MacConkey Agar
SM081

Intended Use:
Recommended for selective isolation and differentiation of coliform organisms and other enteric pathogens.

Composition**

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>Gms / Litre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gelatin peptone</td>
<td>17.000</td>
</tr>
<tr>
<td>Tryptone</td>
<td>1.500</td>
</tr>
<tr>
<td>Peptone</td>
<td>1.500</td>
</tr>
<tr>
<td>Lactose</td>
<td>10.000</td>
</tr>
<tr>
<td>Bile salts</td>
<td>1.500</td>
</tr>
<tr>
<td>Sodium chloride</td>
<td>5.000</td>
</tr>
<tr>
<td>Neutral red</td>
<td>0.030</td>
</tr>
<tr>
<td>Crystal violet</td>
<td>0.001</td>
</tr>
<tr>
<td>Agar</td>
<td>15.000</td>
</tr>
<tr>
<td>Final pH (at 25°C)</td>
<td>7.1±0.2</td>
</tr>
</tbody>
</table>

**Formula adjusted, standardized to suit performance parameters

Directions
MacConkey Agar w/ 0.15% Bile salts, CV and NaCl is a ready to use solid media in glass bottle. The medium is pre-sterilized, hence it does not need sterilization. Medium in the bottle can be melted either by using a pre-heated water bath or any other method. Slightly loosen the cap before melting. When complete melting of medium is observed dispense the medium in tubes as butts / slants or in plates as desired and allow to solidify. If on plate, either streak, inoculate or surface spread the test inoculum (50-100 CFU) aseptically.

Principle And Interpretation
MacConkey agars are slightly selective and differential plating media mainly used for the detection and isolation of gram-negative organisms from clinical (10), dairy (14), food (5,11), water (1), pharmaceutical (3,12) and industrial sources (15). It is also recommended for the selection and recovery of the Enterobacteriaceae and related enteric gram-negative bacilli. USP recommends this medium for use in the performance of Microbial Limit Tests (12).

These agar media are selective since the concentration of bile salts, which inhibit gram-positive microorganisms, is low in comparison with other enteric plating media. The medium M081, which corresponds with, that recommended by APHA can be used for the direct plating of water samples for coliform bacilli, for the examination of food samples for food poisoning organisms (11) and for the isolation of Salmonella and Shigella species in cheese (14). Other than that this medium is also used for count of coli-aerogenes bacteria in cattle and sheep faeces (9), the count of coli-aerogenes and non-lactose fermenters in poultry carcasses (9), bacterial counts on irradiated canned minced chicken (13) and the recognition of coli-aerogenes bacteria during investigations on the genus Aeromonas (4).

MacConkey Agar is the earliest selective and differential medium for cultivation of enteric microorganisms from a variety of clinical specimens (7,8). The original medium contains protein, bile salts, sodium chloride and two dyes. The selective action of this medium is attributed 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 colonies 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, transparent and typically do not alter appearance of the medium.

Peptone, Tryptone and gelatin peptone are sources of nitrogen, carbon, long chain amino acids and other nutrients. Lactose is a fermentable carbohydrate. Sodium chloride maintains the osmotic equilibrium. Bile salts and crystal violet are selective agents that inhibit growth of gram-positive organisms. Neutral red is the pH indicator dye.
Type of specimen
Clinical - faeces, urine and other pathological material, foodstuffs and dairy samples, water samples, pharmaceutical samples.

Specimen Collection and Handling
For clinical samples follow appropriate techniques for handling specimens as per established guidelines (6,10).
For food and dairy samples, follow appropriate techniques for sample collection and processing as per guidelines (5,11,14.).
For water samples, follow appropriate techniques for sample collection, processing as per guidelines and local standards. (1)
For pharmaceutical samples, follow appropriate techniques for sample collection, processing as per guidelines. (3,12) After use, contaminated materials must be sterilized by autoclaving before discarding.

Warning and Precautions
In Vitro diagnostic use. 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 clinical specimens. Safety guidelines may be referred in individual safety data sheets.

