

**PERAN FRAKSI AKTIF TANAMAN SARANG SEMUT (*Myrmecodia pendens*
Merr & Perry) TERHADAP SEL ORAL BURKITT'S LYMPHOMA
(Kajian Sitotoksisitas, Sinergitas Ko-kemoterapi Cisplatin, Hambatan Signal
Transduksi NF- κ B, Komplek CDK-2-cyclin-E, dan Induksi Apoptosis)**

ABSTRAK

Latar belakang : Usaha menghambat pertumbuhan sel kanker oral *Burkitt's lymphoma* memerlukan strategi yang efektif dan potensial salah satunya menggunakan tanaman sarang semut (*Myrmecodia pendens* Merr & Perry) yang merupakan tanaman obat yang potensi antitumornya perlu terus diuji secara ilmiah.

Tujuan penelitian : Menguji fraksi aktif *M. pendens* terhadap sel oral *Burkitt's lymphoma*: kajian sitotoksisitas dan sinergitas ko-kemoterapi dengan cisplatin, hambatan signal transduksi kompleks CDK-2-cyclin-E, NF- κ B, serta induksi apoptosis.

Metode: Jenis penelitian yang digunakan adalah eksperimental murni laboratorik dengan rancangan *post-test only control group design*. Uji sitotoksisitas dilakukan dengan uji MTT (3-(4,5 dimethyl thiazol-2-yl)-2,5-diphenyltetrazolium bromide). Uji sinergitas ko-kemoterapi cisplatin dilaksanakan dengan program CompuSyn. Uji apoptosis diobservasi menggunakan FITC-Annexin V, Induksi apoptosis *caspase-3, -8* dan *-9* dan mekanisme hambatan pertumbuhan sel pada kompleks CDK-2-cyclin-E, dan NF- κ B. menggunakan uji kolorimetri dengan ELISA kit.

Hasil : Fraksi etil asetat *M. pendens* memiliki aktivitas sitotoksik paling kuat dengan nilai IC50 sebesar 278,21 μ g/ml. Ko-kemoterapi cisplatin dengan fraksi etil asetat *M. pendens* menunjukkan aktivitas sitotoksik kuat dan sinergitas positif pada level ringan sampai sedang dengan nilai *Combination Index* (CI) sebesar 0,7-0,9. Fraksi etil asetat *M. pendens* menunjukkan hambatan pertumbuhan sel oral *Burkitt's lymphoma* melalui mekanisme hambatan signal transduksi NF- κ B dan kompleks protein CDK2-cyclin-E, serta mempunyai potensi menghambat siklus sel sebagian besar pada fase G0-G1 dan sebagian kecil pada fase G2-M. Hasil uji apoptosis menggunakan uji kolorimetrik *caspases* dan FITC-Annexin V menunjukkan induksi apoptosis *caspase-3, -8* dan *-9*.

Kesimpulan: Ko-kemoterapi cisplatin dengan fraksi etil asetat *M. pendens* memiliki aktivitas sitotoksisitas dan sinergitas yang positif, potensi hambatan yang kuat terhadap sel oral *Burkitt's lymphoma* melalui mekanisme hambatan siklus sel, penurunan regulasi signal transduksi kompleks CDK-2-cyclin-E, NF- κ B, dan induksi apoptosis.

Kata kunci: *Myrmecodia. pendens*, *Burkitt's lymphoma* , sitotoksisitas, ko-kemoterapi, CDK-2-cyclin-E, NF- κ B, apoptosis, *caspase*.

**The Role of Active Fraction from *Myrmecodia* plant (*Myrmecodia pendens*
Merr & Perry) Towards Oral Burkitt's Lymphoma Cell**
**(A Study of Cytotoxicity and Co-Chemotherapy Synergism with Cisplatin, The
Inhibition of Transduction Signal of NF- κ B, CDK-2-Cyclin-E Complex,
and The Induction of Apoptosis)**

ABSTRACT

Background: The effort to inhibit the growth of Burkitt's lymphoma oral cancer cell needs an effective and potential strategy. One of the strategy was using *Myrmecodia* plant (*Myrmecodia pendens* Merr & Perr), a medicinal plant which its antitumor properties have been empirically and scientifically tested.

Aim: The aim of this study was to test the active fractions of *M. pendens* towards Burkitt's lymphoma oral cell. It was also to study the cytotoxicity and co-chemotherapy synergism with cisplatin, the inhibition of transduction signal of CDK-2-cyclin-E complex and NF- κ B complex, and also the induction of apoptosis.

Method: The study was a true laboratory experimental research. The design of this study was post-test only control group design. The cytotoxicity assay was taken with MTT 3-(4,5 dimethyl thiazol-2-yl)-2,5-diphenyltetrazolium bromide) assay. The synergism and co-chemotherapy test with cisplatin was taken with CompuSyn program. The apoptosis was observed with FITC-Annexin V and caspase-3, -8 and -9 assay. Next, the inhibition of cell's growth mechanism was detected by the expression assay of CDK-2-cyclin-E complex and NF- κ B complex with ELISA kit.

Result: The ethyl-acetate fraction of *M. pendens* had the strongest cytotoxic properties with IC50 value of 278,21 μ g/ml. The combination of ethyl-acetate fraction of *M. pendens* co-chemotherapy with cisplatin exhibited a strong cytotoxic properties and positive synergism with a low to moderate level, with Combination Index (CI) score of 0,7-0,9. The ethyl-acetate fraction of *M. pendens* revealed the inhibited growth of Burkitt's lymphoma oral cell through the inhibition of the transduction signal of NF- κ B and CDK2-cyclin-E's protein. It was also noted that it had a potential inhibition activity to cell's cycle, mainly during G0-G1 phase and lesser during G2-M phase. The apoptosis test with caspase colorimetric assay and FITC-Annexin V assay showed the induction of proteolytic activity of caspase-3, -8 and -9.

Conclusion: The ethyl-acetate fraction of *M. pendens* had a cytotoxicity activity and co- chemotherapy synergism with cisplatin. It also had a potential inhibition activity of Burkitt's lymphoma's oral cell, cell cycle arrest, by lowering the transduction signal of CDK-2-cyclin- E complex and NF- κ B complex, and it also induced apoptosis.

Keywords: *Myrmecodia pendens*, Burkitt's lymphoma, cytotoxicity, co-chemotherapy, CDK-2-cyclin-E, NF- κ B, apoptosis, caspase.