The logo for Microbiologics, featuring the word "Microbiologics" in a white sans-serif font next to a stylized blue and white circular graphic composed of dots.

Microbiologics

CUSTOM MICROBIOLOGY CONTROLS

WE CREATE CONFIDENCE IN SCIENCE



www.microbiologics.com

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INTRODUCTION

TEST-READY MICROBIAL CONTROLS MADE WITH YOUR ENVIRONMENTAL ISOLATES AND OBJECTIONABLE ORGANISMS

Microbiologics simplifies environmental isolate and objectionable organism challenge testing with custom ready-to-use controls made to your specifications.

We are the world's leading experts and go-to collaborators in designing biomaterials that are critical for assay development, drug development, vaccine screening, quality control testing, and beyond. With each engagement, we apply our inventive spirit, deep expertise, vast resources and unparalleled support to create the best products and services for our fellow scientists. Because we never lose sight of our shared mission to protect the health and safety of people around the world through continuous scientific innovation.

CONNECT WITH OUR TEAM

Our knowledgeable team is ready to answer your questions and get started with designing a customized microbial control to fit your unique needs. As a trusted industry partner with more than 5 decades of experience, we will work with you to determine the best solution for your lab.

Contact Custom Controls Team

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ENVIRONMENTAL ISOLATES AND PHARMACEUTICAL QC TESTING



ENVIRONMENTAL MONITORING DOESN'T STOP AT DETECTION

Pharmaceutical auditors and regulators are increasingly issuing observations related to the use of environmental isolates in microbiological quality control testing. Though regulations and industry standards are somewhat limited on guidance for the proper use of environmental isolates, there is a clear expectation to use them in some microbiology laboratory testing applications.

Key regulations and standards that mention the use of environmental isolates:

- **European Pharmacopoeia (Ph. Eur.) Chapter 5.1.4:** Microbiological Quality of Non-Sterile Pharmaceutical Preparations and Substances for Pharmaceutical Use
- **Parenteral Drug Association (PDA) Technical Reports 70:** Fundamentals of Cleaning and Disinfection Programs for Aseptic Manufacturing Facilities
- **United States Pharmacopeia (USP) Chapter <1116>:** Microbiological Control and Monitoring of Aseptic Processing Environments
- **U.S. Food and Drug Administration:** Compliance Program Guidance Manual Program 7356.002A, Chapter 56 – Drug Quality Assurance
- **U.S. Food and Drug Administration:** FDA Guidance for Industry for Sterile Drug Products Produced by Aseptic Processing
- **U.S. Food and Drug Administration:** Guide to Inspections of Microbiological Pharmaceutical Quality Control Laboratories
- **United States Pharmacopeia (USP) Chapter <1072>:** Disinfectants and Antiseptics
- **United States Pharmacopeia (USP) Chapter <1117>:** Microbiological Best Laboratory Practices
- **United States Pharmacopeia (USP) Chapter <51>:** Antimicrobial Effectiveness Testing
- **World Health Organization (WHO):** Environmental Monitoring of Clean Rooms in Vaccine Manufacturing Facilities



OBJECTIONABLE ORGANISMS AND PHARMACEUTICAL QC TESTING



A LEADING CAUSE OF PHARMACEUTICAL PRODUCT RECALLS

Objectionable organisms are a leading cause of regulatory observations and recalls for sterile and non-sterile pharmaceutical products. Determining which organisms should be considered objectionable is one of the biggest challenges facing non-sterile pharmaceutical and personal care laboratories today. In the case of sterile products, all organisms are considered objectionable. When it comes to non-sterile products, a thorough risk assessment must be completed to ascertain the objectionable status of a particular organism.

