ABSTRAK

Ekstrak krud enam spesies *Curcuma* ubatan iaitu *C. aeruginosa, C. mangga, C. rubescens, C. xanthorrhiza, C. zedoaria* dan *C. inodora* aff. telah dikaji untuk melihat kesan aktiviti antibakteria yang dijalankan keatas beberapa bakteria yang patogen terhadap manusia. Di dapati ekstrak-ekstrak tersebut telah berjaya merencatkan pertumbuhan bakteria gram-positif *Staphylococcus aureus* (strain ATCC 24213 dan ATCC 29213), *Micrococcus luteus* dan *Enterococci faecalis* dengan menggunakan kaedah diffusi agar dan tiada aktiviti antibakteria dilihat ke atas pertumbuhan bakteria gram-negatif *Escherishia coli* (strain ATCC 25922 dan ATCC 35213). *C. inodora* aff. menunjukkan spektrum aktiviti antibakteria yang paling luas manakala *C. zedoaria* menunjukkan spektrum antibakteria yang paling sempit di antara spesies *Curcuma* yang dikaji. Penentuan aktiviti antibakteria secara kuantitatif telah dilakukan menggunakan ekstrak *C. inodora* aff. terhadap *M. luteus* yang memberikan nilai MIC (Minimum inhibitory concentration) 25 µg/ml dan nilainya berganda (50 µg/ml) terhadap *S. aureus* ATCC 29213.

Malaysia merupakan salah sebuah Negara tropika yang tidak mampu untuk mengeluarkan benih *Curcuma* yang berkualiti berikutan kekurangan kawasan yang bebas vektor. Oleh itu kaedah mikropropagasi digunakan sebagai kaedah alternatif untuk menghasilkan propagul bebas penyakit. Kajian yang dijalankan ini merangkumi kajian terhadap kesan sitokinin ke atas kadar multiplikasi pucuk untuk penghasilan media optima spesies kajian serta pengamatan tumbuhan *in vitro* berbanding tumbuhan di rumah hijau. Eksplan yang dikultur di atas media pepejal Murashige dan Skoog dengan 3% (b/i) sukrosa berupaya menghasilkan purata 8 pucuk per eksplan dalam masa 4 minggu. Setelah akar terbentuk plantlet telah dipindahkan ke rumah hijau dengan jayanya. Media optima untuk spesies kajian ialah media yang dirawat dengan 3.0 mg/l BAP.

Penghasilan DNA berkualiti tinggi telah tercapai dalam kajian ini menggunakan kaedah yang di modifikasi daripada Doyle & Doyle (1990). Kaedah ini didapati cepat, (hanya beberapa langkah sahaja), murah, senang untuk dikendalikan dan tidak melibatkan penggunaan bahan kimia yang toksik seperti fenol. Satu protokol telah dipilih untuk pengekstrakan 6 sampel *Curcuma* ubatan dan DNA yang terhasil didapati jelas dan tidak berpigmen. Untuk pengekstrakan DNA, hanya daun muda sahaja digunakan kerana kurang kontaminasi dan mengandungi kurang bahan fenolik. Keputusan menunjukkan kaedah RAPD menggunakan OPA 5, OPA 16, OPA 18, OPA 20, OPE 6 dan OPE 9 berupaya untuk menghasilkan amplifikasi yang boleh membezakan profil DNA di antara spesies kajian dan keputusan ini boleh digunakan untuk dokumentasi profil capjari DNA sepsies *Curcuma* ubatan yang dikaji.

ABSTRACT

Crude extracts of six medicinal plants, namely *C. aeruginosa, C. mangga, C. rubescens, C. xanthorrhiza, C. zedoaria* and *C. inodora* aff. were investigated for their antibacterial activities against some human pathogenic bacteria. These extracts significantly inhibited the growth of gram-positive *Staphylococcus aureus* (strains ATCC 24213 and ATCC 29213) and *Micrococcus luteus* and *Enterococci faecalis*, using agar diffusion assay method. None of the plant extracts inhibited the growth of gram-negative *Escherishia coli* (strains ATCC 25922 and ATCC 35213). *C. inodora* aff. showed a pronounced and broad spectrum of activity whereas *C. zedoaria* showed the least activity. Quantitative determination for antibacterial activity of *C. inodora* aff. extract against *M. luteus* gave a minimum inhibitory concentration (MIC) values 25 μg/ml whereas *S. aureus* ATCC 29213 showed a two fold MIC reading (50 μg/ml).

Malaysia is one of the tropical countries that is not able to produce high quality *Curcuma* plants tuber due to lack of vector-free planting areas. The alternative methods of producing disease-free propagules through micropropagation and the field performance of the resultant plants were investigated. Studies that have been carried out included the effect of cytokinin on shoot multiplication rate in order to establish a micropropagation media and comparing the field performance of *in vitro* and *in vivo* plants. An average of 8 shoots per explants were produced within 4 weeks on agar solidified Murashige and Skoog medium supplemented with 3% sucrose, were obtained with various *in vitro* multiplication trials. Plantlets were rooted and were successfully acclimatized to field condition. The optimum concentrations of BAP for *in vitro* multiplications were 3 mg/l for all species studied.

RAPD was performed on the *Curcuma* species to determine their genetic relationship. A modified simple technique for DNA isolation from fresh plant tissue (Doyle & Doyle 1990) successfully yield high quality intact genomic DNA. This method was fast (fewer steps involved), cheap, easy to handle and less toxic then the commonly used method that required phenol extraction steps. A protocol that was used to extract all the 6 samples produces clear, nonpigmented and intact DNA. The quality of the DNA was much more improved when reextraction was carried out. For the *Curcuma* species, only young leaves were used for the DNA extraction as they were free from contaminations and contain less phenolic substances. This study demonstrated that the RAPD method was preferred for discriminating the 6 species. The results indicate that the RAPD methods using OPA 5, OPA 16, OPA 18, OPA 20, OPE 6 and OPE 9 yields amplification products which were species specific for the samples investigated throughout the analysis.