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The Antioxidant Activity and Induction of Apoptotic Cell Death by *Musa paradisiaca* and *Trigona* sp. Honey Jelly in ORL115 and ORL188 Cells

(2023) *Malaysian Journal of Medical Sciences*, 30 (1), pp. 82-91.

DOI: 10.21315/mjms2023.30.1.7

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Abstract

Background: Head and neck cancer patients usually need nutritional support due to difficulties in swallowing and chewing. Therefore, this study aimed to formulate *Musa paradisiaca* and *Trigona* sp. honey jelly (MTJ) as a convenient functional food. Methods: The antioxidant properties were analysed using 2,2'-diphenyl-1-picrylhydrazyl (DPPH), ferric reducing antioxidant potential (FRAP) and 2,2'-azino-di 3-ethylbenzothiazolinesulfonate (ABTS) assays. Cytotoxicity was assayed using the 3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyl tetrazolium bromide (MTT) test and the induction of apoptosis was observed via caspase-3/7 activity assay. The identification of phenolic compounds was done via ultra-high-performance-liquid chromatography coupled to mass spectrometer (UHPLC-MS/MS). Results: The antioxidant analysis exhibited: the half inhibitory concentration (IC50) of DPPH inhibition, 54.10 (SD = 4.51) µg/mL; the FRAP value, 30.07 (SD = 0.93) mM TEQ/100 g; and the ABTS value, 131.79 (SD = 8.73) mg TEQ/100 g. Cinnamic acid was the most abundant phenolic compound, followed by maleic acid and salicylic acid. The IC50 for ORL115 and ORL188 were 35.51 mg/mL and 43.54 mg/mL, respectively. The cells became rounded and dissymmetrical which reduced in number and size. The apoptotic cell death in ORL115 and ORL188 was deduced as caspase-3/7 activities that significantly increased (P < 0.05). Conclusion: The study evidenced that the antioxidant activity of MTJ could influence the induction of apoptosis in ORL115 and ORL188 in future investigations and verifications. © Penerbit Universiti Sains Malaysia, 2023.

Author Keywords

antioxidant; apoptosis; head and neck squamous cell carcinoma; *Musa paradisiaca*; stingless bee

Index Keywords

antioxidant, caspase 3, caspase 7, cinnamic acid, gallic acid, kaempferol, maleic acid, phenol, phenol derivative, quercetin, salicylic acid, sinapic acid, vanillic acid; ABTS radical scavenging assay, antioxidant activity, apoptosis, Article, cell death, cell proliferation, cell viability, cell viability assay, cytotoxicity, DPPH radical scavenging assay, dysphagia, ferric reducing antioxidant power, ferric reducing antioxidant power assay, functional food, head and neck cancer, head and neck squamous cell carcinoma, honey, human, human cell, IC50, mastication, MTT assay, multiple reaction monitoring, *Musa x paradisiaca*, nonhuman, nutritional support, ORL11 cell line, ORL18 cell line, squamous epithelium cell, stingless bee, swallowing, tandem mass spectrometry, ultra performance liquid chromatography

Chemicals/CAS

caspase 3, 169592-56-7; caspase 7, 189258-14-8; cinnamic acid, 4151-45-5, 538-42-1, 621-82-9; gallic acid, 149-91-7; kaempferol, 520-18-3; maleic acid, 110-16-7, 18610-42-9; phenol, 108-95-2, 3229-70-7; quercetin, 117-39-5; salicylic acid, 63-36-5, 69-72-7; sinapic acid, 530-59-6; vanillic acid, 121-34-6

Manufacturers

Schott, United States

Funding details

Ministry of Higher Education, Malaysia MOHEPRGS15-015-0025

The work was funded by the Ministry of Higher Education (MOHE) Malaysia under the Prototype Research Grant Scheme (PRGS15-015-0025).

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Publisher: Penerbit Universiti Sains Malaysia

ISSN: 1394195X

CODEN: MJMSA

Language of Original Document: English

Abbreviated Source Title: Malays. J. Med. Sci.

2-s2.0-85149461215

Document Type: Article

Publication Stage: Final

Source: Scopus

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