Technical Information

Bismuth Sulphite Agar

Product Code: DM 1027

Application: Bismuth Sulphite Agar is recommended for the selective isolation and preliminary identification of *Salmonella* Typhi and other Salmonellae from pathological materials, sewage, water supplies, food etc.

Composition**

Ingredients	Gms / Litre
Peptic digest of animal tissue	10.000
Beef extract	5.000
Dextrose	5.000
Disodium phosphate	4.000
Ferrous sulphate	0.300
Bismuth sulphite indicator	8.000
Brilliant green	0.025
Agar	20.000
Final pH (at 25°C)	7.7±0.2

**Formula adjusted, standardized to suit performance parameters

Principle & Interpretation

The Salmonellae represent the most taxonomically complex group of bacteria among *Enterobacteriaceae* [1]. Human Salmonella infections are most commonly transmitted by ingestion of food, water or milk contaminated by human or animal excreta. Humans are the only reservoirs of *S.* Typhi [2]. Four Clinical types of salmonella infections have been described [3]. They are gastroenteritis, bacteremia or septicemia, enteric fever and a carrier state [3]. Different types of media have been employed for the isolation and preliminary identification of Salmonellae, particularly *Salmonella* Typhi; Bismuth Sulphite Agar is found tube more suitable media for this purpose [4].

Bismuth Sulphite Agar is a modification of original Wilson and Blair Medium [5-7] which has been also recommended by various Associations ([8-13] for the isolation and preliminary identification of *Salmonella* Typhi and other Salmonellae from pathological materials, sewage, water, food and other products.

S. Typhi, *S.* Enteritidis and *S.* Typhimurium typically grow as black colonies with a surrounding metallic sheen due to hydrogen sulphide production and reduction of sulphite to black ferric sulphide. *Salmonella* Paratyphi A grows as light green colonies. Bismuth Sulphite Agar may be inhibitory to some strains of *Salmonella like S.Sendai, S. Berta, S. Gallinarum, S. Abortus-equi and* therefore should not be used as the sole selective medium for these organisms. Most *Shigella* species are inhibited on this medium; except S. *flexneri* and S. sonnei [14]. This medium favors use of larger inoculum as compared to other selective media, as it has unique inhibitory action towards gram-positive organisms and coliforms.

Peptic digest of animal tissue and beef extract serve as sources as carbon, nitrogen, vitamins and essential growth factors. Dextrose is the carbon source. Disodium phosphate maintains the osmotic equilibrium. Bismuth sulphite indicator along with brilliant green inhibits the intestinal gram-positive and gram-negative bacteria. Ferrous sulphate aids in detection of hydrogen sulphide production. Clinical samples can be directly used to inoculate Bismuth Sulphite Agar. In case of food samples, pre enrichment of the sample is done prior to inoculation.

Methodology

Suspend 52.33 grams of powder media in 1000 ml distilled water. Shake well & heat to dissolve the medium completely. DO NOT STERILIZE IN AUTOCLAVE or by fractional sterilization since overheating may destroy the selectivity of the medium.

The sensitivity of the medium depends largely upon uniform dispersion of precipitated bismuth sulphite in the final gel, which should be dispersed before pouring into sterile Petri plates.

Quality Control

Physical Appearance

Light yellow to greenish yellow homogeneous free flowing powder

Gelling

Firm, comparable with 2.0% agar gel.

Colour and Clarity of prepared medium

Greenish yellow coloured, opalescent with flocculent precipitate forms in Petri plates.

Reaction

Reaction of 5.23% w/v aqueous solution at 25°C. pH : 7.7±0.2

pH range

7.50-7.90

Cultural Response/Characteristics

DM1027: Cultural characteristics observed after an incubation at 35-37°C for 40-48 hours.

