bioguard

mini AST

Veterinary Antibiotic Susceptibility Test Analyzer

Faster,
Smarter
Antibiotic Choices !

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Introduction

01

What is Antibiotic?

Antibiotic = **Opposing life**
(Greek)
Anti = **Against**
Bios = **Life**

Antibiotic is a type of antimicrobial substance that is widely used in the **treatment** and **prevention** of **bacterial infections**.

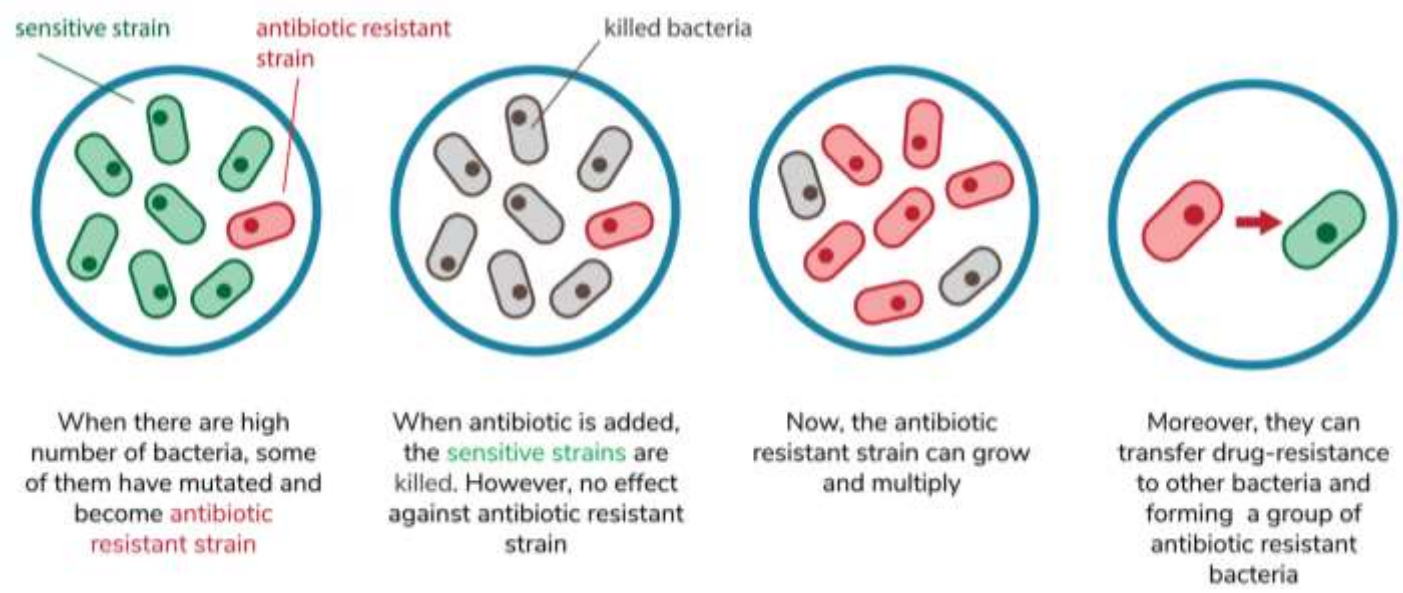
When do we need Antibiotic?

- **Lower and upper respiratory tract** infections
- **Central Nervous System** infections
- **Eye** infections
- **Ear** infections
- **Urogenital tract** infections
- **Skin** infections
- **Bone and joint** infections
- **Bacterial septicemia**
- **Endocarditis, pericarditis**
- **Intra-abdominal** infections
- **Prior and or After surgery**

What is
Antibiotic Susceptibility Testing?

Drug resistant bacteria

How does it happen?



Antibiotic susceptibility testing (AST) is an in vitro measure to assess the likelihood that a particular antimicrobial agent will treat an infection caused by a particular organism.

Why do we need
Antibiotic Susceptibility Testing?

- if there is suspicion of a complicated infection (Ex. associated with underlying disease),
- if the patient has NOT responded to therapy,
- if the patient has a history of relapse or re-infection,
- if there is any reason to suspect infection with MDR bacteria.
- if the patient is immunocompromised,
- if the infection is life-threatening.

When do we need **Antibiotic Susceptibility Testing**

Before the start of any treatment with an antimicrobial drug

During treatment to monitor the effectiveness of treatment.

When the infection is **not responding** to treatment

Method of antimicrobial Susceptibility Testiing

Phenotypic methods

Constrained by bacterial growth time

- Dilution — 48 h
- Diffusion — 48 h
- Gradient test — 48 h
- Chromogenic media — 24 h
- Automated devices — > 20 h

Molecular-based methods

- PCR (Gene 1 Gene 2 ··· Gene N) — several h
- qPCR — several h
- Cycle sequencing — 24 - 48 h
- NGS — several days

