PRODUCT SPECIFICATION SHEET

SIM Medium (DM231)

Intended Use
SIM Medium is recommended for the differentiation of enteric bacteria on the basis of hydrogen sulphide production, indole production and motility.

Product Summary and Explanation
Semisolid media have been used extensively in the determination of bacterial motility. Jordan and Victorson reported that *Salmonella Paratyphi A* and *Paratyphi B* can be distinguished on the basis of H_2S production using lead acetate.[1] Sulkin and Willett used Triple Sugar Iron Agar with 1% agar for motility along with H_2S production and carbohydrate fermentation.[2] Sosa described a peptone medium with low agar for motility and indole determination.[3] Greene et al. used SIM Medium to detect motility in a large series of cultures of typhoid organisms.[4] SIM Medium enables determination of three characteristics by which enteric bacteria can be differentiated.[5, 6] The three characteristics are represented by the three letters in the name 'Sulfur reduction', 'Indole production' and 'Motility'. The production of hydrogen sulfide, indole formation, and motility are useful diagnostic tests in the identification of *Enterobacteriaceae*, especially *Salmonella* spp. and *Shigella* spp.

Principles of the Procedure
The ingredients in SIM Medium enable the determination of three activities by which enteric bacteria can be differentiated. Peptic digest of animal tissue and Beef extract serves as nitrogen, carbon and amino acids sources in the SIM medium. Sodium thiosulphate and peptonized iron are the indicators of H_2S production. This H_2S reacts with peptonized iron to form black precipitate of ferrous sulphide. Motile organisms deepen the H_2S reaction, as they grow away from line of inoculation showing diffused growth, while non-motile organisms grow along the stabline. Motility detection is made possible due to the semisolid nature of the medium. Growth radiating out from the central stabline indicates that the test organism is motile. Peptic digest of animal tissue is rich in tryptophan, which is degraded by specific bacteria to produce indole. The indole is detected by the addition of chemical reagents following the incubation period.

Formula / Liter

Ingredients	Gms / Liter
Beef extract	3.00
Peptic digest of animal tissue	30.00
Peptonized iron	0.02
Sodium thiosulphate	0.025
Agar	3.00
Final pH: 7.3 ± 0.2 at 25°C	
Formula may be adjusted and/or supplemented as required to meet performance specifications	

Precautions
1. For Laboratory Use only.
2. IRRITANT. Irritating to eyes, respiratory system, and skin.

Directions
1. Suspend 36.23 grams of the medium in one liter of distilled water.
2. Heat to boiling, to dissolve the medium completely.
3. Dispense in appropriate tubes.
4. Autoclave at 121°C, 15 psi pressure, for 15 minutes / validated cycle.

Quality Control Specifications

Dehydrated Appearance	Cream to beige, homogeneous free flowing powder
Prepared Medium	Medium amber coloured, opalescent gel forms in tubes as butts
Reaction of 3.6% Solution	pH : 7.3 ± 0.2 at 25°C
Gel Strength	Semisolid, comparable with 0.3% Agar gel

Expected Cultural Response: Cultural characteristics observed after an incubation 35 -37°C for 18-24 hours.

