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Identification and Quantification of Quercetin, A Major Constituent of Artocarpus altilis by Targeting Related Genes of Apoptosis and Cell Cycle: In Vitro Cytotoxic Activity Against Human Lung Carcinoma Cell Lines (Article)

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Abstract

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Nine phenolic compounds were identified and quantified in Artocarpus altilia fruit. One of the main compounds was quercetin, which is the major class of flavonoids has been identified and quantified in pulp part of A. altilis fruit of methanol extract. The aim of this study was to evaluate in vitro cytotoxic assay. Inhibitory concentration 50% concentration was determined using trypan blue exclusion assay. Apoptosis induction and cell cycle regulation were studied by flow cytometric analysis. The expression of apoptosis and cell cycle-related regulatory genes were assessed by RT-qPCR study of the methanol extract of pulp part on human lung carcinoma (A549) cell line. A significant increase of cells at G2/M phases was detected ($P < 0.05$). Furthermore, the pulp of the fruit downregulated the expression of anti-apoptosis gene BCL-2 and upregulated the expression of pro-apoptosis gene BAX. CASPASE-3 was also activated by the fruit, which started a CASPASE-3-depended mitochondrial pathway to induce apoptosis. As the results, the pulp was the most active in terms of all tests, due to high amount of quercetin in pulp part, 78% of total flavonoids. Taken together, these findings suggested that A. altilis induces apoptosis in a mitochondrial-dependent pathway by releasing and upregulating CYTOCHROME C expression and regulates the expression of downstream apoptotic components, including BCL-2 and BAX. © 2019, © 2019 Taylor & Francis Group, LLC.

SciVal Topic Prominence

Topic: Morus | Artocarpus | Root bark

Prominence percentile: 93.466

Indexed keywords

EMTREE drug terms: 4 hydroxybenzoic acid, ascorbic acid, caspase 3, caspase 8, caspase 9, cyclin A1, cyclin B1, cytochrome c, ferulic acid, flavonoid, gallic acid, messenger RNA, para coumaric acid, phenol derivative, protein Bax, protein bcl 2, protocatechuic acid, quercetin, rutoside, sinapic acid

EMTREE medical terms:

A-549 cell line | apoptosis | Article | breadfruit | cell cycle arrest | cell cycle G2 phase | cell cycle M phase | cell cycle regulation | comparative study | controlled study | cytotoxicity | down regulation | flow cytometry | gene expression | human | human cell | in vitro study | lung carcinoma | reverse transcription polymerase chain reaction | tandem mass spectrometry | ultra performance liquid chromatography | upregulation

Chemicals and CAS Registry Numbers:

4 hydroxybenzoic acid, 456-23-5, 99-96-7; ascorbic acid, 134-03-2, 15421-15-5, 50-81-7; caspase 3, 169592-56-7; caspase 8; caspase 9, 180189-96-2; cytochrome c, 9007-43-6, 9064-84-0; ferulic acid, 1135-24-6, 24276-84-4; gallic acid, 149-91-7; para coumaric acid, 7400-08-0; protein bcl 2, 219306-68-0; protocatechuic acid, 99-50-3; quercetin, 117-39-5; rutoside, 153-18-4, 22519-99-9; sinapic acid, 530-59-6

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