ANTIOXIDANT AND ANTIMICROBIAL ACTIVITIES OF PHYTOCHEMICALS FROM SPENT COFFEE GROUNDS EXTRACT (SCGE)

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ABSTRACT

ANTIOXIDANT AND ANTIMICROBIAL ACTIVITIES OF PHYTOCHEMICALS FROM SPENT COFFEE GROUNDS EXTRACT (SCGE)

The most common waste produced during the production of coffee beverages is spent coffee grounds (SCG), which are abundant in a range of valuable bioactive substances. The improper disposal of SCG in a landfill can contaminate the soil, water, and air. In comparison to fresh coffee grounds (CG), the effect of the brewing process on the concentration and yield of phytochemicals such caffeine, phenolic, and flavonoids as well as their antioxidant and antibacterial properties were investigated in this study. The SCG and CG extract were carried out using Soxhlet extraction method. Using UV-Vis Spectroscopy, the total phenolic content (TPC) and total flavonoid content (TFC) of the SCG and CG extract were identified. Furthermore, the antioxidant and antimicrobial activity of the extracts were studied. Results showed that the yields of the SCG and CG extracts were 6.48 ± 0.40 and 8.13 ± 0.65%, respectively. It shows that the most water-soluble substances are extracted in the brewing process while substances with lower water solubility remain in SCG. The phenolic and flavonoid content of SCG was indicated slightly lower than CG extract. The phenolic content of SCG and CG extracts are 86.98 ± 0.27 and 115.71 ± 0.17 mg GAE/g, respectively. While the TFC of SCG and CG extract are 23.73 ± 0.03 and 27.21 ± 0.02 mg QE/g due to the lower water solubility of the compounds. The caffeine concentration of SCG and CG extract showed a similar pattern, with values of 6.59 ± 0.02 and 19.36 ± 0.01 mg/g, respectively due to caffeine water-soluble properties. SCG and CG extracts have IC_{50} values of 11.34 and 19.73 for antioxidant activity, respectively. The findings demonstrate that SCG and CG extract have high phenolic and flavonoid content that contributes to its strong antioxidant activity. Subsequently, growth against *Escherichia coli* is inhibited by both the SCG and CG extracts, suggesting that both materials possess antimicrobial properties. Finally, using SCG offers a new supply of valuable chemicals, encourages the development of sustainable practices for the coffee business, and increases the value of a readily available waste product.