PURPOSE: The beta-lactamase test is used to rapidly detect the production of Beta-lactamase in colonies of *Neisseria gonorrhoeae*, *Moraxella catarrhalis*, *Staphylococcus* spp., *Enterococcus* spp., *Haemophilus influenzae* and anaerobic bacteria.

SAMPLE INFORMATION:

Type	Few, well isolated colonies

REAGENTS and/or MEDIA:

Type	BD BBL Cefinase Disks
Stability and Storage Requirements	• Store unopened package at -20°C to +8°C. • After opened, store in air tight container containing desiccant at -20°C to +8°C. • Discard remaining disks 60 days after opening blister packaging. • Do not use the cartridge if the disks appear orange or red in color.

SUPPLIES:

- Glass microscope slides
- Forceps
- Sterile saline
- Sterile pipettes
- Wooden sticks
- Disposable loops

SPECIAL SAFETY PRECAUTIONS:

Containment Level 2 facilities, equipment, and operational practices for work involving infectious or potentially infectious materials or cultures.

- Lab gown must be worn when performing activities with potential pathogens.
- Gloves must be worn when direct skin contact with infected materials is unavoidable.
- Eye protection must be used when there is a known or potential risk of exposure to splashes.
- All procedures that may produce aerosols, or involve high concentrations or large volumes should be conducted in a biological safety cabinet (BSC).
- The use of needles, syringes and other sharp objects should be strictly limited.

All patient specimens are assumed to be potentially infectious. Universal precautions must be followed. Since viable micro-organisms are used, all cultures must be handled with appropriate precautions. All equipment in contact with cultures should be decontaminated by appropriate methods.

QUALITY CONTROL:

- Quality control is performed weekly:
  - Positive: *Staphylococcus aureus* ATCC 29213
  - Negative: *Haemophilus influenzae* ATCC 10211
- A TQC order is automatically generated on Wednesdays to record the QC results.

PROCEDURE INSTRUCTIONS:

Step	Action
Performing the beta-lactamase test	
1	Using forceps, remove the required number of disks from the dispenser and place on a microscope slide. Use 1 disk per organism.
2	Using a sterile pipette, moisten each disk with a drop of sterile saline.
3	With a disposable loop or wooden stick, pick several similar colonies from the agar plate and smear onto the surface of the disk.
4	Observe the disk for up to 5 minutes for a colour change. For *Staphylococci*, observe the disk for up to 60 minutes.

Organism	Result	Time	Interpretation
Staphylococcus aureus	Positive	1 hour	Resistant to penicillin, ampicillin, carbenicillin. Probably susceptible to cephalothin, methicillin, oxacillin, naficillin and other penicillinase-resistant penicillins.
Enterococcus faecalis	Positive	5 minutes	Resistant to penicillin and ampicillin.
Haemophilus influenzae	Positive	1 minute	Resistant to ampicillin. Susceptible to cephalosporins.
Neisseria gonorrhoeae *Moraxella catarrhalis*	Positive	1 minute	Resistant to penicillin.

INTERPRETATION OF RESULTS:

IF	THEN
Yellow to red colour at site of inoculation	**Beta-lactamase = Positive**
No colour change on the disk	**Beta-lactamase = Negative**

LIMITATIONS/PRECAUTIONS:

1. The efficacy of this test in predicting the β-lactam resistance of microorganisms other than *Neisseria gonorrhoeae*, *Haemophilus influenzae*, *Moraxella catarrhalis*, *Staphylococci*, *Enterococci* and certain anaerobic bacteria is unproven.
2. Resistance to β-lactam antibiotics has been, on rare occasions, reported in some of the above organisms without the production of β-lactamases. In these cases, resistance mechanisms such as permeability barriers have been postulated. Therefore, the β-lactamase test should be used as a rapid supplement and not a replacement for conventional susceptibility testing.
3. For some strains of *Staphylococci*, particularly *S.epidermidis*, an inducible β-lactamase has been described that might result in a false-negative β-lactamase reaction with a strain which is resistant to penicillin or ampicillin.

REFERENCES:

- BD BBL, Paper Disks for the Detection of ß-Lactamase Enzymes package insert, 2018-09
- Clinical Microbiology Procedures Handbook, 4th edition, ASM Press, 2016

REVISION HISTORY:

REVISION	DATE	Description of Change	REQUESTED BY
1.0	4 APR 19	Initial Release	L. Steven