CRITERION™ MUELLER HINTON BROTH

Cat. no. C7520	CRITERION™ Mueller Hinton Broth	42gm
Cat. no. C7521	CRITERION™ Mueller Hinton Broth	500gm
Cat. no. C7522	CRITERION™ Mueller Hinton Broth	2kg
Cat. no. C7523	CRITERION™ Mueller Hinton Broth	10kg
Cat. no. C7524	CRITERION™ Mueller Hinton Broth	50kg

INTENDED USE

Hardy Diagnostics CRITERION™ Mueller Hinton Broth is recommended for use in the cultivation of a wide variety of microorganisms. Mueller Hinton Broth is also recommended for antimicrobial susceptibility testing of aerobic microorganisms by broth dilution methods.[7]

This dehydrated culture medium is a raw material intended to be used in the making of prepared media products, which will require further processing, additional ingredients, or supplements.

SUMMARY

Mueller and Hinton developed Mueller Hinton media in 1941 to be a protein free medium for isolating pathogenic strains of *Neisseria*.[8] Mueller Hinton Broth is recommended for the cultivation of microorganisms, and for making dilutions of organisms to be used in the Kirby-Bauer disk diffusion procedure. Broth dilution antimicrobial susceptibility testing can be performed using Mueller Hinton Broth.

CRITERION™ Mueller Hinton Broth contains the same ingredients as Mueller Hinton Agar, with the exception of the solidifying agent. Mueller Hinton Broth contains beef infusion, casamino acids and starch. Starch acts as a colloid that protects against toxic material in the media. Beef infusion and casamino acids are provided as a source of energy and nutrients.

FORMULA

Gram weight per liter:	21.0gm/L
Acid Hydrolysate of Casein	17.5gm
Beef Extract	2.0gm
Starch	1.5gm

Final pH 7.3 +/- 0.1 at 25ºC.

* Adjusted and/or supplemented as required to meet performance criteria.

STORAGE AND SHELF LIFE

Store the sealed bottle(s) containing dehydrated culture medium at 2-30ºC. Dehydrated culture medium is very hygroscopic. Keep lid tightly sealed. Protect dehydrated culture media from moisture and light. The dehydrated culture media should be discarded if it is not free-flowing or if the color has changed from its original light beige.

Store the prepared media at 2-30ºC.

The expiration dating on the product label applies to the product in its intact packaging when stored as directed. The product may be used and tested up to the expiration date on the product label and incubated for the recommended quality control incubation times.

Refer to the document "Storage" for more information.

PRECAUTIONS

This product may contain components of animal origin. Certified knowledge of the origin and/or sanitary state of the animals does not guarantee the absence of transmissible pathogenic agents. Therefore, it is recommended that these products be treated as potentially infectious, and handle observing the usual universal blood precautions. Do not ingest, inhale, or allow to come into contact with skin.

This product is for laboratory use only. It is to be used only by adequately trained and qualified laboratory personnel. Observe approved biohazard precautions and aseptic techniques. All laboratory specimens should be considered infectious and handled according to "standard precautions." Refer to the document "Guidelines for Isolation Precautions" from the Centers for Disease Control and Prevention.

For additional information regarding specific precautions for the prevention of the transmission of all infectious agents from laboratory instruments and materials, and for recommendations for the management of exposure to infectious disease, refer to CLSI document M-29: *Protection of Laboratory Workers from Occupationally Acquired Infections: Approved Guideline.*

Sterilize all biohazard waste before disposal.

Refer to the document "Precautions When Using Media" for more information.

METHOD OF PREPARATION FOR DEHYDRATED CULTURE MEDIA

1. Suspend 21.0gm of the dehydrated culture media in 1 liter of distilled or deionized water.

2. Heat as necessary to dissolve completely.

3. Dispense Mueller Hinton Broth as desired.

4. Autoclave at 121ºC. for 15 minutes.

5. Check prepared Mueller Hinton Broth to ensure the final pH is 7.3 +/- 0.1 at 25ºC.

6. Adjust cation content as necessary to meet performance requirements. Refer to the product container label for lot specific cation concentration. Consult listed references for information regarding cation adjustments.[7]

PROCEDURE AND INTERPRETATION OF RESULTS

For information on procedures and interpretation of results, consult listed references or refer to the prepared media Instructions for Use (IFU) for Cat. No. R38.

LIMITATIONS

It is recommended that biochemical, immunological, molecular, or mass spectrometry testing be performed on colonies from pure culture for complete identification.

Some formulations may require a settling period before pH testing of the prepared medium. If the pH is tested immediately after preparation and is out of specification, retest the medium after 24 hours to obtain final pH results.

Some strains may be encountered that fail to grow or grow poorly in this broth.

