PRODUCT SPECIFICATION SHEET

MacConkey Agar W/ 0.15% Bile Salts, CV and NaCl (DM143)

Intended Use

MacConkey agars are slightly selective and differential plating media mainly used for the detection and isolation of gram-negative organisms from clinical, dairy, food, water, pharmaceutical and industrial sources. MacConkey Agar is used for isolating and differentiating lactose fermenting from lactose-non-fermenting gram-negative enteric bacilli. MacConkey Agar Base is used with added carbohydrate in differentiating coliforms based on fermentation reactions. MacConkey Agar without Crystal Violet is used for isolating and differentiating enteric microorganisms while permitting growth of staphylococci and enterococci. The medium can be used also to separate *Mycobacterium fortuitum* and *M. chelonae* from other rapidly growing mycobacteria. MacConkey Agar without Crystal Violet or Salt and MacConkey Agar without Salt are used for isolating and differentiating gram-negative bacilli while suppressing the swarming of most *Proteus* species.

Product Summary and Explanation

MacConkey Agar is based on the bile salt-neutral red-lactose agar of MacConkey. The original MacConkey medium was used to differentiate strains of *Salmonella typhosa* from members of the coliform group. Formula modifications improved the growth of *Shigella* and *Salmonella* strains. These modifications included the addition of 0.5% sodium chloride, decreased agar content, and altered bile salts and neutral red concentrations. The formula improvements gave improved differential reactions between these enteric pathogens and the coliform group. MacConkey Agar contains crystal violet and bile salts that inhibit gram-positive organisms and allow gram-negative organisms to grow. Isolated colonies of coliform bacteria are pink to red in color and may have a zone of precipitated bile. This bile precipitate is due to a local pH drop around the colony due to lactose fermentation. Colonies that do not ferment lactose remain colorless. When lactose non-fermenters grow in proximity to coliform colonies, the surrounding medium appears as cleared areas. It is recommended in the *USP* for use in the performance of Microbial Limit Tests.

MacConkey Agar Base is prepared without added carbohydrates, which permits their addition either individually or in combination.It is recommended that carbohydrates such as sucrose or lactose be added in a concentration of 1% to the basal medium. MacConkey Agar without Crystal Violet is a differential medium that is less selective than MacConkey Agar. The lack of crystal violet permits the growth of *Staphylococcus* and *Enterococcus*. Staphylococci produce pale pink to red colonies and enterococci produce compact tiny red colonies either on or beneath the surface of the medium. The medium is used also to separate *Mycobacterium fortuitum* and *M. chelonae* from other rapidly growing mycobacteria. MacConkey Agar without Crystal Violet or Salt and MacConkey Agar without Salt (which also lacks crystal violet) are differential media used for isolating and cultivating gram-negative enteric organisms and gram-positive cocci from waters, feces and other sources suspected of containing these organisms, as well as limiting the swarming of *Proteus* species.

Principles of the Procedure

Peptones are sources of nitrogen and other nutrients. Lactose is a fermentable carbohydrate. When lactose is fermented, a local pH drop around the colony causes a color change in the pH indicator (neutral red) and bile precipitation. Bile salts, bile salts no. 3, oxgall and crystal violet are selective agents that inhibit growth of gram-positive organisms. Agar is the solidifying agent.

Formula / Liter

Ingredients	Gms / Litre
Pancreatic digest of gelatin	17.00
Casein enzymic hydrolysate	1.50
Peptic digest of animal tissue	1.50
Lactose	10.00
Bile salts	1.50
Sodium chloride	5.00
Neutral red	0.03
Crystal violet	0.001

Agar	15.00
Final pH: 7.1 ± 0.2 at 25°C	
Formula may be adjusted and/or supplemented as required to meet performance specifications	

Precautions

1. For Laboratory Use only.
2. IRRITANT. Irritating to eyes, respiratory system, and skin.

Directions

1. Suspend 51.55 grams of the powder in 1 L of Distilled water. Mix thoroughly.
2. Heat with frequent agitation and boil for 1-2 minutes to completely dissolve the powder.
3. Autoclave at 121°C , 15 psi pressure, for 15 minutes.

Quality Control Specifications

Dehydrated Appearance	Light yellow to pink colored, homogeneous, free flowing powder
Prepared Medium	Red with purplish tinge, clear to slightly opalescent.
Reaction of 5.15% Solution	pH 7.1 ± 0.2 at 25°C
Gel Strength	Firm, compared to 1.5% Agar Gel.

Expected Cultural Response: Cultural response on MacConkey Agar at 35 - 37°C after 18 - 72 hours incubation. The recovery rate is considered as 100% for bacteria growth on Soyabean Casein Digest Agar

