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Antibacterial Activity of Combined Leaf and Seed Extracts of *Carica papaya* Against *Staphylococcus aureus (*ATTC 25923*)* and *Escherichia coli (*ATTC 10536*)*

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Structured Abstract

Background: The rising problem of antimicrobial resistance has created an urgent need to develop alternative antibacterial agents that are effective, safe and sustainable to the environment. In line with this, the study aimed at determining the antibacterial effectiveness of the *Caria papaya* aqueous extract in combination with leaves and seeds against *Staphylococcus aureus* and *Escherichia coli* to fill a research gap relating to the combination of extracts as well as environmentally friendly methods of extracts extraction.

Methods: *C. papaya* leaves and seeds were collected, washed, dried in the oven and reduced to fine powder. Aqueous extraction was done through the process of maceration, which was followed by concentration of the crude extracts. In vitro testing of the extracts was done in relation to Agar well diffusion and minimum inhibitory concentration with respect to *S. aureus* and *E. coli*. Considering the absence of visible inhibition areas, to quantitatively determine the bacterial growth, OD600 were used.

Results: The aqueous extract showed no visible zone of inhibition of either bacterial strain in the concentration of 0.195 to 100 mg/mL. Observation showed that all the wells were growing, therefore setting that the minimum inhibitory concentration was above 100 mg/ml. OD 600 was analysed to support these findings with minimal percentage inhibition as compared to the growth control. Based on this, the minimum bactericidal concentration could not be tested because no inhibitory concentrations were present within the range of concentrations tested. These findings prove that the aqueous extract was neither bacteriostatic or bactericidal within the tested concentration range.

Conclusion: In conclusion, this shows that aqueous extracts of combine seed and leaves extract of *C. papaya* do not have any activity against *S. aureus* and *E. coli* at their concentrations. The lack of activity of the antibacterial is explained by limitations of solvents that aqueous extraction cannot effectively extract major antimicrobial phytochemicals. Even though there was no inhibition, the attained result is scientifically important, and it highlights the significance of solvent choice and efficiency of extraction.

Keywords: *Carica papaya*, aqueous plant extract, antibacterial efficacy, *Staphylococcus aureus*, *Escherichia coli*.

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