

## Technical Information

### Moeller Decarboxylase MiVeg Broth Base

#### Product Code : VM1393

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

#### Composition

| Ingredients         | Gms / Litre |
|---------------------|-------------|
| MiVeg peptone       | 5.00        |
| MiVeg extract       | 5.00        |
| Dextrose            | 0.50        |
| Bromo cresol purple | 0.01        |
| Cresol red          | 0.005       |
| Pyridoxal           | 0.005       |
| Final pH ( at 25°C) | 6.0±0.2     |

\*\* Formula adjusted, standardized to suit performance parameters.

#### Principle & Interpretation

Moeller Decarboxylase MiVeg Broth Base is prepared by using Miveg peptones and Miveg extract in place of animal based peptones and Beef extract respectively which makes it free from BSE/TSE risk. This medium is used for differentiating gram-negative enteric bacilli on the basis of their ability to decarboxylate amino acids. The Decarboxylase Broth was introduced by Moeller for detecting the production of lysine and ornithine decarboxylase and arginine dihydrolase (1). Prior to Moeller's work, bacterial amino acid decarboxylases were studied by Gale (2) and Gale and Epps (3). The Production of ornithine decarboxylase helps in differentiating *Klebsiella* and *Enterobacter* species. *Klebsiella* are non-motile and do not produce ornithine decarboxylase while *Enterobacter* are motile and produce ornithine decarboxylase except *Enterobacter agglomerans* (4).

This medium contains nutritious ingredient which supplies 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 serve as the pH indicators in the medium. The pH is lowered due to acid production by dextrose fermenting bacteria which changes the colour of the indicator from purple to yellow. Production of acid 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 the basal medium tube lacking the amino acid.

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

#### Methodology

Suspend 10.52 grams of powder media in 1000 ml distilled water. Add 10 gm. of L-Lysine, L-Arginine, L-Ornithine or other L-amino acids. Mix thoroughly. Heat if necessary to dissolve the medium completely. Dispense in 5 ml amount in screw-capped tubes and sterilize by autoclaving at 15 lbs pressure (121°C) for 10 minutes.

**Note:-** When using DL-amino acids, use 2% concentration. . When L-Ornithine is added, readjustment of the pH is required.

#### Quality Control

## Physical Appearance

Greenish yellow coloured, homogeneous, free flowing powder.

## Colour and Clarity of prepared medium

Purple coloured, clear solution without any precipitate.

## Reaction

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

## pH range

5.8-6.2

## Cultural Response/Characteristics

Cultural characteristics observed after after inoculating tubes, overlaying with sterile mineral oil and incubating at 35 - 37°C for upto 4 days.

| Organisms (ATCC)                        | Lysine | Arginine | Ornithine |
|---|--------|----------|-----------|
| <i>Citrobacter freundii</i> (8090)      | -      | ±        | ±         |
| <i>Enterobacter aerogenes</i> (13048)   | +      | -        | +         |
| <i>Escherichia coli</i> (25922)         | ±      | ±        | ±         |
| <i>Klebsiella pneumoniae</i> (13883)    | +      | -        | -         |
| <i>Proteus vulgaris</i> (13315)         | -      | -        | -         |
| <i>Proteus mirabilis</i> (25933)        | -      | -        | +         |
| <i>Pseudomonas aeruginosa</i> (9027)    | -      | +        | -         |
| <i>Salmonella</i> serotype Paratyphi A  | -      | (+) or + | +         |
| <i>Salmonella</i> serotype Typhi (6539) | +      | (+) or - | -         |
| <i>Shigella flexneri</i> (12022)        | -      | - or (+) | -         |
| <i>Shigella sonnei</i> (25931)          | -      | ±        | +         |
| <i>Shigella dysenteriae</i> (13313)     | -      | - or (+) | -         |
| <i>Serratia marcescens</i> (8100)       | +      | -        | +         |

Key : + = positive reaction, purple colour

— = negative reaction, yellow or no colour change

± = variable

(+) = delayed positive reaction

## Storage and Shelf Life

**Dried Media:** Store below 30°C in tightly closed container and use before expiry date as mentioned on the label.

**Prepared Media:** 2-8° in sealable plastic bags for 2-5 days.



VM1393 Moeller Decarboxylase MiVeg Broth (Supplemented with Arginine Hydrochloride)

- |                                  |                                     |
|----------------------------------|-------------------------------------|
| 1. Control                       | 6. <i>Proteus vulgaris</i>          |
| 2. <i>Citrobacter freundii</i>   | 7. <i>Pseudomonas aeruginosa</i>    |
| 3. <i>Enterobacter aerogenes</i> | 8. <i>Salmonella</i> serotype Typhi |
| 4. <i>Escherichia coli</i>       | 9. <i>Shigella flexneri</i>         |
| 5. <i>Klebsiella pneumoniae</i>  |                                     |

## Further Reading

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., 2000, Biochemical Tests for Identification of Medical Bacteria, 3<sup>rd</sup> ed., Williams and Wilkins, Baltimore.

## Disclaimer :

- User must ensure suitability of the product(s) in their application prior to use.
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