

Training on Tuberculosis Drug and Susceptibility Testing (MGIT DST – Liquid Method)

MGIT DST PRE TEST

1. State the principle of reading MGIT DST? (1 marks)

Isolated cultures from TB patients are subjected to a known concentration of a test anti-TB drug. A growth control is also included with no addition of an anti-TB drug. This system uses the common proportion method, that is to say resistance is determined at a 1% level for the anti-TB drugs. Resistance is expressed as the percentage of growth index on drug containing media in comparison to the growth index on drug-free growth control. This means that 1% or more of the total test bacterial population is resistant to the test drug, it is considered as resistant for clinical purposes.

2. List the materials required for MGIT DST drug preparation (2 marks)

- Sterile Distilled water,
- 1000ul adjustable pipette
- 100ul adjustable pipette
- Sterile barrier pipette tips (1000ul and 100ul)
- Sterile plastic Pasteur pipette
- Sterile Universal bottles
- Sterile 15 ml falcon tubes.
- Sterile barrier filter pipette
- Biological safety Cabinet
- Drugs(both 1st and 2nd lines)
- 0.00uL weighing balance
- Vortex mixer

3. What is the storage conditions for:

Lyophilized drugs **2-8°C (1 mark)**

Reconstituted drugs **-20°C (1 mark)**

4. What are the number of days of positive culture required to set MGIT DST

- a. Solid 15 days (1 mark)**

- b. Liquid **5 days** (1 mark)
5. Why do we QC reagent in DST testing (1 mark)
- Product may be mishandled during shipment
- Antibiotic potency may decrease
- Checks ability of laboratory to perform test(Reagent storage, Reagent preparation, Organism preparation)
6. When should we perform QC in DST testing? (2 mark)
- New shipment or lot number of drug kits before use with patient isolates
- Weekly SIRE, 2nd line drugs and PZA DST QC
- If validated, otherwise set up a QC DST set each time DSTs are inoculated
7. List the strains used in QC (2 mark)
- MX
- KA
- M. tuberculosis* ATCC 27294 (H37Rv)
8. What are cut off growth control units for reading growth control and drug tubes?(1mark)
- When Growth Control GU reaches 400, the instrument evaluates drug tube
- GU Drug ≤ 100 = Susceptible
- GU Drug > 100 = Resistant
- GU around 100 = usually borderline (interpreted S or R)
9. List the possible causes of X400 and X200 errors
- X400 (2 mark)
- Over inoculation with bacteria
- Contamination with other organisms
- Drug was not added to tube

X200 (2 mark)

Under inoculation with bacteria

No bacterial inoculation (use of a negative bacterial isolate).

Use of old culture isolate

10. List the possible causes of;

i. False resistance DST results and ways to troubleshoot them. (4 mark)

Culture is contaminated or mixed culture

Organism inoculum was too heavy

Organism was not properly diluted

Suspension was not homogeneous or had clumps

Growth control dilution was too light (Growth control grew too slowly)

Drug was not reconstituted properly

Drug was not stored properly

Drug was not added to tube

MGIT tube was not mixed properly after the addition of the organism suspension

Organism could be borderline-resistant

ii. False susceptibility DST results and ways troubleshoot them (4 mark)

Organism inoculum is too light (Starting suspension must be > 1.0 McFarland)

Suspension not homogeneous

Culture too old

Growth control dilution was too heavy (Growth control grew too fast)

Drug not reconstituted properly (Too much drug added to tubes)

Organism could be borderline-resistant