** estimated time depend on a sample analysed (clinical specimen vs. isolated bacterial culture)*

Mass spectrometry

MALDI–TOF MS

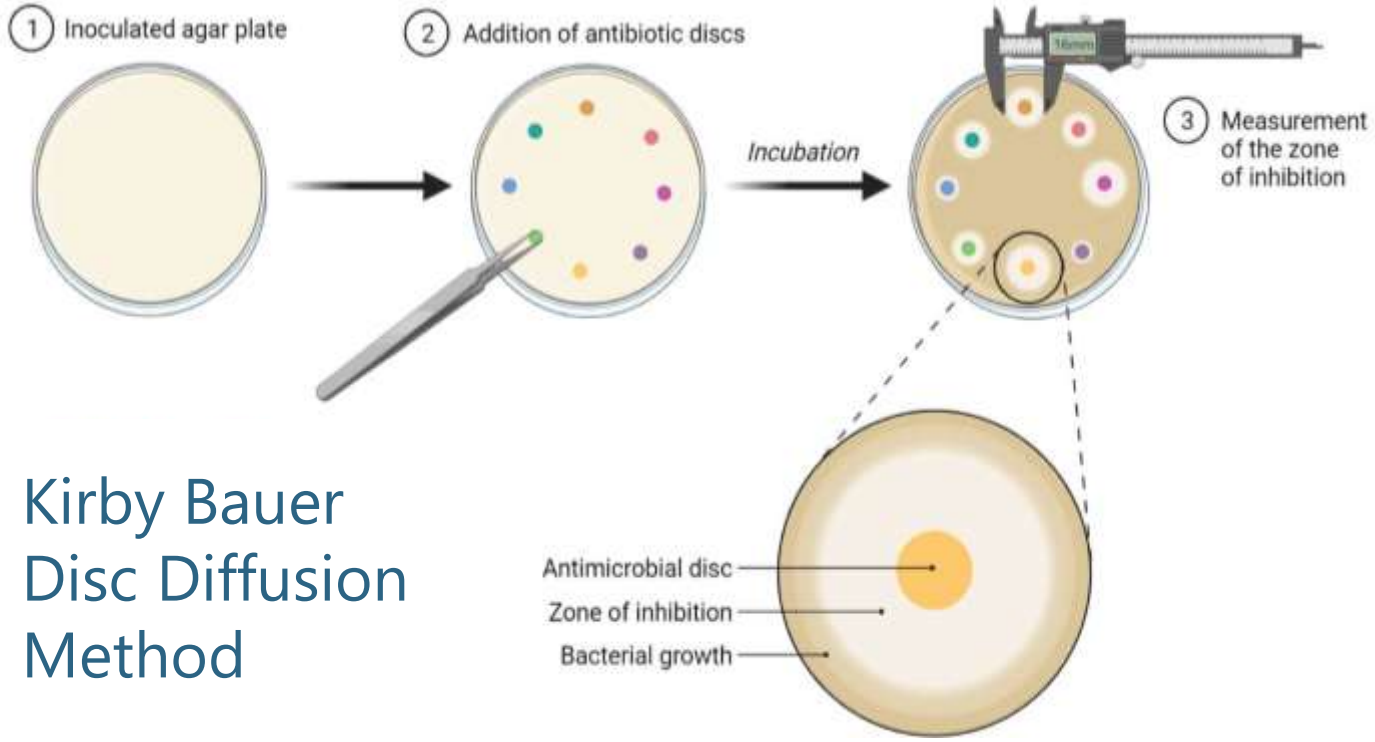
Incubation (antibiotic + sample)

Matrix

several h

** estimated time depend on a sample analysed (clinical specimen vs. isolated bacterial culture)*

Conventional
Antibiotic Susceptibility Testing



Kirby Bauer
Disc Diffusion
Method

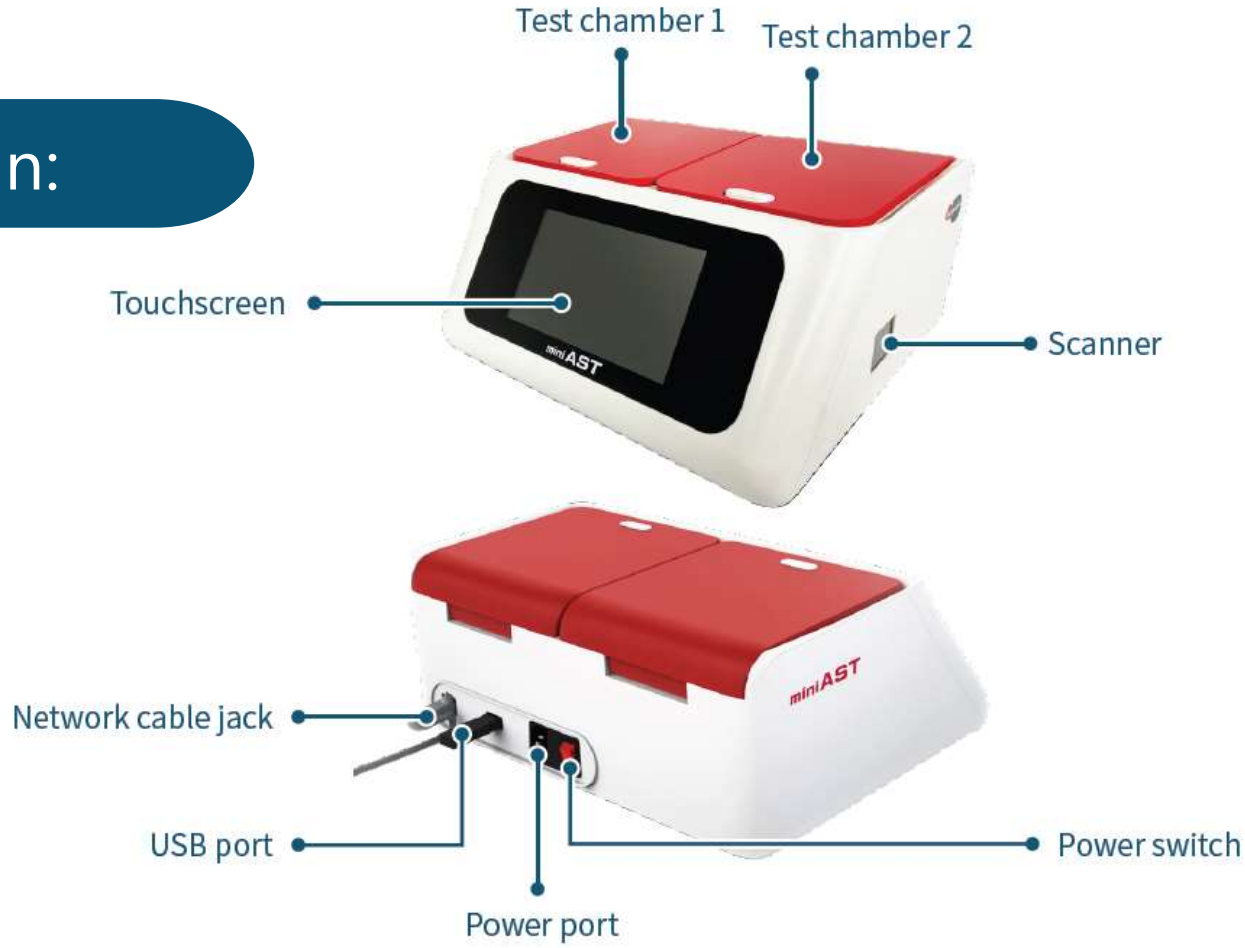
Problems:

- Laborious protocol.
- Long preparation and incubation time.
- High risk of cross - contamination.
- Expensive and need a high power supply.
- Prone to human error in analysis.

