MANNITOL SALT AGAR

INTENDED USE
Remel Mannitol Salt Agar is a solid medium recommended for use in qualitative procedures for selective and differential isolation of staphylococci.

SUMMARY AND EXPLANATION
In 1942, Koch reported the use of 7.5% sodium chloride as a selective agent for the isolation of staphylococci.[1] Chapman confirmed the results of Koch and suggested the addition of 7.5% sodium chloride to phenol red mannitol agar.[2] Most strains of coagulase-positive staphylococci grow on Mannitol Salt Agar and produce yellow zones as a result of the fermentation of mannitol. Coagulase-negative strains of staphylococci produce small colonies with no color change of the surrounding medium. Mannitol Salt Agar is formulated in conformance with harmonized *United States Pharmacopeia* (USP)/*European Pharmacopeia* (EP) guidelines.[3]

PRINCIPLE
Casein and meat peptones supply nitrogen, amino acids, and peptides necessary for bacterial growth. Sodium chloride, in a concentration of 7.5%, is a selective agent which inhibits many bacteria other than staphylococci. Phenol red is a pH indicator which causes a color change in the medium from red-orange to yellow when acid is produced. Colonies of staphylococci that ferment mannitol will be surrounded by a yellow zone, while those that do not ferment mannitol will have a red zone.

REAGENTS (CLASSICAL FORMULA)*

Sodium Chloride	75.0 g	Beef Extract	1.0 g
D-Mannitol	10.0 g	Phenol Red	25.0 mg
Casein Peptone	5.0 g	Agar	15.0 g
Meat Peptone	5.0 g	Demineralized Water	1000.0 ml

pH 7.4 ± 0.2 @ 25°C

*Adjusted as required to meet performance standards.

PREPARATION OF DEHYDRATED CULTURE MEDIUM
1. Suspend 111 g of medium in 1000 ml of demineralized water.
2. Heat to boiling with agitation to completely dissolve.
3. Sterilize by autoclaving at 121°C for 15 minutes, or according to established laboratory procedures.
4. Dispense into appropriate containers.

PROCEDURE
1. Consult current editions of appropriate references for the recommended procedure for sample preparation, inoculation, and testing.[3,4]

QUALITY CONTROL
Each lot number of Mannitol Salt Agar 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. This quality control testing meets or exceeds harmonized USP/EP guidelines for microbial limits testing. Testing of control organisms should be performed in accordance with established laboratory quality control procedures.

CONTROL	INCUBATION	RESULTS
Staphylococcus aureus ATCC® 6538	Aerobic, 18-72 h @ 30-35°C	Growth, colonies with yellow zones
Escherichia coli ATCC® 8739	Aerobic, 18-72 h @ 30-35°C	Inhibition (partial to complete)

LIMITATIONS
1. Not all strains of coagulase-positive staphylococci are recoverable on Mannitol Salt Agar (MSA).
2. MSA is a selective and differential medium, and as such some inhibition to target organisms is normal. If it is necessary to detect all potential pathogens in a test material, it is advisable to combine use of this medium with use of one or more nonselective, nondifferential media.
3. A high inoculum level combined with an extended incubation time may permit break-through growth of organisms that are inhibited at lower inoculation levels.

BIBLIOGRAPHY

1. Koch, F.D. 1942. Zentr. Bakt. Labt. Orig. 149:122.
2. Chapman, G.H. 1945. J. Bacteriol. 50:201.
3. The United States Pharmacopeia. United States Pharmacopeial Convention, Rockville, MD.
4. Food and Drug Administration. 2001. Bacteriological Analytical Manual Online. AOAC International, Gaithersburg, MD.

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.

IFU 1580-MLT, Revised June 22, 2009

Printed in U.S.A.

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