Technical Information

Selenite Cystine Broth Base

Product Code: DM 2079

Application: - It is recommended as a selective enrichment media for *Salmonella* and possibly *Shigella sonnei* from faeces, urine, water and foodstuffs.

Composition**

Ingredients	Gms / Litre
Casein enzymic hydrolysate	5.000
Lactose	4.000
Disodium phosphate	10.000
L-Cystine	0.010
Final pH (at 25°C)	7.0±0.2

**Formula adjusted, standardized to suit performance parameters

Principle & Interpretation

Klett [1] first demonstrated the inhibitory effects of selenite and Guth [2] used it to isolate *Salmonella serotype* Typhi. Leifson fully investigated selenite and formulated the media. Selenite Cystine Medium is a modification of Leifsons [3] formula with added cystine [4]. Modification of original composition and similar medias are recommended by AOAC, APHA, USP etc [3-9]. As the pathogens are present in a very small number in the intestinal flora enrichment media are routinely employed for detection of pathogens in faecal specimens in the nonacute stages of illness from asymptomatic or convalescent patients [10] and for epidemiological studies to establish the diagnosis of infection.

Casein enzymic hydrolysate provides nitrogenous substances. Lactose maintains the pH of medium. Selenite is reduced by bacterial growth and alkali is produced. An increase in pH lessens the toxicity of the selenite and results in overgrowth of other bacteria. The acid produced by bacteria due to lactose fermentation serves to maintain a neutral pH. Sodium phosphate maintains a stable pH and also lessens the toxicity of selenite. L-cystine improves recovery of *Salmonella.*

Enriched broth is subcultured on differential plating media such as Bismuth Sulphite Agar (MS2027), Brilliant Green Agar (MS2016), XLD Agar (MS2031) etc. Do not incubate the broth longer than 24 hours as inhibitory effect of selenite decreases after 6-12 hours of incubation [11].

Methodology

Suspend 19.01 grams of powder media in 1000 ml distilled water. Add 4 grams of sodium hydrogen selenite (030161). Warm to dissolve the medium completely. Distribute in sterile test tubes. Sterilize in a boiling water bath or free flowing steam for 10 minutes. DO NOT AUTOCLAVE. Excessive heating is detrimental. Discard the prepared medium if large amount of selenite is reduced (indicated by red precipitate at the bottom of tube/bottle).

Caution: Sodium hydrogen selenite (Sodium biselenite) is very toxic and corrosive agent and causes teratogenicity. Handle with great care. If there is contact with skin, wash immediately with lot of water.

Quality Control

Physical Appearance
Cream to light yellow homogeneous free flowing powder

Colour and Clarity of prepared medium
Cream to yellow coloured clear solution without any precipitate

Reaction
Reaction of 1.9% w/v of medium along with 0.4% w/v selenite aqueous solution at 25°C. pH : 7.0±0.2

pH Range 6.80-7.20

Cultural Response/Characteristics

DM 2079: Cultural characteristics observed with added sodium hydrogen selenite (030161) when subcultured on MacConkey

Organism	Inoculum (CFU)	Recovery	Colour of colony
Escherichia coli ATCC 25922	50-100	none to poor (no increase in numbers)	pink with bile precipitate
Salmonella Choleraesuis ATCC 12011	50-100	good-luxuriant	colourless
Salmonella Typhi ATCC 6539	50-100	good-luxuriant	Colourless
Salmonella Typhimurium ATCC 14028	50-100	good-luxuriant	Colourless

Agar(M081) after an incubation at 35-37°C for 18-24 hours.

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. Klett A., 1900, Zeitsch Für Hyg. Und. Infekt., 33: 137.
2. Guth F., 1926, Zbl. Bakt. I. Orig., 77:487.
3. Leifson E., 1936, Am. J. Hyg., 24(2) : 423.
4. North W.R. and Bartran M.T., 1953, Appl. Microbiol., 1:130.
5. AOAC, 1978, Bacteriological Analytic Manual, 5th ed., AOAC, Washington, DC
6. Downes F. P. and Ito K. (Eds.), 2001, Compendium of Methods For The Microbiological Examination of Foods, 4th Ed., APHA, Washington, D.C.
7. Wehr H. M. and Frank J. H., 2004, Standard Methods for the Microbiological Examination of Dairy Products, 17th Ed., APHA Inc., Washington, D.C
8. Eaton A. D., Clesceri L. S., Rice E. W., and Greenberg A W., (Eds.), 2005, Standard Methods for the Examination of Water and Wastewater, 21st Ed., APHA, Washington, D.C.
9. United States Pharmacopoeia, 2002, USP 25/NF 20, Asian Edition, United States Pharmacopeial Convention, Inc., Rockville, MD.
   Kelly, Brenner and Farmer, 1985, Manual of Clinical Microbiology, 4th ed., Lennett and others (Eds.), ASM, Washington, D.C.
10. Chattopadhyay W. and Pilford J. N., 1976, Med.Lab. Sci., 33:191.

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