Moeller Decarboxylase Broth Base

M393

(Decarboxylase Broth Base,Moeller)

Moeller Decarboxylase Broth Base with the addition of appropriate L-amino acid is used to differentiate bacteria on the basis of their ability to decarboxylate the amino acids.

Composition**

Ingredients	Gms / Litre
Peptic digest of animal tissue	5.000
Beef extract	5.000
Dextrose	0.500
Bromocresol purple	0.010
Cresol red	0.005
Pyridoxal	0.005
Final pH (at 25°C)	6.0±0.2

**Formula adjusted, standardized to suit performance parameters

Directions

Suspend 10.52 grams in 1000 ml distilled water. Add 10 gm. of L-Lysine, L-Arginine, L-Ornithine or other L-amino acids. When using DL-amino acids, use 2% concentration. Heat if necessary to dissolve the medium completely. When L-Ornithine is added, readjustment of the pH is required. Dispense in 5 ml amount in screw-capped tubes and sterilize by autoclaving at 15 lbs pressure (121°C) for 10 minutes.

Principle And Interpretation

Moeller Decarboxylase Broth Base is used for differentiating gram-negative enteric bacilli on the basis of their ability to decarboxylate amino acids. Moeller introduced the Decarboxylase Broth for detecting the production of lysine and ornithine decarboxylase and arginine dihydrolase (1). Prior to Moellers work, bacterial amino acid decarboxylases were studied by Gale (2) and Gale and Epps (3). Production of ornithine decarboxylase is a helpful criterion in differentiating *Klebsiella* and *Enterobacter* species. *Klebsiella* are nonmotile and do not produce ornithine decarboxylase while *Enterobacter* are motile and produce ornithine decarboxylase except *Enterobacter agglomerans* (4).

This medium contains beef extract and peptic digest of animal tissue, which provide nitrogenous nutrients for the growth of bacteria. Dextrose is the fermentable carbohydrate and pyridoxal is the co-factor for the decarboxylase enzyme. Bromo cresol purple and cresol red are the pH indicators in this medium. When the medium is inoculated with the dextrose fermenting bacteria, the pH is lowered due to acid production, which changes the colour of the indicator from purple to yellow. Acid produced stimulates decarboxylase enzyme. Decarboxylation of lysine yields cadaverine while putrescine is produced due to ornithine decarboxylation. Arginine is first hydrolyzed to ornithine which is then decarboxylated to form putrescine. Formation of these amines increases the pH of the medium, changing the colour of the indicator from yellow to purple. If the organisms do not produce the appropriate enzyme, the medium remains acidic, yellow in colour. Each isolate to be tested should also be inoculated into Moeller Decarboxylase Broth Base medium tube lacking the amino acid.

Inoculated tubes must be protected from air with a layer of sterile mineral oil. Exposure to air may cause alkalinization at the surface of the medium which makes the test invalid.

Quality Control

Appearance

Light yellow to greenish yellow homogeneous free flowing powder

Colour and Clarity of prepared medium

Purple coloured, clear solution without any precipitate in tubes

Reaction

Reaction of 1.05% w/v aqueous solution at 25°C. pH : 6.0±0.2

pH
5.80-6.20

Cultural Response
Cultural characteristics observed after an incubation at 35-37°C for upto 4 days with addition of appropriate amino acids and overlaying with sterile mineral oil.

Cultural Response

Organism	Inoculum (CFU)	Arginine decarboxylation	Ornithine decarboxylation	Lysine decarboxylation
Cultural Response				
Citrobacter freundii ATCC 8090	50-100	variable reaction	variable reaction	negative reaction, yellow colour
Enterobacter aerogenes ATCC 13048	50-100	negative reaction, yellow colour	positive reaction, purple colour	positive reaction, purple colour
Escherichia coli ATCC 25922	50-100	variable reaction	variable reaction	positive reaction, purple colour
Klebsiella pneumoniae ATCC 13883	50-100	negative reaction, yellow colour	negative reaction, yellow colour	positive reaction, purple colour
Proteus mirabilis ATCC 25933	50-100	negative reaction, yellow colour	positive reaction, purple colour	negative reaction, yellow colour
Proteus vulgaris ATCC 13315	50-100	negative reaction, yellow colour	negative reaction, yellow colour	negative reaction, yellow colour
Salmonella Paratyphi A ATCC 9150	50-100	delayed positive reaction/ positive reaction,purple colour	positive reaction, purple colour	negative reaction, yellow colour
Salmonella Typhi ATCC 6539	50-100	delayed positive reaction / negative reaction	negative reaction, yellow colour	positive reaction, purple colour
Serratia marcescens ATCC 8100	50-100	negative reaction, yellow colour	positive reaction, purple colour	positive reaction, purple colour
Shigella dysenteriae ATCC 13313	50-100	negative reaction/ delayed positive reaction	negative reaction, yellow colour	negative reaction, yellow colour
Shigella flexneri ATCC 12022	50-100	negative reaction/ delayed positive reaction	negative reaction, yellow colour	negative reaction, yellow colour
Shigella sonnei ATCC 25931	50-100	variable reaction	positive reaction, purple colour	negative reaction, yellow colour

Storage and Shelf Life
Store below 30°C in tightly closed container and the prepared medium at 2 - 8°C. Use before expiry date on the label.

Reference
1. Moeller V., 1955, Acta Pathol. Microbiol. Scand. 36:158.

2. Gale G. F., 1940, Biochem. J., 34:392.
3. Gale and Epps, 1943, Nature, 152:327.
4. MacFaddin J., 1980, Biochemical Tests for Identification of Medical Bacteria, 2nd ed., Williams and Wilkins, Baltimore.

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