Selenite Cystine Broth Base

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

**Composition**

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>Gms / Litre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Casein enzymic hydrolysate</td>
<td>5.000</td>
</tr>
<tr>
<td>Lactose</td>
<td>4.000</td>
</tr>
<tr>
<td>Disodium phosphate</td>
<td>10.000</td>
</tr>
<tr>
<td>L-Cystine</td>
<td>0.010</td>
</tr>
<tr>
<td><strong>Final pH (at 25°C)</strong></td>
<td>7.0±0.2</td>
</tr>
</tbody>
</table>

**Formula adjusted, standardized to suit performance parameters**

**Directions**

Suspend 19.01 grams in 1000 ml distilled water. Add 4 grams of sodium hydrogen selenite (,,M1079B). 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.

**Principle And Interpretation**

Klett (1) first demonstrated the selective 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 Leifson's (3) formula with added cystine (4). Modification of original composition and similar medias are recommended by AOAC, APHA, USP etc (3-9). Enrichment media are routinely employed for detection of pathogens in faecal specimens as the pathogens are present in a very small number in the intestinal flora. Selenite Cystine Broth is useful for detecting *Salmonella* in the nonacute stages of illness when organisms occur in the faeces in low numbers and for epidemiological studies to enhance the detection of low number of organisms from asymptomatic or convalescent patients (10).

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 (M027), Brilliant Green Agar (M016), XLD Agar (M031) etc. Do not incubate the broth longer than 24 hours as inhibitory effect of selenite decreases after 6 - 12 hours of incubation (11).

**Quality Control**

**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**

6.80-7.20

**Cultural Response**
Cultural characteristics observed with added sodium hydrogen selenite (M1079B) when subcultured on MacConkey Agar(M081) after an incubation at 35-37°C for 18-24 hours.

**Cultural Response**

<table>
<thead>
<tr>
<th>Organism</th>
<th>Inoculum (CFU)</th>
<th>Recovery</th>
<th>Colour of colony</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Escherichia coli</em> ATCC 25922</td>
<td>50-100</td>
<td>none to poor (no increase in numbers)</td>
<td>pink with bile precipitate</td>
</tr>
<tr>
<td><em>Salmonella Choleraesuis</em> ATCC 12011</td>
<td>50-100</td>
<td>good-luxuriant</td>
<td>colourless</td>
</tr>
<tr>
<td><em>Salmonella Typhi</em> ATCC 6539</td>
<td>50-100</td>
<td>good-luxuriant</td>
<td>colourless</td>
</tr>
<tr>
<td><em>Salmonella Typhimurium</em> ATCC 14028</td>
<td>50-100</td>
<td>good-luxuriant</td>
<td>colourless</td>
</tr>
</tbody>
</table>

**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**


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