

Scope

All Laboratory Personnel

Bactec Fx Process Bottle Principle

When microorganisms are present in culture vials, they metabolize nutrients in the culture medium, releasing carbon dioxide into the medium. A dye in the sensor at the bottom of the vial reacts with CO₂. This modulates the amount of light that is absorbed by a fluorescent material in the sensor. A photo detector at each station measures the level of fluorescence, which corresponds to the amount of CO₂ released by organisms. Then the measurement is interpreted by the system according to pre-programmed positivity parameters.

Specimen

Whole blood collected using aseptic procedure as listed below.

Bottle Volume Required:

- Adult: A **minimum** of 5 ml and **maximum** of 10ml blood or normally sterile body fluid in each bottle.
- Pediatric (**anyone <80 lbs**): A **minimum** of 1ml and a **maximum** of 5 ml blood.

****If only enough blood can be drawn to fill one bottle, inoculate an aerobic bottle.**

Materials**Media used for collection:**

- Bactec plus aerobic /F
- Bactec Standard /10 Aerobic /F
- Bactec Standard Anaerobic /F
- Bactec Plus Anaerobic /F
- Bactec Lytic /10 anaerobic F
- Bactec PEDS PLUS /F

Media Storage:

Store all media at room temperature. Observe expiration date.

Other materials needed:

- ChloroPrep One-Step Frepp Applicator
- Butterfly set-up
- Alcohol swabs
- Gauze
- Tape
- Gloves
- **Betadine (for infants 2 months old and younger)**

Performance Considerations

Inspect the bottle before use. **Do not use a bottle if the media is cloudy or if the bottle is cracked.**

Important Points to Consider Before Collection

- If at all possible, blood for cultures should **not** be drawn through an intravenous or intra-arterial catheter **unless otherwise noted by the physician**. If blood cultures are drawn from an intravenous line, a second culture should be drawn from a peripheral venipuncture. The rate of false positive blood cultures increases when blood is taken from a catheter regardless of when the catheter was placed. Hence, **the practice of drawing blood from a newly placed catheter is greatly discouraged. See Collection Procedure below.**
- If blood is aspirated from a line draw, identify the bottle as such by attaching the **NEON PINK “LINE DRAW” label to the bottle.**
- The laboratory will collect data and generate monthly contamination reports that differentiate specimens drawn via line vs. peripheral sites.

Recommended Frequency of Blood Cultures:

- It is sufficient and appropriate to obtain blood cultures from two **separate** sites within minutes of each other from patients who are acutely ill or those whom the likelihood of continuous bacteremia is high.
- Acute sepsis, meningitis, pneumonia, etc: Obtain two or three blood samples from **separate sites** before starting therapy.
- Continuous bacteremia and suspected endocarditis: Draw three samples from **separate sites** and begin therapy. If all are negative 24h later, obtain three more samples.
- Patients on antimicrobial therapy: Collect sample prior to the next dose of antibiotic.
- Fever of unknown origin: Draw two or three separate initial samples. Obtain two more samples after 24 to 36 hours.

Duration of Incubation

Default maximum test time will be 5 days. Maximum test time for suspected yeast is 21 days. Incubation time for a bottle can be manually changed as needed.

Collection

Specimen collection is extremely important in obtaining blood cultures. Proper skin disinfection is essential to reduce the incidence of contamination. Universal Precautions must be followed.

Collection Procedure

Skin Preparation

- After location of the vein, prepare Chloraprep applicator by squeezing the sides together until you hear/feel the snap.
- Scrub the venipuncture site with the Chloraprep applicator in an **up and down motion** for a **minimum of 30 seconds**. Allow site to air dry for **30 seconds** before venipuncture. **DO NOT RE-PALPATE THE VEIN.**

- **If patient is less than or equal to 2 months of age**, it is necessary to use betadine swabs instead of Chloraprep. Scrub the venipuncture site with betadine in an outward circle for one minute, let dry for one minute then wipe away with alcohol swab. Let alcohol dry before beginning venipuncture.

Bottle Preparation

- Repeat inspection of the bottle surface. **Do not use a bottle if the sensor has changed color, media is cloudy, or if the bottle is cracked.**
- Remove protective flip-top over-cap.
- Cleanse the rubber stopper with 70% alcohol. Allow alcohol to **dry 1 minute** before inoculation.

