

## MacConkey Agar (NCM0017)

### Intended Use

MacConkey Agar is used for the isolation and differentiation of Gram-negative enteric bacilli in a laboratory setting. Conforms to Harmonized USP/EP/JP Requirements and FDA/BAM. MacConkey Agar is not intended for use in the diagnosis of disease or other conditions in humans.

### Description

A medium recommended by the Harmonized USP/EP/JP for isolation and identification of *Escherichia coli* from non-sterile products. Conforms to USP/EP/JP performance specification. Gelatin serves as source of carbon and nitrogen. Lactose is a fermentable carbohydrate and sodium chloride maintains the osmotic balance. Bile salts and crystal violet act as selective agents inhibiting many Gram-positive bacteria. *Escherichia coli* can ferment lactose to produce acid which results in a pH drop. This is indicated by neutral red resulting in pink colonies. Enough acid production will cause the precipitation of bile salts resulting in a bile precipitate or halo around lactose fermenting bacteria. Non-lactose fermenting bacteria such as *Salmonella spp.* grow but remain colorless with no bile precipitate. According to the Harmonized USP/EP/JP, MacConkey Broth is used as a selective enrichment broth, with subculture performed onto MacConkey Agar.

### Typical Formulation

Enzymatic Digest of Gelatin	17.0 g/L
Enzymatic Digest of Casein	1.5 g/L
Enzymatic Digest of Animal Tissue	1.5 g/L
Lactose	10.0 g/L
Bile Salts Mixture	1.5 g/L
Sodium Chloride	5.0 g/L
Neutral Red	0.03 g/L
Crystal Violet	0.001 g/L
Agar	13.5 g/L

Final pH: 7.1 ± 0.2 at 25°C

Formula may be adjusted and/or supplemented as required to meet performance specifications.

### Precaution

Refer to SDS

### Preparation

1. Suspend 50 g of the medium in one liter of purified water.
2. Heat with frequent agitation and boil for one minute to completely dissolve the medium.
3. Autoclave at 121°C for 15 minutes.
4. Cool to 45-50°C.

### Test Procedure

Refer to appropriate references using MacConkey Agar for the isolation and identification of enteric organisms.

### Quality Control Specifications

**Dehydrated Appearance:** Powder is homogeneous, free flowing, and light pink-beige.

**Prepared Appearance:** Prepared MacConkey Agar is medium to dark pink-purple and trace to slightly hazy.



# Technical Specification Sheet



**Expected Cultural Response:** Cultural response on MacConkey Agar tested at Harmonized USP/EP/JP specified temperatures and incubation times.

<u>MICROORGANISM</u>	<u>ATCC</u>	<u>APPROX. INOCULUM (CFU)</u>	<u>EXPECTED RESULTS</u>	
			<u>Recovery</u>	<u>Reaction</u>
<i>Enterococcus faecalis</i>	29212	>1000	Inhibited	---
<i>Escherichia coli</i>	25922	10-100	70-200%	Pink colonies w/ bile ppt.
<i>Escherichia coli</i>	8739	10-100	70-200%	Pink colonies w/ bile ppt.
<i>Proteus mirabilis</i>	29906	10-100	70-200%	Colorless colonies; partial inhibition of swarming
<i>Salmonella typhimurium</i>	14028	10-100	70-200%	Colorless colonies
<i>Staphylococcus aureus</i>	6538	>1000	Inhibited	---

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

## Results

Lactose-fermenting organisms grow as pink colonies with or without a zone of precipitated bile. Non-lactose fermenting organisms grow as colorless or clear colonies.

## Expiration

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

## Limitations of the Procedure

1. Some strains may be encountered that grow poorly or fail to grow on this medium.
2. Although MacConkey Agar is a selective medium primarily for Gram-negative enteric bacilli, biochemical and serological testing using pure cultures are recommended for complete identification.
3. Incubation of MacConkey Agar plates under increased CO<sub>2</sub> has been reported to reduce growth and recovery of a number of strains of Gram-negative bacilli.

## Storage

Store dehydrated culture media at 2-30°C away from direct sunlight. Once opened and recapped, place container in a low humidity environment at the same storage temperature. Protect from moisture and light by keeping container tightly closed.

## References

1. European Pharmacopoeia 10<sup>th</sup> Edition (2020)
2. United States Pharmacopeia National Formulary 2018: USP 41 NF 36
3. Japanese Pharmacopoeia 17<sup>th</sup> Edition (2017)
4. MacConkey, A. 1905. Lactose-fermenting bacteria in feces. J. Hyg. 5:333-379.
5. PI7102, Rev 5, March 2011
6. Murray, P. R., E. J. Baron, M. A. Pfaller, F. C. Tenover, and R. H. Tenover (eds.). Manual of clinical microbiology, 6th ed. American Society for Microbiology, Washington, D.C.
7. Marshall, R. T. (ed.). Standard methods for the examination of dairy products, 17th ed. American Public Health Association, Washington, D.C.
8. [www.fda.gov/Food/ScienceResearch/LaboratoryMethods/BacteriologicalAnalyticalManualBAM/default.htm](http://www.fda.gov/Food/ScienceResearch/LaboratoryMethods/BacteriologicalAnalyticalManualBAM/default.htm).
9. Vanderzant, C., and D. F. Splittstoesser (eds.). 2015. Compendium of methods for the microbiological examination of food, 4th ed. American Public Health Association, Washington, D.C.



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# Technical Specification Sheet



10. Eaton, A. D., L. S. Clesceri, and A. E. Greenberg (eds.). 2017. Standard methods for the examination of water and wastewater, 19th ed. American Public Health Association, Washington, D.C.
11. Association of Official Analytical Chemists. 2016. Official methods of analysis of AOAC International, 20th ed. AOAC International. Arlington, VA.
12. Mazura-Reetz, G. T. Neblett, and J. M. Galperin. 1979. MacConkey Agar: CO<sub>2</sub> vs. ambient incubation. Abst. Ann. Mtg. American Society for Microbiology. C179.

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