Technical Information

MUG EC O157 Agar

Product Code: DM 2373

Application: - MUG EC O157 Agar is used for isolation and differentiation of enterohaemorrhagic *Escherichia coli* O157:H7 from foodstuffs, water and clinical samples by a fluorogenic method.

Composition**

Ingredients	Gms / Litre
Casein peptone	20.000
Meat extract	2.000
Yeast extract	1.000
Sorbitol	10.000
Ferric ammonium citrate	0.500
Sodium chloride	5.000
Bromothymol blue	0.025
Sodium thiosulphate	2.000
Sodium deoxycholate	1.120
4-Methylumbelliferyl ß-D-Glucuronide (MUG)	0.100
Agar	13.000
Final pH (at 25°C)	7.4±0.2

**Formula adjusted, standardized to suit performance parameters

Principle & Interpretation

MUG EC O157 Agar is used (1) for isolation and enumeration of enterohaemorrhagic *Escherichia coli* (EHEC) from foodstuffs, water and clinical samples based on sorbitol utilization and formation of beta-glucuronidase enzyme. The enterohaemorrhagic *E. coli* O157:H7 strains produce toxins, which can result in life threatening extra intestinal complicationsin the form of the hemolytic uremic syndrome and thrombotic-thrombocytopenic purpura. Due to severe clinical implications, the isolation and detection of *E. coli* O157:H7 strains are of importance.

Sodium deoxycholate enhances the growth of gram-positive microbes. Sorbitol supplies carbon and energy source. Bromothymol blue is the pH indicator. Microorganisms utilizing sorbitol exhibit yellow colonies whereas sorbitol-negative strains (such as *E.coli* O157:H7) grow as greenish colonies. Hydrogen suphide production is detected as black-brown colony colouration due to presence of sodium thiosulphate and ferric ammonium citrate. Thus *Proteus mirabilis* having similar biochemical characteristics as that of *E. coli* O157:H7 can easily be differentiated. 4-Methylumbelliferyl b-D-glucuronide (MUG) is converted into 4-methylumbelliferone by beta-D-glucuronidase-forming pathogens. 4-methylumbelliferone fluoresces under UV light. All commensal *E. coli* produce beta-glucuronidase. *E. coli* O157:H7 is not capable of forming b-glucuronidas, thus when exposed under long-wave UV light, no fluorescence is observed. The plates were exposed to ammonia fumes to increase fluorescence as suggested by Freir and Hartman (2).

Methodology

Suspend 54.74 grams of dehydrated powder media in 1000 ml distilled water. Mix thoroughly & heat to boiling to dissolve the medium completely. Sterilize by autoclaving at 15 lbs pressure (121°C) for 15 minutes. Shake well before pour into sterile Petri plates.

Quality Control

Appearance
Cream to yellow homogeneous free flowing powder

Gelling
Firm, comparable with 1.3% Agar gel.

Colour and Clarity
Bluish green coloured clear to slightly opalescent gel forms in Petri plates

Reaction
Reaction of 5.47% w/v aqueous solution at 25°C. pH : 7.4±0.2

pH Range
7.20-7.60

Cultural Response
DM2373: Cultural characteristics observed after an incubation at 35-37°C for 18-24 hours.

Organism	Inoculum (CFU)	Growth	Recovery	Colour of colony	Fluorescence (under UV)*
Enterobacter aerogenes ATCC 13048	50-100	luxuriant	>=50%	yellow	negative
Escherichia coli O157:H7	50-100	luxuriant	>=50%	colourless	negative
Escherichia coli ATCC 25922	50-100	luxuriant	>=50%	yellow	positive
Enterococcus faecalis ATCC 19433	>=10^3	inhibited	0%	-	-
Proteus mirabilis ATCC 25933	50-100	luxuriant	>=50%	brown, may show black colouration(H_2S production)	negative
Salmonella Typhimurium ATCC 14028	50-100	luxuriant	>=50%	yellow w/black centre	negative

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

Storage and Shelf Life

Dried Media: Store below 30°C in tightly closed container and the prepared medium at 2 - 8°C. Use before expiry date on the label.
Prepared Media: 2-8° in sealable plastic bags for 2-5 days.

Further Reading

1. Szabo R. A., Todd E. C., Jean A., 1986, J. Food Prot., 10:768-772.
2. Freir T.A. and Hartman P.A. (1987) Appl. Env. Microbiol. 53. 1246-1250

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