

Technical Information

Nutrient MiVeg Agar w/ Manganese

Product Code : VM1931

Application:- Nutrient MiVeg Agar with Manganese is recommended for promoting sporulation of aerobic sporeformers particularly *Bacillus* species and to primarily differentiate mesophilic from thermophilic *Bacillus* species.

Composition

Ingredients	Gms / Litre
MiVeg extract	3.0
MiVeg peptone No. 2	5.0
Manganese sulphate	0.03
Agar	15.0
Final pH (at 25°C)	6.8±0.2

** Formula adjusted, standardized to suit performance parameters.

Principle & Interpretation

Nutrient MiVeg Agar with Manganese is prepared by using MiVeg peptone No.2 and MiVeg extract, which serve as the MiVeg substitutes for Pancreatic digest of gelatin and Beef extract respectively which makes the medium free from BSE/TSE risks. This medium can be used in place of animal based Nutrient Agar w/Manganese, conventionally abbreviated as NAMn which favours culture and sporulation of aerobic *Bacillus* species especially from canned foods.

It contains MiVeg extract and MiVeg peptone No.2 which supplies necessary nutrients for growth of *Bacillus* species. Manganese is known to influence and enhance sporulation in the *Bacillus* species (1,2,3,4). It has been reported that organisms recovered from spoilage of foods such as fruit drinks, tomatoes, acidified onions and other canned foods sporulate well aerobically on Nutrient Agar with added manganese (5).

Thermophilic bacteria such as *Bacillus stearothermophilus* are capable of growth at 55 - 65°C while an incubation period of 30 to 35°C is favourable for culture and sporulation of mesophilic spore formers (5). This property is exploited to grow and therefore differentiate mesophilic and thermophilic spoilage bacteria. As recommended by APHA, in routine diagnosis for spoilage in canned foods, microbiological cultural procedures involves the use of primary recovery media and subculture media to identify spoilage bacteria and study their growth characteristics. Recovery medias for aerobes generally include DTA (Dextrose Tryptone Agar, DM1092) or DTB (Dextrose Tryptone Broth, DM1122). Use of Cooked meat medium (DM1149) is recommended for recovery of anaerobic organisms. NAMn is widely used as subculture media for aerobes.

This medium is like the conventional medium supports growth and enhances spore production by aerobic sporeformers and therefore serves the same purpose as NAMn. When rod shaped aerobes in pure culture are isolated on MiVeg DTA (or DTB) medias (VM1092/ VM1122) and sporulation is not evident, the isolates should be subcultured on this agar medium, at the temperature of initial isolation. If spore production has taken place, after incubation of 10 days then the spores are heat shocked to destroy all vegetative cells and cultured again on MiVeg NAMn at both 30 to 35°C and 55°C. The temperature at which outgrowth occurs from the spore state indicates whether the isolate is an obligate mesophile (growth at 30 to 35°C), an obligate thermophile (growth at 55°C) or a facultative thermophile (growth at 30° to 35°C and at 55°C).

Methodology

Suspend 23.03 grams of powder media in 1000 ml distilled water. Mix thoroughly. Heat to boiling to dissolve the medium completely. Sterilize by autoclaving at 15 lbs pressure (121°C) for 15 minutes.

Quality Control

Physical Appearance

Yellow coloured, may have slightly greenish tinge, homogeneous, free flowing powder.

Gelling

Firm, comparable with 1.5% Agar gel.

Colour and Clarity of prepared medium

Light amber coloured, clear to slightly opalescent gel forms in petri plates.

Reaction

Reaction of 2.3 % w/v aqueous solution pH: 6.8 ± 0.2 at 25°C

pH range

6.6-7.0

Cultural Response/Characteristics

Cultural characteristics observed after an incubation at 35-37°C for up to 5 days.

Organisms (ATCC)	Inoculum (CFU)	Growth	Recovery
* <i>Bacillus stearothermophilus</i> (7953)	10 ² -10 ³	luxuriant	>70%
<i>Bacillus coagulans</i> (8038)	10 ² -10 ³	luxuriant**	>70%
<i>Bacillus licheniformis</i> (9945a)	10 ² -10 ³	luxuriant**	>70%
<i>Bacillus megaterium</i> (9855)	10 ² -10 ³	luxuriant**	>70%
<i>Bacillus polymyxa</i> (8526)	10 ² -10 ³	luxuriant**	>70%
<i>Bacillus subtilis</i> (6633)	10 ² -10 ³	luxuriant**	>70%

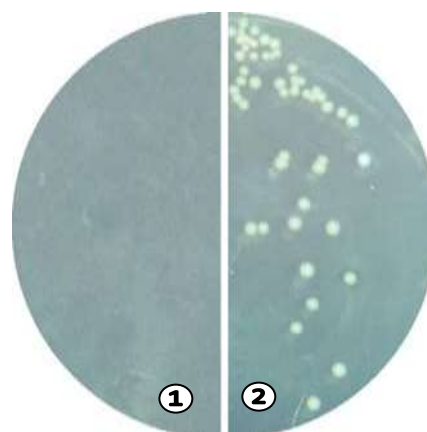
Key : * = Incubation at 55°C upto 7 days

** = with sporulation

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.



VM1931 Nutrient MiVeg Agar w/ Manganese
(Against dark background)

1. Control

2. *Bacillus subtilis*

Further Reading

- Charney, J., Fisher, W.P. and Hegarty, C.P. 1951. Manganese as an essential element for sporulation in the genus *Bacillus*. J Bacteriol. 62:145.
- Curran, H.R. and Evans, F.R. 1954. The influence of iron or manganese upon the formation of spores by mesophilic aerobes in fluid organic media. J. Bacteriol. 67:489.



Dehydrated Culture Media
Bases / Media Supplements

3. Maunder, D.T. 1970. "Examination of canned foods for microbial spoilage." Microbiology, Metal Div. R. and D, Continental Can Co., Inc., Oak Brook, Ill.
4. Penna, T.C., Machoshvili, I.A., Taqueda, M.E and Ferraz, C.A. 1998. PDA J. Pharm. Sci. Technol., 52 (5):198.
5. Downes FP and Ito K (Eds.), 2001, Compendium of methods for the microbiological examination of foods, 4th ed., APHA, Washington, D.C

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