaving, cool the broth as quickly as possible.
4. Test samples of the finished product for performance using stable, typical control cultures.

Preparation of Lauryl Tryptose (Sulfate) Broth⁴

INOCULUM mL	AMOUNT OF MEDIUM IN THE TUBE mL	VOLUME OF MEDIUM+INOCULUM mL	DEHYDRATED MEDIUM REQUIRED g/L
1	10 or more	11 or more	35.6
10	10	20	71.2
10	20	30	53.4
20	10	30	106.8
100	50	150	106.8
100	35	135	137.1
100	20	120	213.6

NOTE: Refrigerated broth generally becomes cloudy or forms precipitates but clears upon warming to room temperature.

However, clarity is not important because only gas production is significant.

Procedure

Refer to the official test procedures for the detection of coliforms in the compendia of methods for microbiological examination of foods, dairy products and waters.²⁻⁵

Expected Results

After incubation of the tubes with loosened caps at 35 ± 0.5°C for 24 hours, examine for turbidity and for gas production in the Durham fermentation tubes. If no gas has formed and been trapped in the inverted tube, reincubate and reexamine after 48 hours.²⁻⁵

Turbidity of the medium accompanied by formation of gas in any amount in the Durham tubes within 48 hours is a positive presumptive test for the presence of coliforms in the sample.²⁻⁵ The result should be confirmed by additional standard testing.

References

1. Mallmann and Darby. 1941. *Am. J. Public Health* 31:127.
2. Downes and Ito. 2001. *Compendium of methods for the microbiological examination of foods*. 4th ed. American Public Health Association, Washington, D.C.
3. Marshall (ed.). 1993. *Standard methods for the examination of dairy products*, 16th ed. American Public Health Association, Washington, D.C.
4. Clesceri, Greenberg and Eaton (ed.). 1998. *Standard methods for the examination of water and wastewater*, 20th ed. American Public Health Association, Washington, D.C.
5. Horwitz (ed.). 2000. *Official methods of analysis of AOAC International*. 17th ed. AOAC International. Gaithersburg, Md.

Availability

Difco™ Lauryl Tryptose Broth

	AOAC	BAM	CCAM	COMPF	EPA	ISO	SMD	SMWW	USDA
Cat. No. 224140									
224150									
224120									
224130									

BBL™ Lauryl Sulfate Broth

	AOAC	BAM	CCAM	COMPF	EPA	ISO	SMD	SMWW	USDA
Cat. No. 211338									
211339									
294369									

Lauryl Tryptose Broth with MUG Lauryl Sulfate Broth with MUG

Intended Use

Lauryl Tryptose Broth with MUG and Lauryl Sulfate Broth with MUG, which are also known as Lauryl Sulfate Tryptose Broth with MUG (LST-MUG), are used for the detection of *Escherichia coli* in water, food and dairy samples by a fluorogenic procedure.

Summary and Explanation

E. coli is used as an indicator organism of unsanitary conditions. A number of selective media are recommended for use in enrichment, presumptive identification and confirmatory procedures for demonstrating the presence of coliforms in

material of sanitary importance. These procedures require the incubation of test media for up to 7 days.

The presence of the fluorogenic compound, MUG (4-methylumbelliferyl-β-D-glucuronide), in this medium permits the rapid detection of *E. coli* when the medium is observed for fluorescence using a long-wave UV light source, and further confirmation is not required.^{1,2} MUG detects anaerogenic strains which may not be detected in the conventional procedure.¹

Feng and Hartman, using a MUG-containing medium in microtitration plates, reported β-glucuronidase activity in 96% of *E. coli*, 100% of enterotoxigenic *E. coli*, 17% of *Salmonella*

