INTISARI

Kurkumin, senyawa aktif yang ditemukan dalam kunyit (*Curcuma longa*), memiliki berbagai manfaat kesehatan, antara lain sebagai agen antiinflamasi, antibakteri, antioksidan, dan antihipertensi. Upaya meningkatkan bioavailabilitas kurkumin dilakukan dengan pengembangan senyawa analognya, salah satunya 2,6-bis-(2'-klorobenziliden)-sikloheksanon (kode senyawa: A125). Berbagai penelitian mengenai aktivitas senyawa tersebut sudah dilakukan, seperti sifat antikanker dan antiparasitiknya. Akan tetapi, penelitian tentang aktivitas antihipertensi melalui penghambatan *angiotensin-converting enzyme* (ACE) masih jarang dipelajari.

Penelitian ini berupa suatu penelitian eksperimental yang menggabungkan dua pendekatan, yaitu studi *in silico* dan studi *in vitro*. Studi *in silico* dilakukan melalui metode penambatan molekul menggunakan piranti lunak *Molecular Operating Environment* (MOE) untuk melihat interaksi senyawa A125 dengan protein ACE. Hasil yang diperoleh dari studi *in silico* dinyatakan dalam bentuk skor *docking* dan hasil pose. Studi *in vitro* dilakukan menggunakan *Angiotensin-Converting Enzyme (ACE) Activity Assay Kit (Fluorometric)* dari Sigma-Aldrich® untuk mengukur aktivitas enzim ACE. Hasil *in vitro* dinyatakan dalam satuan miliunit (mU) dan persentase inhibisi. Ramipril digunakan sebagai pembanding.

Hasil studi *in silico* menunjukkan bahwa senyawa A125 berinteraksi dengan asam amino residu His383 pada protein ACE dan memiliki nilai skor *docking* sebesar -5,6268. Dibandingkan dengan pembanding ramipril, senyawa tersebut memiliki interaksi yang kurang kuat terhadap protein ACE (skor ramipril sebesar -8,1649). Akan tetapi, hasil studi *in vitro* menunjukkan senyawa A125 memiliki nilai rata-rata mU sebesar 8,9641 ± 0,5741 mU dan rata-rata persentase inhibisi sebesar 78,7796 ± 1,3939%. Angka tersebut lebih baik dibandingkan ramipril (nilai mU 12,2241 ± 0,2430 mU dan persentase inhibisi 71,0648 ± 0,6806%). Secara keseluruhan, hasil penelitian menunjukkan bahwa 2,6-bis-(2'-klorobenziliden)-sikloheksanon memiliki potensi sebagai agen antihipertensi yang lebih baik dibandingkan ramipril.

Kata kunci: 2,6-bis-(2'-klorobenziliden)-sikloheksanon, antihipertensi, *angiotensin-converting enzyme*, *molecular docking*

ABSTRACT

Curcumin, an active compound found in turmeric (*Curcuma longa*), offers anti-inflammatory, antibacterial, antioxidant, and antihypertensive properties. To improve its bioavailability, analog compounds have been developed, one of which is 2,6-bis-(2'-chlorobenzylidene)-cyclohexanone (compound code: A125). Several studies have been conducted to explore the biological activities of this compound, including anticancer and antiparasitic. However, research on antihypertensive activity through the inhibition of angiotensin-converting enzyme (ACE) is still limited.

This experimental study was conducted using a combination of in silico and in vitro studies. The in silico study employed the molecular docking method using Molecular Operating Environment (MOE) software to analyze the interaction between A125 and the ACE protein. The results were presented as docking scores and poses. The in vitro study utilized the Angiotensin-Converting Enzyme (ACE) Activity Assay Kit (Fluorometric) from Sigma-Aldrich® to measure ACE enzyme activity. The in vitro results were expressed in milliunits (mU) and inhibition percentage. Ramipril, known ACE inhibitor, was used as a comparator.

The in silico study showed that the 2,6-bis-(2’-chlorobenzylidene)-cyclohexanone interacts with the amino acid residue His383 of ACE and had a docking score of -5.6268. Compared to ramipril it exhibited lower interaction with ACE (ramipril docking score of -8.1649). However, in vitro study showed that compound A125 had an average mU value of 8.9641 ± 0.5741 mU and an average inhibition percentage of 78.7796 ± 1.3939%. These values were higher than those of ramipril (mU value of 12.2241 ± 0.2430 mU and inhibition percentage of 71.0648 ± 0.6806%). Overall, this study indicates that 2,6-bis-(2’-chlorobenzylidene)-cyclohexanone has the potential to be a better antihypertensive agent than ramipril.

Keywords: 2,6-bis-(2’-chlorobenzylidene)-cyclohexanone, antihypertension, angiotensin-converting enzyme, molecular docking