70144 Mac Conkey Broth

A presumptive medium for the detection or/and determination of the titer of the coliform group in water milk and other material acc. Mac Conkey.

Composition:

Ingredients	Grams/Litre
Peptone	17.0
Lactose	10.0
Bile salts	1.5
Sodium chloride	0.03
Neutral red	0.001
Final pH 7.4 +/- 0.2 at 37°C	

Store prepared media below 8°C, protected from direct light. Store dehydrated powder, in a dry place, in tightly-sealed containers at 2-25°C.

Directions:
Add 40 g to 1 litre of distilled water. Mix well and distribute into containers fitted with Durham tubes. Sterilize by autoclaving at 121°C for 15 minutes.
Gas production from lactose fermentation is indicated by using inverted Durham tubes. Inoculate the tubes containing 10 ml of Mac Conkey Broth and the Durham tubes and incubate at 35°C for 24-48 hours. In case of gas formation the Durham tubes rise.

Principle and Interpretation:
Peptone provides nitrogen, carbon compounds, vitamins and amino acids. Lactose is the fermentable sugar. Lactose-positive bacteria metabolize lactose with gas formation. Gas generation within 48 hour or less is a presumptive evidence of the presence of coliform bacteria. If acid and gas is produced, it can be *E.coli* or other coliforms. The acid production is detected by the indicator Neutral red, which turns red. Bile salts promote the growth of several species of intestinal bacteria and inhibit gram-positive bacteria.

Cultural characteristics after 18-48 hours at 35-37°C .

Organisms (ATCC)	Growth	Color change to red (Acid)	Gas
Escherichia coli (25922)	+++	+	+
Enterobacter aerogenes (13048)	+++	+	+
Enterobacter cloacae (13047)	+++	+	+
Klebsiella pneumonia (13883)	+++	+	+
Proteus mirabilis (11060)	+++	-	-
Salmonella cholerasius (12011)	+	-	-
Staphylococcus aureus (25923)	-	-	-

References:

1. A. MacConkey, J. Hyg. 8, 333 (1905)
2. Recommendations of the Public Health Laboratory Service Water Subcommittee, J. Hyg. Camb. 51, 268 (1953)
3. European Pharmacopeia II, Chapter VIII, 10
4. A. MacConkey, Bile salt media and their advantages in some bacteriological examinations, J. Hyg., 8; 322 (1908)
5. J. MacFaddin, Media for Isolation-Cultivation-Identification-Maintainance of Medical Bacteria, Vol. I, Williams and Wilkins, Baltimore (1985)
6. Deutsches Arzneibuch DAB 10
7. A. MacConkey, Bile salt broth, Thompson Yates Lab. Rep., VI/1, 151 (1901)

63014 Mac Conkey MUG Agar

For the isolation of Salmonella, Shigella and coliform bacteria, in particular *E. coli*, from diverse material. Bile salts and crystal violet inhibit extensively the gram positive flora. The presence of lactose and neutral red indicates lactose-positive colonies from which *E. coli* can be identified by UV fluorescence.

Composition:

Ingredients	Grams/Litre
Casein peptone	17.0
Meat peptone	3.0
Sodium chloride	5.0
Lactose	10.0
Bile-salt mixture	1.5
Neutral red	0.03
Crystal violet	0.001
4-Methylumbelliferyl-β-D-glucuronide	0.1
Agar	13.5
Final pH 7.1 +/- 0.2 at 37°C	

Store prepared media below 8°C, protected from direct light. Store dehydrated powder, in a dry place, in tightly-sealed containers at 2-25°C.

Directions:
Dissolve 50.1 g in 1 litre distilled water. Autoclave at 121°C for 15 minutes. Mix well and pour plates. Inoculate the plates as usual after they are solidified.
Check the plates under UV light at about 360-370 nm. Slightly blue fluorescence indicates the presence of *E. coli*. For confirmation the indole test can be made with Kovac's reagent (Fluka 60983). Cover a colony with 10-20 µl Kovac's reagent. A change of color to red after 2-10 seconds indicates indole formation.

Principle and Interpretation:
Mac Conkey MUG Agar is used for isolation of Salmonella, Shigella and coliform bacteria, in particular Escherichia coli, from various materials. Casein peptone and Meat peptone provide carbonaceous, nitrogenous and other essential growth nutrients. Most gram positive organisms are inhibited by crystal violet and bile salts. Sodium chloride maintains the osmotic equilibrium. Lactose together with the pH indicator Neutral red are used to detect lactose-positive colonies and E. coli can be seen among these due to fluorescence under UV light. Lactose-negative colonies are colourless. Lactose-positive colonies are red and often surrounded by a turbid zone due to the precipitation of bile acids. β-D-glucoronidase, which is produced by *E. coli,* cleaves 4-Methylumbelliferyl-β-D-glucuronide to 4-methylumbelliferone and glucuronide. The fluorogen 4-methylumbelliferone can be detected under a long wavelength UV lamp.

Cultural characteristics after 18-24 hours at 35°C .

Organisms (ATCC)	Growth	Color of colony	Color of medium	Fluorescence	Precipitate
Escherichia coli (25922)	+++	red	red	+	+
Enterobacter aerogenes (13048)	+++	red	red	-	-
Salmonella typhimurium (13311)	+++	colorless	yellowish		-
Salmonella dublin (15480)	+++	colorless	yellowish		-
Shigella sonnei (11060)	+++	colorless	yellowish		-
Proteus mirabilis (29906)	+++	colorless	yellowish		-
Staphylococcus aureus (25923)	-				
Enterococcus hirae (8043)	-				
Bacillus cereus (11778)	-				

References:

1. A. MacConkey, J. Hyg. 8, 333 (1905)
2. Recommendations of the Public Health Laboratory Service Water Subcommittee, J. Hyg. Camb. 51, 268 (1953)
3. European Pharmacopeia II, Chapter VIII, 10
4. A. MacConkey, Bile salt media and their advantages in some bacteriological examinations, J. Hyg., 8; 322 (1908)
5. J. MacFaddin, Media for Isolation-Cultivation-Identification-Maintainance of Medical Bacteria, Vol. l, Williams and Wilkins, Baltimore (1985)
6. Deutsches Arzneibuch DAB 10
7. A. MacConkey, Bile salt broth, Thompson Yates Lab. Rep., VI/1, 151 (1901)