PRODUCT SPECIFICATION SHEET

Antibiotic Assay Medium No. 8 (DM020I)

Intended Use
Antibiotic Assay Medium No. 8 (DM020I) is recommended for microbiological assay of Tetracyline and Oxytetracycline, in compliance with IP.

Product Summary and Explanation
The activity (potency) of an antibiotic can be demonstrated under suitable conditions by its inhibitory effect on microorganisms.[1] An assay is made to determine the ability of an antibiotic to kill or inhibit the growth of living microorganisms. Biological tests offer the most convenient means of performing an assay,[2] since a reduction in the antimicrobial activity of a specific antibiotic reveals changes not usually displayed by chemical methods.[3] Antibiotic assays are performed by the cylinder plate method and the turbidimetric "tube" assay. The cylinder plate method, first described by Abraham et al.[4] for the assay of penicillin, was later modified by Foster and Woodruff[5] and by Schmidt and Moyer.[6] The choice of methodology is often based on many factors, including relative ease of performance, flexibility and use of automated or semi-automated devices for both identification and susceptibility testing.[7]
The composition of Antibiotic Assay Medium No. 8 is in accordance with IP and CFR.[8,9] This medium is used to prepare the base layer to assay tetracycline and oxytetracycline.

Principles of the Procedure
Antibiotic Assay Medium No. 8 contains peptone, yeast extract and beef extract which provides nitrogenous growth factors, vitamins and other essential growth nutrients. This medium provides solidified substratum for growth of organisms. This medium provides the optimal pH 5.8-6.0 for assay of tetracycline as these antibiotics are stable at slightly lower pH.[10] This pH condition also supports the growth of test organisms.

Note : *Recommended for the microbiological assay of Tetracycline, Oxytetracycline.*

Formula / Liter

Ingredients	Gms / Liter
Peptone	9.40
Yeast extract	4.70
Beef extract	2.40
Sodium chloride	10.00
Glucose monohydrate	10.00
Agar	23.50
Final pH: 6.0 ± 0.1 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.
3. Freshly prepared plates should be used for antibiotic assays.
4. All conditions in the microbiological assay must be controlled carefully.
5. The use of standard culture medium in the test is one of the important steps for obtaining good results.

Directions
1. Suspend 25.5 grams of the medium in one liter of purified / distilled water.
2. Heat to boiling to dissolve the medium completely.
3. Autoclave at 121°C, 15 psi pressure, for 15 minutes / validated cycle.

Quality Control Specifications

Dehydrated Appearance	Cream to yellow homogeneous free flowing powder
Prepared Medium	Light amber coloured slightly opalescent gel forms in Petri plates
Reaction of 5.9% solution	pH 6.0 ± 0.1 at 25°C

Gel Strength	Firm, comparable with 2.35% Agar gel

Expected Cultural Response: Cultural characteristics observed after an incubation at 32 - 35°C for 5 days.

Sr. No.	Organisms	Results to be achieved			
		Inoculum (CFU)	Growth	Recovery	Antibiotics Assayed
1.	*Bacillus cereus var mycoides ATCC 11778*	50-100	good-luxuriant	>=70%	Tetracycline, Oxytetracycline

The organisms listed are the minimum that should be used for quality control testing.

Test Procedure

Preparation of Stock cultures

1. Maintain stock cultures on agar slants and make transfers at 1- or 2-week intervals.
2. Using sterile purified water, saline or Antibiotic Medium No. 3, prepare the inoculum for assay by washing growth from a fresh 24-48 hour agar slant and further dilute the culture to obtain the desired organism concentration.
3. For using as a test organism *Bacillus subtilis*, inoculate the organism on Antibiotic Medium No. 1 and incubate at 37°C for 1 week. Wash spores from the agar surface, and heat the spores at 56°C for 30 minutes. Using sterile purified water wash the spores three times, heat again at 65°C for 30 minutes, and then dilute to the optimal concentration. Inoculum prepared following this method should produce a sharp zone in the assay.
4. For preparing spore suspension of *B. Subtilis*, Antibiotic Medium No. 1 modified by the addition of 300 mg manganese sulfate ($MnSO_4 \cdot H_2O$) per liter is used which aids in the sporulation of *B. Subtilis*.

Cylinder Plate Assay

1. Use 20 × 100 mm glass or plastic Petri dishes with sufficient depth so that cylinders used in the assay will not be pushed into the medium by the cover.
2. Use stainless steel or porcelain assay cylinders having the following dimensions (± 0.1 mm): 8 mm outside diameter, 6 mm inside diameter and 10 mm long. Clean the cylinders carefully to remove all residues, using an occasional acid bath (i.e., with approximately 2N nitric acid or with chromic acid).
3. Four or six cylinders are generally used per plate, evenly spaced on a 2.8 cm radius.
4. For assuring accurate assays, use a level surface for working to obtain uniformly thick base and seed layers in the Petri dish.
5. Allow the base layer to solidify and then overlay the seed layer containing a proper concentration of the test organism. The amount of medium in the layers varies for different antibiotics, with most assays specifying a 21 mL base layer and a 4 mL seed layer.
6. In any case, dishes with flat bottoms are required to assure complete coverage of the bottom of the dish when small amounts of base medium are used. Tilt the plate to obtain even coverage of the base layer by the seed layer and allow it to solidify in a level position. Plates should be used the same day as prepared.

Results

1. After incubation the concentration of the antibiotic being assayed is determined by measuring the zone of inhibition obtained, with that of reference standard antibiotic.
2. Refer to appropriate references and specific test procedures.

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. For identification, organisms must be in pure culture. Morphological, biochemical and/or serological tests should be performed for final identification.
2. Consult appropriate texts for detailed information and recommended procedures.

Packaging

Product Name : Antibiotic Assay Medium F
Product Code : DM020I
Available Pack sizes : 500gm

References

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3. The United States Pharmacopoeia, 2009, The United States Pharmacopoeial Convention,Rockville, MD.
4. Abraham, Chain, Fletcher, Florey, Gardner, Heatley and Jennings. 1941. Lancett *ii*:177.
5. Foster and Woodruff. 1943. J. Bacteriol. 46:187.
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7. Murray P. R., Baron J. H., Pfaller M. A., Jorgensen J. H. and Yolken R. H., (Eds.), 2003, Manual of Clinical Microbiology, 8th Ed., American Society for Microbiology, Washington, D.C.
8. Indian Pharmacopoeia 2010, Ministry of Health and Family welfare, Government of India, New Delhi.
9. Tests and Methods of Assay of Antibiotics and Antibiotic containing Drugs, FDA, CFR, 1983 Title 21, Part 436,Subpart D, Washington, D.C.: U.S. Government Printing Office, paragraphs 436, 100-436, 106, p. 242-259, (April1).
10. Chapin-Robertson and Edberg, 1991, Measurement of Antibiotics in Human Body fluids:Techniques and significance. Antibiotics in Laboratory medicine, New York pp 311.

Further Information

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DM020IPSS, QAD/FR/024,Rev.00