INTISARI

FARIDA, 2019, ANALISIS *DOCKING* MOLEKULER SENYAWA-SENYAWA *ACETOGENIN* DARI TANAMAN SIRSAK (*Annona muricata* L.) SEBAGAI ANTIKANKER HATI, SKRIPSI, FAKULTAS FARMASI, UNIVERSITAS SETIA BUDI, SURAKARTA.

Kanker hati termasuk dalam peringkat ke-3 penyebab kematian di dunia, dengan angka kejadian sebesar 781.631. Beberapa reseptor yang berperan dalam regulasi kanker hati adalah *B-cell lymphoma extra-large* (BCL-XL) dan *extracellular regulated protein kinase* 1/2 (ERK1/2). Senyawa-senyawa *acetogenin* dari tanaman sirsak (*Annona muricata*) yang memiliki aktivitas antikanker hati secara *in vitro* dan *in silico* digunakan sebagai ligan uji dan protein BCL-XL serta ERK1/2 sebagai target *docking* molekuler untuk mengetahui interaksi obat dengan reseptor. Penelitian ini bertujuan untuk memprediksi interaksi senyawa-senyawa *acetogenin* dari *A. muricata* terhadap BCL-XL dan ERK1/2 sebagai molekul biologi target kerja kanker hati.

Ligan-ligan uji dipreparasi menggunakan MarvinSketch dan VegaZZ. Makromolekul target dioptimasi menggunakan AutoDockTools. Kemudian dilanjutkan proses *docking* ligan uji terhadap protein target menggunakan PyRx 0.8. Visualisasi hasil *docking* dilihat melalui *DiscoveryStudio Visualizer* serta PyMOL.

Hasil *docking* menunjukkan ligan-ligan uji mampu berinteraksi dengan protein BCL-XL dan ERK1/2 dilihat dari energi ikatan (ΔG_{bind}) serta model interaksi yang terjadi. Ligan dengan ΔG_{bind} terbaik pada protein BCL-XL yaitu Muricin F (-9,2 kkal/mol), sedangkan pada protein ERK1/2 yaitu Muricin B (-8,2 kkal/mol) serta Muricin D (-8,2 kkal/mol). Hasil analisis menunjukkan model interaksi ligan-ligan uji serupa dengan ligan asli dari masing-masing protein target. Model interaksi yang paling meyerupai ligan asli dari masing-masing protein yaitu senyawa Corossolone pada BCL-XL dan Muricin D dan Annocatacin B pada ERK1/2. Senyawa-senyawa *acetogenin* yang diujikan berinteraksi lebih baik terhadap protein BCL-XL dibandingkan ERK1/2.

Kata kunci : *acetogenin*, antikanker hati, BCL-XL, *docking*, ERK1/2

ABSTRACT

FARIDA, 2019, MOLECULAR DOCKING ANALYSIS OF ACETOGENINS FROM SOURSOP PLANTS (*Annona muricata* L.) AS LIVER ANTICANCER, SKRIPSI, FAKULTAS FARMASI, UNIVERSITAS SETIA BUDI, SURAKARTA.

Liver cancer is the third most common cause of death in the world, with an incidence of 781,631. Some of the receptors that play a role in regulation of liver cancer are extra-large B-cell lymphoma (BCL-XL) and extracellular regulated protein kinase 1/2 (ERK1/2). Acetogenin compounds from soursop plants (Annona muricata) which have activity in vitro and in silico against liver cancer are used as test ligands as well as BCL-XL and ERK1/2 as molecular docking targets to determine drug interactions with receptors. The purpose of this research is to predict interaction of acetogenins from A. muricata against BCL-XL and ERK1 / 2 as target molecule for liver cancer. The prediction of interaction is done with PyRx 0.8 software then visualization using DiscoveryStudio Visualizer and PyMOL.

The test ligands were prepared using MarvinSketch and VegaZZ. Targeted macromolecules were optimized using AutoDockTools, followed by docking process on test ligands against targeted macromolecules using PyRx 0.8. Visualization of docking results was seen by DiscoveryStudio Visualizer and PyMOL.

The results showed that the test ligands were able to interact with BCL-XL and ERK1/2 based on the binding affinity (ΔG_{bind}) and the interaction model. The test ligand with the best ΔG_{bind} in BCL-XL was Muricin F (-9.2 kcal / mol), while in ERK1 / 2 were Muricin B (-8.2 kcal / mol) and Muricin D (-8.2 kcal) / mol). The results showed that the interaction model of the test ligands were similar to the original ligand of each targeted proteins. The interaction model that most resembles with original ligand of each proteins was Corossolone on BCL-XL, while Muricin D and Annocatacin B on ERK1/2. Acetogenins from *A. muricata* had better interactions to BCL-XL than ERK1/2.

Key words : acetogenins, BCL-XL, docking, ERK1/2, liver anticancer