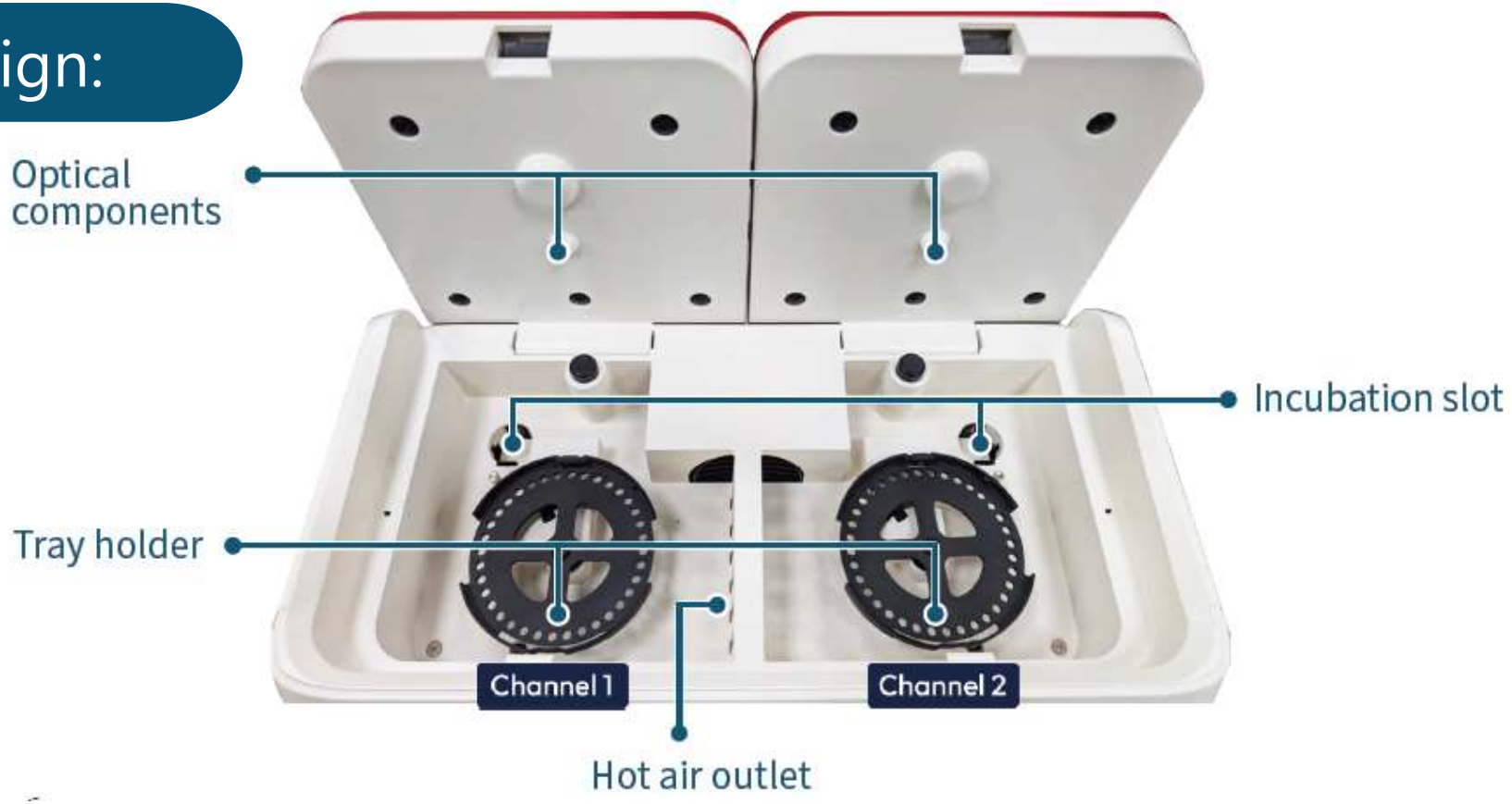
Product Specification

02

Design:


Test chamber 1
Test chamber 2
Touchscreen
Scanner
Network cable jack
USB port
Power port
Power switch
miniAST

Design:


Optical components
Incubation slot
Tray holder
Channel 1
Channel 2
Hot air outlet

miniAST device

1. miniAST Machine & Power Cord
2. Two Pipettes (800 µL and 20 µL)
3. Two Micropipette Tip Boxes
4. Warranty Card and Product Certificate
5. User Manual
6. Operational Instruction Card

Reagent disc

Media Bottles

- Pre-incubation (Pink-cap)
- Diluent (Blue-cap)
- 10 each medium

General Panel Disc
~10 discs

Sterile Swab
10 pieces

Lyophilized reagent

Shelf-life up to 12 months in 2-8 °C

Specimen collection

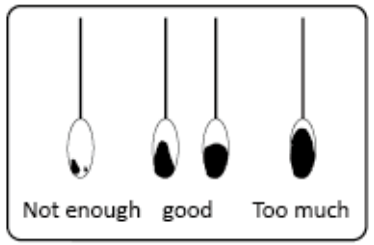
- **The specimen that can be used in the device are:**

1. Sterile Urine
2. Fecal swab
3. Skin swab
4. Ear swab
5. Pus/Wound swab
6. Tracheal swab

- Please note that blood, pleural effusion, abdominal effusion, tissues are not applicable in the device as it may interfere with the result measurement.

Catheterization

Cystocentesis



Swab Collection Guide

Antibiotic Portfolio

General Panel 1

Amikacin	Cefixime	Enrofloxacin	Levofloxacin
Amoxicillin	Ciprofloxacin	Clindamycin	Meropenem
Augmentin	Cefalexin	Gentamicin	Minocycline
Cefotaxime	Doxycycline	Imipenem	SXT

General Panel 2

Amikacin	Azithromycin	Clindamycin	Meropenem
Amoxicillin	Cefalexin	Doxycycline	Metronidazole
Augmentin	Ceftriaxone	Enrofloxacin	SXT
Ampicillin	Ciprofloxacin	Gentamicin	Tetracycline

General Panel 3
(Coming soon)

Amikacin	Cefalexin	Enrofloxacin	Meropenem
Ampicillin	Ceftazidime	Gentamicin	Oxacillin
Augmentin	Ciprofloxacin	Imipenem	Polymyxin E
Azithromycin	Doxycycline	Levofloxacin	SXT

*Various antibiotic options are available, and customized panels can be arranged upon discussion.

