Lab Report

Lab Report: Antibiotic Resistance

Name

Institution

Course

Instructor

Date

Introduction

Antibiotic resistance is a major problem and a key threat to the healthcare sector. Studies link misuse of antibiotics to the rise in cases of resistance, with some strains that were traditionally susceptible to antibiotics acquiring resistance against the antimicrobial agents (Aslam et al., 2018). This has contributed to the rise in the number of cases of treatment failure. However, the degree of resistance to an antibiotic varies from one strain of microbe to another (Centers for Disease Control and Prevention (U.S.), 2019). These disparities in susceptibility to different antibiotics inform the choice of treatments administered to different patients. The current study sought to establish the disparities in susceptibility of selected strains of bacteria to various antibiotics. It was hypothesized that there would be no differences in the susceptibility of the bacteria to the selected antibiotics.

Materials and Methods

The experiment required selected antibiotics, nutrient agar plates, an inoculation loop, a permanent marker, and pure colonies of bacteria of interest, among others. The agar plates were prepared, and the nutrient agar plates and left to solidify in a sterile environment. The plates were then inoculated with the corresponding antibiotics as per the defined protocol. This involved using a sterile cotton swab to inoculate the allocated agar plates in a zig-zag motion. The plate was then rotated and the zig-zag motion repeated until the entire plate was covered. The lid of the plate was replaced, and the swab disposed of. The antibiotic discs were then marked AM10, K30, and Te30, and sterile forceps were used to place the discs in the corresponding zones within the plate. The lid was then replaced, and the plate incubated in an upside-down position at warm temperatures below 37°C overnight. The zones of inhibition corresponding to the antibiotic discs were then noted, measured, and recorded. Upon completion of the measurement of the radius for the zones of inhibition, the materials were sterilized and disposed of. The zones of inhibition for the various discs were compared, and conclusions drawn on the resistance of the bacteria to different classes of antibiotics.

Results

Table 1: Zone of Inhibition for Skin Sample

Antibiotic Disk	Diameter of Zone (mm)
AM10	21
K30	8
Te30	45

Table 2: Zone of Inhibition for Local Sample

Antibiotic Disk	Diameter of Zone (mm)
AM10	19
K30	18
Te30	43

Table 3: Zone of Inhibition for Yeast Sample

Antibiotic Disk	Diameter of Zone (mm)
AM10	14
K30	28
Te30	49

Discussion and Conclusion

Microbial contaminations are found in virtually all surfaces, with the guts of human beings and other living organisms also containing the normal flora with millions of microbes. While some of the microbes are helpful, others are pathogenic (Centers for Disease Control and Prevention (U.S.), 2019). Therefore, antibiotics are key in controlling the pathogenic strains of microbes. In this study, the local sample and sample from the skin sample contained microbes believed to be susceptible to antibiotics. Similarly, yeast samples were likely to be susceptible to antifungal agents.

Based on the experiments, ampicillin appeared to have the highest activity against all classes of microbes. The study indicated that ampicillin was most effective against the yeast sample (49mm), followed by the skin sample (45mm), and had the lowest activity against the local sample (43mm). On the other hand, tetracycline had very low activity against the yeast sample (14mm), followed by the local sample (19mm), and the highest activity against the skin sample (21mm). In the case of kanamycin, the skin sample was the most resistant (8mm), while the resistance in the local sample (18mm) and yeast sample (28mm) was significantly lower. The choice of antibiotics for various microbes would thus be dependent on the degree of resistance exhibited by the target species (Charani & Holmes, 2019).

References

Aslam, B., Wang, W., Arshad, M. I., Khurshid, M., Muzammil, S., Rasool, M. H., Nisar, M. A., Alvi, R. F., Aslam, M. A., Qamar, M. U., Salamat, M. K. F., & Baloch, Z. (2018). Antibiotic resistance: A rundown of a global crisis. Infection and Drug Resistance, 11, 1645–1658. https://doi.org/10.2147/IDR.S173867

Centers for Disease Control and Prevention (U.S.). (2019). Antibiotic resistance threats in the United States, 2019. Centers for Disease Control and Prevention (U.S.). https://doi.org/10.15620/cdc:82532

Charani, E., & Holmes, A. (2019). Antibiotic stewardship—Twenty years in the making. Antibiotics, 8(1), 7. https://doi.org/10.3390/antibiotics8010007