

Effect of Vinegar as a Natural Disinfectant: An In-Vitro Study Done for Planktonic Escherichia Coli

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Disinfectants are well known for eliminating microorganisms from surfaces and transmission media, which are important in maintaining ecological health and human safety. Despite the decreased effectiveness of commercially available chemical disinfectants, the emergence of disinfectant resistance has grown to be a serious threat to the safety of life and health. Thus, addressing disinfectant resistance necessitates thorough innovations prompting many countries to explore natural products such as grapes, dates and apple vinegar. Hence, this study focuses on cost-effective coconut vinegar, widely available in Sri Lanka. *E. coli*, isolated from biofilms associated with poultry, was used for the *in vitro* study where ATCC *E. coli* was used as the positive control. First, the isolates were confirmed as *E. coli* by PCR using *16s rRNA* gene-specific primers which were then exposed to grow in a series of concentrations of commercially available vinegar (0.25% - 4%) and ampicillin (3.125 µl/ml – 6400 µl/ml) in 96 well plates at planktonic state using standard protocols to detect minimum inhibitory concentrations of vinegar and ampicillin. *E. coli* growth was observed through a plate reader under 570 nm wavelengths. Ampicillin treatment on ATCC *E. coli* 25922 was the control to assess test accuracy. The experiments were independently repeated using three different bacterial broths from the same sample. As CLSI recommended the quality control strain *E. coli*, 25922 gave the inhibitory concentrations as 2-8 mg/ml of ampicillin, confirming the test's validity. For vinegar, 90% of planktonic *E. coli* growth reduction was observed (92% reduction in positive control) at a 2% concentration of coconut vinegar use indicating the efficacy of vinegar to work as a natural disinfectant. The study is expanding to detect the effectiveness of different vinegar products on planktonic and biofilm *E. coli* to further confirm vinegar as a cost-effective remedy for commercial disinfectants and disinfectant resistance.

Keywords: *Escherichia Coli*, ATCC, *16s Rna* Gene, Planktonic, Vinegar 5