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BAX® System PCR Assay for *E. coli* O157:H7 MP

Part KIT2004 (D12404903)

PERFORMANCE TESTED AOAC RESEARCH INSTITUTE LICENSE NUMBER 050501

BY AFNOR CERTIFICATION NF VALIDATION EN ISO 16140

QUA 18/04-03/08
ALTERNATIVE ANALYTICAL METHODS FOR AGRIBUSINESS
http://nf-validation.afnor.org/en

KIT CONTENTS

96 PCR tubes with tablets (1 bag of 12 x 8 strips)
96 flat optical caps (12 x 8 strips)
1 bottle of protease (400 µL)
2 bottles of lysis buffer (12 mL)

INTENDED USE

Food processors and associated laboratories can use the BAX® System as a quick and reliable method for detecting *E. coli* O157:H7 in a variety of foods. This multiplex (MP) assay is designed to report yes/no results for *E. coli* O157:H7 at concentrations as low as 10^4 cfu/mL after enrichment. With a processing time of approximately 3.5 hours for *E. coli* O157:H7 MP* or 2.5 hours for *E. coli* O157:H7 MP Express* in the BAX® System Q7 instrument, the method returns results comparable to culture methods, but with a significantly faster time to result.

BAX® Systems are designed for use by qualified lab personnel who follow standard microbiology laboratory practice, including the safe handling and disposal of potentially pathogenic materials. The laboratory must comply with good laboratory practice (see ISO 7218 standard).

**Two BAX® System protocols, MP and MP Express, have been validated.*

Field of use: Data obtained from the BAX® System should not be used for human diagnostic or human treatment purposes. Equipment is not approved by the United States Food and Drug Administration or any other U.S or non-U.S. regulatory agency for use in human diagnostics or treatment. The BAX® System should not be used as the sole basis for assessing the safety of products for release to consumers. The information generated is only to be used in conjunction with the user's regular quality assurance program. Not approved for clinical diagnosis. Use for research and development, quality assurance and quality control under supervision of technically qualified persons.

PRINCIPLE OF THE METHOD

See the BAX® System User Guide for an overview of how the BAX® System method uses automated, Polymerase Chain Reaction (PCR) technology.

MATERIALS

BAX® System PCR Assay for *E. coli* O157:H7 MP (KIT2004 [D1240493])

BAX® System start-up package (equipment and supplies for up to 192 tests)

- BAX® System cycler/detector and computer work station
- Heating blocks with inserts* capable of maintaining 37±2ºC and 95±3ºC
- Cooling blocks with inserts*
- PCR tube holder
- Capping/decapping tools
- Adjustable mechanical pipettes (5-50 µL; 20-200 µL)
- Repeating pipette
- Multi-channel pipette (8 channels – 5-50 µL)
- Cluster tubes with caps and racks
- Pipette tips with barriers
- Powder-free nitrile gloves

**The Automated Thermal Block (Catalog No. MCH2023 [D14614252]) may be used in place of heating and cooling blocks.*

Stomacher with bags

Incubator capable of maintaining directed enrichment temperatures within ±2°C

***Note**: Health Canada and AFNOR Certification standards require an incubator capable of maintaining ±1°C.*

Enrichment media (see BAX® System User Guide for details)

- BAX® System MP Media (2.5 kg tub) – Catalog No. MED2003 (D12404925)

  ***Note**: StatMedia™ soluble packets may also be used to prepare BAX® System MP media. See instructions on packet or in User Guide.*

- Modified Tryptic Soy Broth (mTSB) with 20 mg/L Novobiocin

***Note**: For an NF-Validation method, please note that for the preparations of master solutions, you must follow the instructions from the EN ISO 6887 standards.*

STORAGE AND SHELF LIFE

- Reagent packages should be kept refrigerated at 2–8°C. Do not freeze.
- Reagents should be used by the expiration date stamped on the individual labels.
- After protease has been added to the lysis buffer, shelf life of the solution is 2 weeks when stored at 2-8°C.

PRECAUTIONS

The BAX® System method includes sample enrichment procedures that nourish the growth of potential pathogens to detectable levels. Because pathogens can cause human illness, appropriate safety precautions must be taken when handling samples, media, reagents, glassware and other supplies and equipment that could be contaminated with potentially pathogenic bacteria.

Reagents used with the BAX® System assays should pose no hazards when used as directed. Before using this assay, please review the Safety Data Sheets (SDS) included with your BAX® System purchase and also available at www.hygiena.com. Refer to your site practices for safe handling of materials at extreme temperatures.

SOFTWARE REQUIREMENTS

Before using this assay for the first time, install the most current version of the BAX® System software, then run a calibration report to check that "*E. coli* O157:H7 MP" and "*E. coli* O157:H7 MP Express" appear in the list of calibration files. See "Troubleshooting Calibration" in the BAX® System User Guide for details.