Key regulations and standards regarding objectionable organisms:

- **U.S. Food and Drug Administration Code of Federal Regulations Title 21:** 211.84(d)(6), 211.113(a) and 211.165(b)
- **Parenteral Drug Association (PDA) Technical Report 67:** Exclusion of Objectionable Microorganisms from Nonsterile Pharmaceuticals, Medical Devices, and Cosmetics
- **United States Pharmacopeia (USP) Chapter <61>:** Microbial Enumeration Tests
- **United States Pharmacopeia (USP) Chapter <62>:** Tests for Specified Microorganisms
- **United States Pharmacopeia (USP) Chapter <1111>:** Acceptance Criteria for Pharmaceutical Preparations and Substances for Pharmaceutical Use
- **United States Pharmacopeia (USP) Chapter <1112>:** Application of Water Activity Determination to Nonsterile Pharmaceutical Products
- **Japanese Pharmacopoeia (JP) Chapter 4.05:** Microbiological Examination of Non-sterile Products
- **European Pharmacopoeia (Ph. Eur.) Chapter 2.6.12:** Microbial Enumeration Tests
- **European Pharmacopoeia (Ph. Eur.) 2.6.13:** Tests for Specified Micro-organisms



DETERMINING WHICH ORGANISMS TO USE IN ROUTINE MICROBIOLOGY TESTING



GOING BEYOND PHARMACOPEIA REQUIRED SPECIFIED MICROORGANISMS

Determining which microorganisms to include in your pharmaceutical microbiology testing is a complex undertaking. The objectionable status of an organism or appropriate use for an environmental isolate is dependent on many variables. Auditors and regulators expect manufacturers to know and document all the variable information about their product and its intended use to make appropriate decisions regarding batch release. A formal risk assessment will help laboratories establish a list of objectionable organisms and environmental isolates to include in their microbiological assay.



Common questions that factor into a comprehensive risk-assessment include:

THE DATA

- How often has the organism been found?
- Does trending data show an increase in instances?

THE LOCATION

- Where was the organism found?
- Was it found in a critical zone such as a cleanroom?

THE ORGANISM

- What are the characteristics of the organism?
- What is the pathogenicity of the organism?
- What is the organism's infectious dose?

