IFU

Instructions for Use

CRITERION™ BARNEY MILLER BROTH WITH INDICATOR

Cat. no. C8990	CRITERION™ Barney Miller Broth with Indicator	89.1gm
Cat. no. C8991	CRITERION™ Barney Miller Broth with Indicator	500gm
Cat. no. C8992	CRITERION™ Barney Miller Broth with Indicator	2kg
Cat. no. C8993	CRITERION™ Barney Miller Broth with Indicator	10kg

INTENDED USE

Hardy Diagnostics CRITERION™ Barney Miller Broth with Indicator is recommended for the isolation and detection of beer spoilage microorganisms, specifically lactic acid bacteria.

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

Barney Miller Medium was developed at the Miller Brewing Company by Barney, Kot and Chicoye for the purpose of detecting and identifying beer spoilage microorganisms during beer manufacture.[3] Lactic acid bacteria, such as *Lactobacillus* spp. and *Pediococcus* spp., often cause spoilage during brewing and processing.[5] Though beer is not an ideal growth medium, lactic acid bacteria tend to flourish during beverage fermentation and maturation stages because they do not require oxygen for growth, are resistant to ethanol, and thrive at low pH. When present, lactic acid bacteria can cause excessive turbidity and acidity and disrupt the flavor development of the final product.[5]

Hardy Diagnostics CRITERION™ Barney Miller Broth with Indicator contains tomato juice solids, peptone, yeast extract, amino acids, salts and electrolytes, and beef extract, which provide nitrogen, vitamins, carbon, and minerals to optimize bacterial growth. The carbohydrate mixture provides a substrate to support fermentation and chlorophenol red is used as a pH indicator. Potassium acetate inhibits the growth of unwanted microorganisms and Tween® 80 is added to neutralize the inhibitory effects of ethanol.

Prepared Barney Miller Broth is intended for use as a transport medium for environmental monitoring in the brewing industry. It is used in combination with Hardy Diagnostics EnviroTrans™ product NaCl with Na Thiosulfate (Cat. no. SRK50), which contains the swab for environmental sampling. After surface sampling, the swab is inserted into prepared Barney Miller Broth, which acts as an enrichment medium and has a similar composition to Barney Miller Medium without agar. Upon receipt in the lab, samples of Barney Miller Broth should be plated to Barney Miller Medium or another suitable medium, where they can be analyzed for the presence and abundance of beer spoilage microorganisms.

FORMULA

Ingredients per 750ml deionized water:*

Carbohydrate Mixture	28.7gm
Peptone	5.0gm
Yeast Extract	3.7gm
Potassium Acetate	3.0gm
Beef Extract	2.0gm
Amino Acid Mixture	0.7gm
Tween® 80	0.5gm
Salt and Electrolyte Mixture	0.482gm
Chlorophenol Red	0.07gm
Dehydrated Tomato Powder	0.018gm

Final pH 5.6 +/- 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 2-30 degrees C. 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 tan.

Store the prepared culture media at 2-8ºC.

The expiration date 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 incubation times as stated below.

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 M29: *Protection of Laboratory Workers from Occupationally Acquired Infections.*

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. Shake to disperse clumps before weighing.

2. Suspend 44.17gm of the dehydrated culture media in 750ml of distilled or deionized water and mix to dissolve completely.

3. Add 250ml of beer to the slurry and mix well. Heat as needed to dissolve completely.

4. Sterilize in the autoclave at 118ºC. for 12 minutes.

PROCEDURE AND INTERPRETATION OF RESULTS

For information on procedures and interpretation of results, consult listed references or refer to the comparable Beer Testing Media Instructions for Use (IFU) document for prepared EnviroTrans™ Barney Miller Broth, Cat. no. SRK100.

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. Always take pH reading at room temperature.

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

MATERIALS REQUIRED BUT NOT PROVIDED

Standard microbiological supplies and equipment such as autoclave, 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 Certificate of Analysis (CofA) and the CLSI document M22-A3 *Quality Assurance for Commercially Prepared Microbiological Culture Media*. The following microorganisms are routinely used for testing at Hardy Diagnostics:

Test Organisms	Inoculation Method*	Incubation			Results
		Time	Temperature	Atmosphere	
Pediococcus damnosus industrial strain	B	40-48hr	15-30°C	Anaerobic	Growth, yellow color change
Saccharomyces cerevisiae industrial strain	B	40-48hr	15-30°C	Aerobic	Growth, no color change
Lactobacillus brevis industrial strain	B	40-48hr	15-30°C	Aerobic	Growth, yellow color change

* Refer to the document "Inoculation Procedures for Media QC" for more 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 certificate of analysis (CofA) available from Hardy Diagnostics Certificate of Analysis website. In addition, refer to the following document "Finished Product Quality Control Procedures," for more information on QC or see the reference(s) for more specific information.

PHYSICAL APPEARANCE

CRITERION™ Barney Miller Broth with Indicator powder should appear homogeneous, free-flowing, and beige in color. The prepared media should be trace to slightly hazy and orange in color.

REFERENCES

1. American Society of Brewing Chemists. 1975. Report of Subcommittee on Microbiological Controls. Proc. *Am. Soc. Brew. Chem.*; 33:75.

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3. Barney, M.C., E.J. Kot and E. Chicoye. 1990. Culture Medium for Detection of Beer Spoilage Microorganisms. *U.S. patent 4,906,573*.

4. Boatwright, J. and Kirsop, B.H. 1976. Sucrose Agar: A Growth Medium for Spoilage Organisms. *Journal of Inst. Brewing*; 82:343-346.

5. Goldammer, T. 2000. *The Brewer's Handbook, The Complete Book to Brewing Beer*. Beer spoilage organisms; 19:1-14. KVP Publishers, Clifton, VA.

6. Kozulis, J.A., and H.E. Page. 1968. *A New Universal Beer Agar Medium for the Numeration of Wort and Beer Microorganisms* . American Society Brewing Chemists Proc. p. 52-58.

7. MacFaddin, J.F. 1985. *Media for Isolation, Cultivation, Identification, Maintenance of Bacteria*, Vol. I. Williams & Wilkins, Baltimore, MD.

8. Murphy, D.T., and L.T. Saletan. 1970. Use of Microbiological Media in the Brewery. *Tech. Q. Master Brew. Assoc. Am.*; 7:182-187.

9. APHA Technical Committee on Microbiological Methods for Foods. *Compendium of Methods for the Microbiological Examination of Foods*, APHA, Washington, D.C.

10. Tiedman, W.D., Chairman. 1948. *Technic for the Bacteriological Examination of Food Utensils* . Committee Report. American Journal of Public Health Yearbook.

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

HDQA 2207B [D]