

Instructions for Use

CRITERION™ BARNEY MILLER AGAR WITH INDICATOR

Cat. no. C9200	CRITERION™ Barney Miller Agar with Indicator	116.34g
Cat. no. C9201	CRITERION™ Barney Miller Agar with Indicator	500g
Cat. no. C9202	CRITERION™ Barney Miller Agar with Indicator	2kg
Cat. no. C9203	CRITERION™ Barney Miller Agar with Indicator	10kg

INTENDED USE

Hardy Diagnostics CRITERION™ Barney Miller Agar with Indicator is recommended for the detection and enumeration of beer spoilage microorganisms.

Dehydrated culture media is a raw material not intended for use in the diagnosis of human disease. For implementation, this product requires additional processing and supplementation of ingredients before use.

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 Agar 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. Tween® 80 is added to neutralize the inhibitory effects of ethanol and agar is the solidifying agent.

Prepared Barney Miller Agar with Indicator is intended for use as a plating medium for the detection and enumeration of beer spoilage microorganisms in the brewing industry.⁽³⁾ It can be used for testing of beer products or for environmental sampling in combination with Hardy Diagnostics Barney Miller Broth, which acts as an enrichment medium and has a similar composition to Barney Miller Agar.

FORMULA

Ingredients per 750ml deionized water:*

Carbohydrate Mixture	28.7g
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Peptone	5.0g
Yeast Extract	3.7g
Potassium Acetate	3.0g
Beef Extract	2.0g
Amino Acid Mixture	0.7g
Tween [®] 80	0.5g
Salt and Electrolyte Mixture	0.482g
Chlorophenol Red	0.07g
Dehydrated Tomato Powder	0.018g
Agar	15.0g

Final pH 5.6 +/- 0.1 at 25°C.

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

STORAGE AND SHELF LIFE

Store the sealed bottle(s) that contain dehydrated culture medium at 2-30°C. Dehydrated culture medium is very hygroscopic and will clump when exposed to moisture and air. Keep lid tightly sealed and do not remove the container desiccant if present. Protect dehydrated culture media from moisture and light. Dehydrated culture media should be discarded if the media is not free-flowing or if the color has changed from its original tan.

Store the prepared culture media at 2-8°C.

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. Suspend 58.17g of the dehydrated culture media in 750ml of distilled or deionized water. Stir to mix thoroughly.
2. Boil for one minute to dissolve completely.
3. Add 250ml of beer and mix well.
4. Sterilize in the autoclave at 121°C for 15 minutes.
5. Cool to 45-50°C and dispense as desired.

Note: The shelf life of in-house prepared media from dehydrated culture media is dependent upon preparation methods, container quality, equipment, storage conditions, and batch testing criteria and must be validated by the end user.

PROCEDURE AND INTERPRETATION OF RESULTS

For information on procedures and interpretation of results, consult listed references or refer to the Beer Testing Media Instructions for Use (IFU) document for prepared EnviroTrans™ Barney Miller Broth, Cat. no. SRK100 and Barney Miller Medium, Cat. no. G93.

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.

Accurate counting may be difficult with molds or spreading colonies.

Rare, fastidious microorganisms may not grow on selective media formulations.

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, incubators, tubes, bottles, petri dishes, 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	
<i>Pediococcus damnosus</i>					

industrial strain	B	48-72hr	15-30°C	Anaerobic	Growth, yellow color change
<i>Saccharomyces cerevisiae</i> industrial strain	B	48-72hr	15-30°C	Aerobic	Growth, no color change
<i>Lactobacillus brevis</i> industrial strain	B	48-72hr	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 Agar with Indicator powder should appear free-flowing and beige in color with brown-orange particles. Some clumps may be present. The prepared media should be trace to slightly hazy and light to medium amber 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 B.H. Kirsop. 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. Murphy, D.T., and L.T. Saletan. 1970. Use of Microbiological Media in the Brewery. *Tech. Q. Master Brew. Assoc. Am.*; 7:182-187.
8. APHA Technical Committee on Microbiological Methods for Foods. *Compendium of Methods for the Microbiological Examination of Foods*, APHA, Washington, D.C.
9. 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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