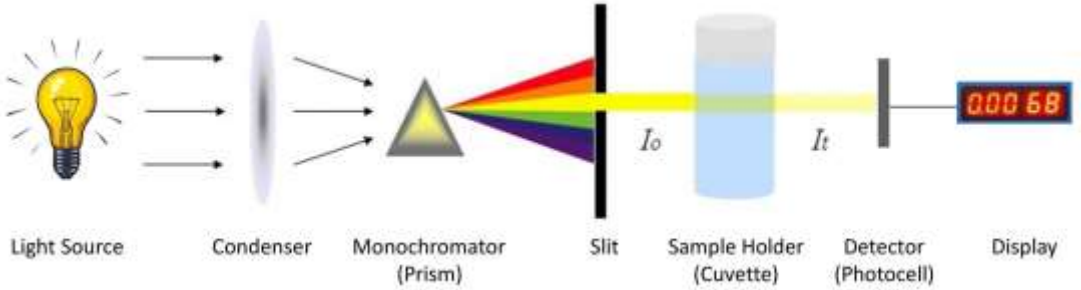
Measurement Principle

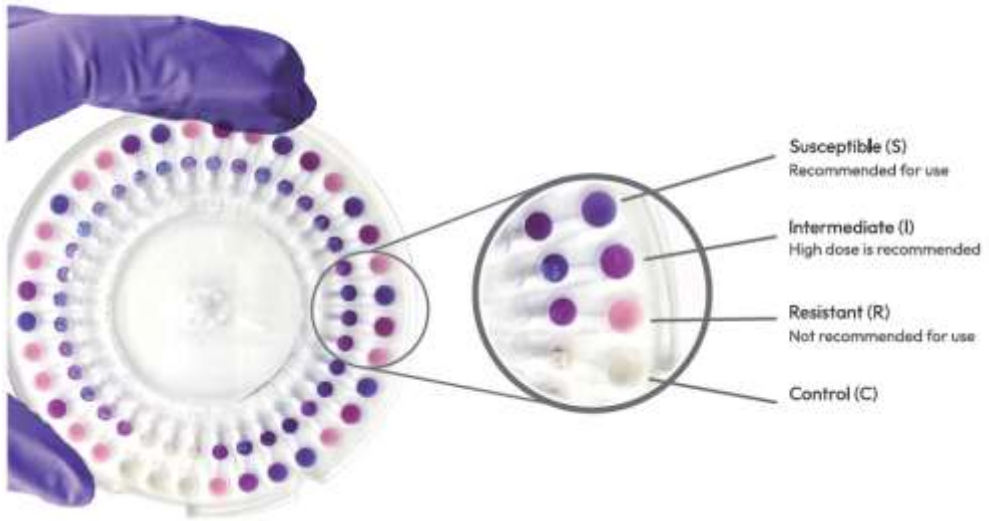
03

Principle

Method: Broth microdilution

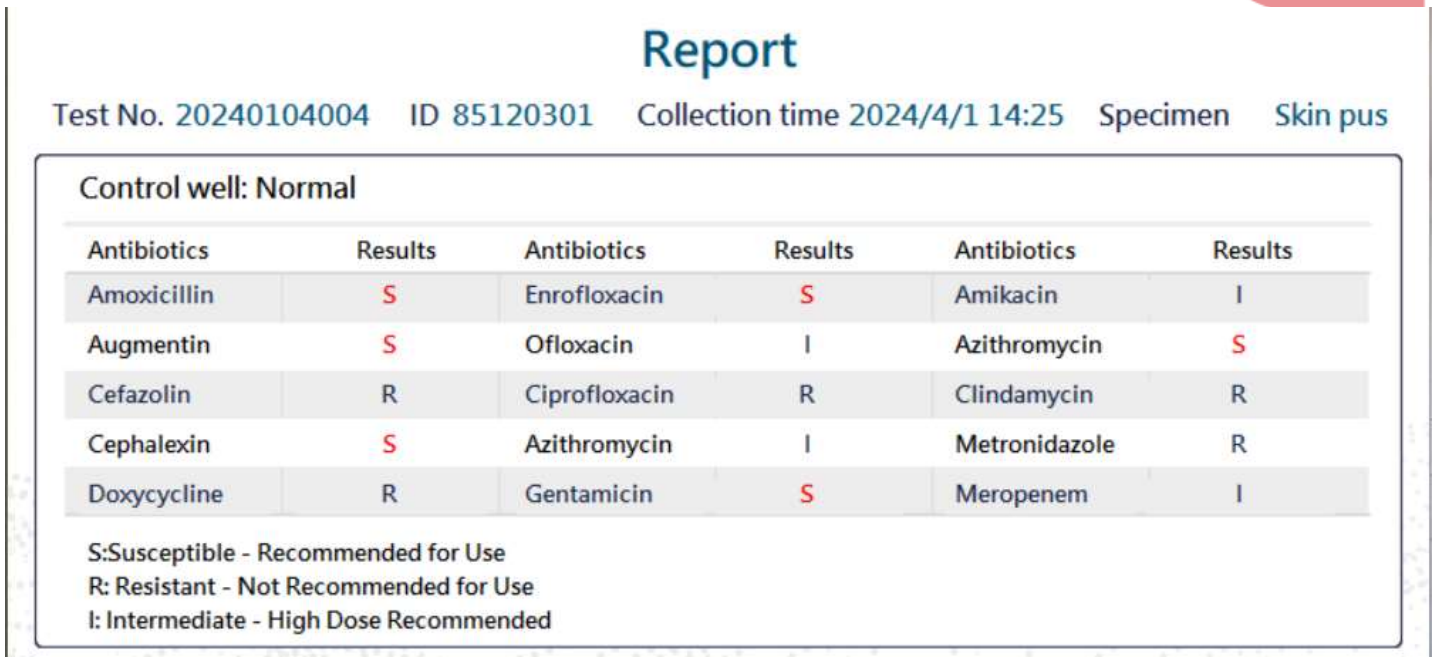
Microorganisms are inoculated into the medium and evenly distributed on the wells on the **microfluidic disc** containing different concentrations of antibiotics. After incubation, the disc is automatically observed for signs of microbial growth.





The outcome is determined using a **Colorimetric analysis**, where the presence of color-change indicates whether microbial growth occurred, thus providing information on the organism's susceptibility to the antimicrobial agents.

