MacConkey Agar w/ Magnesium Sulphate

M1612

MacConkey Agar w/ Magnesium Sulphate is used for isolating and differentiating gram-negative bacilli while suppressing the swarming of most *Proteus* species.

Composition**

Ingredients	Gms / Litre
Pancreatic digest of gelatin	10.000
Yeast extract	10.000
Lactose	10.000
Oxgall	5.000
Magnesium sulphate	0.200
Neutral red	0.075
Agar	12.000
Final pH (at 25°C)	7.4±0.2

**Formula adjusted, standardized to suit performance parameters

Directions

Suspend 47.27 grams in 1000 ml distilled water. Heat to boiling with gentle swirling to dissolve the medium completely. Sterilize by autoclaving at 15 lbs pressure (121°C) for 15 minutes. Avoid overheating. Cool to 45 - 50°C and pour into sterile Petri plates.

Principle And Interpretation

MacConkey Agar is the earliest selective and differential medium for cultivation of enteric microorganisms from a variety of clinical specimens (1, 2). The original medium contains protein, bile salts, sodium chloride and two dyes. Selectivity of the medium is attributed to crystal violet and bile salts. MacConkey Agar contains lactose with neutral red to distinguish the lactose-fermenting coliforms from the lactose non-fermenting *Salmonella* and *Shigella* groups (3).

MacConkey Agar with Magnesium sulphate is a differential medium used for isolation and cultivation of gram-negative enteric organisms and gram-positive cocci from samples suspected of containing these organisms. This medium also limits the swarming of *Proteus* species due to the omission of sodium chloride (3).

Pancreatic digest of gelatin and yeast extract provide necessary nitrogen sources. Lactose is the fermentable carbohydrate. Oxgall serves to improve the selectivity of the medium. Gram-negative bacteria usually grow well on the medium and are differentiated by their ability to ferment lactose. Lactose fermenting strains grow as red or pink coloured colonies and may be surrounded by a zone of acid precipitated bile as found in the case of *Escherichia coli* . The red colour is due to production of acid from lactose, absorption of neutral red and a subsequent colour change of the neutral red dye when the pH of medium falls below 6.8. Lactose non-fermenting strains, such as *Shigella* and *Salmonella* appear as colourless and transparent colonies.

Quality Control

Appearance
Light yellow to pink homogeneous free flowing powder

Gelling
Firm, comparable with 1.2% agar gel.

Colour and Clarity of prepared medium
Red coloured clear to slightly opalescent gel forms in Petri plates

Reaction
Reaction of 4.72% w/v aqueous solution at 25°C. pH : 7.4±0.2

pH
7.20-7.60

Cultural Response

Cultural characteristics observed after an incubation at 35-37°C for 18-24 hours (upto 48 hours).

Cultural Response

Organism	Inoculum (CFU)	Growth	Recovery	Colour of Colony
Cultural Response				
Enterococcus faecalis ATCC 29212	50-100	good	40-50%	pink-red
Escherichia coli ATCC 25922	50-100	good-luxuriant	>=50%	pink - red with bile precipitate
Proteus mirabilis ATCC 12453	50-100	good-luxuriant	>=50%	Colourless, no swarming
Salmonella Typhimurium ATCC 14028	50-100	good-luxuriant	>=50%	colourless
Salmonella Typhi ATCC 6539	50-100	Good	40-50%	colourless
Shigella flexneri ATCC 12022	50-100	good-luxuriant	>=50%	colourless

Storage and Shelf Life

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

Reference

1. MacConkey A., 1900, The Lancet, ii.20.
2. MacConkey A., 1905, J. Hyg, 8:333
3. Collee J. G., Fraser A. G., Marmion B. P., Simmons A., (Eds.), Mackie and McCartney, Practical Medical Microbiology, 1996, 14th Edition, Churchill Livingstone

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