Limitations
1. Though the medium is recommended for selective isolation, further biochemical and serological testing must be carried out for further confirmation.
2. The surface of the medium should be dry when inoculated.

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
Sterile MacConkey Agar w/ 0.15% Bile salts, CV and NaCl in glass bottle.

Colour of medium
Red with purplish tinge coloured medium

Quantity of medium
100ml of medium in glass bottle.

pH
6.90-7.30

Sterility Test
Passes release criteria

Cultural Response
Cultural response was observed after an incubation at 30-35°C for 18-72 hours. Recovery rate is considered as 100% for bacteria growth on Soybean Casein Digest Agar.

<table>
<thead>
<tr>
<th>Organism</th>
<th>Inoculum (CFU)</th>
<th>Growth</th>
<th>Recovery</th>
<th>Colour of colony</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corynebacterium diphtheriae type gravis</td>
<td>50 -100</td>
<td>inhibited</td>
<td>0%</td>
<td>colourless</td>
</tr>
<tr>
<td>Shigella flexneri ATCC 12022 (00126*)</td>
<td>50 -100</td>
<td>fair to good</td>
<td>30 -40 %</td>
<td>colourless</td>
</tr>
<tr>
<td>Salmonella Paratyphi A ATCC 9150</td>
<td>50 -100</td>
<td>luxuriant</td>
<td>&gt;=50 %</td>
<td>colourless</td>
</tr>
<tr>
<td>Salmonella Abony NCTC 6017 (00029*)</td>
<td>50 -100</td>
<td>luxuriant</td>
<td>&gt;=50 %</td>
<td>colourless</td>
</tr>
<tr>
<td>Proteus vulgaris ATCC 13315</td>
<td>50 -100</td>
<td>luxuriant</td>
<td>&gt;=50 %</td>
<td>colourless</td>
</tr>
<tr>
<td>Salmonella Typhi ATCC 6539</td>
<td>50 -100</td>
<td>luxuriant</td>
<td>&gt;=50 %</td>
<td>colourless</td>
</tr>
</tbody>
</table>

Please refer disclaimer Overleaf.
**Technical Data**

*Staphylococcus epidermidis*  
ATCC 12228 (00036*)  

>=10⁴  
inhibited  
0%

*Escherichia coli* ATCC 8739  
(00012*)  

50 -100  
luxuriant  
>=50 %  
pink-red with bile precipitate

*Staphylococcus aureus subsp. aureus* ATCC 6538 (00032*)  

>=10⁴  
inhibited  
0%

*Salmonella Paratyphi B* ATCC 8759  

50 -100  
luxuriant  
>=50 %  
colourless

*Escherichia coli* ATCC 25922 (00013*)  

50 -100  
luxuriant  
>=50 %  
pink to red with bile precipitate

*Escherichia coli* NCTC 9002  

50 -100  
luxuriant  
>=50 %  
pink to red

# Klebsiella aerogenes  
ATCC 13048 (00175*)  

50 -100  
luxuriant  
>=50 %  
pink to red

*Salmonella Typhimurium* ATCC 14028 (00031*)  

50 -100  
luxuriant  
>=50 %  
colourless

*Enterococcus faecalis* ATCC 29212 (00087*)  

50 -100  
none - poor  
<=10 %  
colourless to pale pink

*Salmonella Enteritidis* ATCC 13076 (00030*)  

50 -100  
luxuriant  
>=50 %  
colourless

*Staphylococcus aureus subsp. aureus* ATCC 25923 (00034*)  

>=10⁴  
inhibited  
0%

**Storage and Shelf Life**

On receipt store between 15-25°C Use before expiry date on the label.  
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 clinical sample must be decontaminated and disposed of in accordance with current laboratory techniques (6,10).

**Reference**

12. The United States Pharmacopoeia, 2018, The United States Pharmacopeial Convention, Rockville, M.D.
In vitro diagnostic medical device

CE Marking

Storage temperature

15°C - 25°C

Do not use if package is damaged

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