Optimasi Metode Ultrasonic-Assisted Extraction dengan Natural Deep Eutectic Solvent (NADES) untuk Meningkatkan Yield Ekstrak Kurkumin dari Kunyit, Temulawak, dan Jahe = Optimization of Ultrasonic-Assisted Extraction Method with Natural Deep Eutectic Solvent (NADES) to Increase Curcumin Yield from Turmeric, Javanese Turmeric, and Ginger

Dimas Rafi Narawangsa, author

Abstrak

Pada penelitian ini, dilakukan optimasi pada metode ultrasonic-assisted extraction (UAE) untuk meningkatkan yield ekstrak kurkuminoid dari kunyit, temulawak, dan jahe. Selain itu, metode sokletasi juga dilakukan sebagai pembanding. Hasil dari metode UAE yang sudah dioptimasi lalu dibandingkan metode sokletasi yang sudah dilakukan. Optimasi dilakukan dengan membuat beberapa variasi: kandungan air pada pelarut, solid loading, suhu, dan waktu ekstraksi. Hasil yield kurkuminoid kemudian dihitung dengan menggunakan kurva standar kurkumin yang telah dibuat dengan bantuan alat spektrofotometer UV-Vis. Didapatkan hasil tertinggi untuk hasil ekstrak kunyit sebanyak 84,325 mg/g (8,43% b/b), yang didapatkan pada kondisi operasi: kandungan air 20%, solid loading 4%, suhu 55oC, dan waktu 40 menit. Hasil ini sedikit lebih rendah dari hasil sokletasi, yaitu 88,476 mg/g (8,8% b/b). Untuk hasil ekstrak temulawak dan jahe, didapatkan yield sebanyak 2,056 mg/g dan 0,21 mg/g, secara berurutan. Selain itu, dilakukan separasi ekstrak kurkuminoid dari senyawa pengotor dan kristalisasi untuk meningkatkan konsentrasi ekstrak kurkuminoid. Separasi pada kunyit meningkatkan konsentrasi ekstrak kurkuminoid sebanyak 1,36%, sedangkan proses kristalisasi meningkatkan konsentrasi ekstrak sebesar 2,9%. Meskipun begitu, kedua metode tersebut menyebabkan penurunan konsentrasi kurkuminoid pada temulawak dan jahe sebanyak 85,88% dan 67,36%, secara berurutan. Setelah itu, model kinetik ekstraksi dibuat berdasarkan model Peleg dan persamaan transfer massa.

..... In this study, the ultrasonic-assisted extraction (UAE) method was optimized to increase the yield of curcuminoid extracts from turmeric, Javanese turmeric, and ginger. In addition, the soxhletation method was also carried out as a comparison. The result of the optimized UAE method is then compared to the soxhletation method that has been carried out. Optimization is done by making several variations: water content in the solvent, solid loading, temperature, and extraction time. The yield of curcuminoids was then calculated using a standard curve of curcumin that had been made using a UV-Vis spectrophotometer. The highest curcuminoid extract yield obtained from turmeric was 84,325 mg/g (8,43% w/w), which was obtained under operating conditions: 20% water content, 4% solid loading, temperature of 55oC, 40 minutes extraction time. This result was slightly lower than the soxhletation result, which was 88,476 mg/g (8,8% w/w). For the curcuminoid extracts obtained from Javanese turmeric and ginger, the yields were 2,056 mg/g and 0,21 mg/g, respectively. In addition, the curcuminoid extract was separated from impurities and crystallized to increase the concentration of the curcuminoid extract. The separation of turmeric increased the concentration of the curcuminoid extract by 1,36%, while the recrystallization process increased the concentration of the extract by 2,9%. However, both methods caused a decrease in the concentration of curcuminoids in Javanese turmeric and ginger by 85,88% and 67,36%, respectively. After that, the

extraction kinetic model was made based on the Peleg model and the mass transfer equation.