ABSTRAK

RAHAYU, L., 2021, PENAMBATAN MOLEKULER DAN PREDIKSI PROFIL FARMAKOKINETIK KANDUNGAN KIMIA *Bryophyllum pinnatum* L. SEBAGAI ANTIKANKER SERVIKS, SKRIPSI, FAKULTAS FARMASI, UNIVERSITAS SETIA BUDI, SURAKARTA. Dibimbing oleh Dr. apt. Rina Herowati, M.Si. dan apt. Ismi Puspitasari, M.Farm

Kanker serviks merupakan tumor ganas ginekologi dari *Squamous Intraepithelial Cell* yang penyebab utamanya *Human Papillomavirus* (HPV) tipe *high risk*. Kandungan senyawa aktif daun cocor bebek terutama *bufadienolide* memiliki aktivitas antikanker serviks secara *in vitro*. Penelitian ini dilakukan untuk memprediksi empat belas senyawa kimia daun cocor bebek yang sesuai dengan molekuler target berdasarkan nilai *ΔGbinding* terbaik, interaksi senyawa dan mengetahui profil farmakokinetika sebagai antikanker serviks.

Metode pengembangan obat dilakukan dengan *in silico screnning* melalui penambatan molekuler. Empat belas kandidat obat di identifikasi menggunakan *Swiss Target Prediction* dan KEGG *Pathway* untuk memprediksi makromolekul dan *pathway* target penyakit. Senyawa uji dipreparasi menggunakan *software* MarvinSketch dan VegaZZ. Preparasi makromolekul dengan menggunakan AutodockTools 1.5.6. Hasil visualisasi diamati dengan *Discovery Studio Visualizer* dan PyMOL. Senyawa uji dengan nilai *ΔGbinding* terbaik dianalisis profil farmakokinetik dengan ADMETLab.

Hasil penambatan terdapat delapan senyawa dengan interaksi terbaik yaitu *Bufalin, 1β-hydroxylbufalin, Bryophyllin B, Quercetin 3-O-α-L-rhamnopyranoside, 12β-hydroxylbufalin, Hellebrigenin* dan *Myricitrin* dengan target makromolekul kanker serviks meliputi protein *erbB1, PARP-1, PI3K-α, Mtor* dan *TNF-α*. Nilai *ΔGbinding* tertinggi diperoleh *Bufalin* dengan nilai sebesar -11,590(kkal/mol) pada target PARP-1. Analisis profil farmakokinetik didapatkan lima senyawa dari daun cocor bebek yaitu *Bufalin, 1β-hydroxylbufalin, Bryophyllin B, 12β-hydroxylbufalin dan Hellebrigenin* dalam rentang yang sesuai persyaratan farmakokinetika.

Kata kunci : Kanker serviks, *bryophyllum pinnatum* L., penambatan molekuler, *software* AutoDockTools 1.5.6.

ABSTRACT

RAHAYU, L ., 2021, "MOLECULAR DOCKING AND PHARMACOKINETIC PROFILE PREDICTION OF THE CHEMICAL CONTENT OF *Bryophyllum pinnatum L.* AS A CERVIC ANTI-CANCER", RESEARCH PAPER, FACULTY OF PHARMACY, SETIA BUDI UNIVERSITY, SURAKARTA. Supervised by Dr. apt. Rina Herowati, M.Sc. and apt. Ismi Puspitasari, M. Farm.

Cervical cancer is a gynecological malignant tumor from Squamous Intraepithelial Cell which is the main cause of the high-risk type of Human Papillomavirus (HPV). The active compound content of cocor bebek leaves, especially bufadienolide, has cervical anticancer activity in vitro. This research was conducted to predict fourteen chemical compounds of cocor bebek leaf that matched the molecular target based on the best *ΔGbinding* value, compound interactions and knowing the pharmacokinetic profile as cervical anticancer.

The drug development method is carried out by in silico screening through molecular docking. Fourteen cocor bebek leaf compounds were identified using Swiss Target Prediction and KEGG Pathway to predict macromolecules and disease target pathways. The test compounds were prepared using MarvinSketch and VegaZZ software. Preparation of macromolecules using AutodockTools 1.5.6. Visualization results were observed with Discovery Studio Visualizer and PyMOL. The test compound with the best Gbinding value was analyzed for pharmacokinetic profiles with ADMETlab.

The results showed that there were eight compounds with the best interactions, namely *Bufalin, 1β-hydroxylbufalin, Bryophyllum B, Quercetin 3-O-α-L-rhamnopyranoside, 12β-hydroxylbufalin, Hellebrigenin* and *Myricitri*n with macromolecular targets for cervical cancer including proteins *erbB1, PARP-1, PI3K -α, Mtor* and *TNF-α*. The highest *ΔGbinding* value was obtained by *Bufalin* with a value of -11,590(kcal/mol) at the *PARP-1* target. Analysis of pharmacokinetic profiles obtained five compounds from cocor bebek leaves, namely *Bufalin, 1β-hydroxylbufalin, Bryophyllum B, 12β-hydroxylbufalin* and *Hellebrigenin* within the appropriate range of pharmacokinetic requirements.

Keywords: Cervical cancer, *bryophyllum pinnatum L.*, molecular docking, AutoDockTools 1.5.6 software.