Result Interpretation



Report

Test No. 20240104004 ID 85120301 Collection time 2024/4/1 14:25 Specimen Skin pus

Control well: Normal

Antibiotics	Results	Antibiotics	Results	Antibiotics	Results
Amoxicillin	S	Enrofloxacin	S	Amikacin	I
Augmentin	S	Ofloxacin	I	Azithromycin	S
Cefazolin	R	Ciprofloxacin	R	Clindamycin	R
Cephalexin	S	Azithromycin	I	Metronidazole	R
Doxycycline	R	Gentamicin	S	Meropenem	I

S:Susceptible - Recommended for Use
R: Resistant - Not Recommended for Use
I: Intermediate - High Dose Recommended

Resistant:	The antibiotic **did not** stop the growth or kill the microorganism causing the infection.	**It would NOT be a good choice for treatment.**
Susceptible:	The antibiotic **stopped** the growth or killed the microorganism causing the infection.	**It may be a good choice for treatment.**
Intermediate:	The antibiotic stopped the growth or killed **some** of the microorganism causing the infection.	**The medicine may work at a higher or more frequent dose.**

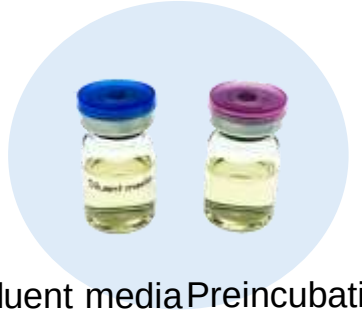
Workflow

04

Preparation

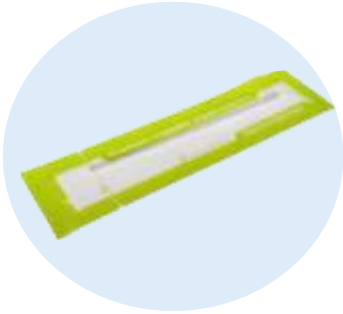
miniAST

Reagent Disc



Diluent media (Blue cap)

Preincubation media (Pink cap)

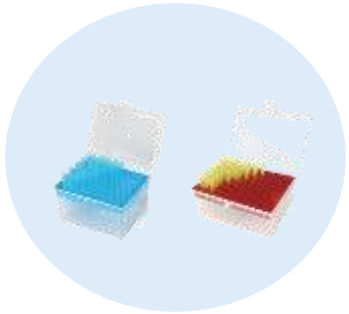


Sterile Swab

Powder-free Gloves

70% Alcohol (Disinfectant)

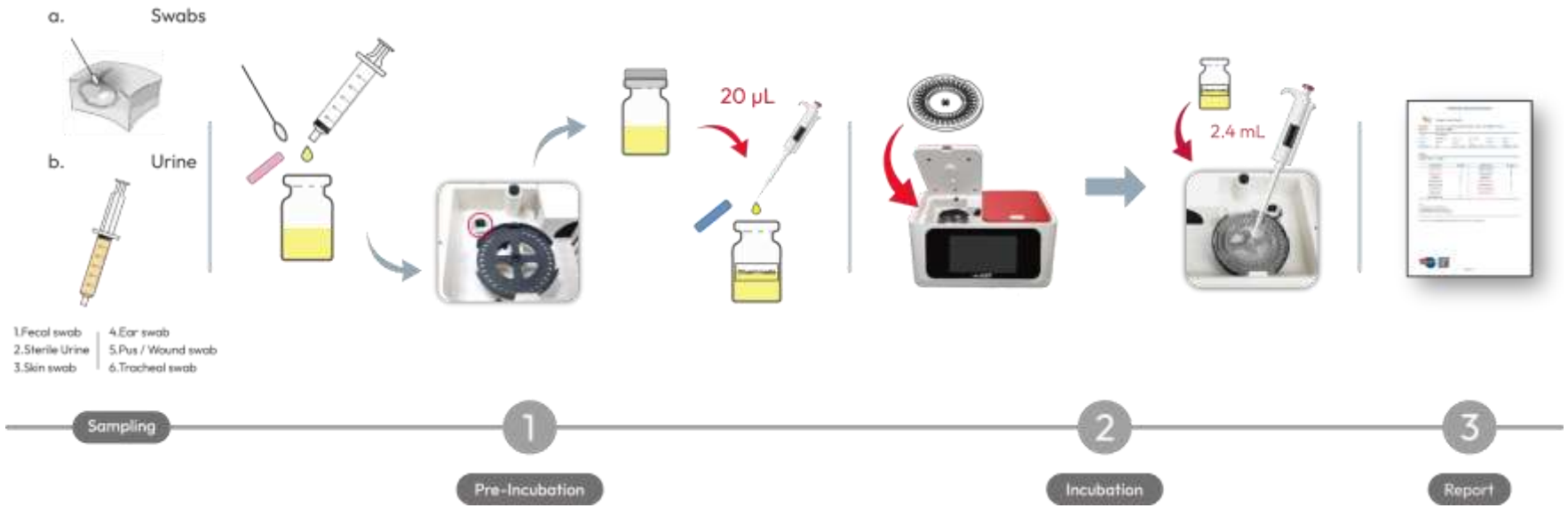
Micropipette (20µL & 800 µL)



