MYP Agar
Antimicrobial Vial P

**Intended Use**
MYP Agar is used with Egg Yolk Enrichment 50% and Antimicrobial Vial P for enumerating *Bacillus cereus* from foods.

**Summary and Explanation**
Mossel et al. formulated Mannitol-Egg Yolk-Polymyxin (MYP) Agar to isolate and enumerate *Bacillus cereus* from foods. This medium differentiates *B. cereus* from other bacteria based on its resistance to polymyxin, lack of mannitol fermentation and presence of lecithinase.2,3 *B. cereus* is commonly found in nature, on vegetables and in some processed foods.4 Under favorable circumstances the microorganism grows to sufficient numbers and causes gastrointestinal illness.4 Outbreaks of foodborne illness have been associated with boiled and cooked rice, cooked meats and cooked vegetables.5

MYP Agar is a recommended medium for testing foods.4,6

**Principles of the Procedure**
MYP Agar contains beef extract and peptone as sources of carbon, nitrogen, vitamins and minerals. D-Mannitol is the carbohydrate source. Phenol red is the pH indicator. Agar is the solidifying agent. Egg Yolk Enrichment 50% provides lecithin. Antimicrobial Vial P is polymyxin B which inhibits the growth of most other bacteria.

Bacteria that ferment mannitol produce acid products and form colonies that are yellow. Bacteria that produce lecithinase hydrolyze the lecithin and a zone of white precipitate forms around the colonies. *B. cereus* is typically mannitol-negative (pink-red colonies) and lecithinase-positive (zone of precipitate around the colonies).

**Formulae**

**Difco™ MYP Agar**
Approximate Formula* Per Liter
- Beef Extract ................................................. 1.0 g
- Peptone ......................................................... 10.0 g
- D-Mannitol .................................................... 10.0 g
- Sodium Chloride ........................................... 10.0 g
- Phenol Red ..................................................... 10.0 g
- Agar ............................................................... 15.0 g

**Difco™ Antimicrobial Vial P**
Approximately 30,000 units polymyxin B per vial.

*Adjusted and/or supplemented as required to meet performance criteria.

**Directions for Preparation from Dehydrated Product**
**Difco™ MYP Agar**
1. Suspend 46 g of the powder in 900 mL of purified water. Mix thoroughly.
2. Heat with frequent agitation and boil for 1 minute to completely dissolve the powder.
3. Dispense 225 mL into 500 mL flasks.

**User Quality Control**

### Identity Specifications

**Difco™ MYP Agar**
- Dehydrated Appearance: Pink, free-flowing, homogeneous.
- Solution: 46 g soluble in 900 mL purified water upon boiling. Solution is red, slightly opalescent.
- Prepared Appearance: Red, very slightly to slightly opalescent without significant precipitate.
- Reaction of 46 g/900 mL at 25°C: pH 7.2 ± 0.1

**Difco™ Antimicrobial Vial P**
- Dehydrated Appearance: White cake or powder.

### Cultural Response

**Difco™ MYP Agar**
Prepare the medium per label directions. Supplement with Egg Yolk Enrichment 50% and Antimicrobial Vial P. Inoculate and incubate at 30 ± 2°C for 18-48 hours. Lecithinase reaction is read as a zone of precipitate. Colonies that ferment mannitol are yellow.

<table>
<thead>
<tr>
<th>ORGANISM</th>
<th>ATCC*</th>
<th>INOCULUM CFU</th>
<th>RECOVERY</th>
<th>MANNUITOL FERMENTATION</th>
<th>LECITHINASE REACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Bacillus cereus</em></td>
<td>13061</td>
<td>30-300</td>
<td>Good</td>
<td>–</td>
<td>+</td>
</tr>
<tr>
<td><em>Bacillus subtilis</em></td>
<td>6633</td>
<td>30-300</td>
<td>Good</td>
<td>+</td>
<td>–</td>
</tr>
<tr>
<td><em>Pseudomonas aeruginosa</em></td>
<td>27853</td>
<td>10⁴-2×10⁵</td>
<td>Inhibition</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

Uninoculated Plate

Bacillus subtilis ATCC™ 6633

Bacillus cereus ATCC™ 13061
4. Autoclave at 121°C for 15 minutes. Cool to 45-50°C.
5. Aseptically add 12.5 mL Egg Yolk Enrichment 50% and 4.1 mL Antimicrobic Vial P rehydrated with 5 mL sterile water (25,000 units of polymyxin B). Mix thoroughly.

**Difco™ Antimicrobic Vial P (Polymyxin B)**
1. To rehydrate, aseptically add 5 mL sterile purified water (to achieve the desired concentration for MYP Agar).
2. Rotate in an end-over-end motion to dissolve the contents completely.

**Procedure**
Consult appropriate references.4-6

**Expected Results**
Consult appropriate references.4-6

**References**

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**MacConkey Agars**

**MacConkey Agar • MacConkey Agar Base**
**MacConkey Agar without Crystal Violet**
**MacConkey Agar without Crystal Violet or Salt**
**MacConkey Agar without Salt**

**Intended Use**
MacConkey Agar conforms with the specifications of The United States Pharmacopeia (USP).

MacConkey agars are slightly selective and differential plating media mainly used for the detection and isolation of gram-negative organisms from clinical,1 dairy,2 food,3 water,4 pharmaceutical5 and industrial6 sources.

MacConkey Agar is used for isolating and differentiating lactose-fermenting from lactose-nonfermenting 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.

**Summary and Explanation**
MacConkey Agar is based on the bile salt-neutral red-lactose agar of MacConkey.5

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 brick red in color and may be surrounded by 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 (such as typhoid, paratyphoid and dysentery bacilli) remain colorless. When lactose nonfermenters 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.6