
SIM MEDIUM

INTENDED USE

Remel SIM (Sulfide Indole Motility) Medium is a semisolid medium recommended for use in qualitative procedures for differentiation of microorganisms on the basis of hydrogen sulfide, indole production, and motility.

SUMMARY AND EXPLANATION

In 1940, Sulkin and Willet reported H₂S detection is an important parameter for differentiating *Salmonella* and *Shigella* from other members of the family *Enterobacteriaceae*.¹ Blazevic used motility-indole medium for differentiating *Klebsiella* from *Enterobacter* and *Serratia*.² In 1951, Green et al. demonstrated SIM Medium could be used to determine motility results for enteric gram-negative bacilli.³ For convenience, sulfide, indole, and motility have been combined in one tube.

PRINCIPLE

Casein and meat peptones supply nitrogenous compounds and amino acids necessary for the growth of enteric gram-negative bacilli. Sodium thiosulfate is a sulfur source. Ferric ammonium citrate, an indicator, reacts with the H₂S produced by sulfate-reducing bacteria to form ferrous sulfide, a black precipitate. Organisms that possess the enzyme tryptophanase degrade tryptophan in the medium to form indole. Detection of indole is accomplished by addition of Kovacs' Reagent or Ehrlich's Reagent. Indole combines with p-dimethyl-aminobenzaldehyde to produce a red complex. The addition of agar results in a semisolid medium which is ideal for the detection of motility.

REAGENTS (CLASSICAL FORMULA)*

Casein Peptone.....	20.0 g	Ferric Ammonium Citrate	0.2 g
Meat Peptone.....	6.0 g	Agar.....	3.5 g
Sodium Thiosulfate	0.3 g	Demineralized Water.....	1000.0 ml

pH 7.3 ± 0.2 @ 25°C

*Adjusted as required to meet performance standards.

PRECAUTIONS

This product is For Laboratory Use only. It is not intended for use in the diagnosis of disease or other conditions.

PREPARATION OF DEHYDRATED CULTURE MEDIUM

1. Suspend 30 grams of medium in 1000 ml of demineralized water
2. Heat to boiling with agitation to completely dissolve.
3. Dispense into tubes and sterilize by autoclaving at 121°C for 15 minutes.

PROCEDURE

1. Consult current editions of appropriate references for the recommended procedure for sample preparation, inoculation, testing, and interpretation.
2. Lightly inoculate SIM Medium from a pure, 18-24 hour culture of the test isolate. Using an inoculating needle, stab down the center of the medium to within the bottom 1/3 of the tube.
3. Incubate tube in ambient air with loosened cap at 33-37°C for 18-24 hours.
4. Examine tube for H₂S production and motility (see Interpretation).
5. To detect indole production, add 3-4 drops of Kovacs' Reagent (REF R21227) or Ehrlich's Reagent (REF R21213) and observe medium for a red color development.

INTERPRETATION OF THE TEST

Hydrogen Sulfide (S):

Positive Test - Blackening along the line of inoculation
Negative Test - No blackening of the medium

Indole (I):

Positive Test - Red color development in the upper portion of the medium
Negative Test - No red color development

Motility (M):

Positive Test - Diffuse growth outward from the stab line or turbidity throughout the medium
Negative Test - Growth only along the line of inoculation

QUALITY CONTROL

Each lot number of SIM Medium has been manufactured, packaged, and processed in accordance with current Good Manufacturing Practice regulations. All lot numbers have been tested using the following quality control organisms and have been found to be acceptable. Testing of control organisms should be performed in accordance with established laboratory quality control procedures. If aberrant quality control results are noted, sample results should not be reported.

CONTROL

Escherichia coli ATCC® 25922
Klebsiella pneumoniae ATCC® 27736
Salmonella enterica serovar Typhimurium ATCC® 14028

INCUBATION

Ambient, 18-24 h @ 33-37°C
Ambient, 18-24 h @ 33-37°C
Ambient, 18-24 h @ 33-37°C

RESULTS

S (-), I (+), M (+)
S (-), I (-), M (-)
S (+), I (-), M (+)

LIMITATIONS

1. Inoculate SIM Medium from an agar plate; the use of a broth culture has been shown to delay the initiation of growth.⁴
2. H₂S reactions are intensified by motile cultures.⁴
3. Mucoid strains of *Klebsiella* have been falsely interpreted as motile due to spilling between the medium and the side of the tube. This results in a cloudy appearance which may be confused with motility. Avoid false-positive readings by using media with adequate tube depth and carefully examine growth in the central stab line when interpreting results.⁵

BIBLIOGRAPHY

1. Sulkin, S.E. and J.C. Willet. 1940. J. Lab. Clin. Med. 25:649.
2. Blazevic, D.J. 1968. Appl. Microbiol. 16:668.
3. Green, R.A., E.F. Blum, C.T. DeCoro, R.B. Fairchild, M.T. Kaplan, J.L. Landau, and T.R. Sharp. 1951. J. Bacteriol. 62:347.
4. MacFaddin, J.F. 1985. Media for Isolation-Cultivation-Identification-Maintenance of Medical Bacteria. Vol. 1. Williams & Wilkins, Baltimore, MD.
5. Edmondson, E.B. and J.P. Sanford. 1967. Medicine. 46:323.

Refer to the front of Remel *Technical Manual of Microbiological Media* for **General Information** regarding precautions, product storage and deterioration, specimen collection, storage and transportation, materials required, quality control, and limitations.

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12076 Santa Fe Drive, Lenexa, KS 66215, USA
General Information: (800) 255-6730 Website: www.remel.com Email: remel@remel.com
Local/International Phone: (913) 888-0939 International Fax: (913) 895-4128