



SIM Motility Medium, Modified

M181F

SIM Medium is recommended for determination of hydrogen sulphide production, indole formation and motility of enteric bacilli in accordance with FDA BAM.

Composition**

Ingredients	Gms / Litre
Pancreatic digest of casein	20.000
Peptic digest of animal tissue	6.100
Ferrous ammonium sulfate	0.200
Sodium thiosulfate	0.200
Agar	3.500
Final pH (at 25°C)	7.3±0.2

**Formula adjusted, standardized to suit performance parameters

Directions

Suspend 30.0 grams in 1000 ml distilled water. Heat to boiling to dissolve the medium completely. Dispense in tubes. Sterilize by autoclaving at 15 lbs pressure (121°C) for 15 minutes. Allow the tubes to cool in an upright position.

Principle And Interpretation

SIM Medium is recommended by FDA BAM, 1998 (1) to differentiate enteric bacilli particularly *Salmonella* and *Shigella* on the basis of sulphide production, indole formation and motility (2). Jordan and Victorson (3) reported that *Salmonella* Paratyphi A and Paratyphi B can be distinguished on the basis of H₂S production using lead acetate. Sulkin and Willett (4) used Triple Sugar Iron Agar with 1% agar for motility along with H₂S production and carbohydrate fermentation. Sosa (5) described a peptone medium with low agar for motility and indole determination.

Motility, indole and sulphide production tests are used to differentiate *Enterobacteriaceae* members. SIM Medium combines these three differential characteristics in a single medium. Peptonized iron and sodium thiosulphate are the indicators of H₂S production. This H₂S reacts with peptonized iron to form black precipitate of ferrous sulphide. *Salmonella* are H₂S positive and *Shigella* are H₂S negative. Motile organisms intensify the H₂S reaction. Motile organisms grow away from line of inoculation showing diffused growth while non-motile organisms grow along the stabline. Motility detection is possible due to the semisolid nature of the medium. *Salmonella* is motile while *Shigella* are non motile. Tryptophan, from peptic digest of animal tissue, is degraded by specific bacteria to produce indole. The indole is detected by the addition of chemical reagents following the incubation period.

Inoculate fresh culture with a single stab using straight needle through the center of the medium. Following incubation, observe for motility (diffuse growth outward from the stabline or turbidity throughout the medium) and for H₂S production (blackening of the medium). To detect indole production, add three or four drops of Kovacs reagent and observe for development of red color (positive reaction). Determine motility and H₂S production prior to determination of indole production.

Quality Control

Appearance

Cream to beige homogeneous free flowing powder

Gelling

Semisolid, comparable with 0.3% Agar gel.

Colour and Clarity of prepared medium

Medium amber coloured slightly opalescent gel forms in tubes as butts

Reaction

Reaction of 3.0% 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 18-24 hours.

Cultural Response

Organism	Inoculum (CFU)	Growth	Motility	Indole production (on addition of Kovac's)	H2S
Cultural Response <i>Escherichia coli</i> ATCC 25922	50-100	luxuriant	positive, growth away from stabline causing turbidity	positive reaction, red ring at the interface of the medium	negative reaction
<i>Salmonella Typhimurium</i> ATCC 14028	50-100	luxuriant	positive, growth away from stabline causing turbidity	negative reaction	positive reaction, blackening of medium
<i>Shigella flexneri</i> ATCC 12022	50-100	luxuriant	negative, growth along the stabline, surrounding medium remains clear	negative reaction	negative reaction
<i>Salmonella Paratyphi A</i> ATCC 9150	50-100	luxuriant	positive, growth away from stabline causing turbidity	negative reaction	Negative reaction
<i>Salmonella Paratyphi B</i> ATCC 8739	50-100	luxuriant	positive, growth away from stabline causing turbidity	Negative reaction	Positive reaction, blackening of medium
<i>Klebsiella pneumoniae</i> ATCC 13883	50-100	luxuriant	negative, growth along the stabline, surrounding medium remains clear	Negative reaction	Negative reaction

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

- 1.FDA, U.S. 1998. Bacteriological Analytical Manual. 8 ed. Gaithersburg, MD: AOAC International.
- 2.MacFaddin, J. F. 1985. Media for Isolation-Cultivation-Identification-Maintenance of Medical Bacteria vol. 1. Baltimore: Williams and Wilkins.
- 3.Jordan, E. O. and Victorson, R 1917. J. Inf. Dis, 21.
- 4.Sulkin, S. E. and Willett, J. C 1940. J. Lab. Clin. Med., 25.
- 5.Sosa, L 1943. Rev. Inst. Bacteriol, 11.

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