



# MicroBiologics®

## EZ-PEC™ Microorganisms

---

EZ-PEC™ Microorganism preparations provide quantitative challenges for Antimicrobial Effectiveness and Preservative Efficacy Testing.

---

### INTENDED USE

The **EZ-PEC™ (Preservative Efficacy Challenge) Microorganisms** are lyophilized, enumerated microorganism preparations to be used in industrial laboratories.

The applications for these microorganism preparations include quantitative challenges for Antimicrobial Effectiveness and Preservative Efficacy Testing.

These microorganism preparations are traceable to the American Type Culture Collection (ATCC®) or other authentic reference culture collection.

### SUMMARY AND HISTORY

Many laboratory QC testing procedures dictate that a specified concentration of the challenge strain be employed and the challenge strain can only be passed or subcultured from a reference culture a limited number of times to prevent mutation and subtle performance changes.

Traditional methods for preparing challenge strains at specified concentrations are time consuming and labor-intensive. Laboratories purchase a designated strain, grow the strain, prepare the dilutions, perform colony counts on each dilution to determine the concentration to be employed in the challenge procedure, and subsequently prepare dilutions of the challenge strain for actual use. Also, at each subculture step, phenotypic tests (biochemical activity and morphological examinations) are performed to provide assurance that no mutations or alterations have taken place.

**EZ-PEC™ Microorganisms** are a cost-effective alternative to labor-intensive dilution/colony count procedures. They do not require the equipment necessary for processing and preserving in-house concentrations of challenge strains, and routine quality control is performed which supports the absence of mutations and alterations.

### PRINCIPLE

**EZ-PEC™ Microorganisms** incorporate a lyophilization method reported by Obara et.al. which uses a suspending medium consisting of gelatin, skim milk, ascorbic acid, dextrose, and charcoal. The gelatin serves as a carrier for the microorganism. Skim milk, ascorbic acid, and dextrose protect the microorganism by preserving the integrity of the cell wall during freeze-drying and storage. The charcoal is included to neutralize any toxic substances formed during the lyophilization process.

A proprietary technology yields a lyophilized microorganism population at a predetermined concentration.

### FORMULA COMPONENTS

The lyophilized preparation consists of:

- A quantified microorganism population
- Gelatin
- Skim milk
- Ascorbic acid
- Dextrose
- Charcoal

The Hydrating Fluid is a working solution of pH 7.2 Phosphate Buffer. The fluid contains:

- Monobasic potassium phosphate
- Sodium hydroxide
- Deionized Water
- Magnesium Chloride as required

### SPECIFICATIONS AND PERFORMANCE

**EZ-PEC™ Microorganisms** are packaged in a kit configuration. Each kit consists of:

- Two (2) vials each containing ten (10) lyophilized pellets of an individual microorganism strain
- Ten (10) vials each containing 2 ml of hydrating fluid
- Detailed instructions
- Certificate of Assay



**Processed as directed, a 0.5 or 1.0 percent (%) addition of the microorganism suspension to the product to be tested will result in a final challenge concentration of 1.0E+05 to 1.0E+06 CFU per mL of product.**

Quality control documentation includes, but is not limited to, a Certificate of Assay stating:

- The identity of the microorganism
- The traceability of the microorganism to a reference culture
- That the microorganism preparation has been removed four (4) passages from the reference culture
- The mean assay value for the microorganism preparation

**PRECAUTIONS AND LIMITATIONS**

These products are for in-vitro use only.

These devices, and subsequent growth of these microorganisms on culture media, are considered to be biohazard material.

These devices contain viable microorganisms that may, under certain circumstances, produce disease. Proper techniques must be employed to avoid exposure and contact with any microorganism growth.

- The microbiology laboratory must be equipped, and have the facilities to receive, process, maintain, store and dispose of biohazard material.
- The microbiology laboratory personnel using these devices must be trained, experienced and demonstrate proficiency in processing, maintaining, storing and disposing of biohazard material.
- Agencies and statutes do regulate the disposal of all biohazard materials. Each laboratory must be aware of, and comply with, the proper disposal of biohazard materials.

**STORAGE AND EXPIRATION**

Store the **EZ-PEC™ Microorganisms** and Hydrating Fluid at 2°C to 8°C in their original, sealed vials.

Stored as directed, the lyophilized microorganism preparation will retain, until the expiration date stated on the device label, its specifications and performance within the stated limits.

**EZ-PEC™ Microorganisms** should not be used if:

- Stored improperly
- There is evidence of excessive exposure to heat or moisture
- The expiration date has passed

**MATERIALS REQUIRED BUT NOT PROVIDED**

Sterile pipettes are required to inoculate the material to be challenged.

