# **Endo Agar**

# **Intended Use**

Endo Agar is a differential and slightly selective culture medium for the detection of coliform and other enteric micro-organisms.

# **Summary and Explanation**

The majority of the enteric plating media developed in the early years of the 20<sup>th</sup> century utilized either mixtures of bile salts or individual salts as selective agents to achieve inhibition of gram-positive species. In 1904, Endo reported the development of a culture medium for the differentiation of lactose fermenters from the nonfermenters in which no bile salts were used.<sup>1</sup> Inhibition of gram-positive microorganisms was achieved by the sodium sulfite and basic fuchsin contained in the formulation. Endo's Fuchsin Sulphite Infusion Agar was the original name for this medium,<sup>2</sup> which is known today as Endo Agar. It was developed initially in order to facilitate the isolation and identification of the typhoid bacillus.

The original formula has been modified extensively since its introduction. The meat infusions have been replaced by a peptic digest of animal tissue. The dye composition and concentration also have been adjusted.

Over the years, Endo Agar has been an important medium in the microbiological examination of potable water and wastewater, dairy products and foods; however, the current compendia of standard methods for the examination of these materials recommend alternative media formulations.<sup>3-5</sup>

# **Principles of the Procedure**

The selectivity of Endo Agar is due to the sodium sulfite/basic fuchsin combination, which results in the suppression of gram-positive microorganisms. It is classified as only slightly selective since other media contain more potent inhibitors of the gram-positive microorganisms. Coliforms ferment the lactose, produce pink to rose-red colonies and similar coloration of the medium. The colonies of organisms that do not ferment lactose are colorless to faint against the pink background of the medium.

# Formula

# BBL<sup>™</sup> Endo Agar

Approxir	mate	Form	ula*	Per	Liter

Dipotassium Phosphate	3.5	g
Peptic Digest of Animal Tissue	10.0	g
Agar	15.0	g
Lactose	10.0	g
Sodium Sulfite	2.5	g
Basic Fuchsin	0.5	g
*Adjusted and/or supplemented as required to meet performance criteria.		

# **User Quality Control**

<i>Identity Specifica</i> BBL <sup>™</sup> Endo Agar	tions
Dehydrated Appearance:	Fine, homogeneous powder that may contain a large amount of minute to small dark particles.
Solution:	4.15% solution, soluble in purified water upon boiling. Solution is light to medium, pink rose to tan rose trace orange, moderately hazy to hazy. May contain a moderate amount of small dark red particles and a large amount of minute dark red particles.
Prepared Appearance:	Light to medium, pink rose to tan rose trace orange, moderately hazy to hazy. May contain a moderate amount of small dark red particles and a large amount of minute dark red particles.
Reaction of 4.15% Solution at 25°C:	рН 7.5 ± 0.2

#### *Cultural Response* BBL<sup>™</sup> Endo Agar

Prepare the medium per label directions. Inoculate and incubate at  $35 \pm 2^{\circ}$ C for 48 hours.

ORGANISM	ATCC™	INOCULUM CFU	RECOVERY	COLONY COLOR
Enterococcus faecalis	29212	10 <sup>4</sup> -10 <sup>5</sup>	Poor to fair	Pink to rose-red
Escherichia coli	25922	10 <sup>3</sup> -10 <sup>4</sup>	Good	Rose-red, green metallic sheen
Klebsiella pneumoniae	33495	10 <sup>3</sup> -10 <sup>4</sup>	Good	Pink to rose- red mucoid
<i>Salmonella enterica</i> subsp. <i>enterica</i> serotype Typhimurium	14028	10 <sup>3</sup> -10 <sup>4</sup>	Good	Colorless to pale pink

# Directions for Preparation from Dehydrated Product

- 1. Suspend 41.5 g of the powder in 1 L of purified water. Mix thoroughly.
- 2. Heat with frequent agitation and boil for 1 minute to completely dissolve the powder.
- 3. Autoclave at 121°C for 15 minutes.
- 4. Cool to 45-50°C. Resuspend precipitate by gentle mixing before use. Endo Agar should be prepared as needed.
- 5. Test samples of the finished product for performance using stable, typical control cultures.

# **Procedure**

Use standard procedures to obtain isolated colonies from specimens. A nonselective medium should also be streaked to increase the chance of recovery when the population of gramnegative organisms is low and to provide an indication of other organisms present in the specimen. Incubate plates, protected from light, at  $35 \pm 2^{\circ}$ C for 18-24 hours. If negative after 24 hours, reincubate an additional 24 hours.



# **Expected Results**

Typical colonial morphology on Endo Agar is as follows:

Escherichia coli.....Pink to rose-red, green metallic sheen

Enterobacter/Klebsiella....Large, mucoid, pink

Proteus .....Colorless to pale pink

Salmonella .....Colorless to pale pink

Shigella.....Colorless to pale pink

Pseudomonas.....Irregular, colorless

Gram-positive bacteria .... No growth to slight growth

## References

- Endo. 1904. Zentralbl. Bakteriol., Abt. 1, Orig. 35:109.
  Levin and Schoenlein. 1930. A compilation of culture media for the cultivation of microorganisms. Williams & Wilkins, Baltimore, Md.
  Eaton, Rice and Baird (ed). 2005. Standard methods for the examination of water and wastewater, 21st ed., online. American Public Health Association, Washington, D.C.
  Wehr and Frank (ed). 2004. Standard methods for the examination of dairy products. 17th ed. American Public Health Association, Washington, D.C.
  Doume and Iso (ad). 2001. Compared up of perturbed for the microbiological examination of fords.
- Downes and Ito (ed.). 2001. Compendium of methods for the microbiological examination of foods, 4th ed. American Public Health Association, Washington, D.C.

# **Availability**

### BBL<sup>™</sup> Endo Agar

CCAM

Cat. No. 211199 Dehydrated - 500 g

United States and Canada

Cat. No.	221167	Prepared Plates – Pkg. of 20*
	221265	Prepared Plates – Ctn. of 100*

Europe

Cat. No. 254016 Prepared Plates - Pkg. of 20\*

254074 Prepared Plates - Ctn. of 120\*

\*Store at 2-8°C.

