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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

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Abstract

Nine phenolic compounds were identified and quantified in Artocarpus altilis 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-dependent 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.

Keywords

KeyWords Plus: P-COUMARIC ACID; PHENOLIC-COMPOUNDS; CANCER STATISTICS; NITRIC-OXIDE; ANTIPROLIFERATIVE ACTIVITY; LIQUID-CHROMATOGRAPHY; FRUIT EXTRACT; G(2)/M ARREST; FERULIC ACID; HUMAN BREAST

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