Decarboxylase Test Medium Base (Falkow) M912

Decarboxylase Test Medium Base (Falkow) is used for testing decarboxylase activity.

Composition**

Ingredients	Gms / Litre
Peptic digest of animal tissue	5.000
Yeast extract	3.000
Dextrose	1.000
Bromocresol purple	0.020
Final pH (at 25°C)	6.8±0.2

**Formula adjusted, standardized to suit performance parameters

Directions

Suspend 9 grams in 1000 ml distilled water. Heat, if necessary to dissolve the medium completely. Divide into four equal parts. One part is tubed without addition of any amino acid. To the remaining three parts, add separately 3 amino acids, L-lysine hydrochloride, L-arginine hydrochloride and L-ornithine hydrochloride to a final concentration of 0.5%. Dispense in

3-4 ml quantities in screw capped tubes and sterilize by autoclaving at 15 lbs pressure (121°C) for 15 minutes. To avoid false alkalinization at the surface of medium it is recommended to add liquid paraffin to a height of about 5mm before sterilization.

Principle And Interpretation

Decarboxylase Test Medium Base is used for differentiating bacteria on their ability to decarboxylate the amino acids. First practical application of amino acid decarboxylase test was reported by Moeller for distinguishing various microorganisms (1). Moellers work was based on the experiments done by Gale (2) and Gale and Epps (3) on bacterial amino acid decarboxylases. Moeller observed that production of lysine, arginine, ornithine decarboxylase by various members of Enterobacteriaceae offered an important parameter to other biochemical tests for differentiating bacteria within closely related groups. Further, to differentiate *Salmonella* serotype Arizonae from *Citrobacter* , Calquist (4) developed a medium utilizing the lysine decarboxylase reaction. Later on Falkow (5) was the one who emphasized and developed the lysine decarboxylase medium for differentiating *Salmonellae* and *Shigellae* by the valid and reliable results.

Dextrose is fermented by the enteric bacteria resulting in acidic pH. Bacteria which produce lysine or ornithine or arginine decarboxylase will produce alkaline products and increase the pH. The resulting reaction after 24-96 hours will indicate an alkaline reaction seen as purple colour for decarboxylase producing bacteria and an acid pH (yellow) by the bacteria not producing decarboxylase. Inoculated tubes must be protected from air (by overlaying the medium with sterile mineral oil) to avoid false alkalinization at the surface of the medium. Control tubes of basal media should be inoculated.

Biochemical testing should be attempted on pure culture isolation only and subsequent to differential determinations. The decarboxylase reactions can be considered indicative of a given genus or species but conclusive and final identification of these organisms cannot be made solely on the basis of the decarboxylase reactions.

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 0.9% w/v aqueous solution at 25°C. pH : 6.8±0.2

Cultural Response

M912: 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.

Organism	Inoculum (CFU)	Arginine decarboxylation	Ornithine decarboxylation	Lysine decarboxylation		

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		

Reference

1. Moeller, 1954, Acta Path. Micro. Scand., 34:102.
2. Gale, 1940, Biochem. J., 34:392, 583, 846.
3. Gale and Epps, 1943, Nature, 152:327.
4. Calquist, 1956, J. Bact., 71:339.
5. Falkow, 1958, Am. J. Clin. Path., 29:598.

Storage and Shelf Life

Store below 30°C and the prepared medium at 2-8°C. Use before expiry date on the label.