MOF Medium (Marine Oxidation Fermentation Medium) M379

MOF Medium (Marine Oxidation Fermentation Medium) is used for the differentiation of marine bacteria on the basis of oxidative and fermentative metabolism of carbohydrate.

Composition**

Ingredients	Gms / Litre
Casein enzymic hydrolysate	1.000
Yeast extract	0.100
Tris hydroxymethyl aminomethane	0.500
Boric acid	0.011
Ammonium sulphate	0.500
Disodium phosphate	0.004
Ammonium nitrate	0.0008
Sodium chloride	9.700
Magnesium chloride	4.400
Sodium sulphate	1.600
Calcium chloride	0.900
Potassium chloride	0.275
Sodium bicarbonate	0.080
Potassium bromide	0.040
Strontium chloride	0.017
Sodium silicate	0.002
Sodium fluoride	0.0012
Phenol red	0.010
Agar	3.000
Final pH (at 25°C)	8.0±0.2

**Formula adjusted, standardized to suit performance parameters

Directions

Suspend 22.14 grams in 1000 ml distilled water. Heat to boiling to dissolve the medium completely. Sterilize by autoclaving at 15 lbs pressure (121°C) for 15 minutes. Cool to 55-60°C and aseptically add sterile dextrose solution (or other carbohydrate of choice) to a final concentration of 1%. Mix well and dispense into sterile test tubes.

Principle And Interpretation

Some organisms metabolize glucose oxidatively and others ferment glucose fermentatively when the hydrogen acceptor is not oxygen. Such organisms can be differentiated based on the Oxidation Fermentation Test. This test is also known as the “oxferm” test. MOF medium is a modified version of the formula originally developed by Leifson (1); used for differentiating oxidative and fermentative carbohydrate metabolizing marine bacteria. The marine environment of the oceans illustrates a different view of microbial populations in water. In the high salt concentration of ocean water, halophillic or salt- loving microorganisms survive. In addition, the organisms must be psychrophilic since it is very cold below the surface. Those at bottom must also withstand great pressure and are therefore barophilic or pressure loving (2).

Casein enzymic hydrolysate and yeast extract in the medium supply the necessary nitrogenous nutrients including amino acids, vitamins etc. The mineral content of this medium is equivalent to one-half that of seawater (1). It contains a variety of salts found in seawater, which not only makes the medium suitable for marine bacteria but also buffers the medium. Phenol red is the pH indicator in the medium.

For differentiating the fermentation and oxidation of carbohydrates, inoculate two tubes of medium containing carbohydrate with each culture to be tested. Cover one medium tube of each culture with sterile melted petrolatum to form a layer of about one inch in height.

Carbohydrate -fermenting marine bacteria change the colour of the medium in both the tubes (covered and uncovered) from red to yellow whereas carbohydrate-oxidizing marine bacteria change the colour of the medium from red to yellow only in the uncovered (open) tube. Marine bacteria that are neither oxidative nor fermentation do not exhibit any change in the covered medium and exhibit an alkaline (red to deep pink) reaction in the uncovered medium. Gas production is detected as splitting or displacement of agar or formation of small bubbles. Motile organisms form a diffuse zone of growth originating from the line of inoculation. Non-motile organisms grow along the line of inoculation.

Quality Control

Appearance
Light yellow to pinkish purple homogeneous free flowing powder

Gelling
Semisolid, comparable with 0.3% Agar gel.

Colour and Clarity of prepared medium
Pink coloured clear to slightly opalescent gel forms in tubes as butts

Reaction
Reaction of 2.2% w/v aqueous solution at 25°C. pH : 8.0±0.2

pH
7.80-8.20

Cultural Response
M379: Cultural characteristics observed after an incubation at 35-37°C for 18-24 hours.

Organism	Inoculum (CFU)	Growth	Motility	Acid	Gas
Vibrio cholerae ATCC 15748	50-100	luxuriant	positive, growth away from stabline causing turbidity	positive reaction, yellow colour	positive reaction
Vibrio parahaemolyticus ATCC 17802	50-100	luxuriant	negative, growth along the stabline, surrounding medium remains clear	negative reaction	negative reaction

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. Leifson E., 1963, J. Bacteriol., 85:1183.
2. Alcamo E. I., 2001, Fundamentals of Microbiology, 6th Ed., Jones and Bartlett Publishers.

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