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Research Article

NUTRITIONAL ANALYSIS, *IN VITRO* AND *IN SILICO* STUDIES ON ANTIOXIDANT AND ANTI-DIABETIC POTENTIAL OF *COCCINIA GRANDIS* L. FRUIT

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ABSTRACT

Coccinia, commonly known as ivy gourd (Coccinia grandis L.), is a medicinal food plant with numerous health benefits. It is widely used in traditional medicine, particularly in Ayurveda and folk medicine, for managing conditions such as inflammation and oxidative stress. The precise biochemical mechanisms through which Coccinia exerts its therapeutic effects are not yet fully understood, and there is limited research on its long-term safety and potential side effects. Investigating these lesser-reported aspects of Coccinia is crucial for filling the knowledge gaps, developing natural therapeutics, and validating its role in modern healthcare. The aim of this study was to evaluate the nutritional profile, antioxidant activity, and the anti-diabetic potential of the fruit of Coccinia grandis L. through in vitro and in silico approaches. From the study, the fruit extract of C. grandis possesses a good nutritional profile like protein (1.2 g/100 g) and fiber (1.2 g/100 g). There are 38 ± 0.45 µg/g of total alkaloids, 84 ± 0.25 µg/g of total phenols and 98 ± 0.31 µg/g of total flavonoids in the fruit extract. When compared to standard (butylated hydroxytoluene), the extract exhibits the strong antioxidant activity of 94.4% at 250 µg/mL. The results of the in vitro assay highlighted that the extract has low inhibition activity on α-amylase (4.6% at 250 µg/mL) and moderate inhibition against α-glucosidase (53% at 250 µg/mL) when compared to the standard acarbose. The phytoconstituent quercetin was quantified in the fruit extract (0.06 % w/w) using HPTLC method. Further, the computational in silico analysis of quercetin binding affinity with alpha amylase (-15.866 kcal/mol) and alpha glucosidase glucosidase (-14.147 kcal/mol) enzymes and the in silico results are consistent with in vitro experimental data. The study concluded that the fruit of C. grandis presents a good source of nutrients with antioxidant and anti-diabetic potentials