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Analysis of Phytochemical and Antibacterial Activity of Green Tea (*Camellia sinensis*) Extracts

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Structured Abstract

Background: Green tea is a plant with a high concentration of bioactive compounds based on polyphenols. The major polyphenols in green tea are flavonoids and have four major divisions: epicatechin, epigallocatechin, epicatechin gallate, and epigallocatechin gallate. Humans can easily get infections from bacteria, particularly from contaminated food. Foodborne bacteria such as *Salmonella sp., E. coli, Staphylococcus*, and *Bacillus cereus* pose health risks. This study aims to identify the bioactive compounds and effectiveness of *Camellia sinensis* against *E. coli, P. aeruginosa, S. aureus, and B. cereus*.

Methods: Green tea was extracted using methanol, ethanol, and distilled water. The bioactive compounds of green tea, including phenol, alkaloid, saponin and flavonoid, were detected using phytochemical tests. The colour changes for each solution were observed to detect the bioactive compound's existence. This study used disc diffusion and microdilution methods for minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC). The results of both tests were observed after one day of incubation at 35℃.

Results: This study found that *C. sinensis* consists of phenol, alkaloid, saponin, and flavonoid as bioactive compounds. The susceptibility test indicated that methanol, ethanol, and distilled water effectively inhibited the growth of four types of bacteria (*E. coli, P. aeruginosa, S. aureus,* and *B. cereus*) by showing no significant differences. The MIC of ethanolic extraction against *B. cereus* was 0.9375mg/ml, while the MBC against *P. aeruginosa* was 1.875 mg/mL. The MIC and MBC values for other strains in three different solvents were higher than 15 mg/mL. In certain concentrations, *C. sinensis* has shown effectiveness against some bacteria strains, such as *P. aeruginosa* and *B. cereus*.

Conclusion: The findings indicated that *C. sinensis* has shown effectiveness against some bacteria strains, such as *P. aeruginosa* and *B. cereus*, in certain concentrations. These results highlight the potential of green tea extracts as effective antibacterial agents, supporting their use in medical and preservative applications.

Keywords: *Camellia sinensis*, Green tea, Antibacterial activity, Phytochemicals, Bioactive compounds

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