

Evaluation of nutrient agar and Antibiotic Assay Medium 1 as cost-effective alternatives to Mueller-Hinton agar for antibiotic sensitivity testing

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The antibiotic sensitivity test (ABST) is a crucial tool in clinical microbiology for determining the most effective antibiotic to treat infections. Though Mueller-Hinton Agar (MHA) is the standard culture medium used for ABST in most clinical laboratories, this study investigates the efficacy of Antibiotic Assay Medium 1 (AAM1) and Nutrient Agar (NA) as cost-effective alternatives to MHA for commonly isolated bacteria pathogens in the microbiology laboratory. This is a laboratory-based experimental study. Pure and fresh cultures of control strains including *Staphylococcus aureus* (ATCC 25922), *Escherichia coli* (ATCC 2785) and *Pseudomonas aeruginosa* (ATCC 25923) were inoculated separately into MHA, AAM-1 agar and NA. Selected antibiotic panels such as *Staphylococcus aureus*: co-trimoxazole (SXT), clindamycin (DA), cefoxitin (FOX), *Escherichia coli*: cefotaxime (CTX), gentamicin (CN), ampicillin (AMP), and *Pseudomonas aeruginosa*: ceftazidime (CAZ), ciprofloxacin (CIP) and CN) were used to perform ABST following the standard CLSI disk diffusion method. The test was repeated five times to ensure precision. After overnight incubation at 37 °C, the zones of inhibition (ZoI) were measured. The statistical analysis was performed to compare the mean values using one-way ANOVA, with $p < 0.05$ considered statically significant. The test results showed that *Staphylococcus aureus* exhibited a statistically significant difference in ZoI for cefoxitin only on NA ($p = 0.000$). For *Escherichia coli*, both AAM-1 and NA showed non-significant differences in ZoI for all tested antibiotic panels. However, *Pseudomonas aeruginosa* demonstrated significantly different results for gentamicin on both NA ($p = 0.000$) and AAM-1 ($p = 0.002$) in comparison with the standard MHA. NA and AAM-1 showed potential as cost-effective alternatives to Mueller-Hinton Agar, particularly for *Escherichia coli* and *Staphylococcus aureus*, especially in resource-limited laboratories. Further validation is necessary before widespread adoption in clinical settings.

Keywords: Antibiotic Sensitivity test (ABST), Muller-Hinton Agar, Antibiotic Assay medium 1, and Nutrient agar.