If the report list does not contain "*E. coli* O157:H7 MP" and "*E. coli* O157:H7 MP Express" you must recalibrate the Q7 instrument to load the required dyes. Be sure to allow enough time to complete the calibration (about 1.5 to 2 hours) before starting the assay. For instructions and tips on calibrating the instrument, see the BAX® System User Guide.

ENRICHMENT PROTOCOL

1. Prepare Enrichment Broth

Dissolve 22.5 g BAX® System MP media in 1 L distilled water and mix. Do not boil. Adjust pH to a final value of 7.2±0.2 at 25°C, then autoclave at 121°C for 15 minutes.

2. Collect and Enrich Samples

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- *Raw Ground Beef* : Homogenize 25 g sample with 225 mL pre-warmed (42°C) BAX® System MP media. Incubate at 42°C for 8-24 hours.
- *Raw Ground Beef:* Homogenize 65 g sample with 585 mL pre-warmed (42°C) BAX® System MP media. Incubate at 42°C for 8-24 hours.
- *Beef Trim*: Gently massage 65 g sample by hand with 585 mL pre-warmed (42°C) BAX® System MP media for 30 seconds so that broth covers entire surface of sample. Incubate at 42°C for 8-24 hours.
- *Spinach and Lettuce*: Combine 25 g sample with 225 mL pre-warmed (42°C) BAX® System MP media and swirl to soak entire sample. Incubate at 42°C for 8-24 hours.

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Test portions weighing more than 25 g have not been tested in the context of NF VALIDATION

For preparation of initial suspensions, follow instructions of EN ISO 6579 and EN ISO 6887 standards.

- *Raw beef meats*: Homogenize 25 g sample with 225 mL pre-warmed (42°C) BAX® System MP media. Incubate at 42°C for 8-24 hours.
- *Raw beef meats, raw milk, ready to eat and ready to reheat dishes, raw pork, ovine and chicken meats, fruits and vegetables:* Homogenize 25 g sample with 225 mL pre-warmed (41.5°C) mTSB broth supplemented with novobiocin. Incubate at 41.5°C for 18-24 hours.

TEST PROTOCOL

3. Prepare Equipment

3.1 Turn on the heating blocks for 37ºC and 95ºC*.
3.2 Make sure cooling blocks are chilled to 2-8ºC*.
**If using the Automated Thermal Block, follow the instructions in the Automated Thermal Block User Guide for running the Gram Negative program.*
3.3 Power on the Q7 instrument and launch the BAX® System application.
3.4 Create a rack file (see User Guide for details).
***Note**: You have two choices when testing for E. coli* O157:H7 *using the MP assay. Select E. coli* O157:H7 *MP for single or mixed target batches. Select E. coli* O157:H7 *MP Express for faster processing of single-target batches.*

4. Perform Lysis

4.1 Break cluster tubes apart.
4.2 Label and arrange cluster tubes in rack according to the rack file.
4.3 Prepare lysis reagent by adding 150 µL protease to one 12 mL bottle of lysis buffer.
4.4 Transfer 200 µL lysis reagent to each cluster tube.
4.5 Transfer enriched sample to the corresponding cluster tube.
- For samples enriched in BAX® System MP media, transfer 20 µL enriched sample.

BAX® System Q7 instruments are sold under licensing arrangement with Applied Biosystems for food testing. Use for research and development, quality assurance and quality control testing under supervision of technically qualified persons. Not approved for clinical use. Please read the limitation of warranty and liability before use. INS2025 REV05
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- For all other samples, transfer 5 µL enriched sample.

4.6 Heat at 37°C for 20 minutes.
4.7 Heat at 95°C for 10 minutes.
4.8 Cool at 2-8°C for 5 minutes.

5. Hydrate PCR Tablets

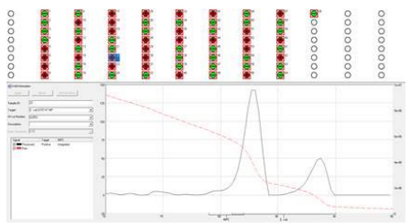
5.1 Initialize the instrument by selecting RUN FULL PROCESS from the OPERATION menu.
5.2 Place a PCR tube rack onto a frozen (-20°C) PCR cooling block.
5.3 Arrange strips of PCR tubes according to your rack file.
5.4 Remove the caps from the first strip of tubes with the decapping tool.
5.5 Transfer 50 µL lysate (from step 4.8) into PCR tubes, then seal with flat optical caps.
5.6 Repeat with remaining strips of PCR tubes until all PCR tablets have been hydrated.

6. Amplify and Detect

6.1 At the "Ready for Rack Load" prompt, click the NEXT button and open the instrument drawer.
6.2 Place the rack of PCR tubes over the wells in the drawer and check that the tubes are seated correctly.
6.3 Close the drawer and click the NEXT button to begin automated processing.

