ABSTRACT

A phytochemical study on the constituents of *Kaempferia galanga* Linn., belonging to the family of Zingiberaceae, was performed. Using various isolation techniques such as solvent extraction, chromatography and recrystallization, three compounds were isolated: ethyl cinnamate, *p*-methoxycinnamic acid and ethyl *p*-methoxycinnamate. Structural elucidation of these compounds were carried out by spectral methods. Sixty-two volatile components of this plant were also studied using GC-MS.

Bioassay-guided fractionation of the crude CH_2Cl_2 extract on repeated chromatographies using the vascular muscles of rat thoracic aorta afforded the active constituent, ethyl cinnamate, which showed inhibitory effects on phenylephrine and high K^+-induced contractions. Mechanisms of vasorelaxant action of ethyl cinnamate were also compared to several compounds which possessed structurally similar moiety to it, and they were: cinnamaldehyde, *N*-cinnamalidene-*p*-fluoroaniline, *N*-cinnamalidene-*p*-methoxyaniline, *N*-cinnamalidene-lysin, methyl cinnamate and cinnamyl cinnamate. The results of this study suggested that these compounds inhibited both Ca^{2+} influx into the cells via voltage-dependent Ca^{2+} channel and receptor-operated Ca^{2+} channel, and Ca^{2+} release from intracellular stores. Moreover, the vasorelaxant actions of ethyl cinnamate and cinnamaldehyde might also partially involve the release of endothelium-derived relaxing factor (EDRF) and prostacyclin from endothelial cells. Ethyl cinnamate and ethyl *p*-methoxycinnamate were also tested for cytotoxicity against KB cells. The former showed low activity, while the latter revealed strong activity.

ABSTRAK

Satu kajian fitokimia terhadap kandungan *Kaempferia galanga* Linn., yang tergolong kepada famili Zingiberaceae, telah dijalankan. Dari kaedah-kaedah pengasingan seperti pengekstrakan pelarut, kromatografi dan penghabluran semula, tiga sebatian telah diasingkan: etil sinamat, asid *p*-metoksisinamik dan etil *p*-metoksisinamat. Penentuan struktur sebatian-sebatian ini telah dijalankan dengan kaedah spektra. Enam puluh dua komponen mudahruap tumbuhan ini juga telah dikaji dengan menggunakan GC-MS.

Pemisahan berpandukan ujikaji bio yang dijalankan ke atas ekstrak CH_2Cl_2 mentah, dengan kaedah kromatografi yang berulang-ulang dan menggunakan otot aorta tikus, telah menghasilkan konstituen aktif, etil sinamat, yang mempamerkan kesan halangan terhadap pengecutan-yang-dijanakan-oleh-fenilefrina dan K^+ tinggi. Mekanisma aktiviti pengenduran-vaso oleh etil sinamat telah dibandingkan dengan beberapa sebatian yang mempunyai ciri struktur yang serupa dengannya, iaitu: sinamaldehid, *N*-sinamalidin-*p*-floroanalina, *N*-sinamalidin-*p*-metoksianalina, *N*-sinamalidin-lisina, metil sinamat dan sinamil sinamat. Keputusan menyarankan bahawa sebatian-sebatian tersebut menghalang kemasukan Ca^{2+} ke dalam sel-sel melalui terusan-Ca^{2+} yang bergantung kepada voltan dan kepada reseptor, dan juga pelepasan Ca^{2+} dari stor intraselular. Dan lagi, aktiviti pengenduran-vaso oleh etil sinamat dan sinamaldehid juga mungkin sedikit sebanyak melibatkan pelepasan faktor-pengenduran dari endotelium dan prostasiklina dari sel-sel endotelial. Etil sinamat dan etil *p*-metoksisinamat juga telah diuji untuk keracunan-sel terhadap sel-sel KB. Sebatian yang pertama menunjukkan aktiviti yang lemah, manakala sebatian yang kedua menunjukkan aktiviti yang tinggi.