Coliform PA Broth

M1051

Coliform PA Broth is recommended for determination of presence or absence of coliforms during detection of pollution in treated water from treatment plants or distribution systems.

Composition**

Ingredients	Gms / Litre
Casein enzymic hydrolysate	10.000
Pancreatic digest of gelatin	5.000
Beef extract	3.000
Lactose	7.500
Dipotassium phosphate	1.375
Monopotassium phosphate	1.375
Sodium chloride	2.500
Sodium lauryl sulphate	0.050
Bromocresol purple	0.0085
Final pH (at 25°C)	6.8±0.2

**Formula adjusted, standardized to suit performance parameters

Directions

Suspend 92.42 grams in 1000 ml distilled water to prepare triple strength medium. Dispense 50 ml amounts in 250 ml screw capped milk dilution bottles. Sterilize by autoclaving at 15 lbs pressure (121°C) for 12 minutes.

Principle And Interpretation

Bacteriological Examination of water samples to determine its suitability for drinking and other domestic purpose has traditionally been done by the most probable number (MPN) procedures or the membrane filter (MF) technique (6). Although these methods have been useful, disadvantages such as space and time requirements prompted the idea of simply testing for the presence or absence of indicator bacteria (3). The presence of enteric pathogens in drinking and recreational waters is of great concern to public health. Therefore, interest in presence absence methods for determining the microbiological quality of drinking water has increased. The presence of total coliforms, faecal coliforms or *Escherichia coli* is well recognized as an indication of unsafe or poor water quality for which corrective measures should be taken. Coliform Broth is recommended for the isolation and cultivation of coliform organisms from cream, yogurt and raw milk (1).

Coliform PA Broth is used for the determination of presence or absence of coliforms during detection of pollution in treated water from treatment plants or distribution systems. Weiss and Hunter (2) proposed a simple procedure for the bacteriological examination of treated water that should be free of pollution. Later Presence-Absence (P-A) test was developed by Clark as the simplified version of the test, which is based on the principle that coliforms and other bacterial indicators of pollution should not be found in 100ml sample of treated water (3). However the common connotation of “absence” can be misleading in the case of injured bacteria that are frequently present in treated drinking water systems and fail to produce a positive test on established media (4). P-A test has proved to be better than MF (Membrane filter) and FT (Multiple fermentation tube) methods (5). Coliform P-A broth is adaptable for screening of sample for the presence of alternative indicator organisms (6).

Beef extract, pancreatic digest of gelatin, and casein enzymic hydrolysate provides nitrogenous and carbonaceous compounds, vitamin B complex and trace ingredients. Lactose is the fermentable carbohydrate. Phosphates provide buffering capacity to the medium while sodium chloride maintains osmotic equilibrium. Bromocresol purple is the pH indicator. Coliforms that ferment lactose produce acid and gas, which is indicated by a change in colour. Sodium lauryl sulphate is inhibitory to many organisms other than coliforms. The P-A analysis of drinking water for total coliforms can entail 100 ml of sample added to 50 ml of triple strength Coliform P-A Broth (M1051) in 250 ml bottles. Bottles containing aliquots of the water sample to be tested are incubated and the results observed. A distinct yellow colour results from the fermentation of lactose and gas production can be detected as bubbles with gentle shaking.

Quality Control

Appearance
Cream to yellow homogeneous free flowing powder

Colour and Clarity of prepared medium
Purple coloured, clear solution without any precipitate

Reaction
Reaction of 9.24% w/v aqueous solution at 25°C. pH : 6.8±0.2

pH
6.60-7.00

Cultural Response
M1051: Cultural characteristics observed after an incubation at 35-37°C for 18-48 hours.

Organism	Inoculum (CFU)	Growth	Acid	Gas
Cultural Response				
Enterobacter aerogenes ATCC 13048	50-100	good - luxuriant	positive reaction, yellow colour	positive reaction
Escherichia coli ATCC 25922	50-100	good - luxuriant	positive reaction, yellow colour	positive reaction
Staphylococcus aureus ATCC 25923	>=10^3	inhibited		
Salmonella Typhimurium ATCC 14028	50-100	good - luxuriant	negative reaction,no colour change	negative reaction

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. Atlas R. M., 2004, Handbook of Microbiological Media, Lawrence C. Parks (Ed.), 3rd Edition, CRC Press.
2. Weiss and Hunter, 1939, J. Am. Water Works Assoc., 31:707.
3. Clark, 1969, Can. J. Microbiol., 5:771.
4. McFeters G. A., 1990, Drinking Water Microbiology, Springer-Verlag,New York, pg. 478-492.
5. Jacobs et al, 1986, Appl. Environ. Microbiol., 51:1007.
6. Eaton A. D., Clesceri L. S., Rice E. W. and Greenberg A. E., (Eds.), 2005, Standard Methods for the Examination of Water and Wastewater, 21st Ed., APHA, Washington, D.C.

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