Optimasi ekstraksi rimpang temulawak (Curcuma xanthorrhiza Roxb.) dengan pelarut Ionic Liquid 1-Heksadesil-3- Metilimidazolium Bromida menggunakan metode ultrasonic assisted extraction (UAE) = Optimization of Javanese turmeric rhizome (Curcuma xanthorrhiza Roxb.) extraction with Ionic Liquid 1-Hexadecyl-3- Methylimidazolium Bromide using ultrasonic assisted extraction (UAE) method

Dinar Meltiara, author

Abstrak

Ionic liquid merupakan salah satu jenis pelarut hijau yang sudah banyak diuji keberhasilannya dalam mengekstraksi berbagai senyawa bahan herbal. IL merupakan designer solvent, dimana kation dan anion pada IL bersifat fleksibel menyesuaikan dengan sifat zat aktif target, membuat IL efisien dalam menarik senyawa polar maupun non-polar. Tujuan dari penelitian ini yaitu memperoleh kondisi optimum ekstraksi kurkuminoid dan xantorizol dari rimpang temulawak (Curcuma xanthorrhiza roxb.) menggunakan 1-Heksadesil-3-metilimidazolium bromida secara UAE (Ultrasonic Assisted Extraction) serta mengetahui perbandingannya dengan maserasi menggunakan etanol 96%. Variabel-variabel bebas yang digunakan dalam optimasi yaitu konsentrasi IL (0.05; 0.1; 0.15M), waktu ekstraksi (10; 12.5; 15 menit) dan rasio sampel-pelarut (15; 20; 25 mL/g). Semua variabel di desain menggunakan metode Response Surface Methodology. Kuantifikasi senyawa kurkuminoid dan xantorizol dilakukan menggunakan KCKT UV-Vis menggunakan fase gerak asetonitril (A) dan asam format 0.007% dalam air (B) dengan program elusi gradien 45–85% (A): 0-60 menit dan dideteksi pada panjang gelombang 425 nm dan 275 nm. Hasil kadar senyawa kurkuminoid terbesar diperoleh pada konsentrasi IL 0.05M; waktu ekstraksi 12 menit dan rasio sampel-pelarut 25 mL/g dengan perolehan sebesar 8.709 mg/g. Sementara, kadar xantorizol optimum diperoleh sebesar 14.099 mg/g pada konsentrasi IL 0.05M; waktu ekstraksi 14 menit dan rasio sampel-pelarut 1:24.5 mL/g. Berdasarkan hasil penelitian, disimpulkan bahwa kadar senyawa kurkuminoid dan xantorizol yang diekstraksi secara IL-UAE memberikan nilai lebih tinggi dibandingkan metode konvensional. Maserasi temulawak menggunakan etanol 96% hanya mampu menghasilkan kadar kurkuminoid dan xantorizol berturut-turut sebesar 4,92 mg/g dan 12,467 mg/g.
.....Ionic liquid is one of the green solvents studied in relation to its success in extracting natural compounds. Ionic liquids are considered to be designer solvents due to its ability to alter cation and anion combination adapting to the compounds target, making it efficient for extraction on polar and non-polar compounds. The purpose in this study is to find the optimum extraction of curcuminoid and xanthorrhizol from rhizome of javanese turmeric using ionic liquid 1-Hexadecyl-3-methylimidazolium bromide based UAE (Ultrasonic Assisted Extraction) and to compare the effectiveness of the extraction with 96% ethanol by maceration method. Independent variables used for optimization are IL concentration (0.05; 0.1; 0.15M), time extraction (10; 12.5; 15 minutes) and ratio of solvent to powder (15; 20; 25 mL/g). All variables were designed by using Response Surface Methodology (RSM). Curcuminoid and xanthorrhizol quantification was done using HPLC UV-Vis with mobile phase composition of acetonitrile (A) and 0.07% formic acid on water (B) with gradient elution program 45–85% (A): 0-60 min, 65 – 100% (A): 60-75 min, 100% (A): 75-80 min and was detected on a wavelength of 425 (curcuminoid) and 275 (xanthorrhizol). The results showed

that the highest curcuminoid content obtained was 8.709 mg/g with IL concentration 0.05M; time extraction 12 minutes and a ratio of solvent to powder 1:25 g/mL. While the highest xanthorrhizol content obtained was 14.099 mg/g with IL concentration 0.05M; time extraction 14 minutes and a ratio of solvent to powder 1:24.5 g/mL. Based on the result, IL-UAE is more effective to attract curcuminoid and xanthorrhizol than the conventional method. Maceration using 96% ethanol of javanese turmeric rhizome only gave results of 4.92 mg/g for curcuminoid and 12.467 mg/g for xanthorrhizol.