**PRODUCT WARRANTY**

- These products are warranted to meet the specifications and performance printed and illustrated in product inserts, instructions, and supportive literature.
- The warranty, expressed or implied, is limited when:
  - The procedures employed in the laboratory are contrary to printed and illustrated directions and instructions
  - The products are employed for applications other than the intended use cited in product inserts, instructions, and supportive literature

**INSTRUCTIONS FOR USE**

**A. Material Preparation**

1. The Hydrating Fluid and all the materials required for the challenge procedure, and the materials to be challenged must be ready for use immediately following the hydration step.
2. Following the hydration of the lyophilized strain, challenge inoculation(s) **MUST** be completed within thirty (30) minutes to avoid a change in the challenge suspension concentration.
3. The Hydrating Fluid **MUST** be warmed to 34°C to 38°C prior to use.

**B. Hydration**

1. Remove the vial of lyophilized pellets from refrigerated storage (2°C to 8°C) and allow the materials to equilibrate to room temperature.
2. **PRIOR** to use, warm the hydration and dilution fluids to 34°C to 38°C.
3. With a sterile forceps, remove **TWO (2)** pellets and place into the vial containing 2 mL Hydrating Fluid.  
**TWO PELLETS MUST BE USED**
4. Immediately replace the rubber stopper, recap the vial, and return the remaining lyophilized material to refrigerated storage (2°C to 8°C).
5. Immediately recap the vial with the hydrated material and place into a 34°C to 38°C incubator for thirty (30) minutes to assure complete hydration.
6. Immediately following incubation, vortex the hydrated material to achieve a homogeneous suspension and equal distribution of the challenge strain throughout the hydrated suspension.



**Note:** Charcoal is an essential component of the lyophilized pellet preparation. Following hydration, charcoal particles may be visible in the suspension.

**C. Challenge**

1. Proceed with the test according to laboratory protocol.  
For example, for each 20.0 ml product to be tested, remove the desired volume (i.e. 0.1 ml to 0.2 mL) of the well-mixed hydrated suspension with a sterile pipette and transfer to the material to be tested for Antimicrobial Effectiveness Testing.

**TECHNICAL NOTES**

The lyophilized microorganism preparation, hydrating fluid, procedure, and process support and conform to the following applications:

**A. Test Challenge.**

As stated in USP, the final challenge concentration of the diluted microorganism suspension will result in a concentration between 1.0E+05 and 1.0E+06 CFU per mL of the product being tested.

**B. Assayed Control Volume.**

As stated in USP, the volume of the challenge microorganism must be between 0.5% and 1.0% of the total volume of the preparation to be tested.

For example, if the total volume of the preparation to be tested is 20.0 mL, the challenge volume would be between 0.1 mL and 0.2 mL.

**C. Challenge Concentration Example.**

- The mean assay value of the **EZ-PEC™ Microorganism** is 3.5E+07 CFU/mL.
- Following hydration, the concentration of the microorganism suspension is 3.5E+06 CFU per 0.1 mL.
- 0.2 mL of the hydrated suspension (7.0E+06 CFU) added to 20.0 mL of the material to be tested results in a final concentration of 3.5E+05 per mL.



**TROUBLE SHOOTING GUIDE**

**EZ-PEC™ Microorganism** preparations are subjected to a validated assay procedure prior to release from quality control to ensure that each lot meets product specifications. When used according to the instructions in the Product Insert, the concentration following hydration will be between 2.0E+07 and 9.9E+07 CFU/mL. A 0.5 or 1.0 percent addition of this suspension to the product to be tested will result in a challenge concentration of 1.0E+05 to 1.0E+06 per mL of product. If results outside of this range are observed, the following should be considered as possible causes. All literature referenced in this section is available on our website at [www.microbiologics.com](http://www.microbiologics.com) as well as in our Technical Manual. To request a copy of our Technical Manual, please call us at 1-800-599-BUGS(2847) or send an email to [info@mbl2000.com](mailto:info@mbl2000.com).