Pipette Tips

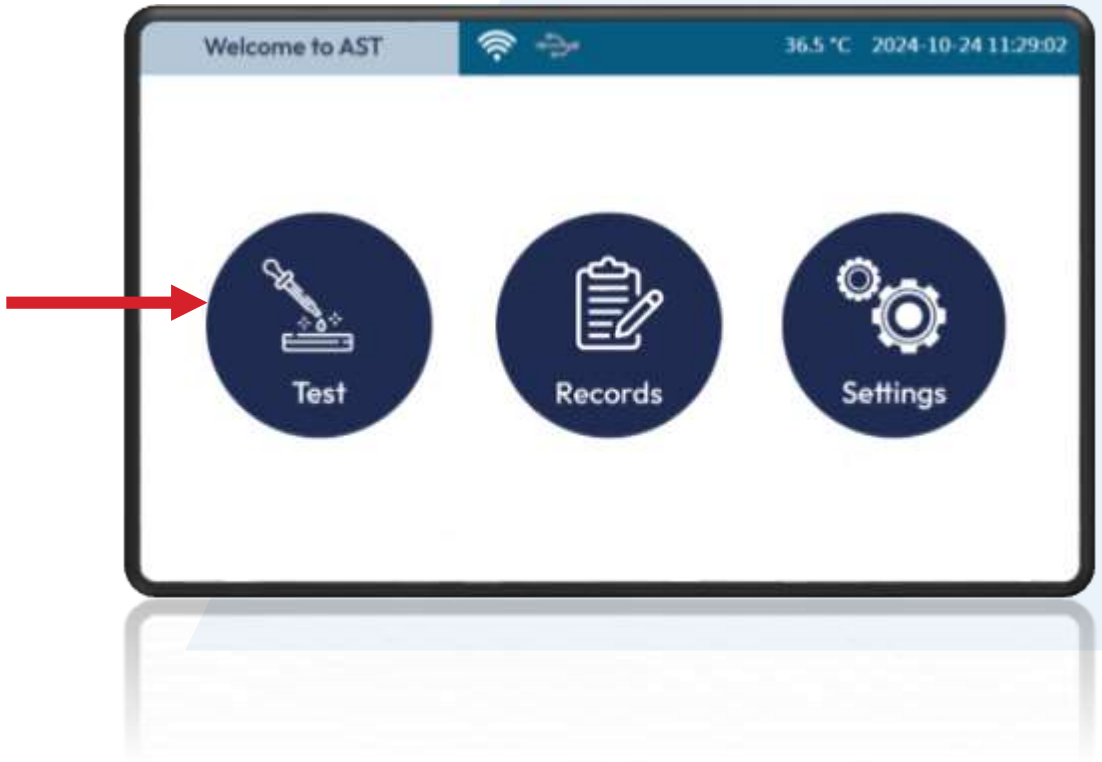
Easy Workflow

Drop, Load, and Go!



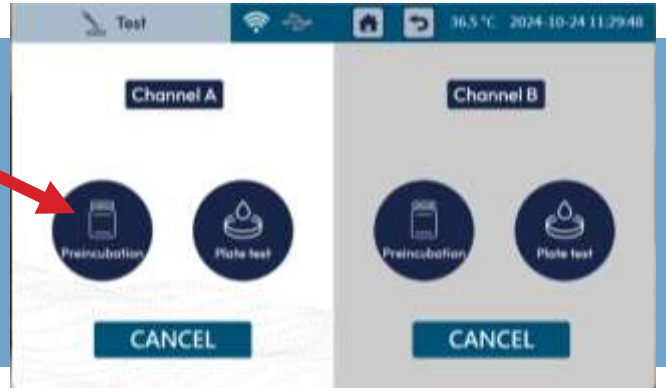
Operation

UI Home screen



STEP 1. Pre-incubation

1



2

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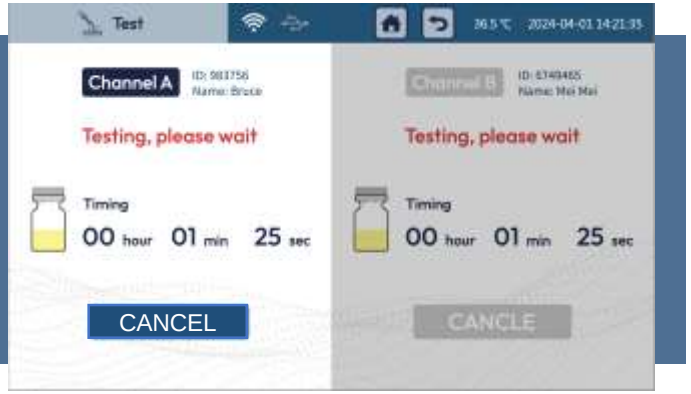


STEP 1. Pre-incubation

5

6

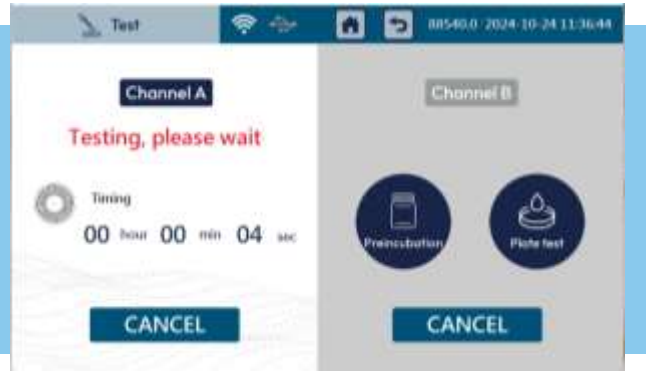
- **After the pre-incubation is complete, you will hear a "beep" sound.**
- **At this time, take the dilution medium (with the blue cap) and the miniAST disc from the refrigerator and allow them to reach room temperature for 10 minutes.**