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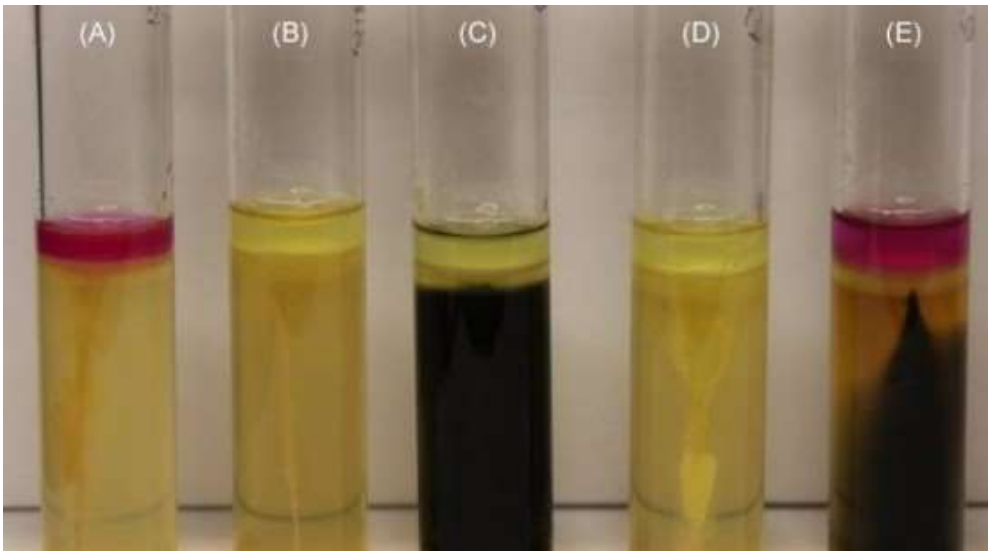
Sr. No.	Organisms	Results to be achieved				
		Inoculum (CFU)	Growth	Motility	Indole production on addition of Kovac's	H_2S
1.	*Escherichia coli* ATCC 25922	50 -100	good-luxuriant	Positive, growth away from stabline causing turbidity	positive reaction, red ring at the interface of the medium	negative reaction
2.	*Salmonella Typhimurium* ATCC 14028	50 -100	good-luxuriant	positive, growth away from stabline causing turbidity	negative reaction	positive reaction, blackening of medium
3.	*Shigella flexneri* ATCC 12022	50-100	good-luxuriant	Negative, growth along the stabline, surrounding medium remains clear	negative reaction	negative reaction
4.	*Salmonella Paratyphi A* ATCC 9150	50-100	good-luxuriant	positive, growth away from stabline causing turbidity	negative reaction	negative reaction
5.	*Salmonella Paratyphi B* ATCC 8739	50-100	good-luxuriant	positive, growth away from stabline causing turbidity	negative reaction	positive reaction, blackening of medium
6.	*Klebsiella pneumoniae* ATCC 13883	50-100	good-luxuriant	negative, growth along the stabline, surrounding medium remains clear	negative reaction	negative reaction

The organisms listed are the minimum that should be used for quality control testing.
Gradually Increase in the Zone of Inhibition with increasing concentaration.



A: *Escherichia coli* - Negative for H_2S, Positive for Indole, Undetermined motility
B: *Staphylococcus aureus* - Negative for H_2S, Negative for Indole, Undetermined motility
C: *Salmonella Paratyphi B* - Positive for H_2S, Negative for Indole, Positive for motility
D: *Enterobacter aerogenes* - Negative for H_2S, Negative for Indole, Positive for motility
E: *Proteus vulgaris* - Positive for H_2S, Positive for Indole, Positive for motility

Test Procedure

1. Using a straight needle inoculate pure fresh culture with a single stab through the center of the medium.

2. Incubate with loose caps at 35 – 37°C for 18 – 24 hours.
3. After the incubation, examine the tubes for motility, H_2S production and indole production.

Results

1. Motility is observed as a diffused growth outward from the stab line or turbidity throughout the medium. H_2S production is shown as blackening along the stab line.
2. To detect indole production, add three or four drops of Kovàcs reagent and observe for a red color (positive reaction).
3. Consult appropriate references for activities of specific microorganisms.

Storage

Store the sealed bottle containing the dehydrated medium at 10 - 30°C. Once opened and recapped, place container in a low humidity environment at the same storage temperature. Protect from moisture and light.

Expiration

Refer to the expiration date stamped on the container. The dehydrated medium should be discarded if not free flowing, or if the appearance has changed from the original color. Expiry applies to medium in its intact container when stored as directed.

Limitations of the Procedure

1. Some strains may grow poorly or fail to grow on this medium, due to nutritional variation.
2. Avoid inoculum from liquid or broth suspension as growth initiation will be delayed.
3. Reactions are not sufficient to speciate organisms. Additional biochemical and serological tests are required for confirmation.
4. Consult appropriate texts for detailed information and recommended procedures.

Packaging

Product Name : SIM Medium
Product Code : DM231
Available Pack sizes : 100gm / 500gm

References

1. Jordan E. O. and Victorson R., 1917, J. Inf. Dis., 21:554.
2. Sulkin S. E. and Willett J. C., 1940, J. Lab. Clin. Med., 25:649.
3. Sosa L., 1943, Rev. Inst. Bacteriol., 11:286.
4. Greene, R. A., E. F. Blum, C. T. Decoro, R. B. Fairchild, M. T. Kapla, J. L. Landau, and T. R. Sharp. 1951. Rapid method for the detection of motility. J. Bact. 62:347.
5. MacFaddin J. F., 1985, Media for Isolation-Cultivation-Identification-Maintenance of Medical Bacteria, Vol. Williams and Wilkins, Baltimore.
6. Ewing W. H., 1986, Edwards and Ewings Identification of Enterobacteriaceae, 4th Ed., Elsevier Science Publishing Co.,Inc. New York.

Further Information

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