ABSTRAK

ELOK RIHADATUL MASTUTI, 2024, *NETWORK PHAMACOLOGY* KEMENYAN INDIA (*Boswellia serrata*) DAN RIMPANG KUNYIT (*Curcuma longa* L.) SEBAGAI ANTIINFLAMASI PADA OSTEOARTRITIS, PROPOSAL SKRIPSI, PROGRAM STUDI S1 FARMASI, FAKULTAS FARMASI, UNIVERSITAS SETIA BUDI, SURAKARTA. Dibimbing oleh Dr. apt. Rina Herowati, M.Si. dan apt. Ismi Puspitasari, S.Farm., M.Farm.

Osteoartritis adalah jenis artritis yang terjadi akibat kerusakan tulang rawan yang menyebabkan gesekan antar tulang dengan ciri khas salah satunya adalah degradasi tulang rawan. Kemenyan india dan rimpang kunyit diprediksi memiliki khasiat sebagai antiinflamasi pada osteoartritis. Tujuan penelitian ini adalah mengetahui protein-protein target yang terlibat dalam patofisiologi osteoartritis, mengetahui senyawa-senyawa kemenyan india dan rimpang kunyit yang diprediksi menjadi target kerja dari protein target dalam patofisiologi osteoartritis, dan untuk mengetahui profil *network pharmacology* kandungan senyawa kimia kemenyan india dan rimpang kunyit terhadap protein target osteoartritis.

Penelitian ini menggunakan metode *network pharmacology*. Pengumpulan data kandungan senyawa-senyawa kimia kemenyan india dan rimpang kunyit meneggunakan KNApSAcK, dan jurnal-jurnal penelitian. Protein target yang terlibat dalam patofisiologi osteoartritis diidentifikasi menggunakan jurnal penelitian. Protein target dilakukan validasi menggunakan *UniProt*. Interaksi protein-protein menggunakan *String*. Skrining zat aktif terhadat protein target dengan *Pubchem*. Prediksi protein target dari senyawa bioaktif menggunakan *Swiss Target Prediction, SEA,* dan *SuperPred*. Visualisasi *network pharmacology* dari interaksi protein-protein dan interaksi senyawa-protein menggunakan *Cytoscape*.

Visuaisasi protein *network pharmacology* protein target yang terlibat dalam patofisiologi osteoartritis dengan senyawa kemenyan india dan rimpang kunyit yakni NFKBIA, NOS2, MAPK1, MAPK3, MAPK14, PTEN, MAP2K1, MAP2K2, MAP2K3, MAP2K4, MMP1, MMP3, MMP13, dan AKT1. Kandungan senyawa *geraniol*, *α-pinene, limonene, α-boswellic aci*d (ABA), *β-boswellic acid* (ABA), *11-Keto-beta-boswellic acid* (KBA), *3 alpha-Acetoxy-11-keto-beta-boswellic acid* (AKBA*), 3-Acetyl-beta-boswellic acid, β-caryophillene,* dan *sabinene* pada kemenyan india serta *guaiacol, curcumin, caffeic acid, quercetin, demetoxycurcumin, xylitol, cineol, isoborneol, β-sitosterol,*

stigmasterol, dan *quercetin* pada rimpang kunyit dapat membentuk profil *network pharmacology* dengan protein target utama osteoartritis.

Kata kunci: antiinflamasi, osteoartritis, kemenyan india, rimpang kunyit, *network pharmacology, cytoscape*

ABSTRACT

ELOK RIHADATUL MASTUTI, 2024, NETWORK PHAMACOLOGY OF INDIAN FRANCHISE (*Boswellia serrata*) AND TURMERIC RHIZOME (*Curcuma longa* L.) AS ANTIINFLAMMATORY IN OSTEOARTHRITIS, THESIS PROPOSAL, S1 PHARMACY STUDY PROGRAM, FACULTY OF PHARMACY, SETIA BUDI UNIVERSITY, SURAKARTA. Supervised by Dr. apt. Rina Herowati, M.Sc. and apt. Ismi Puspitasari, S.Farm., M.Farm.

Osteoarthritis is a type of arthritis that occurs due to cartilage damage that causes friction between bones with one of the characteristics being cartilage degradation. Indian frankincense and turmeric rhizomes are predicted to have anti-inflammatory properties in osteoarthritis. The purpose of this study is to determine the target proteins involved in osteoarthritis pathophysiology, to determine the compounds of Indian frankincense and turmeric rhizomes that are predicted to be the target of action of target proteins in osteoarthritis pathophysiology, and to determine the network pharmacology profile of the chemical compounds content of Indian frankincense and turmeric rhizomes on the target protein of osteoarthritis.

This study uses the network pharmacology method. Data collection on the content of chemical compounds of Indian frankincense and turmeric rhizomes using KNApSAcK, and research journals. The target proteins involved in osteoarthritis pathophysiology were identified using research journals. The target protein was validated using UniProt. Protein-protein interactions using Strings. Screening of active substances against target proteins with Pubchem. Target protein prediction of bioactive compounds using Swiss Target Prediction, SEA, and SuperPred. Visualization of network pharmacology of protein-protein interactions and protein-compound interactions using Cytoscape.

Visuaization of protein network pharmacology target proteins involved in osteoarthritis pathophysiology with Indian frankincense compounds and turmeric rhizomes, namely NFKBIA, NOS2, MAPK1, MAPK3, MAPK14, PTEN, MAP2K1, MAP2K2, MAP2K3, MAP2K4, MMP1, MMP3, MMP13, and AKT1. The content of geraniol, α-pinene, limonene, α-boswellic acid (ABA), β-boswellic acid (ABA), 11-Keto-beta-boswellic acid (KBA), 3 alpha-Acetoxy-11-keto-beta-boswellic acid (AKBA), 3-Acetyl-beta-boswellic acid, β-caryophillene, and sabinene in Indian frankincense as well as guaiacol, curcumin, caffeic acid, quercetin, demetoxycurcumin, xylitol, cineol, isoborneol,

β-sitosterol, stigmasterol, and quercetin in turmeric rhizomes can form a pharmacology network profile with key target proteins Osteoarthritis.

Keywords: anti-inflammatory, osteoarthritis, indian frankincense, turmeric rhizome, network pharmacology, cytoscape