ABSTRAK

Kanker payudara menjadi jenis kanker yang mempunyai tingkat insidensi tertinggi di Indonesia pada tahun 2018 dengan angka kejadian sebesar 58.256 kasus. *International Agency for Reasearch on Cancer* (IARC) tahun 2018 memprediksi pada tahun 2040, kasus kanker payudara meningkat menjadi 89.512 kasus. Kanker payudara memiliki karakter ekspresi tinggi reseptor estrogen alfa (RE-α) yang dapat dihambat dengan pengobatan standar yaitu tamoxifen. Dewasa ini muncul efek samping dan resistensi terhadap pengobatan tamoxifen. Penelitian sebelumnya menunjukkan ekstrak etanolik jamur lingzhi memiliki kemampuan sitotoksik terhadap berbagai sel kanker termasuk sel kanker payudara MCF-7 & MDA-MB-231. Penelitian ini dilakukan untuk mengetahui pengaruh ekstrak etanolik jamur lingzhi (*Ganoderma lucidum* (Ley. ex Fr.) Kar.) pada sel kanker payudara T47D dengan melihat aktivitas sitotoksik, induksi apoptosis dan ekspresi reseptor estrogen alfa (RE-α). Model sel kanker payudara yang digunakan adalah sel T47D yang mampu mengekspresikan reseptor estrogen alfa (RE-α). Uji sitotoksisitas dianalisis menggunakan metode *3-[4,5-dimethylthiazol-2-yl]-2,5 diphenyl tetrazolium bromide* (MTT), dilanjutkan dengan uji induksi apoptosis dengan metode *double staining* AO-EB. Mekanisme molekuler terhadap RE-α dianalisis secara semi-kuantitatif menggunakan metode imunositokimia.

Ekstrak etanolik jamur lingzhi memiliki kemampuan sitotoksik terhadap sel kanker payudara T47D dengan IC_{50} sebesar 284,098 µg/mL, dapat menginduksi apoptosis sebesar 97,8 ± 0,13% dan nekrosis sebesar 0,27 ± 0,01, tetapi belum mampu menekan ekspresi RE-α, sehingga RE-α masih terekspresikan sebesar 97-98% dengan level ekspresi RE-α yaitu di level 4+.

Kata kunci: Kanker payudara, RE- α, *Ganoderma lucidum*, sel T47D.

ABSTRACT

Breast cancer was a type of cancer with the highest incidence rate in Indonesia in 2018 with 58,256 number of cases. In 2018, International Agency for Research on Cancer (IARC) has predicted that in 2040, breast cancer cases will increase up to 89,512 cases. Breast cancer has the overexpression character of estrogen alpha receptors (ER-α) which can be inhibited by the standard treatment namely tamoxifen. However, resistance and side effects against tamoxifen are still two of the major hurdles in the effective management of breast cancer. Previous research showed that lingzhi mushroom ethanolic extracts had cytotoxic effect against various cancer cells including MCF-7 & MDA-MB-231 breast cancer cells. This study was conducted to determine the effect of lingzhi (*Ganoderma lucidum* (Ley. ex Fr.) Kar.) ethanolic extracts on T47D breast cancer cells by study on cytotoxic activities, apoptotic induction and expression of alpha estrogen receptors (ER-α). T47D cancer cells were used as a model of cancer cells because they were able to activate alpha estrogen receptors. Cytotoxicity tests were carried out using the 3 - [4,5-dimethylthiazol-2-yl] - 2,5 diphenyl tetrazolium bromide (MTT) method, followed by apoptosis trial by the AO-EB double staining method. The molecular relationship with ER-α was analyzed semi-quantitatively using the immunocytochemistry method.

The lingzhi mushroom ethanolic extract demonstrates cytotoxic effect on T47D breast cancer cells with IC_{50} value is 284.098 µg / mL, can induce apoptosis by 97.8 ± 0.13% and necrosis by 0.27 ± 0.01, but has not been able to suppress ER-α expression, therefore ER-α is still expressed at 97-98% with ER-α expression level at level 4+.

Keywords: Breast cancer, ER-α, *Ganoderma lucidum*, T47D cells.