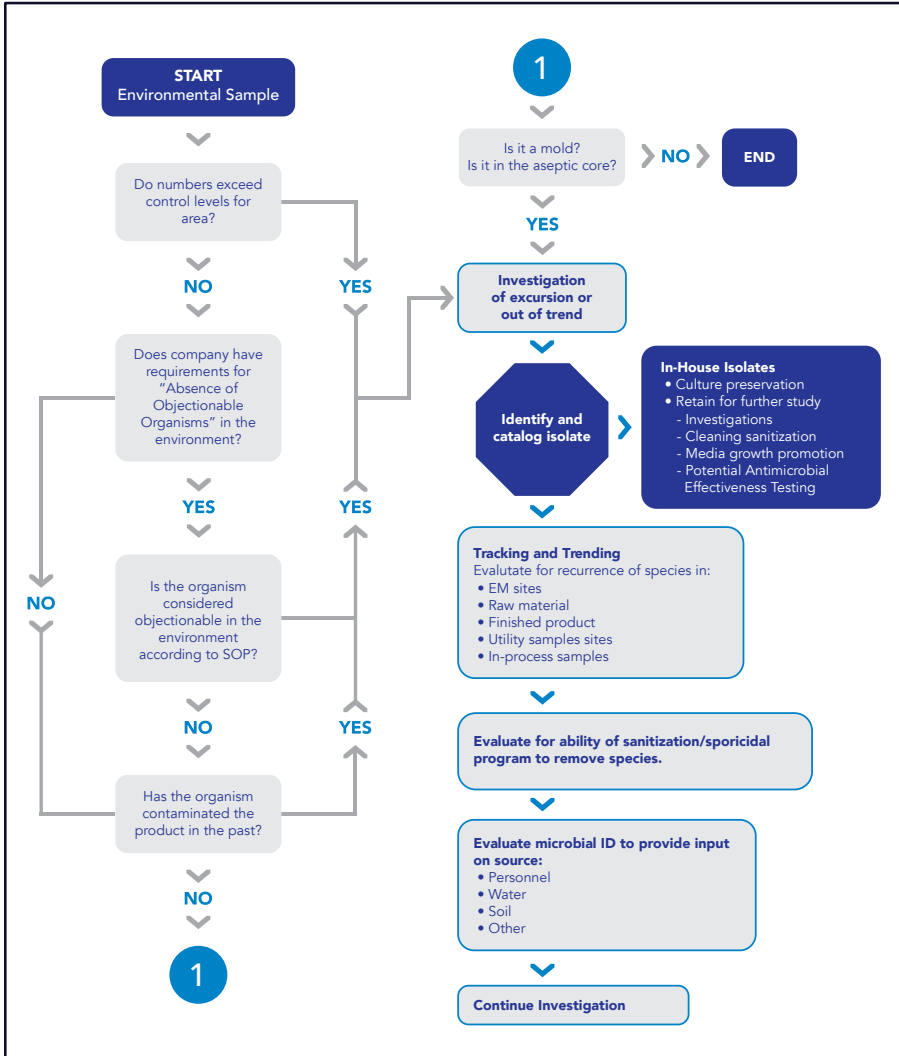
THE PRODUCT

- What is the pH and water activity of the product?
- What nutrients are in the product?
- Does the organism use these nutrients?
- What is the product's method of application?
- Can the organism cause spoilage or degrade the drug or component?

THE CONSUMER

- Who is the intended recipient of the product?
- Is the consumer immunocompromised or otherwise at risk?
- Is the organism harmful for the intended consumer?

ENVIRONMENTAL ISOLATE DECISION TREE



With all the necessary information, microbiologists can make a scientifically-sound, risk-based decision about the appropriate use for environmental isolates. Microbiologics created this decision tree, in partnership with the late Scott Sutton, Ph.D., as a quick reference for charting a course of action when isolates are recovered from an environmental sample.



COMMON APPLICATIONS FOR ENVIRONMENTAL ISOLATES & OBJECTIONABLE ORGANISMS

The following are common assays where environmental isolates and objectionable organisms may be included:

United States Pharmacopeia (USP)

- Antimicrobial Effectiveness Testing – USP <51>
- Aseptic Processing Environment – USP <1116>
- Disinfectant Qualification – USP <116>
- Growth Promotion Testing – USP <61> | <62> | <71>
- Suitability Testing – USP <51> | <61> | <62> | <71>
- Validation of Neutralization Methods – USP <1227>
- Water for Pharmaceutical Purposes – USP <1231>

European Pharmacopoeia (Ph. Eur.)

- Antimicrobial Effectiveness Testing – Ph. Eur. 5.1.3
- Growth Promotion Testing – Ph. Eur. 2.6.1 | 2.6.12 | 2.6.13
- Suitability Testing – Ph. Eur. 2.6.1 | 2.6.12 | 2.6.13 | 5.1.3

Japanese Pharmacopoeia (JP)

- Antimicrobial Effectiveness Testing – JP 19
- Growth Promotion Testing – JP 4.05, I.3 | 4.05, II.2 | 4.06, III.02
- Suitability Testing – JP 4.05, I.3 | 4.05, II.2 | 4.06, III.02

MICROBIOLOGICS CUSTOM CONTROL PROGRAM



YOUR STRAIN. YOUR FORMAT. YOUR CONVENIENCE.

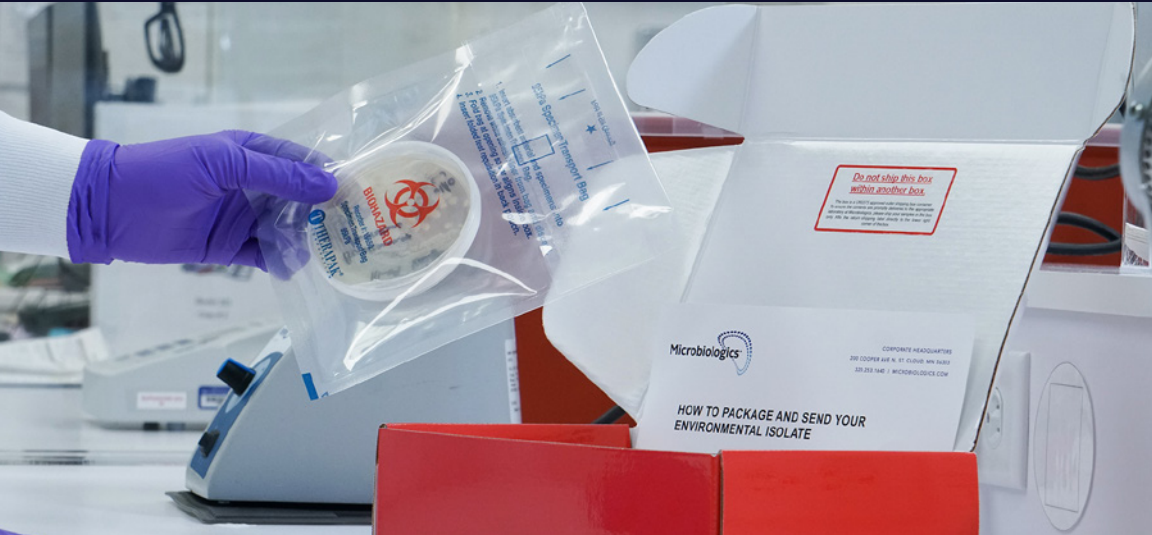
Maintaining environmental isolates and objectionable organisms in-house can consume significant laboratory time and resources. In addition, strains may be difficult to grow, preserve and enumerate for specific applications. We offer end-to-end services that simplify microbiological quality control for our customers. Our team of experts will identify, preserve, and manufacture your environmental isolates or target objectionable organisms into a test-ready control format designed for your test methods. Microbiologics custom controls will help your lab reduce cost, minimize risk, and increase confidence in your microbiological quality control program.



