Decarboxylase Agar Base

M501

Decarboxylase Agar Base is used to differentiate bacteria on the basis of their ability to decarboxylate the amino acid added to the medium.

Composition**

Ingredients	Gms / Litre
Peptic digest of animal tissue	5.000
Yeast extract	3.000
Dextrose	1.000
Bromocresol purple	0.020
Agar	15.000
Final pH (at 25°C)	6.5±0.2

**Formula adjusted, standardized to suit performance parameters

Directions

Suspend 24.02 grams in 1000 ml distilled water. Heat to boiling to dissolve the medium completely. Add 5 grams of desired L-Amino acid (L-Lysine, L-Arginine, L-Ornithine) in hydrochloride form per litre of the medium. Sterilize by autoclaving at 15 lbs pressure (121°C) for 15 minutes. Dispense into sterile test tubes and cool in a slanted position. When L-Ornithine hydrochloride is used, readjustment of pH is necessary.

Principle And Interpretation

Decarboxylase Agar Base is formulated as described by Moeller (1) to differentiate bacteria on the basis of their ability to decarboxylate the amino acids. The medium is useful for the identification of the *Enterobacteriaceae* and other gram-negative bacilli (2, 3). Production of ornithine decarboxylase is especially useful for differentiating *Enterobacter* and *Klebsiella* species as the former produces this enzyme and are motile while latter are nonmotile and do not synthesize this enzyme.

Peptic digest of animal tissue and yeast extract supply nitrogenous nutrients for the bacterial growth. Dextrose is the fermentable carbohydrate. Bromo cresol purple is the pH indicator which changes colour from purple to yellow in acidic condition. Decarboxylase activity is stimulated by acidic pH and hence the amino acids are decarboxylated or degraded to form corresponding amine. Production of these amines increases the pH of the medium changing the colour of the indicator and in turn the medium from yellow to purple violet.

Each isolate must be inoculated into a tube of the basal medium without amino acid. If this tube becomes alkaline then the test is invalid. Exposure of the medium to air may cause alkalinization so the inoculated tubes if covered with a layer of sterile mineral oil will give best results (4).

Quality Control

Appearance
Light yellow to greenish yellow homogeneous free flowing powder

Gelling
Firm, comparable with 1.5% Agar gel

Colour and Clarity of prepared medium
Purple coloured, clear gel forms in tubes as slants

Reaction
Reaction of 2.4% w/v aqueous solution at 25°C. pH : 6.5±0.2

pH
6.30-6.70

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
Pseudomonas aeruginosa ATCC 27853	50-100	positive reaction, purple colour	negative reaction, yellow 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, 1955, Acta. Pathol. Microbiol. Scand., 36:158.
2. MacFaddin J., 1985, Media for Isolation-Cultivation-Identification-Maintenance of Medical Bacteria, Vol. 1, Williams and Wilkins, Baltimore.

3. Kelly, Brenner and Farmer, 1985, In Manual of Clinical Microbiology, Lennette, Balows, Hausler and Shadomy (Eds.), 4th ed., ASM, Washington, D.C.
4. MacFaddin J., 1980, Biochemical Tests for Identification of Medical Bacteria, 2nd ed., Williams and Wilkins, Baltimore.

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