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Exploring antioxidant and antidiabetic potential of Mutingia calabura (Kerukupsiam) leaf extract: In vitro analysis and molecular docking study

(2024) *Results in Chemistry*, 7, art. no. 101305, .

DOI: 10.1016/j.rechem.2024.101305

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Abstract
Antioxidant activity and antihyperglycemic constituents and of traditional medicinal plants are currently the preferred therapeutic means of treatment and management of diabetes because of the undesired adverse effect of synthetic drugs. Muntingia calabura (Kerukupsiam) leaves and other parts are considered as alternative natural sources of treatment for diabetes. Ultrasonic assisted extraction is a novel approach for extraction of phytoconstituents which gives high extraction yield of bioactive compounds. However, there has been no published information presently on the use of ethanol ultrasonic assisted extraction method for assessment of antioxidant and antidiabetic activities of M. calabura leaves. Hence, the current study aims to evaluate the in vitro antioxidant and antidiabetic activities of M. calabura leave extract. IC50 analysis was done to determine theinhibitory concentration and the results obtained from 2,2-Diphenyl-1-picrylhydrazyl (DPPH) radical scavenging assay showed IC50 of gallic acid to be 1.0 μg/ml, which is lower than M. calabura leaves extract at 2.54 μg/ml, indicating that only small concentration of gallic acid was required to inhibit the free radicals at 50 %. However, IC50 analysis for amylase inhibition showed that M. calabura extract had 44.39 μg/ml antidiabetic activity compared to acarbose with 57.1 μg/ml activity. This indicates that M. calabura leaves extract has a better inhibition on amylase activity compared to the acarbose which is a synthetic drug. Further still, in silico study was carried out and the molecular docking result of eight ligands against amylase indicates quercetin had the least binding free energy of −9.1 kcal/mol, indicating the strongest interaction. Using Lineweaver-Burk plot, the results showed a competitive inhibition, hence, it was justified that M. calabura has the potential to manage diabetes and other diseases related to free radicals.

Author Keywords
Amylase Inhibitor; Diabetes; In silico; Lineweaver-Burk; Medicinal Plant

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Publisher: Elsevier B.V.

ISSN: 22117156
Language of Original Document: English
Abbreviated Source Title: Results Chem.
2-s2.0-85183698644
Document Type: Article
Publication Stage: Final
Source: Scopus