Organism	Inoculum (CFU)	Growth	Recovery	Colour of Colony
Enterobacter aerogenes ATCC 13048	50-100	None-poor	<=10%	Brown-green(depends on the inoculum density)
Enterococcus faecalis ATCC 29212	$>10^3$	Inhibited	0%	
Escherichia coli ATCC 25922	50-100	None-poor	<=10%	Brown-green(depends on the inoculum density)
Salmonella Enteritidis ATCC 13076	50-100	Good- luxuriant	>=50%	Black with metallic sheen
Salmonella Typhi ATCC 6539	50-100	Good-luxuriant	>=50%	Black with metallic sheen
Salmonella Typhimurium ATCC 14028	50-100	Good-luxuriant	>=50%	Black with metallic sheen
Shigella flexneri ATCC 12022	50-100	None-poor	<=10%	brown
Escherichia coli ATCC 8739	50-100	None-poor	<=10%	brown to green, depends on inoculum density
Escherichia coli NCTC 9002	50-100	None-poor	<=10%	brown to green (depends on inoculum density)
Salmonella Abony NCTC 6017	50-100	Good-luxuriant	>=50%	black with metallic sheen

Storage and Shelf Life

Dried Media: Store below 30°C in tightly closed container and use before expiry date as mentioned on the label.
Prepared Media: 2-8^0 in sealable plastic bags for 2-5 days.

Further Reading

1. Tindall B. J., Crimont P. A. D., Gorrity G. M., EUZESY B. P., 2005, Int. J. Sys. Evol. Microbiol., 55:521
2. Koneman E. W., Allen S. D., Janda W. M., Schreckenberger P. C., Winn W. C. Jr., 1992, Colour Atlas and Textbook of Diagnostic Microbiology, 4 th Ed., J. B. Lippinccott Company
3. Mandell G. L., Douglas R. G. Jr., Bennet J. E., (Eds.) , 1985, Principles and Practice of Infectious Diseases, 2nd Ed., 660-669, John Wiley & Sons New York.
4. Gunter and Tuft, 1939, J. Lab. Clin. Med., 24:461.
5. Wilson and Blair, 1926, J. Pathol. Bateriol., 29:310.
6. Wilson and Blair, 1927, J. Hyg., 26:374
7. Wilson and Blair, 1931, J. Hyg., 31:138

8. Washington J. A., 1981, Laboratory Procedures in Clinical Microbiology, Springer-Verlag, New York.
9. Greenberg A. E., Clesceri L. S. and Eaton A. D., (Eds.), 1998, Standard Methods for the Examination of Water and Wastewater, 20th Ed., APHA, Washington D.C.,
10. FDA Bacteriological Analytical Manual, 2005, 18th Ed., AOAC, Washington, D.C.
11. Murray P. R., Baron J. H., Pfaller M. A., Tenover F. C. and Yolken R. H., (Eds.). 1999, Manual of Clinical Microbiology, 7th Ed., American Society for Microbiology, Washington, D.C.
12. Downes F. P. and Ito K., (Eds.), 2001, Compendium of Methods for the Microbiological Examination of Foods, 4th Ed., APHA, Washington, D.C.
13. Indian Pharmacopoeia, 1996, Ministry of Health and Family Welfare, Govt. of India, Volume 2.
14. MacFaddin J. F., 2000, (Ed.), Biochemical Tests for Identification of Medical Bacteria, 3rd Edition, Lippincott, Williamss & Wilkins, New York.

Disclaimer :

- User must ensure suitability of the product(s) in their application prior to use.
- The product conforms solely to the technical information provided in this booklet and to the best of knowledge research and development work carried at **CDH** is true and accurate.
- **Central Drug House Pvt. Ltd.** reserves the right to make changes to specifications and information related to the products at any time.
- Products are not intended for human or animal diagnostic or therapeutic use but for laboratory, research or further manufacturing of diagnostic reagents extra.
- Statements contained herein should not be considered as a warranty of any kind, expressed or implied, and no liability is accepted for infringement of any patents.
- Do not use the products if it fails to meet specificatons for identity and performens parameters.