Columbia Broth Base

M145

Columbia Broth Base is used as a general-purpose medium and also for the cultivation of fastidious organisms.

Composition**

Ingredients	Gms / Litre
Peptone, special	10.000
Biopeptone	10.000
Heart infusion powder	3.000
L-Cystine hydrochloride	0.100
Dextrose	2.500
Sodium chloride	5.000
Magnesium sulphate	0.100
Ferrous sulphate	0.020
Sodium carbonate	0.600
Tris (hydroxymethyl) aminomethane	0.830
Tris (hydroxymethyl) aminomethane HCl	2.860
Final pH (at 25°C)	7.5±0.2

**Formula adjusted, standardized to suit performance parameters

Directions

Suspend 35.01 grams in 1000 ml distilled water. Heat to boiling to dissolve the medium completely. If desired, SPS (Sodium polyanethol sulphonate) may be added in a final concentration of 0.01%. Dispense into tubes and sterilize by autoclaving at 15 lbs pressure (121°C) for 15 minutes.

Principle And Interpretation

Morello and Ellner in 1969 devised a liquid medium for the recovery of microorganisms from blood cultures (1). This medium was devised from Columbia Blood Agar Base previously formulated by Ellner et al (2). While studying they found that Columbia Broth was superior to a commonly used general-purpose broth for faster growth of *Staphylococcus aureus*, *Escherichia coli* , viridans Streptococci and *Enterococcus* groups. In the formulation the increased concentration of cystine is provided for improved recovery of both aerobic and anaerobic microorganisms from blood specimens. Columbia Broth Base supplemented with SPS (Sodium Polyanethol Sulphonate), a polyanionic anticoagulant inhibits complement and lysozyme activity, interferes with phagocytosis and inactivates aminoglycosides (3). The presence of CO2 is stimulatory for many organisms. It is an excellent blood culture medium (4). It differs from the agar base in that the cornstarch is omitted to reduce opalescence (1) and salts have been included.

Medium contains peptone special, biopeptone and heart infusion to support luxurious growth of the organisms. Dextrose is added as a carbon and energy source. The medium is buffered with tris buffer. The addition of salts was found to be beneficial for the recovery of organisms. Cystine is the reducing agent. Magnesium and iron are added to facilitate organism growth.

Tube media should be inoculated with 1 to 2 drops of the liquid specimen using a sterile pipette. Swab specimens may be inserted into the broth after inoculation of the plated media. Liquid media should be reduced by placing the tubes with caps loosened under anaerobic conditions for 18-24 hours prior to inoculation for anaerobic incubation. Alternatively, it can be reduced immediately before use by boiling with caps loosened and cooling to room temperature with tightened caps, before inoculation. Growth in tubes is indicated by presence of turbidity compared to an uninoculated control. If growth appears, cultures should be subcultured onto appropriate media. Addition of SPS is inhibitory to *Neisseria* species, and thus 1.2% gelatin addition may counteract the inhibitory effect.

Quality Control

Appearance

Cream to yellow homogeneous free flowing powder

Colour and Clarity of prepared medium
Light amber coloured, clear to slightly opalescent solution, may have a fine precipitate.

Reaction
Reaction of 3.5% w/v aqueous solution at 25°C. pH : 7.5±0.2

pH
7.30-7.70

Cultural Response
M145: Cultural characteristics observed after an incubation at 35-37°C for 18-48 hours

Organism	Inoculum (CFU)	Growth
Clostridium perfringens ATCC 12924	50-100	good-luxuriant
Neisseria meningitidis ATCC 13090	50-100	good-luxuriant
Staphylococcus aureus ATCC 25923	50-100	good-luxuriant
Streptococcus mitis ATCC 9811	50-100	good-luxuriant
Streptococcus pyogenes ATCC 19615	50-100	good-luxuriant

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. Morello J. A. and Ellner P. D., 1969, Appl. Microbiol. 17:68.
2. Ellner P. D., Stoessel C. J., Drakeford E. and Vasi F., 1966, Am. J. Clin. Pathol., 45:502
3. Reller, Murray and MacLowry, 1982, Cumitech 1A, Blood cultures II, Coord. Ed., ASM, Washington D.C.
4. Isenberg, (Ed.), 1992, Clinical Microbiology Procedures Handbook, Vo l. American Society for Microbiology, Washington, D.C.

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