Venipuncture and Bottle Inoculation

Using the following method to obtain the sample and inoculate the bottles.

Direct Draw with Butterfly: Use the routine blood collection barrel

1. Connect the barrel to the luer connector of the butterfly collection set.
2. Perform venipuncture. When the needle is in the vein, secure it with tape or hold in place.
3. Place barrel on the aerobic BacT/Alert culture bottle rubber stopper and press down to penetrate and obtain blood flow. Hold the barrel down on the bottle.
4. After obtaining the specified amount of blood, move the barrel from the aerobic bottle to the anaerobic bottle and continue the collection.
5. If additional blood is required for other tests, they can be drawn now.
6. After blood collection is complete, remove the barrel from the culture bottle and then remove the needle from the patient's vein.
7. Thoroughly mix bottles to avoid clotting.
8. **Label Bottles with:** Patient's name, Medical Record #, date, time, site used and collector's initials **CLEARLY** printed. **Take care not to cover barcode labels and lot numbers.** , **clearly initial** and indicate site used.

Collection from Intravascular Catheters

1. While wearing gloves, disinfect the rubber stopper of the blood culture bottle with 70% alcohol. Allow alcohol to dry 1 minute before inoculation.
2. Using two separate alcohol preps, scrub catheter hub connection vigorously for 15 seconds with 70% alcohol as though "juicing an orange." Air dry.
3. Disconnect tubing or cap of catheter and attach syringe to collect discard blood (suggested amounts are 3ml for adults and 0.2ml for pediatric patients), which is not used for culture.

NOTE: Avoid drawing from lines within an hour of completion of antimicrobial agent administration.

4. Using a new syringe, collect blood for culture through the hub. Quickly reconnect tubing.
5. Connect filled syringe to safety system adapter.
6. Holding the syringe plunger for control, inoculate the bottles with a **minimum** of 5ml, **maximum** of 10ml in each adult bottle and a **minimum** of 1ml, **maximum** of 5ml in pediatric bottles.
7. Thoroughly mix to avoid clotting.

8. **Label bottles with:** Patient's name, Medical Record #, date, time, site used and collector's initials **CLEARLY** printed. **Take care not to cover the barcode labels or lot numbers. CLEARLY** initial and indicate site used
NOTE: Attach a **NEON PINK "LINE DRAW"** label to each bottle drawn.

Send bottles to the laboratory immediately; DO NOT REFRIGERATE.

DELAYED ENTRY/DELIVERY

Inoculated bottles that cannot be delivered to the laboratory immediately may be held at **room temperature for up to 24 hours**. It is important to hold inoculated bottles, delayed in entry, **at room temperature** in order to sustain the organism in the lag phase of growth until they can be loaded into the Blood Culture instrument.

LIMITATIONS and REMINDERS:

- Recommended blood to broth ratio is 1:5 to 1:10. As the volume of blood drawn is increased, the yield of positive cultures increases. Optimally, 20ml of blood should be drawn from adults (10ml per bottle).
- Do not overfill the bottles as this may cause false positive readings.
- For best volume control, mark the fill level on side of bottle prior to collection.
- To avoid contamination of the blood culture sample, inoculate blood culture bottles first and then fill additional blood collection tubes.
- When labeling the bottles, **do not cover barcode labels** or the lot numbers.
- A different site should be used for each culture set collected.
- Please direct any questions to the Laboratory's Microbiology Department.

References:

- Miller, J. M. 1999. *Specimen Management in Clinical Microbiology*. ASM Press, Washington, D.C.
- Baron, E. J., et al. 2005 *Cumitech 1C, Blood Cultures IV*. Coordinating ed., E. J. Baron. ASM Press, Washington, D. C.
1. **BACTEC™** Plus Aerobic/F and Plus Anaerobic/F Culture Vials Insert. Rev. PP-088 (2008/01) BD Diagnostics.
 2. **BACTEC™** Peds Plus/F Culture Vials Insert.Rev. PP-091(2008/01) . BD Diagnostics.
 3. **BACTEC** Myco/F Lytic Culture Vials Insert.Rev. PP-162 (2008/01). BD Diagnostics.
 4. **BACTEC** Blood Culture Procedural Trays. Document Number L-001810 (A). BD Diagnostics.
 5. Howden, R.J. J. Clin. Path. 1976, 29:50-53.

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