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Research

Tapping Into *Tinospora crispa* and *Tinospora cordifolia* Bioactive Potentials Via Antioxidant, Antiglycation and GC-MS Analyses

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ABSTRACT

Tinospora crispa and *Tinospora cordifolia* are plant species that are commonly used in traditional medicine, such as Ayurvedic medicine, renowned for their therapeutic roles in addressing diverse health issues, including diabetes. These plants are esteemed for their ability to counter oxidative stress through electron donation which is a prominent feature of antioxidants. However, a sole assessment of their antioxidant effectiveness is insufficient to holistically understand their antioxidative capabilities. This study aimed to study the antioxidative and antiglycation properties exhibited by *T. crispa* and *T. cordifolia*. This evaluation encompassed a range of tests measuring radical scavenging activity (DPPH assay), capacity for reducing ferric ions (FRAP assay), and their antiglycation potential (BSA-MGO assay). GC-MS analysis was employed to identify compounds with antioxidative properties within *T. crispa* and *T. cordifolia*. The stems and leaves of *T. crispa* and *T. cordifolia* underwent solvent extraction using 90% methanol and hot distilled water. Notably, the methanolic extract of *T. cordifolia* displayed the most robust radical scavenging activity, evident from its lowest IC_{50} value, 0.03 ± 0.00 mg/mL in the DPPH assay. Conversely, the methanolic extract of *T. crispa* exhibited the lowest IC_{50} value, 0.19 ± 0.00 mg/mL in the FRAP assay. Additionally, the methanolic extract of *T. cordifolia* showcased a minimal IC_{50} value of 0.52 ± 0.18 mg/mL in the BSA-MGO antiglycation assay. It's worth noting that the methanolic extracts of both *T. crispa* and *T. cordifolia* outperformed their hot water counterparts in terms of antioxidative activity, potentially due to the presence of phytochemical compounds such as phenol, 4-vinyl guaiacol, guaiacol, syringol, and vanillin in the methanolic extracts. The study highlights the potent antioxidative properties of *T. crispa* and *T. cordifolia* in supporting their traditional medicinal use and leads the way for the development of antioxidant therapies, particularly for managing oxidative stress-related conditions such as diabetes.

Key words: Antiglycation, FRAP, scavenging, *T. cordifolia*, *T. crispa*

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INTRODUCTION

In most parts of the world, herbal products have been used extensively as part of the practice of complementary and alternative medicine (CAM). *Tinospora crispa*, a climbing shrub, is a member of the Menispermaceae botanical family which can be found in Asian and African rainforests. The foliage, stem, and roots of *T. crispa* have been traditionally utilized as alternative remedies for diverse medical conditions. (Ahmad *et al*., 2016; Thomas *et al*., 2016). Another Menispermaceae family member known as *T. cordifolia* is used in Ayurvedic medicine to address a multitude of disorders including diabetes mellitus (Kumar, 2015). A review by Singa *et al*., (2022) revealed that both *T. crispa* and *T. cordifolia* stems and leaves are high in phytochemical content such as phenols that are widely recognised for their antioxidant and/or hypoglycaemic properties. In addition, *in*