

**EFEK FRAKSI ALKALOID DARI EKSTRAK DAUN AWAR-AWAR
(*Ficus septica* Burm.f.) DAN KOMBINASI DENGAN DOKSORUBISIN
TERHADAP APOPTOSIS, SIKLUS SEL DAN EKSPRESI PROTEIN
CASPASE-9 PADA SEL KANKER T47D**

INTISARI

Tanaman awar-awar (*Ficus septica* Burm.f.) berpotensi untuk dikembangkan menjadi agen anti-kanker. Ekstrak etanolik daun awar-awar terbukti mempunyai aktivitas sitotoksik pada sel kanker T47D. Penelitian ini bertujuan untuk mengkaji efek fraksi alkaloid ekstrak daun awar-awar dan kombinasi dengan doksorubisin terhadap profil siklus sel, apoptosis serta mengkaji efeknya terhadap ekspresi protein caspase 9 pada sel kanker T47D.

Penelitian diawali dengan fraksinasi ekstrak kental etanolik daun-awar-awar dan reaksi asam basa hingga didapatkan fraksi alkaloid. Deteksi senyawa alkaloid menggunakan metode KLT. Fase gerak yang digunakan 2-propanol : asam asetat glasial:air (5:1:1) dan fase diam silika gel PF₂₅₄. Standar senyawa yang digunakan adalah tiloporin. Hasil identifikasi alkaloid dengan KLT menunjukkan bahwa alkaloid pada ekstrak dan fraksi alkaloid bukanlah alkaloid tiloporin yang terlihat dari bercak warna merah bata setelah disemprot dengan pereaksi Dragendorff. Penelitian selanjutnya yaitu uji siklus sel, apoptosis dan imunositokimia dilakukan secara *in vitro* menggunakan sel T47D. Uji siklus sel dan apoptosis menggunakan *flowcytometry* yang dianalisis menggunakan *cell quest*. Uji ekspresi caspase-9 menggunakan metode imunositokimia yaitu melihat perbedaan intensitas warna coklat pada sitoplasma sel.

Hasil Penelitian menunjukkan fraksi alkaloid dan kombinasi dengan doksorubisin dapat menghambat siklus sel pada fase G2/M dan juga menginduksi apoptosis. Fraksi alkaloid dan kombinasi dengan doksorubisin meningkatkan ekspresi protein caspase-9. Berdasarkan hasil penelitian ini dapat disimpulkan bahwa fraksi alkaloid dan kombinasi dengan doksorubisin mampu menghambat pertumbuhan sel kanker payudara sel T47D melalui penghambatan siklus sel pada fase G2/M, apoptosis dan peningkatan ekspresi caspase-9. Oleh karena itu fraksi alkaloid berpotensi untuk dikembangkan sebagai agen kokemoterapi.

Kata kunci : *Ficus septica*, fraksi alkaloid, caspase-9, T47D.

**THE EFFECT OF ALKALOID FRACTION OF (*Ficus Septica* Burm.f)
LEAVES EXTRACT AND IN COMBINATION WITH DOXORUBICIN TO
APOPTOSIS, CELL CYCLE, AND EXPRESSION OF CASPASE-9
PROTEIN ON CANCER CELL T47D**

ABSTRACT

Ficus septica Burm.f plant had the potential to be developed into an anti-cancer agent. Ethanol extract of *Ficus septica* Burm.f leaf was proved to have cytotoxic activity in cancer cell T47D. This study aimed to assess the effect of an alkaloid fraction of *Ficus septica* Burm.f leaf extract and in combination with doxorubicin to the profile of the cell cycle, apoptosis and assess its effect on the expression of caspase-9 protein in cancer cell T47D.

The research began with fractionation of viscous ethanol extract of *Ficus septica* Burm.f leaf and acid-base reaction until the alkaloid fraction was obtained. The detection of alkaloid compound used TLC method. The mobile phase used 2-propanol: glacial acetic acid: water (5: 1: 1) and the stationary phase silica gel PF254. The standard compound used was tilopirin. The result of alkaloid identification with TLC indicated that the alkaloid in the extract and the alkaloid fraction was not the tilopirin alkaloid which was seen from the red brick spots after being sprayed with Dragendorff reagent. The next research that was testing the cell cycle, apoptosis and immunocytochemistry were performed in in vitro by using cell T47D. The test of cell cycle and apoptosis were analyzed by using flowcytometry which was analyzed by using cell quest. The test of caspase-9 expression used immunocytochemistry method that was observing the difference in the intensity of brown color on the cell cytoplasm.

The result showed that the alkaloid fraction and the combination with doxorubicin could inhibit cell cycle in G2/M phase and also induced apoptosis. The alkaloid fraction and the combination with doxorubicin increased the expression of the caspase-9 protein. Based on the results of this study, it could be concluded that alkaloid fraction and combination with doxorubicin might able to inhibit the growth of breast cancer cell T47D through the inhibition of cell cycle in G2/M phase, apoptosis and the increased caspase-9 expression. Therefore, the alkaloid fraction had the potential to be developed as a co-chemotherapy agent.

Keywords: *Ficus septica*, the alkaloid fraction, caspase-9, T47D.