Step 2. Incubation Steps

1

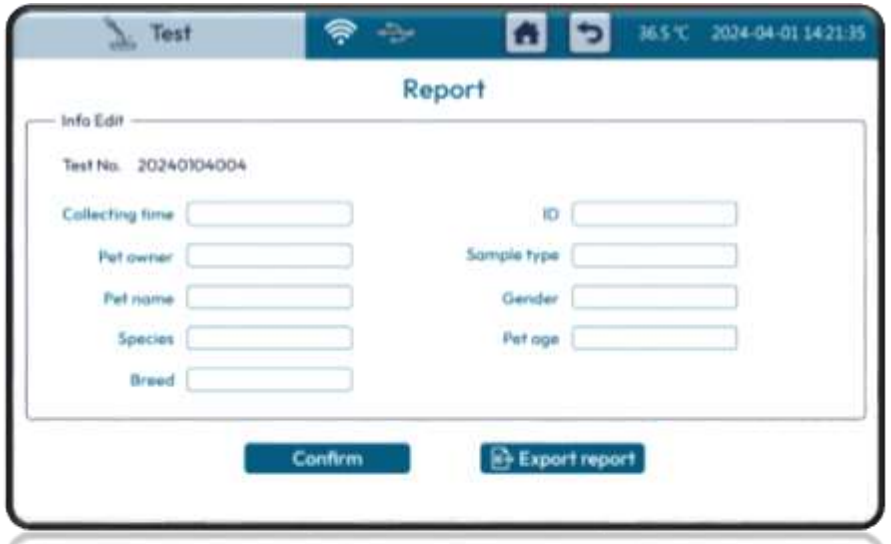
2

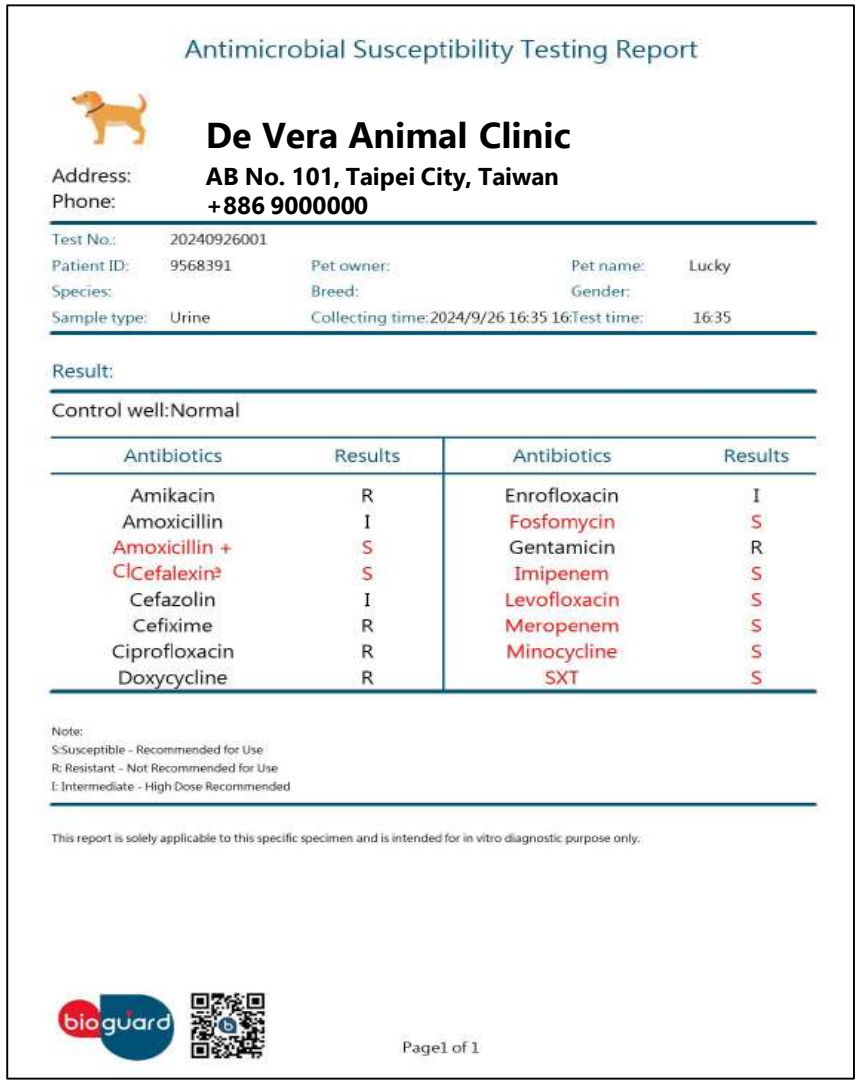
3



4

Report Generation





Antimicrobial Susceptibility Testing Report

De Vera Animal Clinic

Address: **AB No. 101, Taipei City, Taiwan**
Phone: **+886 9000000**

Test No.:	20240926001			
Patient ID:	9568391	Pet owner:	Pet name:	Lucky
Species:		Breed:	Gender:	
Sample type:	Urine	Collecting time:	2024/9/26 16:35 16:	Test time: 16:35

Result:

Control well:Normal

Antibiotics	Results	Antibiotics	Results
Amikacin	R	Enrofloxacin	I
Amoxicillin	I	Fosfomycin	S
Amoxicillin + Cl Cefalexin²	S	Gentamicin	R
	S	Imipenem	S
Cefazolin	I	Levofloxacin	S
Cefixime	R	Meropenem	S
Ciprofloxacin	R	Minocycline	S
Doxycycline	R	SXT	S

Note:
S:Susceptible - Recommended for Use
R: Resistant - Not Recommended for Use
I: Intermediate - High Dose Recommended

This report is solely applicable to this specific specimen and is intended for in vitro diagnostic purpose only.

Page1 of 1

Hospital name, address, and phone number

Owner and Patient's Information

Test result and Interpretation

miniAST ⟲ AMR solution

- ✓ The most advanced and fastest method for performing AST enables for faster treatment decisions
- ✓ With its 16 antibiotic panel, it minimizes risk of wrong antibiotic choice
- ✓ Provides a comprehensive antibiotic profile for both companion and production animals
- ✓ Can process two samples at the same time, doubling efficiency
- ✓ Offers cost-effective antibiotic susceptibility testing
- ✓ With a simple workflow and a compact design that fits into your space

miniAST gives you the speed, accuracy, versatility, and efficiency in every test

FAQ

05

A. Antibiotic Susceptibility Testing

Q1. When will you need antibiotic susceptibility testing?

- if there is suspicion of a complicated infection (Ex. associated with underlying disease),
- if the patient has not responded to therapy,
- if the patient has a history of relapse or re-infection,
- if there is any reason to suspect infection with MDR bacteria.
- if the patient is immunocompromised,
- if the infection is life-threatening.

Q2. What is being determined, the microbe or the antibiotic, and how is it being determined, qualitatively or quantitatively?

The device determines the antibiotic susceptibility level of the microbe in the sample by measuring the color spectrum of the reaction well. The result will be qualitative in the form of R (Resistant), I (Intermediate), S (Susceptible)

B. Sampling

Q3. What type of specimens can be used with the miniAST test panels?

The specimen that can be used in the device are:

1. Sterile Urine
2. Fecal swab
3. Skin swab
4. Ear swab
5. Pus/Wound swab
6. Tracheal swab
7. Urogenital swab

Note: Blood, pleural effusion, abdominal effusion, tissues, surgical specimens, and non-biological items such as surgical instruments or consumables are not applicable in the device as it may interfere with the result measurement.

.

B. Sampling

Q4.What conditions are necessary to obtain the specimen?

The conditions needed for the specimen are:

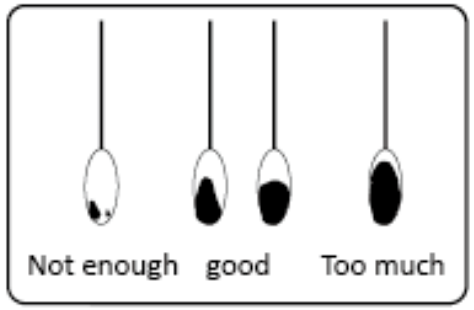
1. Do not use antiseptic solutions or topical antibiotics before taking the sample.
2. If you are sampling from an animal receiving topical or systemic antibacterial treatment, it is recommended to collect the sample after the medication effect subsided.
3. To avoid contamination by other microorganisms, aseptic techniques should be followed during sampling and inoculation.

Note:

- **Skin infections**
  - Obtain sample using a sterile cotton swab.
  - The sample should be taken from the wall of the lesion after removal of the infected dead tissue by surgical debridement.
- **Ear infections**
  - Remove superficial earwax from the walls of the ear canal.
  - Take a sample from the deep wall of the ear canal with the provided sterile cotton swabs.
- **Urinary tract infections**
  - Obtain a sterile urine sample by catheterization or bladder puncture (cystocentesis).

