

BacterLab Division



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BIOCHEMICAL MEDIUM

BacterTube™ Triple Sugar Iron Agar (TSI)

Triple Sugar Iron Agar is used for the identification of gram-negative enteric bacilli on the basis of dextrose, lactose and sucrose fermentation and hydrogen sulphide production.

Code: 08046



1. INTENDED USE

BacterTube™ Triple Sugar Iron Agar is a medium used to perform biochemical tests for the fermentation of glucose, lactose, and sucrose (with or without gas production), hydrogen sulfide (H₂S) production, and gas generation for the identification of Gram-negative bacilli.

2. PRINCIPLES

- The fermentation of sugars leads to acidification, which causes the phenol red (pH indicator) to change from red to yellow.
- The detection of bacteria that ferment only glucose is facilitated by reducing the concentration of lactose or sucrose to 1/10, thus allowing a small amount of acid produced on the slant surface during fermentation to be rapidly oxidized. This causes the red color to return quickly or, alternatively, the alkalization process becomes more pronounced. In contrast, the acidic reaction (yellow color) is maintained at the depth of the agar, at the bottom of the tube.
- Bacteria that ferment lactose or sucrose will turn the slant portion of the tube yellow.
- Bacteria that do not ferment any of these sugars will not alter the color of the medium.
- The production of H₂S is observed at the bottom of the tube by the appearance of a black color, due to the reduction of thiosulfate in the presence of ferric citrate, forming iron sulfide.
- Gas production (H₂, CO₂) resulting from the fermentation of sugars is indicated by the presence of bubbles or the splitting of the agar.

3. TYPICAL COMPOSITION

For 1 liter of medium

Peptone	1,0 g
Pancreatic Digest of Casein	15 g
Lactose	10,0 g
Sucrose	10,0 g
Sodium Chloride	5 g
Peptic Digest of Animal Tissue	5 g
Yeast Extract	3 g
Beef Extract	3 g
Dextrose	1 g
Ferric Ammonium Citrate	0,5 g
Sodium Thiosulfate	0,3 g
Phenol Red	0,024 g
Agar	12,0 g

pH of the ready-to-use medium at 25°C: 7,4 ± 0,2

4. PREPARATION

The environmental tubes are ready-to-use, no preparation required.

5. INSTRUCTIONS FOR USE

- Prior to inoculation, allow medium to equilibrate to room temperature
- Use a sterile inoculation loop to transfer a sample from an isolated colony on the agar plate into the test tube containing the medium.
- Incubate the tube at 35°C, Aerobic.
- Examine the tube after 18 – 24 hours of incubation.
- Observe and record the results

6. RESULTS

- Red slant - yellow butt: Only glucose fermentation.
- Yellow slant - yellow butt: Fermentation of both glucose and lactose (or sucrose).
- Red slant - red butt: No fermentation of glucose, sucrose, or lactose.
- Bubbles, cracks, or displacement of the agar: Gas production.
- Black precipitate at the bottom: Hydrogen sulfide (H₂S) production

7. QUALITY CONTROL

BacterLab ensures the quality of each product batch by testing with ATCC reference strains.

Reference strains	Incubation conditions	Expected results			
		Slant	Butt	Gas	H ₂ S
<i>Salmonella enterica</i> ATCC 14028	18 – 24 hours, 35 – 37°C, Aerobic	Red	Yellow/ Black	+	+
<i>Escherichia coli</i> ATCC 25922		Yellow	Yellow	+	-
<i>Pseudomonas aeruginosa</i> ATCC 27853		Red	Red	-	-

8. STORAGE AND TRANSPORT CONDITIONS

- Storage: 2 – 8°C.
- Transportation: Ambient temperature.

9. PACKAGING

- Packaging: 50 tubes/ box or as per customer request.

10. SHELF LIFE

- Expiration Date: 3 months from the manufacturing date.

11. BIBLIOGRAPHY

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- Greenberg A. E., Trussell R. R. and Clesceri L. S. (Eds.), 1985, Standard Methods for the Examination of Water and Wastewater, 16th ed., APHA, Washington, D.C.