<b>PROBLEM</b>	<b>POSSIBLE CAUSE</b>	<b>RECOMMENDATIONS</b>
<b>LOW RECOVERY/ NO RECOVERY</b>	1) Use of inappropriate or selective media.	Not all media will support the growth of microorganisms. Please check with the media manufacturer if there is uncertainty as to whether or not the medium will support growth of the microorganism. The use of selective medium may inhibit recovery of the microorganism. Please refer to TIB.134 for additional information regarding the use of selective media.
	2) Incorrect incubation time, temperature or atmosphere.	Required incubation periods, temperatures and atmospheric conditions are not the same for all microorganisms. Please refer to TIB.081 for the recommended growth requirements for each organism. Also verify that incubator thermometers are reading correctly.
	3) Improper storage of vial.	<b>EZ-PEC™ Microorganisms</b> must be stored at 2°C to 8°C in their original vials. Desiccant packet should <b>not</b> be removed. The vial must be allowed to equilibrate to room temperature prior to opening. If cold vials are opened, condensation can collect in the vial. The combination of moisture and oxygen can produce toxic free radicals that can reduce the recovery of lyophilized microorganisms.
	4) Use beyond thirty (30) minutes after the hydration step.	As stated in this product insert (Instructions for Use, Section A) the hydrated microorganism suspension must be used within thirty (30) minutes. Please see TIB.160 for additional information.
<b>HIGH RECOVERY</b>	1) Use beyond thirty (30) minutes after the hydration step.	As stated in this product insert (Instructions for Use, Section A) the hydrated microorganism suspension must be used within thirty (30) minutes. Please see TIB.160 for additional information.

If the instructions in this Product Insert are being followed, none of the above situations is applicable, and recovery is still found to be outside the required range please contact our Technical Service Department at 1-800-599-BUGS(2847) or email [indprdts@mbl2000.com](mailto:indprdts@mbl2000.com) for additional assistance.



**BIOHAZARD CLEANUP**

Should accidental leakage or spilling of the device or subsequent growth of the microorganism on agar media occur, the following information outlines materials and procedures which will safely facilitate the clean up of biohazard material.

1. **Material Safety Data Sheet (MSDS)**

- A file must be maintained of all MSDS documents for biohazard material.
- The MSDS file must be available to all employees.
- All employees must be made aware of the location of the MSDS files.

2. **Biohazard Spill Kit**


Biohazard Spill Kits are available from commercial sources or can be made with the following materials:

- One liter bottle of an aqueous germicidal solution
- One pair of disposable latex or latex free gloves
- One tweezers
- One Biohazard Bag with closure
- One stack or roll of paper towels

3. **Procedure**


- Notify **ALL** people working in the immediate area of the incident.
- Do **NOT** leave the area unattended (unless you are the only individual in the area). Designate another employee to watch the incident area and divert traffic away from the incident area.
- After notifying all employees in the immediate area, collect the Biohazard Spill Kit and **IMMEDIATELY** return to the area.
- Put on the disposable gloves.
- With the tweezers, pick up as much material as possible and carefully place the materials into the Biohazard Bag.
- Saturate the spill area with germicidal solution.
- Keep the spill area moist with the germicidal solution for the appropriate amount of time as indicated on the germicidal solution used.
- Wipe up the area with the paper towels.
- Place all used paper towels in the Biohazard Bag.
- Following the cleanup, carefully remove the gloves and place into the Biohazard Bag.
- Seal the Biohazard Bag.
- Dispose of the Biohazard Bag in compliance with regulatory requirements.

**KEY OF SYMBOLS**


 Batch Code (Lot)

 Biological Hazards  
Biological Risks

 Catalog Number

 Caution consult accompanying documents  
Attention, see instructions for use

 Manufacturer

 Temperature Limitation

 Use By

**QUALITY CONTROL**

This product is developed, manufactured, and distributed:

- In compliance with the mandates of FDA: Quality System Regulation (QSR), 21CFR Part 820
- In conformance with the elements of ISO 9001:2000

Quality control functions may include, but are not limited to:

- purity and growth characteristics
- morphological features
- biochemical activity
- Assay value
- The identity of the microorganism and traceability to a reference culture
- The number of passages the microorganism preparation has been removed from the reference culture

The decision to perform additional quality control is the responsibility of each individual laboratory.

**REFERENCES**

The following reference cites the basis for the lyophilization method employed on these microorganism preparations.

1. Y. Obara, S. Yamai, T. Nikkawa, Y. Shimoda, and Y. Miyamoto. 1981. J. Clin. Microbiol. 14:61-66.

**WEB SITE**

Visit our web site for current technical information and product availability.

[www.microbiologics.com](http://www.microbiologics.com)

**ACKNOWLEDGEMENTS**

MicroBioLogics, Inc.  
217 Osseo Avenue North  
St. Cloud, MN 56303 USA  
Tel. 320 253 1640  
Fax. 320 253 6250  
Email. info@mb12000.com



\* The ATCC Licensed Derivative Emblem,  
the ATCC Licensed Derivative word mark and  
the ATCC catalog marks are trademarks of ATCC.  
MicroBioLogics, Inc. is licensed to use these trademarks  
and to sell products derived from ATCC® cultures.