Sr. No.	Organisms	Results to be achieved				
		Inoculum (CFU)	Growth	Observed Lot value (CFU)	Recovery	Colour of colony
1.	*Escherichia coli ATCC 8739*	50-100	Luxuriant	25-100	>=50 %	Pink-red with Bile precipitate
2.	*Escherichia coli ATCC25922*	50-100	Luxuriant	25 -100	>=50 %	Pink-red with Bile precipitate
3.	*Escherichia coli NCTC 9002*	50-100	Luxuriant	25 -100	>=50 %	Pink-red with Bile precipitate
4.	*Enterobacter aerogenes ATCC 13048*	50-100	Luxuriant	25 -100	>=50 %	Pink to red
5.	*Enterococcus faecalis ATCC 29212*	50-100	Fair to good	15-40	30 -40 %	Colourless to Pale pink
6.	*Salmonella typhimurium ATCC 14028*	50-100	Luxuriant	25 -100	>=50 %	Colourless
7.	*Staphylococcus aureus ATCC 6538*	>=10^3	Inhibited	0	0%	--
8.	*Staphylococcus aureus ATCC 25923*	>=10^3	Inhibited	0	0%	--
9.	*Salmonella enteritidis ATCC 13076*	50-100	Luxuriant	25 -100	>=50 %	Colourless
10.	*Salmonella paratyphi A ATCC 9150*	50-100	Luxuriant	25 -100	>=50 %	Colourless
11.	*Salmonella paratyphi B ATCC 8759*	50-100	Luxuriant	25 -100	>=50 %	Colourless
12.	*Salmonella typhi ATCC 6539*	50-100	Luxuriant	25 -100	>=50 %	Colourless

13.	*Salmonella abony NCTC 6017*	50-100	Luxuriant	25 -100	>=50 %	Colourless
14.	*Proteus vulgaris ATCC 13315*	50-100	Luxuriant	25 -100	>=50 %	Colourless
15.	*Shigella flexneri ATCC 12022*	50-100	Fair to good	15-40	30-40%	Colourless
16.	*Staphylococcus epidermidis ATCC 12228*	>=10^3	Inhibited	0	0%	--
17.	*Corynebacterium diphtheriae type gravis*	>=10^3	Inhibited	0	0%	--

The organisms listed are the minimum that should be used for quality control testing.

Test Procedure

For procedures on the isolation and identification of enteric organisms consult the appropriate references.

Results

Lactose-fermenting organisms grow as pink to red colonies with or without a zone of precipitated bile. Lactose-non-fermenting organisms grow as colorless or clear colonies. Swarming by *Proteus* spp. is reduced on MacConkey agars without salt. On MacConkey Agar without Crystal Violet and MacConkey agars without salt, staphylococci produce pale pink to red colonies and enterococci produce tiny red colonies; these organisms are inhibited on MacConkey Agar. On MacConkey Agar without Crystal Violet, potentially pathogenic rapid growers of the *M. fortuitum* complex usually grow in 5-11 days, while the commonly saprophytic species are inhibited. On MacConkey agars without salt, the swarming of *Proteus* is reduced.

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Lactose fermenting colonies of *Escherichia coli* ATCC 25922 & Non-lactose fermenting colonies of *Salmonella typhi* ATCC 6539

Storage

Store the sealed bottle containing the dehydrated medium at 10 - 30°C. Once opened and recapped, place container in a low humidity environment at the same storage temperature. Protect from moisture and light.

Expiration

Refer to the expiration date stamped on the container. The dehydrated medium should be discarded if not free flowing, or if the appearance has changed from the original color. Expiry applies to medium in its intact container when stored as directed.

Limitations of the Procedure

1. Although MacConkey media are selective primarily for gram-negative enteric bacilli, biochemical and serological testing using pure cultures are recommended for complete identification. Appropriate references should be consulted for further information.

2. Incubation of MacConkey Agar plates under increased CO_2 has been reported to reduce the growth and recovery of a number of strains of gram-negative bacilli.

Packaging
Product Name : MacConkey Agar W/ 0.15% Bile Salts, CV and NaCl
Product Code : DM143
Available Pack sizes : 100gm / 500gm

References

1. Bopp, Brenner, Wells and Strockbine. 1999. *In* Murray, Baron, Pfaller, Tenover and Yolken (ed.), Manual of clinical microbiology, 7th ed. American Society for Microbiology, Washington, D.C.
2. Flowers, Andrews, Donnelly and Koenig. 1993. *In* Marshall (ed.), Standard methods for the examination of dairy products. 16th ed., American Public Health Association, Washington, D.C.
3. Downes and Ito (ed.). 2001. Compendium of methods for the microbiological examination of foods, 4th ed. American Public Health Association, Washington. D.C.
4. U.S. Food and Drug Administration. 1995. Bacteriological analytical manual, 8th ed. AOAC International, Gaithersburg, Md.
5. Clesceri, Greenberg and Eaton (ed.). 1998. Standard methods for the examination of water and wastewater, 20th ed. American Public Health Association, Washington, D.C.
6. United States Pharmacopeial Convention, Inc. 2001. The United States pharmacopeia 25/The national formulary 20 – 2002. United States Pharmacopeial Convention, Inc., Rockville, Md.
7. Horwitz (ed.). 2000. Official methods of analysis of AOAC International, 17th ed. AOAC International, Gaithersburg, Md.
8. MacConkey. 1905. J. Hyg. 5:333.
9. Kent and Kubica. 1985. Public health mycobacteriology: a guide for the level III laboratory. USDHHS, Centers for Disease Control, Atlanta, Ga.
10. Master. 1994. *In* Isenberg (ed.), Clinical microbiology procedures handbook, vol. 1, suppl. 1. American Society for Microbiology, Washington, D.C.
11. Mazura-Reetz, Neblett and Galperin. 1979. Abstr. C179, p. 339. Abstr. Annu. Meet. American Society for Microbiology 1979.

Further Information

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