



Malonate Broth, Ewing Modified

M779

Intended Use:

Recommended for differentiating members of *Enterobacteriaceae* on the basis of malonate utilization.

Composition**

Ingredients	g / L
Yeast extract	1.000
Ammonium sulphate	2.000
Dipotassium hydrogen phosphate	0.600
Potassium dihydrogen phosphate	0.400
Sodium chloride	2.000
Sodium malonate	3.000
Dextrose (Glucose)	0.250
Bromothymol blue	0.025
Final pH (at 25°C)	6.7±0.2

**Formula adjusted, standardized to suit performance parameters

Directions

Dissolve 9.28 grams in 1000 ml purified/distilled water. Heat if necessary to dissolve the medium completely. Dispense and sterilize by autoclaving at 15 lbs pressure (121°C) for 15 minutes. Avoid the addition of carbon and nitrogen from other sources.

Principle And Interpretation

Leifson developed a synthetic liquid medium, which differentiated *Aerobacter* (now *Enterobacter*) from *Escherichia* species based on their ability to utilize malonate (1) where *Enterobacter* utilizes malonate and *Escherichia* does not. Ewing et al further modified this medium by the incorporation of yeast extract and dextrose (2). The addition of yeast extract, a source of vitamins, and a relatively small amount of dextrose, a minimal carbon source, is included in Ewings modification to stimulate the growth of some organisms. The medium, therefore, will support the growth of organisms that cannot utilize malonate or ammonium salt. Any spontaneous alkalization produced by such organisms is buffered by the phosphate system and counteracted by the acid produced by the fermentation of the small amount of dextrose (3). An alkaline reaction (blue color) is produced in this medium by organisms capable of utilizing malonate and ammonium sulfate.

An organism that can simultaneously utilize sodium malonate as its carbon source and ammonium sulfate as its nitrogen source produces alkalinity due to the formation of sodium hydroxide (3). The alkali changes the color of the bromothymol blue indicator in the medium to light blue and finally to prussian blue. The color of the medium remains unchanged in the presence of an organism that cannot utilize these substances. Some malonate-negative strains produce a yellow color due to the fermentation of dextrose only, which results in increased acidity causing the pH indicator to change to yellow at a pH of 6.0. Also some malonate-positive organisms produce only a slight alkalinity that causes the results to be difficult to interpret. Therefore these tubes should be compared with an un-inoculated malonate tube (3).

Type of specimen

Isolated Microorganisms from clinical and non-clinical samples

Specimen Collection and Handling:

For clinical samples follow appropriate techniques for handling specimens as per established guidelines (4,5).

After use, contaminated materials must be sterilized by autoclaving before discarding.

Warning and Precautions :

In Vitro diagnostic use. For professional use only. Read the label before opening the container. Wear protective gloves/ protective clothing/eye protection/face protection. Follow good microbiological lab practices while handling specimens and culture. Standard precautions as per established guidelines should be followed while handling specimens. Safety guidelines may be referred in individual safety data sheets.

Limitations :

1. Further biochemical and serological tests must be carried out for further identification.

Performance and Evaluation

Performance of the medium is expected when used as per the direction on the label within the expiry period when stored at recommended temperature.

Quality Control

Appearance

Light yellow to light green homogeneous free flowing powder

Colour and Clarity of prepared medium

Bluish green coloured clear solution without any precipitate

Reaction

Reaction of 0.93% w/v aqueous solution at 25°C. pH : 6.7±0.2

pH

6.50-6.90

Cultural Response

Cultural characteristics observed after an incubation at 35-37°C for 18-48 hours

Organism	Growth	Malonate Utilization
# <i>Klebsiella aerogenes</i> ATCC 13048 (00175*)	luxuriant	Positive reaction, dark blue colour
<i>Escherichia coli</i> ATCC 25922 (00013*)	luxuriant	Negative reaction
<i>Klebsiella pneumoniae</i> ATCC 13883 (00097*)	luxuriant	Positive reaction, dark blue colour
<i>Salmonella</i> Arizonae ATCC 13314	luxuriant	Positive reaction, dark blue colour
<i>Salmonella</i> Typhimurium ATCC 14028 (00031*)	luxuriant	Negative reaction

Key : *Corresponding WDCM numbers.

(#) Formerly known as *Enterobacter aerogenes*

Storage and Shelf Life

Store between 10-30°C in a tightly closed container and the prepared medium at 15-30°C. Use before expiry date on the label. On opening, product should be properly stored dry, after tightly capping the bottle in order to prevent lump formation due to the hygroscopic nature of the product. Improper storage of the product may lead to lump formation. Store in dry ventilated area protected from extremes of temperature and sources of ignition. Seal the container tightly after use. Product performance is best if used within stated expiry period.

Disposal

User must ensure safe disposal by autoclaving and/or incineration of used or unusable preparations of this product. Follow established laboratory procedures in disposing of infectious materials and material that comes into contact with sample must be decontaminated and disposed of in accordance with current laboratory techniques (4,5).

Reference

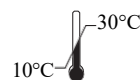
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4. Isenberg, H.D. Clinical Microbiology Procedures Handbook 2nd Edition
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