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Funding

Author contributions

Declaration of Competing Interest

Acknowledgments

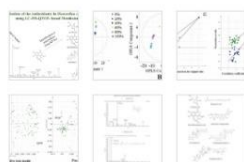
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Food Chemistry: Molecular Sciences

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Antioxidants profile of *Momordica charantia* fruit extract analyzed using LC-MS-QTOF-based metabolomics

Vikneswari Perumal ^a, Alf Khatib ^{b, f}, Qamar Uddin Ahmed ^b, Bisha Fathamah Uzir ^b, Faridah Abbas ^c, Suganya Murugesu ^d, Mohd Zuwaini Saliman ^e, Rieta Primaharinastiti ^f, Hesham El-Seedi ^g

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Highlights

- The 80% ethanol extract of *M. charantia* fruit exhibited the most antioxidant activity.

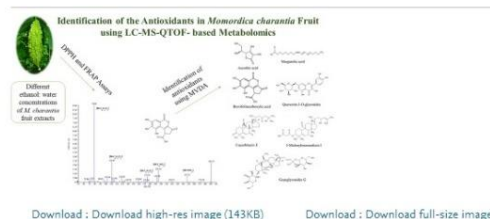
Brevifolincarboxylic acid is a new antioxidant compound reported in *Momordica charantia* fruit.

3-Malonylmomordicin I and goyaglycoside G are possessing anti-oxidant activity.

Abstract

Momordica charantia fruit is claimed to have healthy benefit. Despite this potential claim, the phytochemical study of this fruit is still lacking. Thus, this study aimed to evaluate the antioxidants profile of *Momordica charantia* (Cucurbitaceae) fruit. The antioxidant activity of the ethanolic extracts of various polarities was evaluated and the metabolites that are responsible for its activity were identified using metabolomics approach. Six different mixture of ethanol in water that are 0%, 20%, 40%, 60%, 80%, and 100% (v/v) was extracted using dseedsed fruit sample. Liquid chromatography-mass spectrometry-quadrupole time of flight and multivariate data analysis was used to identify the metabolites that were either antioxidants or pro-oxidants. The 80% ethanol extract exhibited the most antioxidant activity when tested in both 2, 2-diphenyl-1-picrylhydrazyl (DPPH) and ferric reducing antioxidant power (FRAP) antioxidant assays. This extract showed the most intense LC-MS signals represented to ascorbic acid, margarolic acid, brevifolincarboxylic acid, quercetin 3-O-glycoside, kuguacin H, cucurbitacin E, 3-malonylmomordicin I, and goyaglycoside G correlating to the anti-oxidant activity. This study reports for the first time the existence of brevifolincarboxylic acid in this fruit, and the antioxidant activity of 3-malonylmomordicin I and goyaglycoside G. In addition, the loading plots revealed the unknown compounds possessing the antioxidant activity which are potential to be isolated in the future study.

Graphical abstract



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Keywords

Antioxidants; DPPH; FRAP; LC-MS-QTOF; Metabolomics; *Momordica charantia*

1. Introduction

Antioxidants play a crucial role in the pathogenesis of disorders that leads to severe health effects such as diabetes mellitus (DM), coronary heart disease, neurodegenerative disorders, cancers, Alzheimer's disease, and hepatotoxicity. An elevated level of reactive oxygen species (ROS) in the human body is a natural consequence of aerobic metabolism and is essential for maintaining the oxygen homeostasis in tissues. However, ROS can potentially damage essential macromolecules resulting in carcinogenic effects or lead to cardiovascular diseases. The human body requires adequate amounts of antioxidants to fight against ROS such as the hydroxyl radical (OH[•]), the superoxide anion (O^{2-•}) and non-radical molecules such as hydrogen peroxide (H₂O₂), nitric oxide (NO), and singlet oxygen, among others (Karthivashan, Tangestani, Arulselvan, Abbas, & Fakurazi, 2013).

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