TOPIC: TESTS TO GUIDE ANTIMICROBIAL USE

Disk Diffusion Methods Including Kirby-Bauer Test

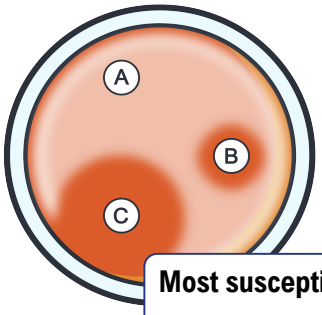
◆ Tests can inform whether an antimicrobial will be effective against an infection.

- **Minimal Inhibitory Concentration (_____)**: lowest antibiotic concentration that inhibits _____.
- **Minimal Bactericidal Concentration (_____)**: lowest antibiotic concentration that _____ bacteria

Disk Diffusion Method (Kirby-Bauer Test):

- _____ of interest applied to agar plate.
- Small paper disks w/ antibiotics added.
  - Zone of _____: region with ___ bacterial growth.

Determines:
____ MIC ____ MBC

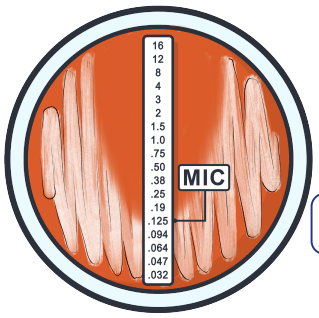


Most susceptible to drug ____.
Resistant to drug ____.

E Test (Epsilometer):

- _____ Kirby-Bauer Test:
  - Uses plastic strip w/ _____ of antibiotic.
  - Estimates MIC: conc. on strip where zone of inhibition _____.

Determines:
____ MIC ____ MBC



MIC = _____

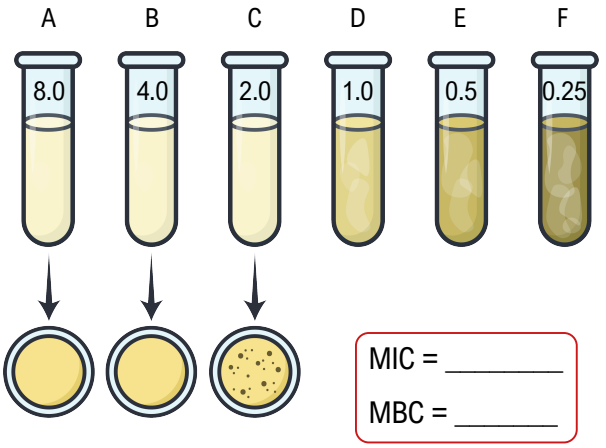
Broth Dilution Test

Broth Dilution Test

- Can test both _____ & _____.

1. Serial dilutions of _____ in growth media (_____).
2. Bacteria of interest added to media and incubated.
3. _____ = bacterial growth.
   - **MIC** = lowest conc. of antibiotics with ___ growth.
4. Clear samples grown w/o antibiotics to determine _____.
   - **MBC** = lowest conc. w/ no growth on _____ media.

Determines:
____ MIC ____ MBC



MIC = _____
MBC = _____

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EXAMPLE

The image below represents eight wells of a microtiter plate that was used to test for minimal inhibitory and minimal bactericidal concentrations using a broth dilution test. The same amount of broth was added to wells 1-8. An antibiotic of increasing concentration was added to wells 3-8. The concentration used is listed above the well in µg/ml. The same amount of bacteria sample was added to each well, except for well #1, to which no bacteria were added. The wells that appeared a darker color were cloudy after incubation. A sample from each well that was not cloudy was added to an agar plate containing no antibiotic and then incubated again. The results are shown for each plate (connected by an arrow to the well from which the sample came).

In this test, what is the:

MIC:_____

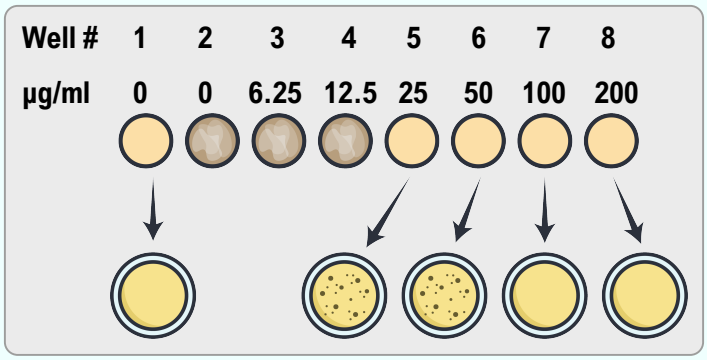
MBC:_____

What do wells # 1 and 2 represent?

_____

_____

_____



PRACTICE

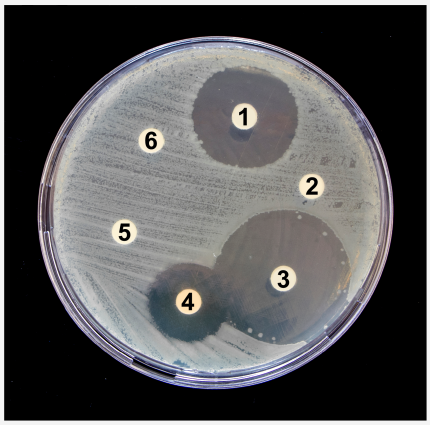
Based on the image, which drug do you think would be most effective at inhibiting the bacteria on the agar?

a) 1

b) 2

c) 3

d) 4



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PRACTICE

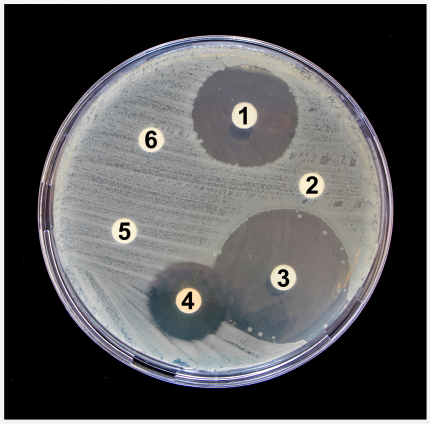
In the image, drugs 1, 3, & 4 are streptomycin, polymyxin B, & imipenem, respectively. Drugs 2, 5, & 6 are penicillin G, bacitracin, & vancomycin, respectively. Knowing that, what can you reasonably conclude from this test?

a) A broad-spectrum drug would be the most effective at treating this infection.

b) Drugs that target the cell wall are the most effective against this bacterium.

c) Drugs 3 and 4 work synergistically.

d) The bacterium on the plate is likely a Gram-negative bacterium.



PRACTICE

What can an E-test tell you that a standard Kirby-Bauer test cannot?

a) An E-test can tell you whether a particular antibiotic is effective against a particular bacterium.

b) An E-test can tell you the MIC.

c) An E-test can tell you the MBC.

d) An E-test can tell you both the MIC & the MBC.