Antibiotic Susceptibility Tests

Determination of bacterial resistance to antimicrobials is an important part of the management of infections in patients.

What is an Antibiotic susceptibility test and how does it work?

The purpose of a susceptibility test is to *in vitro* determine the sensitivity or resistance of pathogenic aerobic and facultative anaerobic bacteria to various antimicrobial compounds. Many laboratory techniques may be used to *in vitro* evaluate bacterial resistance to different antimicrobial agents. Among these techniques, the disk diffusion susceptibility test is the most common, as well as the dilution tests in broth and agar.¹

To obtain reliable and uniform results, the techniques used and the media and procedures employed must be standardized. Nowadays, the Clinical Laboratory Standards Institute (CLSI) is responsible for updating and modifying the original procedure of Kirby and Bauer through a global consensus process. This ensures uniformity of technique and reproducibility of results².

This standardized method involves a constant amount of microbiological agent in a paper disk applied to the agar surface in which the microorganisms have been streaked. In this manner, a concentration gradient is produced and the sensitivity of the microorganisms is indicated by the size of the inhibition halo.

The use of standardized culture media and careful control of all test conditions are fundamental requirements in the microbiological assay of antibiotics in order to achieve satisfactory test results.
CONDA media for Antibiotic Susceptibility Tests

Proper media choice is an important factor in guaranteeing reproducibility of the tests performed. CONDA S.A. offers a wide range of antibiotic media that are used for determining antibiotic potency through the microbiological assay technique.

Strict quality control of the finest ingredients is performed to ensure consistency and reproducibility of the culture media formulations.

Our media for clinical assays include:

Mueller Hinton Agar Cat.1058 – The classic Mueller Hinton media is reliable and widely used in many performances for sensitivity tests on antibiotics and sulfamides, and for the primary isolation of Neisseria and other pathogens from clinical samples.

Mueller Hinton Agar II Cat.1055 – The original specification of Mueller-Hinton Agar Cat. 1058 did not define cation content (affecting tests on several agents, particularly aminoglycosides) and limits of thymidine and thymine content (affecting tests on trimethoprim and trimethoprim sulfamethoxazole). CONDA Mueller-Hinton II agar is manufactured to contain low levels of thymidine and thymine, and controlled levels of calcium and magnesium ions. This medium is recommended for antibiotic sensitivity tests and for the primary isolation of gonococci and meningococci, and other pathogens from clinical samples.

Mueller Hinton Broth Cat. 1214 – when performance in tubes by the turbidimetric assay is needed with the Muller Hinton formula.

ISO- Sensitest Cat.1001 – This media is recommended when all the parameters have to be controlled in the performance of the tests. Its formulation is carefully constructed to give a reproducible medium which the undefined components are kept to a minimal level.

Haemophilus Test Medium Cat.1464 – Suitable medium for susceptibility test of Haemophilus influenzae.

For the development of new antibiotics and the study of bacterial resistance to their presence, the pharmaceutical industries need to perform tests on controlled media with specifications of the United Stated Pharmacopoeia (USP), Antibiotic European Pharmacopoeia and AOAC International. The antibiotic media are identified numerically with names assigned by Grove and Randall in Assay Methods of Antibiotic 4.

Our media for these assays are:

Antibiotic Medium Nº1 Cat.1520 – Standard medium used for the preparation of the seed layer in potency assay of antibiotics of bacitracin and penicillin preparations. This medium has the same formula as Antibiotic Medium Nº 11 (Cat. 1 528), with the difference that the pH of the medium has been adjusted to 6.6 ± 0.1.

Antibiotic Medium Nº2 Cat.1002 – Standard medium used to prepare the base layer in the microbiological assay of antibiotics. It is used to prepare the base layer in the microbiological assay of antibiotics such as bacitracin, chloramphenicol and penicillin.

Antibiotic Medium Nº3 Cat.1534 – In the cylinder method in plates, Antibiotic Medium Nº 3 is used to resuspend the inoculum in the potency assay for penicillin, erythromycin, neomycin, chlorotetracycline and chloramphenicol. The serial dilution method is used for penicillin assay. Lastly, this medium can also be used in the turbidimetric determination of the potency of bacitracin, streptomycin and terramycin. The turbidimetric method is based on the inhibition of growth of a microbial culture in a fluid medium containing a uniform solution of an antibiotic. Use of this method is appropriate only when test samples are clear.

Antibiotic Medium Nº5 Cat.1524 – This medium can be used in the cylinder plate method for the assay of streptomycin, generally with Bacillus subtilis as the tested organism.

Antibiotic Medium Nº8 Cat.1004 – This medium is used to prepare the base layer for the assay of tetracycline and other antibiotics. This medium has the same formula as Antibiotic Medium Nº 2 (Cat. 1002) and Antibiotic Medium Nº 5 (Cat. 1524), with the difference that the pH of the final medium has been adjusted to 5.7 ± 0.1.

Antibiotic Medium Nº11 Cat.1528 – For use in the potency assay of neomycin and other antibiotics. This medium has the same formula as Antibiotic Medium Nº 1 (Seed Agar, Cat. 1520), with the difference that the pH of the medium has been adjusted to 7.9 ± 0.2.

Antibiotic Medium Nº12 Cat.1525 – Recommended for preparing test plates for the cylinder plate assay of the antifungal agents nystatin and anisomycin, using only Saccharomyces cerevisiae as the test organism. It is used for the assay of amphotericin B.

Antibiotic Medium Nº 10 Cat.1537 – This medium is used and recommended for testing the potency of Polymixin through its inhibitory effects on microorganisms.