7. Review Results

Qualitative results are displayed as a grid of color-cued icons in the top half of the screen:



Green (-)	=	Negative for target organism
Red (+)	=	Positive for target organism
Yellow (?)	=	Indeterminate result*
Yellow (?) with red slash	=	Signal error*

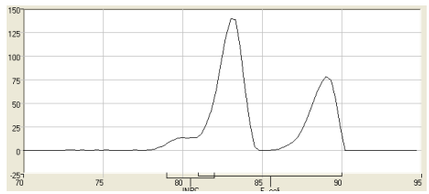
*Refer to the troubleshooting section in the User Guide for assistance.

The lower pane of the well view contains a line graph of processed and/or raw data associated with the selected wells. The process data allows you to view the melting curve, which is unique to each target.

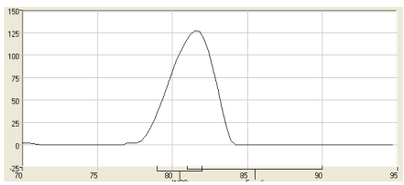
For both *E. coli* O157:H7 MP and *E. coli* O157:H7 MP Express protocols:

- Positive reactions for *E. coli* O157:H7 typically show one peak* in the positive control range (79-82°C) and two peaks in the target range (81-90°C).

  **A small peak may be seen at 75-76°C in the positive control range; its presence does not affect results.*



- Negative reactions display either only the positive control peak or the positive control peak with only one of the two target peaks.



CONFIRMATION

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If desired, BAX® System results can be confirmed from the reference culture method appropriate for the sample type, such as:

- U.S. FDA Bacteriological Analytical Manual (BAM)
- USDA FSIS Microbiology Laboratory Guidebook (MLG)
- Health Canada Compendium of Analytical Methods
- International Organization for Standardization (ISO)

Method Approved by AFNOR Certification

All samples identified as positive by the BAX® System method must be confirmed in one of the following ways:

- Using the conventional testing methods described by CEN or ISO, including purification, from the last enrichment broth.
- From the enrichment broth, streak 50 µL onto CT SMAC plates and incubate at 35-37°C for 18-24 hours. Check plates for typical *E. coli* O157:H7 colonies and confirm characteristic colonies with an appropriate latex agglutination test.

If confirmation cannot be obtained after direct streaking onto CT-SMAC, please proceed with the more thorough confirmation protocol as described in the technical bulletin MTD-2001 Rev 01 "Confirmation Protocol for *E. coli* O157:H7".

This protocol has been part of the AFNOR Certification validation study, and the document is available by contacting your local technical representative or diagnostic support at 1-302-695-5300 (outside the U.S.), 800-863-6842 (inside the U.S.) or email diagnostics.support@hygiena.com.

In the event of discordant results (positive by the alternative method and not confirmed by one of the means described above) the laboratory must follow the necessary steps to ensure the validity of the result obtained.

DISPOSAL

Decontaminate materials and dispose of biohazardous waste per your site practices and as required by federal, state and local regulations.

VALIDATION

The BAX® System PCR Assay for *E. coli* O157:H7 MP has been certified by the AOAC Research Institute as Performance Tested℠ Method #050501. This test kit's performance was reviewed by AOAC-RI and found to perform to the manufacturer's specifications. Validation studies for foods demonstrated BAX® System sensitivity and specificity equal to or better than the reference culture based methods.

The BAX® System PCR Assay for *E. coli* O157:H7 MP has been certified as QUA 18/04-03/08 according to NF VALIDATION rules. Validation studies conducted according to ISO 16140-2 standards found this test kit's performance to satisfy the NF VALIDATION rules for raw beef meat, raw milk, fruits and vegetables, ready to eat dishes and ready to reheat dishes and raw pork, ovine, and chicken meats. For more information, including validity dates, please refer to certificate QUA 18/04-03/08 available at http://nf-validation.afnor.org.

The software version approved in the scope of NF-Validation certification is disclosed in the certificate. For more information about the end of validity of the NF-Validation certification, please refer to the certificate available on the website or upon request to Hygiena representative.

TECHNICAL ASSISTANCE

For questions or comments, please contact your local distributor. You can also call 800-863-6842 in the U.S., 1-302-695-5300 outside the U.S., or email diagnostics.support@hygiena.com.

LIMITATION OF WARRANTY AND LIABILITY

NOTICE: READ THIS LIMITATION OF WARRANTY AND LIABILITY BEFORE USING THE BAX® SYSTEM EQUIPMENT, ASSAYS, AND/OR MEDIA ("BAX® SYSTEM"). If the terms are not acceptable, notify Hygiena immediately and arrangements will be made for return of the unused Equipment, assays, and/or media to Hygiena and for the refund of the purchase price, less shipping costs. USE OF BAX® SYSTEM EQUIPMENT, ASSAYS AND/OR MEDIA CONSTITUTES AN ACCEPTANCE OF ALL TERMS AND CONDITIONS OF THIS LIMITATION OF WARRANTY AND LIABILITY. Any additional or different terms in Buyer's purchase form(s) are material alterations and hereby rejected.

