

RINGKASAN

ANDRE HENDRAWAN, Program Studi Biologi – Program Pascasarjana, Universitas Jenderal Soedirman, Pengaruh Pemberian Ekstrak Etanol Daun Sambiloto (*Andrographis paniculata*) terhadap Aktivitas Sitotoksik, Induksi Apoptosis dan Ekspresi Gen *P53* pada Sel Kanker Payudara T47D.

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Kanker dapat terjadi karena sel kehilangan kontrol proliferasi dan kontrol mekanisme program kematian sel (apoptosis). Penanganan kanker secara medis dapat dilakukan melalui operasi, kemoterapi, dan radioterapi. Ketiga jenis terapi tersebut baik secara terpisah maupun kombinasi menimbulkan efek samping yang cukup berat sehingga perlu diupayakan penanggulangan alternatif. Tanaman sambiloto (*Andrographis paniculata*) merupakan salah satu tanaman yang banyak digunakan oleh masyarakat untuk mengobati penyakit kanker. Sambiloto mengandung zat pahit andrografolida yaitu suatu senyawa diterpenoid yang memiliki efek antikanker. Tujuan penelitian ini adalah mengkaji aktivitas sitotoksik ekstrak etanol daun sambiloto (*Andrographis paniculata*) yang dinyatakan dengan IC_{50} , mengkaji induksi apoptosis, dan mengkaji ekspresi gen *p-53* pada sel kanker payudara T47D akibat pemberian ekstrak etanol daun sambiloto (*Andrographis paniculata*).

Serbuk daun sambiloto dimaserasi dengan etanol 70% selama 3x24 jam. Aktivitas sitotoksik diuji dengan *Yellow MTT assay*. Data persentase penghambatan dianalisis probit dengan SPSS untuk mendapat nilai IC_{50} . Apoptosis sel T47D dideteksi dengan metode *doublestaining* menggunakan etidium bromida-akridin oranye, untuk menghitung persentase apoptosis. Ekspresi gen *p53* sel T47D diamati dengan metode *imunositokimia* sehingga diperoleh persentase ekspresi gen *p53*.

Hasil penelitian menunjukkan bahwa ekstrak etanol daun sambiloto memiliki efek sitotoksik dengan IC_{50} sebesar 81,84 $\mu\text{g/mL}$, mampu menginduksi aktivitas apoptosis dengan persentase apoptosis sebesar 30,19 %, dan mampu memacu ekspresi gen *p53* pada sel T47D sebesar 22,57 %.

Kata kunci: kanker payudara, daun sambiloto, *MTT assay*, apoptosis, *p53*.

SUMMARY

ANDRE HENDRAWAN, Biology Study Program Postgraduate Program, Jenderal Soedirman University, Effect of Ethanol Extract Paniculata Leaf (*Andrographis Paniculata*) on Cytotoxic Activity, Apoptosis Induction and *p53* Gene Expression in T47D Breast Cancer Cells.

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Cancer occurs due to loss of control of cell proliferation and the control mechanism of programmed cell death (apoptosis). Cancer treatments can be done through surgery, chemotherapy, and radiotherapy. The treatments, either individually or in combination often resulted in severe side effects. Alternative treatments are therefore needed. One of the prospective treatments is using herbal. *Andrographis paniculata* is one of traditional herbal that used to treat cancer. *A. paniculata* contains andrographolide, a diterpenoid compound, is known to have anticancer effects. The purposes of this study were to assess the cytotoxic activity of ethanol extract *A. paniculata* leaf expressed by IC_{50} , examine the induction of apoptosis, and assess the *p* - 53 gene expression in T47D breast cancer cells.

Paniculata leaf powder was macerated with 70% ethanol for 3x24 hours. Cytotoxic activity was evaluated using Yellow MTT assay. Probit of percentage inhibition data were analyzed using SPSS to obtain IC_{50} value. Apoptotic T47D cell was detected using doublestaining method applying ethidium bromide-acridine orange, the results were presented as percentage of apoptosis. *p53* gene expression in T47D cell was studied using immunocytochemistry, the results were presented as percentage of *p53* gene expression.

The result showed that ethanol extract paniculata leaf had a cytotoxic effect at IC_{50} of 81.84 $\mu\text{g/mL}$, and it capable to induce apoptosis with the percentage of apoptotic activity of 30.19%, and it triggered 22.57% expression of *p53* gene in T47D cells.

Key words: breast cancer, paniculata leaf, MTT assay, apoptosis, *p53*.