IN SILICO STUDY OF COMPOUNDS IN ETHYL ACETATE EXTRACT FROM ICHY LEAVES (*LAPORTEA DECUMANA* ROXB. (WEDD))

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Thousands of compounds of secondary metabolites from medicinal plants have been isolated and used by humans as single compound medicine. One of medicinal plants is itchy leaves. Itchy leaves (*Laportea decumana* (Roxb.) Wedd) is an endemic medicinal plant from Papua, Indonesia, which is widely used by the local people as a traditional pain reliever/analgesic drug by attaching it to painful parts of the body such as the back, hands, and feet. The purpose of the present study was to determine the compounds contained in the ethylacetate extract of the itchy leaf plant which is predicted to have an analgesic activity. Furthermore, the druglikeness and ADMET of the ten compounds were also predicted.

The initial study began by taking samples of itchy leaves from Arso XIII, Keerom Jayapura Regency, Papua, Indonesia. The leaves were cleaned, dried in an oven at ±50 °C for 7 days, mashed, and sieved into the size of each simplicia was 100 µm. The simplicia was macerated with ethyl acetate for 3x24 hours. The ethyl acetate extract was then analyzed by LC-MS to qualitatively obtain the prediction of active components in it, and the analysis showed that there were 27 compounds. These compounds were used in the *in silico* study by preparing them first using Chemsketch software and *Discovery Studio Visualizer* and optimized geometrically using Avogadro. The docking simulation was performed against COX-1 (PDB: 4O1Z) and COX-2 (PDB: 5IKR) by AutoDock 4.2 and MGLTools 1.5.6 software, and 10 selected compounds were then chosen according to their level of binding free energy and interactions to the key residues. Furthermore, these ten compounds are predicted to have drug-like properties and good ADMET. Then molecular dynamics (MD) simulation was carried out for 100 ns using Amber20 software and finally, the selected compound that had analgesic activity was determined.

The results of molecular dynamics simulations showed that Dihydroxyeudesm-11 (13)-en-12-oic acid was predicted to have better affinity compared to its native ligand with the value of binding free energy in COX-1 and COX-2 of -24.41 and -23.39 kcal/mol, respectively. This compound also shows good stability during the simulation of interaction, thus it is predicted as a potential compound that gives analgesic activity in ethyl acetate extract.

Keywords: Itchy leaves (*Laportea decumana* (Roxb.) *Wedd*), analgesics, cyclooxygenase, molecular docking, molecular dynamics