**Title :** **Comparison of Antioxidant Extraction Efficiency from Indian Gooseberry Using Different Solvents**

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# ABSTRACT

Indian gooseberry is a natural fruit widely utilized for its health benefits and medicinal properties. It is rich in antioxidants, which play a crucial role in reducing cellular damage caused by free radicals and lowering the risk of chronic diseases such as heart disease, diabetes, and cancer. This study aimed to compare the antioxidant extraction efficiency of Indian gooseberry using three different solvents: distilled water, methanol, and ethanol. One gram of Indian gooseberry pulp was soaked in 30 mL of each solvent and incubated at room temperature for three days. The extracts were then filtered and analyzed for total phenolic content (TPC), total flavonoid content (TFC), and antioxidant capacity using DPPH, ABTS, and FRAP assays. The results indicated that the Indian gooseberry extract obtained using distilled water exhibited the highest levels of TPC (14.21±1.62 to 35.91±1.19 mg GAE/g crude extract), TFC (27.11±2.20 to 136.85±2.21 mg QE/g crude extract), and FRAP (27.22±2.92 to 163.76±1.98 mg AAE/g crude extract) with statistically significant differences ($p < 0.05$) compared to other solvents. Although the methanol extract showed higher antioxidant activity in the ABTS assay than the other solvents, there was no significant difference when compared to the ethanol extract. Despite methanol's efficiency in extracting antioxidants in some assays, its safety limitations suggest that distilled water is the most suitable solvent for extracting antioxidants from Indian gooseberry. Distilled water not only provides high extraction efficiency but also ensures safety for applications in the food, pharmaceutical, and cosmetic industries. The findings of this study provide a guideline for selecting appropriate solvents for the extraction of antioxidants from Indian gooseberry for future commercial applications.

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