

m-FC AGAR (7397)

Intended Use

m-FC Agar is used with rosolic acid for the detection and enumeration of fecal coliforms by membrane filtration.

Product Summary and Explanation

Geldreich et al. formulated a medium to enumerate fecal coliforms (FC) using the membrane filter (m) technique without prior enrichment.¹ Fecal coliforms, i.e., those found in feces of warm-blooded animals, are differentiated from environmental coliforms by their ability to grow at $44.5 \pm 0.5^\circ\text{C}$.²

Many standard method membrane filtration procedures recommend m-FC media for testing water. The American Public Health Association (APHA) specified m-FC media and incubation at $44.5 \pm 0.5^\circ\text{C}$ in the fecal coliform procedure and other tests.^{2,3} The Association of Official Analytical Chemists (AOAC) specifies m-FC Agar for detecting total coliforms and fecal coliforms in foods.⁴ The US Environmental Protection Agency specified using m-FC media in fecal coliform methods for testing water by the direct MF method or the delayed-incubation MF methods.^{5,6}

Principles of the Procedure

Enzymatic Digest of Casein and Enzymatic Digest of Animal Tissue provide nitrogen, carbon, and minerals in m-FC Agar. Yeast Extract is a source of vitamins and trace elements. Sodium Chloride maintains the osmotic balance. Lactose serves as a carbohydrate source. Bile Salts inhibit growth of gram-positive bacteria. The differential indicator system combines Aniline Blue and Rosolic Acid which is added as a supplement. Agar is the solidifying agent.

Formula / Liter

Enzymatic Digest of Casein	9 g
Enzymatic Digest of Animal Tissue.....	2.5 g
Yeast Extract.....	6.5 g
Sodium Chloride	5 g
Lactose	12.5 g
Bile Salts	1.5 g
Aniline Blue	0.1 g
Agar	15 g

Final pH: 7.4 ± 0.2 at 25°C

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

Supplement

1% Rosolic Acid, 1 mL

Precaution

1. For Laboratory Use.

Directions

m-FC Agar

1. Suspend 5.2 g of the medium in 100 mL of purified water containing 1 mL of 1% rosolic acid in 0.2 N NaOH.
2. Heat with frequent agitation and boil for one minute to completely dissolve the medium.
3. Cool to $45 - 50^\circ\text{C}$ and pour plates.
4. DO NOT AUTOCLAVE.

Rosolic Acid

1. Dissolve 1 g in 100 mL of 0.2 N NaOH to prepare a 1% solution.

Quality Control Specifications

Dehydrated Appearance: Powder is homogeneous, free flowing, and beige.

Prepared Appearance: Prepared unsupplemented medium is cornflower blue and clear to slightly hazy. Appearances with Rosolic Acid is trace to slightly hazy to cranberry red.

Expected Cultural Response: Cultural response on m-FC Agar at 44.5°C after 22 - 24 hours incubation.

Microorganism	Response	Reactions w/ Rosolic Acid
<i>Enterobacter aerogenes</i> ATCC® 13048	growth	grey colonies, clear, translucent
<i>Escherichia coli</i> ATCC® 11775	growth	blue colonies, may have blue ppt.
<i>Escherichia coli</i> ATCC® 25922	growth	blue colonies, may have blue ppt.
<i>Klebsiella pneumoniae</i> ATCC® 13883	growth	grey to greyish-blue colonies
<i>Salmonella typhimurium</i> ATCC® 14028	growth	grey, clear, translucent
<i>Staphylococcus aureus</i> ATCC® 25923	inhibited	---

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

Test Procedure

1. Filter duplicate samples through separate membrane filters.
2. Transfer filters to surface of separate m-FC Agar plates.
3. Place each plate in a separate waterproof plastic bag. Submerge in waterbath set at 44.5 ± 0.5°C; incubate for 24 ± 2 hours.

Results

Colonies of fecal coliforms will be various shades of blue. Non-fecal coliforms are grey to cream-colored.

Storage

Store sealed bottle containing the dehydrated medium at 2 - 30°C. 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.

Expiration

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

Limitations of the Procedure

1. Due to varying nutritional requirements, some strains may be encountered that grow poorly or fail to grow on this medium.
2. A few non-fecal coliform colonies may be observed on m-FC Agar due to the selective action of the elevated temperature and the addition of rosolic acid. It may be useful to elevate the temperature to 45 ± 0.2°C to eliminate *Klebsiella* strains from the fecal coliform group.²

Packaging

m-FC Agar	Code No.	7397A	500 g
		7397B	2 kg
		7397C	10 kg

References

1. **Geldreich, E. E., H. F. Clark, C. B. Huff, and L. C. Best.** 1965. Fecal-coliform-organism medium for the membrane filter technique. *J. Am. Water Works Assoc.* **57**:208-214.
2. **Eaton, A. D., L. S. Clesceri, and A. E. Greenberg (eds.).** 1995. Standard methods for the examination of water and wastewater, 19th ed. American Public Health Association, Washington, D.C.
3. **Cowman, S., and R. Kelsey.** 1992. Bottled water, p. 1031-1036. *In* C. Vanderzant, and D. F. Splittstoesser (eds.). Compendium of methods for the microbiological examination of foods, 3rd ed. American Public Health Association, Washington, D.C.
4. **Andrews, W.** 1995. Microbial methods, p. 17.1-17-119. *In* Official methods of analysis of AOAC International, 16th ed. AOAC International. Arlington, VA.
5. **Bordner, R., and J. Winter (eds.).** 1978. Microbiological methods for monitoring the environment. EPA-600/8-78-017. Environmental Monitoring and Support Laboratory, Office of Research and Development, U. S. Environmental Protection Agency, Cincinnati, OH.
6. **Environmental Protection Agency.** 1992. Manual for the certification of laboratories analyzing drinking water. EPA-814B-92-002. Office of Ground Water and Technical Support Division, U. S. Environmental Protection Agency, Cincinnati, OH.

Technical Information

Contact Acumedia Manufacturers, Inc. for Technical Service or questions involving dehydrated culture media preparation or performance at (410)780-5120 or fax us at (410)780-5470.