Why Microbiologics?

- We have been developing and producing microbial controls for more than 5 decades. Our team is highly skilled at growing, preserving, and enumerating strains of all types – including fastidious bacteria, yeasts, and molds.
- Our microbial controls are made in a lyophilized pellet format. They are shipped at ambient temperature and stored at 2-8°C which means there is no need for freezing at any point.
- Our catalog is comprised of tried-and-true, user-friendly product formats that consistently deliver results as expected. If an issue does arise, we have a dedicated team of Technical Support experts ready to trouble shoot and solve problems.
- Reordering your custom controls is a breeze. All strains are preserved and stored at our facility so they're readily available when needed with low minimum order quantities and quick turnaround times.

HOW IT WORKS



ORDERING YOUR CUSTOM ENVIRONMENTAL ISOLATES

Microbiologics makes ordering Custom Isolates easy and confidential.

1. **Tell us about your strain and how you will use it.** We make it easy with an online form. All information you share with us will remain confidential. Once we have your strain details, we will prepare and send a quote for your review and approval.
2. **Send your strain to us.** A shipping box will be sent to your laboratory containing all the supplies you will need to safely send your isolate to our facility or partner facility.
3. **We've got it from there.** Our team will get busy identifying, preserving, enumerating, and manufacturing a microbial control product tailor-made to your specifications. Typical turnaround time is 6-8 weeks from the time we receive your isolate.

TEST-READY FORMATS FOR COMMON APPLICATIONS



QUICK AND EASY TEST-READY FORMATS

We have an extensive portfolio of microbial control kits designed for the most common pharmaceutical microbiology test methods. Many times, customers look for these same formats to use in their environmental monitoring and quality control programs. The product formats listed in this section serve as a starting point. Additional customization can be done to meet your needs.

KITS FOR GROWTH PROMOTION TESTING

Product	Packaging/Contents	Enumeration	Specifications
EZ-Accu Shot™	Kit containing 5 vials of lyophilized microorganism pellets and 5 vials of hydrating fluid. Packaged in a plastic container.	Delivers 10-100 CFU per 0.1 ml	<ul style="list-style-type: none"> - Instant dissolve - No dilutions - 50 tests per kit - 8 hour stability at 2-8°C
EZ-CFU™ One Step	Kit containing 2 vials of 10 lyophilized microorganism pellets and 10 vials of Hydrating Fluid. Packaged in a plastic container.	Delivers 10-100 CFU per 0.1 ml	<ul style="list-style-type: none"> - No dilutions - 190 tests per kit
EZ-CFU™	Kit containing 2 vials of 10 lyophilized microorganism pellets and 10 vials of Hydrating Fluid. Packaged in a plastic container.	Delivers 10-100 CFU per 0.1 ml	<ul style="list-style-type: none"> - Requires a 1:10 dilution step - 900+ tests per kit

KIT FOR DISINFECTANT QUALIFICATION, METHOD SUITABILITY & WATER TESTING

Product	Packaging/Contents	Enumeration
Epower™	Vial of 10 lyophilized microorganism pellets. Packaged in a plastic container.	Available in concentrations ranging from 10^2 to 10^8 CFU per pellet

