Abstract

Ficus deltoidea's extracts (three types of leaves and two types of fruits) were prepared through boiling method followed by semi-purification with ammonium sulfate precipitation at 30, 60 and 90% saturation. The samples were evaluated for their antioxidative activities and cytotoxicity towards three cell lines (Hep G2, Ca Ski and Chang Liver cells). Antioxidants results indicated that large type leaf (LL) and medium type leaf (ML) extracts were better compared to small type leaf (SL) while big type fruit (BF) was better compared to small type fruit (SF). Meanwhile, only SF semi-purified fractions showed cytotoxic effects towards the cell lines. Therefore, further investigations of antioxidative properties particularly with regards to endogenous antioxidants and DNA fragmentation were conducted on SF extracts. Following SF extracts treatment at IC_{50} values, catalase concentration were increased while glutathione peroxidase (GPx) activities and superoxide dismutase (SOD) levels were decreased. The results indicated that the cell growth might be halted. On the other hand, observed DNA fragmentation in Hep G2 and Ca Ski cells suggested that the cancer cells might undergo apoptosis. The experiment was then followed by proteomics studies and validated using real-time reverse transcription-polymerase chain reaction (RT-PCR). Through the applications of two-dimensional (2D) gel analysis and matrix assisted laser desorption/ionization (MALDI), various heat shock proteins, cell cycle proteins, structural proteins and antioxidative proteins which are important in cell growth were identified. Among them were stress-70 protein, proliferating cell nuclear antigen (PCNA), actin and peroxiredoxin-2. RT-PCR validations further suggest that semi-purified fraction SF60 was a better fraction compared to SF30 and SF90. The fraction exerts an effect towards Hep G2 and Ca Ski cells while minimal effect on Chang Liver cells.

Abstrak

Ekstrak *Ficus deltoidea* (tiga jenis daun dan dua jenis buah) disediakan melalui kaedah pendidihan diikuti dengan penulenan separa dengan pemendakan amonium sulfat pada ketepuan 30, 60 dan 90%. Sampel dinilai untuk aktiviti antioksidan dan sitotoksik terhadap tiga jenis sel (Hep G2, Ca Ski dan Chang Liver). Keputusan antioksidan menunjukkan bahawa daun jenis besar (LL) dan daun jenis sederhana (ML) adalah lebih baik berbanding daun jenis kecil (SL) manakala buah jenis besar (BF) lebih baik berbanding dengan buah jenis kecil (SF). Sementara itu, hanya fraksi separa tulen SF menunjukkan kesan sitotoksik terhadap sel. Dengan itu, penyelidikan lanjut terhadap ciri-ciri antioksidan terutamanya yang berkaitan dengan antioksidan endogenous dan fragmentasi DNA dijalankan ke atas ekstrak SF. Selepas rawatan dengan ekstrak SF pada kepekatan IC_{50}, paras katalase meningkat manakala aktiviti glutatione peroxidase (GPx) dan tahap superoxide dismutase (SOD) menurun. Keputusan menyarankan bahawa pertumbuhan sel mungkin direncat. Sementara itu, fragmentasi DNA diperhatikan hanya pada sel Hep G2 dan Ca Ski yang menyarankan bahawa sel kanser mungkin mengalami apoptosis. Penelitian ini kemudian diikuti dengan kajian proteomik dan ditentusahkan dengan penggunaan ‘real-time reverse transcription-polymerase chain reaction’ (RT-PCR). Melalui aplikasi analisis gel dua dimensi (2D) dan ‘matrix assisted laser desorption/ionization’ (MALDI), pelbagai protein ‘heat shock’, protein kitaran sel, protein struktural dan protein antioksidan yang penting kepada pertumbuhan sel dapat dikenalpasti. Antaranya adalah protein stress-70, proliferasi sel nuklear antigen (PCNA), aktin and peroxiredoxin-2. Melalui penentusahan RT-PCR, keputusan mencadangkan bahawa fraksi separa tulen SF60 adalah lebih baik berbanding fraksi SF30 dan SF90. Fraksi tersebut jelas mempengaruhi sel Hep G2 dan Ca Ski tetapi menunjukkan kesan minimum terhadap sel Chang Liver.

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