1. BAX® System Equipment should only be used with BAX® System assays.

2. When used with BAX® System assays, BAX® System Equipment is warranted be free of defects in materials, workmanship and design that may appear under normal and proper use within twelve (12) months from the installation date to the first end user. BAX® System assays are warranted to conform to the assay description under the conditions of use specified in the user documentation to the expiration date stamped on the label. BAX® System media is warranted to meet standard specifications in effect on the date of shipment. Hygiena MAKES NO OTHER WARRANTY, EITHER EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, ANY WARRANTY AGAINST INFRINGEMENT, ANY WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE OR THOSE ARISING BY LAW, STATUTE, USAGE OF TRADE, OR COURSE OF DEALING. User assumes all risk and liability resulting from use of the BAX® System Equipment, assays and media, whether used singly or in combination with other products.

3. BAX® Software: Hygiena warrants that for a period of 60 days from the date of first date of use by the Customer/end user, BAX® software media will be free from defect in materials and workmanship and that the BAX® software will substantially perform in accordance with the accompanying BAX® software documentation. EXCEPT FOR THE EXPRESS WARRANTY ABOVE, HYGIENA MAKES NO OTHER WARRANTY, EITHER EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, ANY WARRANTY AGAINST INFRINGEMENT, ANY WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE OR THOSE ARISING BY LAW, STATUTE, USAGE OF TRADE, OR COURSE OF DEALING. User assumes all risk and liability resulting from use of the BAX® software, whether used singly or in combination with other products.

4. The accuracy of the BAX® System can be affected by factors over which Hygiena has no control, including, without limitation, the use of the Equipment, assays and/or media in a manner that is contrary to the conditions of use, the procedures or the instructions specified by Hygiena. Because of the large number of factors over which Hygiena has no control, Hygiena makes no promise or guarantee of the accuracy of or results obtained from the use of the BAX® System. In particular, Hygiena disclaims any warranty or liability and assumes no responsibility whatever for the failure of the BAX® System due, in whole or in part, to user's failure to: (a) properly maintain Equipment, (b) maintain specified operating or storage conditions, (c) follow the specified instructions, or (d) use the proper microbiological techniques consistent with the standard of care accepted in the industry for the proper collection, storage, handling and preparation of the sample.

5. Externally caused failures, such as improper sample preparation, improper storage or loading of reagents, electrical outages, or out-of-specification environmental conditions are not covered under this warranty. Equipment failures caused by spills, abuse, misuse, negligence, or improper operation are not covered by this warranty. Modifications, service or repairs by parties other than Hygiena-authorized providers are not covered by this warranty and, in fact, void this warranty. Circumstances beyond the reasonable control of Hygiena, including fire, explosions, accidents, flood, labor trouble or shortage, war, act

of or authorized by any government, inability to obtain suitable material, Equipment, fuel, power or transportation, or acts of God are not covered under this warranty.

6. The BAX® System is designed to test only for the presence of the target organisms specified in the particular assay. The BAX® System has been tested against many, but not all, strains of the target within the sample types specified in the user documentation. Hygiena, therefore, cannot and does not make any representation or warranty that the BAX® System is capable of detecting every organism in the target genus, serotype, or species in any sample source. Accordingly, the BAX® System should not be used as the sole test for the release of user's products, nor should it be used as the sole basis for determining the safety of user's products.

7. CUSTOMER/USER ASSUMES ALL RISKS IN USING THE BAX® SYSTEM AND HYGIENA OR ITS AFFILIATES, DISTRIBUTORS, ITS LICENSORS OR REPRESENTATIVES SHALL HAVE NO LIABILITY TO CUSTOMER/USER OR TO ANY OTHER PERSON OR ENTITY FOR ANY INDIRECT, INCIDENTAL, SPECIAL, PUNITIVE, EXEMPLARY OR CONSEQUENTIAL DAMAGES WHATSOEVER, INCLUDING, BUT NOT LIMITED TO, LOSS OF REVENUE OR PROFIT, LOST OR DAMAGED DATA OR OTHER COMMERCIAL OR ECONOMIC LOSS EVEN IF CAUSED BY THE NEGLIGENCE OF HYGIENA OR ITS REPRESENTATIVES AND/OR IF HYGIENA HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES, AND/OR IF THEY ARE FORESEEABLE.

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keydiagnostics
T: 02 8212 4074 F: 02 9423 6992
info@keydiagnostics.com.au
www.keydiagnostics.com.au
PO Box 1038, Gymea, NSW, 2227