Optimasi Ekstraksi Daun Komfrey (Symphytum officinale) dengan IL-UAE dan Uji Antiinflamasi dengan Metode Penghambatan Denaturasi Protein = Optimization of Comfrey Leaf Extraction (Symphytum officinale) by IL-UAE and Anti-inflammatory Test with Protein Denaturation Inhibition Method

Andika Purnomo, author

Abstrak

Retrorsin N-oksida dan allantoin merupakan senyawa yang terkandung dalam daun komfrey. Penelitian ini bertujuan untuk mendapatkan parameter kondisi optimum ionic liquidultrasound assisted extraction (IL-UAE) daun komfrey terhadap kadar retrorsin N-oksida dan allantoin dengan KLT-densitometri, serta uji anti-inflamasi secara in vitro dari ekstrak daun komfrey yang optimum. Daun komfrey diekstraksi dengan 8 jenis IL dengan ultrasound assisted extraction (UAE) dan dilakukan skrining terhadap kadar fenol total, retrorsin Noksida dan allantoin. Ionic liquid terbaik dari hasil skrining dilakukan optimasi respon surface methodology (RSM) dengan desain Box-Behnken terhadap tiga faktor dan tiga level untuk menentukan kondisi ekstraksi yang optimum terhadap kadar retrorsin N-oksida dan allantoin. Hasil optimasi terbaik dari ionic liquid kemudian dilakukan uji aktivitas antiinflamasi in-vitro dengan Bovine Serum Albumin (BSA). Hasil dari skrining IL, diperoleh [HMIM]Cl sebagai ionic liquid terbaik dengan nilai rata-rata kadar fenol total 8,037 µg/g serbuk, retrorsin N-oksida 36,539 µg/g serbuk dan allantoin 663,98 µg/g serbuk. Hasil optimasi ekstraksi dari [HMIM]Cl diperoleh kadar retrorsin N-oksida tertinggi pada run ke12, yaitu 11,9007 µg/g serbuk dan kadar allantoin tertinggi pada run ke 6 yaitu 306,396 µg/g serbuk. Hasil optimasi ekstraksi dari [HMIM]Cl memberikan kondisi optimum pada rasio pelarut dengan serbuk 17,65 mL/g, konsentrasi [HMIM]Cl 1,09 mol/L, waktu ekstraksi 31,9 menit, didapatkan kadar retrorsin N-oksida serta allantoin masing masing sebesar 4,85 µg/g serbuk dan 161,987 µg/g serbuk. Efisiensi ekstraksi IL-UAE sedikit lebih rendah dibandingkan dengan metode konvensional maserasi dan UAE dengan pelarut metanol dalam menarik senyawa fenol dan allantoin. Aktivitas anti-inflamasi didapatkan IC50 masing – masing untuk ekstrak metanol UAE, maserasi, [HMIM]Cl dan residu sebesar 127,661 g/mL, 137,061 g/mL, 129,667 g/mL dan 171,066 g/mL.

.....Retrorsin N-oxide and allantoin are compounds contained in comfrey leaves. The aim of this study was to obtain the optimum condition parameters for ionic liquid-ultrasound assisted extraction (IL-UAE) of comfrey leaves against retrorsin N-oxide and allantoin levels by TLC-densitometry, as well as an in vitro anti-inflammatory test of optimum comfrey leaf extract. Comfrey leaves were extracted with 8 ionic liquids by ultrasound assisted extraction (UAE) and screened for total phenol, retrorsin N-oxide and allantoin levels. The best ionic liquid from the screening was carried out by optimizing the response surface methodology (RSM) with the Box-Behnken design against three factors and three levels to determine the optimum extraction conditions for retrorsin N-oxide and allantoin levels. The best optimization results from the ionic liquid were then tested for anti-inflammatory activity in vitro with Bovine Serum Albumin (BSA). The results of the screening of ionic liquids, obtained [HMIM]Cl is the best ionic liquid with total phenol content with an average value of total phenol content of 8,037 g/g powder, retrorsin N-oxide 36,539 g/g powder and allantoin 663,98 g/g powder. The results of optimization of extraction from ionic liquid

[HMIM]Cl obtained the highest levels of retrorsin N-oxide in the 12th run, namely 11.9007 g/g powder and the highest allantoin content in the 6th run, which was 306.396 g/g powder. The results of the optimization of the extraction of the ionic liquid [HMIM]Cl gave optimum conditions at the ratio of solvent to powder 17,65 mL/g, concentration of [HMIM]Cl 1,09 mol/L, extraction time 31,9 minutes, the concentration of retrorsin N-oxide was obtained. and allantoin respectively 4,85 g/g powder and 161,987 g/g powder. The extraction efficiency of IL-UAE is slightly lower than conventional maceration and UAE methods with methanol as a solvent to extract phenolic and allantoin compounds. Anti-inflammatory activity obtained IC50 for UAE methanol extract, maceration, [HMIM]Cl and residue 127,661 g