Inoculum size, rate of growth, medium formulation and pH, length of incubation and incubation environment, drug diffusion rate, and measurement of endpoints can affect results. It is recommended that procedures are accurately followed to ensure reliable results.[5]

Thymidine in excessive amounts can reverse the inhibitory effects of sulfonamides and trimethoprim.[7]

Variation in the concentration of divalent cations, primarily calcium an magnesium, affects results of aminoglycoside, tetracycline, and colistin tests with *P. aeruginosa* isolates. A cation content that is too high reduces zone sizes, where as a cation content that is too low has the opposite effect.

A pH outside the range of 7.3 +/- 0.1 may adversely affect susceptibility test results. If the pH is too low, aminoglycosides and macrolides will appear to lose potency; others may appear to have excessive activity. The opposite effects are possible if the pH is too high.[1]

Mueller Hinton Broth should be inoculated within 15 minutes after preparing the inoculum suspension.[1]

Refer to the document "Limitations of Procedures and Warranty" for more information.

MATERIALS REQUIRED BUT NOT PROVIDED

Standard microbiological supplies and equipment such as autoclaves, incinerators, and incubators, etc., are not provided.

QUALITY CONTROL

Hardy Diagnostics tests each lot of commercially manufactured media using appropriate quality control microorganisms and quality specifications as outlined on the Certificates of Analysis (CofA). The following organisms are routinely used for testing at Hardy Diagnostics:

Test Organisms	Inoculation Method*	Incubation			Results
		Time	Temperature	Atmosphere	
Escherichia coli ATCC ® 25922	A	24hr	35°C	Aerobic	Growth
Staphylococcus aureus ATCC ® 25923	A	24hr	35°C	Aerobic	Growth
Enterococcus faecalis ATCC ® 29212	A	24hr	35°C	Aerobic	Growth
Pseudomonas aeruginosa ATCC ® 27853	A	24hr	35°C	Aerobic	Growth

* Refer to the document "Inoculation Procedures for Media QC" for more information.

Each lot of CRITERION™ Mueller Hinton Broth powder has been tested to determine calcium ion and magnesium ion

concentration. Refer to product container for lot specific information.

USER QUALITY CONTROL

Users of dehydrated culture media should perform QC testing in accordance with applicable government regulatory agencies, and in compliance with accreditation requirements. Hardy Diagnostics recommends end users check for signs of contamination and deterioration and, if dictated by laboratory quality control procedures or regulation, perform quality control testing to demonstrate growth or a positive reaction and to demonstrate inhibition or a negative reaction, if applicable. Hardy Diagnostics quality control testing is documented on the certificates of analysis (CofA) available from Hardy Diagnostics Certificates of Analysis. In addition, refer to the following document "Finished Product Quality Control Procedures," for more information on QC or see reference(s) for more specific information.

PHYSICAL APPEARANCE

CRITERION™ Mueller Hinton Broth powder should appear homogeneous, free-flowing, and light beige, with a few dark specks, in color. The prepared media should appear clear, and very light amber in color; may have slight precipitate.

REFERENCES

1. Wood, G.L. and J.A. Washington. 1995. Antimicrobial Susceptibility Tests; dilution and disk diffusion methods. In Murray, P.R., et al. *Manual of Clinical Microbiology*, 7th ed. American Society for Microbiology, Washington, D.C.; 1327-1341.

2. Tille, P., et al. *Bailey and Scott's Diagnostic Microbiology*, C.V. Mosby Company, St. Louis, MO.

3. Barry and Fay. 1973. *Am. J. Clin. Pathol.*; 50:196.

4. Bauer, A.W., W.M.M. Kirby, et al. 1966. *Am. J. Clin. Pathol.*; 45:493-496.

5. Isenberg, H.D. *Clinical Microbiology Procedures Handbook*, Vol. I, II & III. American Society for Microbiology, Washington, D.C.

6. Koneman, E.W., et al. *Color Atlas and Textbook of Diagnostic Microbiology*, J.B. Lippincott Company, Philadelphia, PA.

7. *Methods for Dilution Antimicrobial Test for Bacteria that Grow Aerobically* , 4th ed., M7-A5. 1997. Clinical Laboratory Standards Institute (CLSI - formerly NCCLS), Villanova, PA.

8. Mueller, J.H. and J. Hinton. 1941. A protein-free medium for primary isolation of the *Gonococcus* and *Meningococcus*. *Proc. Soc. Exp. Diol. and Med.*; 48:330-333.

9. Standard Disk Susceptibility Test, The Federal Register, September 30, 1972; 37(191):20527-20529.

IFU-10212[A]

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The Hardy Diagnostics manufacturing facility and quality management system is certified to ISO 13485.

HDQA 2207B [C]