KIT FOR ANTIMICROBIAL EFFECTIVENESS & PRESERVATIVE EFFICACY TESTING

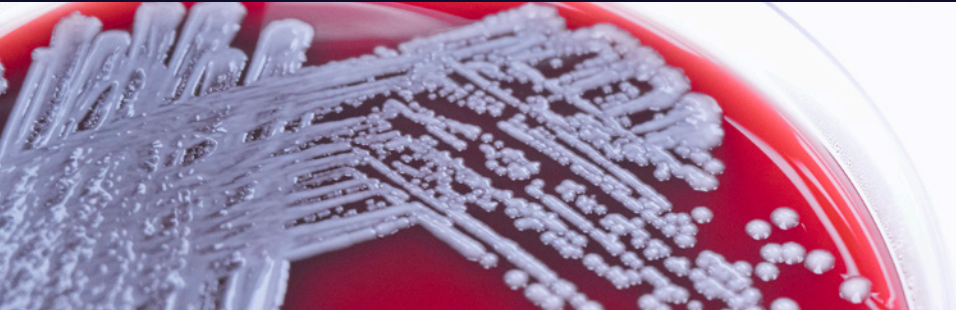
Product	Packaging/Contents	Enumeration
EZ-PEC™	Kit containing 2 vials of 10 lyophilized microorganism pellets and 10 vials of Hydrating Fluid. Packaged in a plastic container.	Final concentration of 10^5 to 10^6 CFU per ml of product tested

DEMONSTRATED HISTORY OF SPECIALIZED MICROBIAL CONTROLS



THE TRUSTED EXPERTS YOU CAN RELY ON

Since launching our custom controls program, we have developed custom environmental isolate and objectionable organism controls for thousands of pharmaceutical and personal care manufacturers. In this section, you'll find lists of environmental isolates and objectionable organisms we have successfully developed into custom controls for our customers. We share these strain lists for two key reasons: (1) to highlight our capabilities to grow, preserve, enumerate, and manufacture microbial controls of all types, (2) show the commonality of environmental isolates and objectionable organisms that microbiologists are including in their QC testing programs around the world.



CUSTOM ENVIRONMENTAL ISOLATE EXAMPLES

Escherichia coli

Bacillus atrophaeus

Bacillus licheniformis

Ralstonia pickettii

Micrococcus luteus

Candida carpophila/fermentati/guilliermondii

Aspergillus versicolor

Staphylococcus epidermidis

Mycobacterium abscessus

Penicillium chrysogenum

Bacillus cereus

Kocuria rhizophila

Bacteroides fragilis

Paecilomyces species

Burkholderia contaminans

Corynebacterium species

Ralstonia insidiosa

Staphylococcus hominis

Paecilomyces variotii

Aspergillus fumigatus

Bacillus altitudinis

Bacillus thuringiensis

Penicillium rubens

Enterobacter cloacae

Legionella pneumophila

Pluralibacter gergoviae

This list is just a sampling of the environmental isolates we have made into custom microbial controls. Connect with our team to get started!

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Email customsolutions@microbiologics.com



CUSTOM CULTURE COLLECTION OBJECTIONABLE ORGANISM EXAMPLES

Aspergillus fumigatus derived from ATCC® 204305™*

Bacillus atrophaeus derived from ATCC® 9372™*

Bacteroides vulgatus derived from ATCC® 8482™*

Bifidobacterium breve derived from ATCC® 15700™*

Chaetomium globosum derived from ATCC® 6205™*

Cladosporium cladosporioides derived from ATCC® 16022™*

Enterobacter cloacae derived from ATCC® 13047™*

Escherichia coli derived from ATCC® 11229™*

Issatchenkia orientalis derived from ATCC® 6258™*

Methylobacterium extorquens derived from ATCC® BAA-2500™*

Mycobacterium avium derived from ATCC® 700898™*

Mycobacterium smegmatis derived from ATCC® 19420™*

Penicillium rubens derived from ATCC® 11709™*

Pseudomonas aeruginosa derived from ATCC® 15442™*

Ralstonia insidiosa derived from ATCC® 49129™*

Ralstonia pickettii derived from ATCC® 27511™*

Shigella sonnei derived from ATCC® 25931™*

Sphingomonas paucimobilis derived from ATCC® 29837™*

Staphylococcus epidermidis derived from ATCC® 202176™*

Campylobacter jejuni subsp. *jejuni* derived from ATCC® 33291™*

ATCC Licensed
Derivative

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