B. Sampling

ex.1.



Q5. How much specimen is required for each test?

For sterile urine: 1 ml

For swab

ex.2.

Q6. How long can the specimen be stored after collection?

The specimens should be processed as soon as possible within 2 hours of collection in room temperature. However, if testing is not possible the sample can be stored up to 24 hours in 2-8 ^{0}C refrigerator. For swab samples, please store it in a transport swab medium tube.

C. Testing

Q7. How does the device work?

The device operates using the broth microdilution method, which involves preparing a liquid broth medium containing varying concentrations of antimicrobial agents. Microorganisms are then inoculated into this medium and evenly distributed on the wells on the disc. After incubation, the disc is observed for signs of microbial growth. The outcome is determined using a colorimetric method, where the presence of color change indicates whether microbial growth occurred, thus providing information on the organism's susceptibility to the antimicrobial agents.

Q8. Which animal species can be tested?

All animals are able to be tested.

Q9. How long does each test take?

The testing of each sample is as soon as 4 hours, depending on the microorganism type and amount

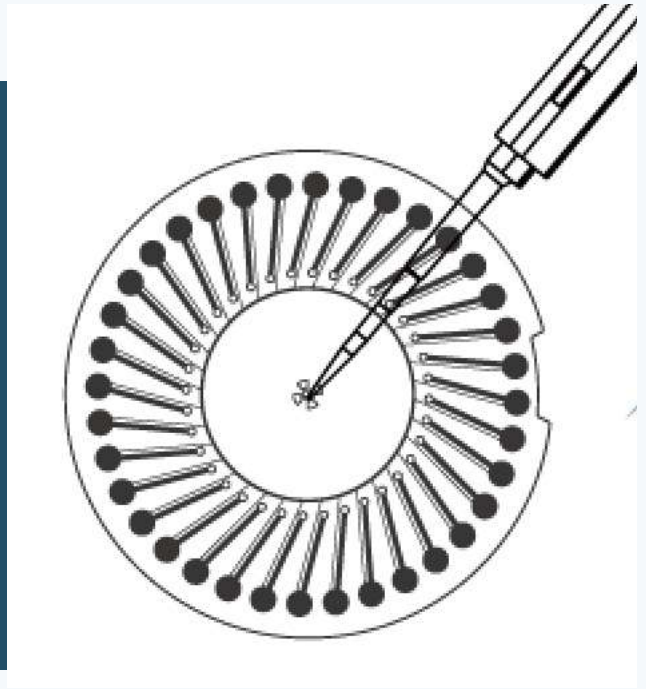
C. Testing

Q10. What are the basic requirements to ensure smooth functioning of the Analyzer?

- Make sure the test disc is correctly positioned, as improper placement can impact the results.
- Keep the instrument lid closed throughout the testing process.
- The working area should be flat and sufficiently strong.
- The environment should be as dust-free, non-corrosive, and non-flammable as possible.
- There should be no mechanical vibrations, excessive noise, or power interference.
- Avoid placing the equipment near heat sources or airflow, ensure good ventilation, and prevent direct sunlight exposure.
- The device needs a minimum of 20 cm clear distance.
- The working temperature should be between 10-30°C, with relative humidity not exceeding 85%.
- The ambient temperature should not be below 10°C.

C. Testing

Q11. How to add the sample to the test?



- After removing the disc from the aluminum foil pouch, place it on the machine by aligning the groove as the picture below. Using a pipette, add the sample through the "Sample" hole.

D. Disc and Media

Q12. Can the QR code on the test disc pouch be reused?

- No, each QR code is unique and contains the data tailored a particular lot of test discs. To ensure accuracy in the test results, it is crucial to use the QR code that accompanies each test disc, rather than reusing one from another lot.

Q13. Can the test disc be reused?

- No, each test disc can only be used once.

Q14. Can we warm up the media before adding the sample?

- No, warming up the media before adding the sample is not necessary.

Q15. What should be considered while preparing the testing disc?

- Please wear powder-free gloves during the operation, as powder can cause destructive effects on the optical components of the instrument. Ensure the test disc remains level during and after sample addition. Avoid air bubbles while adding the sample to the test disc. When placing the test disc onto the machine, hold it from the edges.

Q16. How should the test disc and medium be stored? What is the shelf life?

- The test disc and medium should be stored between 2-8°C. The shelf life is 12 months from the date of manufacture. Before use, take it out and let it reach room temperature for 10 minutes. Please note that the test disc is individually sealed, and once opened, it must be used within 30 minutes.

Q17. Can the test disc be stored in the freezer?

- No, the test disc should be stored at 2-8°C.

E. Result

Q18. How is the result (R, S, I) is calculated?

		High concentration	
		Bacteria not growing	Bacteria growing
Low concentration	Bacteria not growing	S	Error
	Bacteria growing	I	R

The result is calculated by comparing the color results from high and low concentration of the antibiotic.

Q19. What should be done if results of sensitivity testing diverge from clinical outcome?

A number of factors may be responsible for the divergence between sensitivity results and clinical outcome. The main factors to be considered for a negative response to therapy are:

1. Underdosing due to inaccurate weighing of the patient or inadequate tablets for correct dosing (large/small dogs),
2. Limited drug tissue penetration or reduced efficacy at the infection site,
3. Specific underlying conditions in the patient,
4. Inappropriate sample type,
5. Contamination,
6. Non-compliance by the owner.

E. Result

Q20. Is it possible to send miniAST report to an external computer?

Yes, miniAST can transfer testing results to a computer using either USB or WiFi. Bioguard also offers specialized software for computers that enables direct data transfer and printing of reports.

F. Maintenance

Q21. What are the maintenance procedures for the analyzer?

- It is essential to turn off the power and clean any residue from the tray using a damp cloth with 70% alcohol at the end of each workday. Promptly dispose of any waste materials, including reagent discs, media bottles and micro-dropper. It is advised to wear rubber, powder-free gloves while operating the machine for daily maintenance.

Q22. Do the reagents require calibration?

- No, the calibration curve is integrated into the QR code on the reagent disc, so no additional calibration is necessary.

Q23. Does the instrument require calibration?

- The portable instrument does not need calibration since it involves no mechanical movements.

THANK YOU FOR YOUR ATTENTION !

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