Double Sugar Agar, Russell (Russell Double Sugar Agar)  

**Intended Use:**
Recommended for differentiation of Gram-negative enteric bacilli on the basis of their ability to ferment dextrose and lactose with or without gas formation.

**Composition**

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>Gms / Litre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peptone</td>
<td>2.500</td>
</tr>
<tr>
<td>Tryptone</td>
<td>7.500</td>
</tr>
<tr>
<td>HM peptone B #</td>
<td>3.000</td>
</tr>
<tr>
<td>Lactose</td>
<td>10.000</td>
</tr>
<tr>
<td>Dextrose (Glucose)</td>
<td>1.000</td>
</tr>
<tr>
<td>Sodium chloride</td>
<td>5.000</td>
</tr>
<tr>
<td>Phenol red</td>
<td>0.025</td>
</tr>
<tr>
<td>Agar</td>
<td>15.000</td>
</tr>
</tbody>
</table>

Final pH (at 25°C): 7.3±0.2

**Directions**

Suspend 44.02 grams in 1000 ml purified / distilled water. Heat to boiling to dissolve the medium completely. Dispense in tubes or as desired and sterilize by autoclaving at 118-121°C (correspond to 12-15lbs pressure respectively) for 15 minutes. Cool to 45-50°C. Allow the tubes to solidify in slanting position to form a generous butt.

**Principle And Interpretation**

Gram-negative bacilli belonging to *Enterobacteriaceae* are the most frequently encountered bacterial isolates recovered from clinical specimens. Definitive identification of the members of *Enterobacteriaceae* requires a battery of biochemical tests (1). Double Sugar Agar, Russell is used for the differentiation of gram-negative enteric bacilli on the basis of their ability to ferment dextrose and lactose with or without gas formation. This medium was originally formulated by Russell (2) using litmus indicator. It was later modified by Nichols (3) and Nichols and Wood (4) by replacing the litmus indicator with phenol red. This medium is used for differentiating gram-negative enteric bacilli especially the colon-typhoid-salmonellae-dysentery groups based on the fermentation of the double sugars incorporated namely, dextrose and lactose.

On incubation of inoculated tubed medium, acid production under aerobic condition (on the slant) and under anaerobic condition (in the butt) can be detected by the change in colour of the indicator. Phenol red is the pH indicator in the medium. Gaseous fermentation is indicated by splitting of the agar or by bubble formation in the butt. Organism like *Salmonella Typhi* capable of fermenting dextrose but not lactose will show an initial acid slant in short incubation period. Over a period of time as the dextrose gets consumed the reaction under aerobic condition reverts and becomes alkaline due to the oxidation of acids. Under anaerobic condition (in the butt), the same organism fails to revert the reaction and remains acidic. Peptone, Tryptone and HM peptone B serve as sources of carbon, nitrogen, vitamins and other essential nutrients. Lactose and dextrose serve as sources of energy by being the fermentable carbohydrates. Phenol red is the pH indicator in the medium that is pink under alkaline conditions and yellow under acidic conditions. Sodium chloride helps to maintain the osmotic equilibrium of the medium. Pure cultures are used to inoculate the tubed medium (5).

**Type of specimen**

Isolated microorganisms from clinical specimen

**Specimen Collection and Handling:**

For clinical samples follow appropriate techniques for handling specimens as per established guidelines (4,5). After use, contaminated materials must be sterilized by autoclaving before discarding.

**Warning and Precautions :**

In Vitro diagnostic Use only. Read the label before opening the container. Wear protective gloves/protective clothing/eye...
Reaction
Reaction of 4.4% w/v aqueous solution at 25°C. pH : 7.3±0.2

pH
7.10-7.50

Cultural Response
Cultural characteristics observed after an incubation at 35-37°C for 18-40 hours.

Organism | Inoculums (CFU) | Growth | Slant | Butt | Gas |
---|---|---|---|---|---|
# *Klebsiella aerogenes* ATCC 13048 (00175*) | 50-100 | luxuriant | acidic reaction, yellowing of the medium | acidic reaction, yellowing of the medium | positive reaction |
*Escherichia coli* ATCC 25922 (00013*) | 50-100 | luxuriant | acidic reaction, yellowing of the medium | acidic reaction, yellowing of the medium | positive reaction |
*Proteus vulgaris* ATCC 13315 | 50-100 | luxuriant | alkaline reaction, red colour of the medium | alkaline reaction, yellowing of the medium | positive reaction |
*Pseudomonas aeruginosa* ATCC 27853 (00025*) | 50-100 | luxuriant | alkaline reaction, red colour of the medium | alkaline reaction, red colour of the medium | negative reaction |
*Salmonella Typhimurium* ATCC 14028 (00031*) | 50-100 | luxuriant | alkaline reaction, red colour of the medium | acidic reaction, yellowing of the medium | positive reaction |
*Shigella dysenteriae* ATCC 13313 | 50-100 | luxuriant | alkaline reaction, red colour of the medium | acid reaction, yellowing of the medium | negative reaction |

Key : (*) Corresponding WDCM numbers.
(##) Formerly known as *Enterobacter aerogenes*

Storage and Shelf Life
Store between 10-30°C in a tightly closed container and the prepared medium at 20-30°C. Use before expiry date on the label. On opening, product should be properly stored dry, after tightly capping the bottle in order to prevent lump formation due to the hygroscopic nature of the product. Improper storage of the product may lead to lump formation. Store in dry ventilated area protected from extremes of temperature and sources of ignition. Seal the container tightly after use. Use before expiry date on the label. Product performance is best if used within stated expiry period.
Disclaimer:

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