Technical Information

MacConkey Agar w/ CV, NaCl and 0.15% Bile salts

Product Code: DM 1081A

Application: MacConkey Agar w/ CV, NaCl and 0.15% Bile salts is recommended to identify *Enterobacteriaceae* in the presence of coliforms and lactose nonfermenters from water, sewage, food products etc.

Composition**

Ingredients	Gms / Litre
Peptic digest of animal tissue	20.000
Lactose	10.000
Sodium chloride	5.000
Bile salts	1.500
Neutral red	0.050
Crystal violet	0.001
Agar	15.000
Final pH (at 25°C)	7.2±0.2

**Formula adjusted, standardized to suit performance parameters

Principle & Interpretation

MacConkey Agar is one of the earliest selective and differential medium for cultivation of enteric microorganisms from variety of clinical specimens [1, 2]. Subsequently MacConkey Agar and Broth have been recommended for microbiological examination of foodstuffs [3] and for direct plating / inoculation of water samples for coliform counts [4]. These media are also accepted as the Standard Methods for the Examination of Milk and Dairy Products and pharmaceutical preparations [5, 6].

The selective action of this medium is due to crystal violet and bile salts, which are inhibitory to most species of gram-positive bacteria. 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 and may be surrounded by a zone of acid precipitated bile. The red colour is due to production of acid from lactose, absorption of neutral red and a subsequent colour change of the dye when the pH of medium falls below 6.8. Lactose non-fermenting strains, such as *Shigella* and *Salmonella* are colourless and transparent and typically do not alter appearance of the medium. *Yersinia enterocolitica* may appear as small, non-lactose fermenting colonies after incubation at room temperature.

Peptic digest of animal tissue serves as the main source of essential nutrients. Lactose serves as the carbon source by being the fermentable carbohydrate. Bile salts and crystal violet serves to make the medium selective by inhibiting accompanying gram-positive bacteria. Neutral red is the pH indicator dye while sodium chloride maintains the osmotic equilibrium of the medium.

Methodology

Suspend 51.55 grams of powder medium in 1000 ml distilled water. Shake well & heat to boiling with gentle swirling to dissolve the agar 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. The surface of the medium should be dry when inoculated.

Quality Control

Physical Appearance
Light yellow to pink homogeneous free flowing powder

Gelling
Firm comparable with 1.5% Agar gel.

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

Reaction
Reaction of 5.15% w/v aqueous solution at 25°C . pH : 7.2±0.2

pH range 7.00-7.40

Cultural Response/Characteristics

DM 1081A: Cultural characteristics observed after incubation at 30-35 °C for 18-72 hours. Recovery rate is considered as 100% for bacteria growth on Soyabean Casein Digest Agar.

Organism	Inoculum (CFU)	Growth	Observed value (CFU)	Recovery	Colour of colony
Escherichia coli ATCC 25922	50-100	luxuriant	25-100	>=50%	pink-red with bile precipitate
Escherichia coli NCTC 9002	50-100	luxuriant	25-100	>=50%	Pink to red with bile precipitate
Enterobacter aerogenes ATCC 13048	50-100	luxuriant	25-100	>=50%	Pink to red
Enterococcus faecalis ATCC29212	50-100	Fair to good	15-40	30-40%	Colourless to pink
Proteus vulgaris ATCC13315	50-100	Luxuriant	25-100	>=50%	Colourless
Salmonella Paratyphi A ATCC 9150	50-100	Luxuriant	25-100	>=50%	Colourless
Shigella flexneri ATCC12022	50-100	Fair to good	15-40	30-40%	Colourless
Salmonella Paratyphi B ATCC 8759	50-100	Luxuriant	25-100	>=50%	Colourless
Salmonella Enteritidis ATCC 13076	50-100	Luxuriant	25-100	>=50%	Colourless
Salmonella Typhi ATCC6539	50-100	Luxuriant	25-100	>=50%	Colourless
Staphylococcus aureus ATCC 25923	>=10^3	inhibited	0	0%	
Staphylococcus aureus ATCC 6538	>=10^3	inhibited	0	0%	
Salmonella Typhimurium ATCC 14028	50-100	Luxuriant	25-100	>=50%	Colourless
Staphylococcus epidermidis ATCC 12228	>=10^3	inhibited	0	0%	
Corynebacterium diphtheriae type gravis	>=10^3	inhibited	0	0%	

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: 2-8^0 in sealable plastic bags for 2-5 days.

Further Reading

1. MacConkey, 1900, The Lancet, ii:20.
2. MacConkey, 1905, J. Hyg., 5:333.
3. Downes F. P. and Ito K. (Ed.), 2001, Compendium of Methods for the Microbiological Examination of Foods, 4th ed., APHA, Washington, D.C.
4. Greenberg A. E., Clesceri L. S. and Eaton A. D., (Eds.), 2005, Standard Methods for the Examination of Water and Wastewater, 21st ed., APHA, Washington, D.C.
5. Wehr H. M. and Frank J. H., 2004, Standard Methods for the Microbiological Examination of Dairy Products, 17th Ed., APHA Inc., Washington, D.C.
6. The United States Pharmacopoeia XXI and the National Formulary, 16th ed., 1985, United States Pharmacopoeial Convention, Inc., Washington, D.C.

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