MUG EC O157 Agar, Modified

M1429

MUG EC O157 Agar is recommended for direct isolation and differentiation of *Escherichia coli* O157:H7 from foodstuffs and clinical specimen.

Composition**

Ingredients	Gms / Litre
Peptic digest of animal tissue	20.000
Sodium chloride	5.000
Bile salts	1.120
Sorbitol	20.000
4-Methylumbelliferyl ß-D-Glucuronide (MUG)	0.050
Bromocresol purple	0.015
Agar	12.000
Final pH (at 25°C)	7.2±0.2

**Formula adjusted, standardized to suit performance parameters

Directions

Suspend 58.18 grams in 1000 ml distilled water. Heat to boiling to dissolve the medium completely. Sterilize by autoclaving at 15 lbs pressure (121°C) for 15 minutes. Mix well and pour into sterile Petri plates.

Principle And Interpretation

Escherichia coli is one of the common organisms involved in gram-negative sepsis and endotoxin-induced shock. Enterohemorrhagic *E. coli* (EHEC) produces bloody diarrhea in humans, probably secondary to toxin damage of vascular endothelial cells (1). Patients with hemorrhagic colitis typically present abdominal cramps and watery diarrhea followed by hemorrhagic discharges resembling lower gastrointestinal tract bleeding. The enterohaemorrhagic *E. coli* O157:H7 strains produce toxins, which can result in life-threatening extraintestinal complications in the form of the haemolytic uremic syndrome and thrombotic-thrombocytopenic purpura. Thus isolation and detection of *E. coli* O157:H7 strain is of public health significance.

Isolation of this serotype of *E. coli* is based on the fact that serotype O157:H7 is sorbitol negative.

MUG EC O157 Agar, Modified is recommended (2) for isolation and enumeration of enterohaemorrhagic *E. coli* (EHEC) from foodstuffs, water and clinical samples based on sorbitol utilization and formation of b-glucuronidase enzyme. Bile salts inhibit the growth of gram-positive microbes. Sorbitol provides carbon and energy source. Bromocresol purple is pH indicator. Microorganisms utilizing sorbitol exhibit yellow colonies whereas sorbitol-negative strains (such as *E. coli* O157:H7) grow as colourless colonies. MUG is cleaved by b-glucuronidase forming pathogens and can be detected by fluorescence under UV light. The plates are exposed to ammonia fumes to increase fluorescence as suggested by Freir and Hartman (3). All commensal *E. coli* produce b-glucuronidase and therefore cleave MUG and appear fluorescent when observed under long wave UV light (366 nm). *E. coli* O157:H7 is not capable of forming b-glucuronidase, thus when exposed to long-wave UV light, no fluorescence is observed.

Quality Control

Appearance
Cream to yellow homogeneous free flowing powder

Gelling
Firm, comparable with 1.2% Agar gel.

Colour and Clarity of prepared medium
Light purple coloured clear to slightly opalescent gel forms in Petri plates

Reaction
Reaction of 5.8% w/v aqueous solution at 25°C. pH : 7.2±0.2

pH
7.00-7.40

Cultural Response
M1429: Cultural characteristics observed after an incubation at 35-37°C for 16-24 hours.

Organism	Inoculum (CFU)	Growth	Recovery	Colour of colony	Sorbitol	Fluorescence (Under UV)*
Cultural Response						
Bacillus cereus ATCC 10876	50-100	none to poor	<=10%			
Bacillus subtilis ATCC 6633	>=10^3	inhibited	0%			
Escherichia coli O157:H7	50-100	luxuriant	>=50%	colourless	negative reaction	negative
Escherichia coli ATCC 25922	50-100	luxuriant	>=50%	yellow	positive reaction	positive
Enterococcus faecalis ATCC 29212	>=10^3	inhibited	0%			
Serratia marcescens ATCC 8100	50-100	luxuriant	>=50%	pink	positive reaction	negative

Key : * - Fluorescence can be visualized by addition of NaOH solution or exposure to ammonia fumes.

Storage and Shelf Life
Store below 30°C in tightly closed container and the prepared medium at 2 8°C. Use before expiry date on the label.

Reference
1. Riley L. W., Remis R. S., Helgerson S. D., et al., 1983, N. Engl. J.Med. 308: 681-685
2. Szabo R. A., Todd E. C., Jean A., 1986, J. Food Prot., 10:768-772.
3.Freir T.A. and Hartman P.A. (1987) Appl. Env. Microbiol. 53. 1246-1250

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