STUDI PERBANDINGAN POTENSI ANTIKANKER DARI EKSTRAK LUMUT KERAK (*Parmelia sulcata*) DAN ASAM PALMITAT MELALUI PENGHAMBATAN ANGIOGENESIS TERHADAP MEMBRAN KORIOALANTOIS EMBRIO TELUR AYAM

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ABSTRAK

Kanker menjadi penyebab kematian nomor dua di dunia, serta bertanggung jawab atas 9,6 juta kematian di tahun 2018. Pengobatan kanker yang selama ini dilakukan, menunjukkan hasil yang tidak efektif, serta menimbulkan efek samping terhadap sel normal. Lumut kerak (*Parmelia sulcata*) yang sering diabaikan, mengandung berbagai senyawa metabolit sekunder potensial, seperti asam palmitat, flavonoid, triterpenoid, alkaloid, saponin, tanin, steroid, dan diduga mampu menghambat angiogenesis, sehingga mencegah pertumbuhan sel kanker. Asam palmitat merupakan penghambat angiogenesis yang sering digunakan. Oleh karena itu, potensi lumut kerak sebagai penghambat angiogenesis perlu dibandingkan dengan asam palmitat, sehingga menjadi solusi inovatif antikanker yang aman dan efektif.

Ekstraksi metabolit sekunder dari lumut kerak dilakukan secara maserasi menggunakan etanol 96%. Identifikasi kandungan metabolit sekunder ekstrak dilakukan melalui skrining fitokimia menggunakan pereaksi, serta dikonfirmasi dengan *Fourier-transform Infrared* (FTIR) *Spectroscopy*. Uji potensi antikanker dilakukan dengan menguji potensi penghambatan angiogenesis dari ekstrak dan asam palmitat, terhadap membran korioalantois embrio telur ayam, menggunakan metode in ovo CAM (*Chick chorioallantoic membrane*) *assay*. Uji potensi penghambatan angiogenesis dilakukan dengan 3 variasi konsentrasi ekstrak, 5%, 10%, dan 15%, dibandingkan dengan asam palmitat. Tidak tumbuhnya pembuluh darah menunjukkan potensi penghambatan angiogenesis yang besar. Semakin sedikit pembuluh darah yang tumbuh, maka semakin besar potensi penghambatan angiogenesis.

Hasil penelitian menunjukkan, bahwa metabolit sekunder dari lumut kerak dapat diekstraksi secara maserasi menggunakan etanol 96%. Skrining fitokimia yang dikonfirmasi dengan FTIR, membuktikan adanya kandungan flavonoid, alkaloid, triterpenoid, steroid, tanin, saponin, dan asam palmitat, dalam ekstrak lumut kerak. Potensi penghambatan angiogenesis dari ekstrak lumut kerak, terhadap membran korioalantois embrio telur ayam, melampaui asam palmitat pada konsentrasi 5%, meskipun setara pada konsentrasi 10% dan 15%.

Dari hasil penelitian dapat disimpulkan, bahwa ekstrak lumut kerak sangat potensial sebagai penghambat angiogenesis, melampaui asam palmitat, sehingga menjadi alternatif antikanker yang aman dan efektif.

Kata Kunci: *Parmelia sulcata*, asam palmitat, angiogenesis, antikanker, in ovo CAM *assay*

COMPARISON STUDY OF ANTICANCER POTENTIAL FROM SHIELD LICHEN (*Parmelia sulcata*) EXTRACT AND PALMITIC ACID THROUGH THE INHIBITION OF ANGIOGENESIS ON CHICK CHORIOALLANTOIC MEMBRANE

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ABSTRACT

Cancer is the second highest cause of death in the world, and was responsible for 9.6 million deaths in 2018. The current cancer treatments have shown ineffective results and have side effects on normal cells. Shield lichen which is often ignored, contains various secondary metabolites, such as palmitic acid, flavonoid, alkaloid, steroid, triterpenoid, tannin, saponin, and is presumed to be able to inhibit angiogenesis, thus inhibiting the growth of cancer cells. Palmitic acid is an angiogenesis inhibitor that is often used. Therefore, the angiogenesis inhibition potential of shield lichen is necessary to be compared with palmitic acid, thus it could be an innovative solution for anticancer that is safe and effective.

The extraction of secondary metabolites from shield lichen was done using 96% ethanol. Identification of secondary metabolite content in the shield lichen extract, was carried out through phytochemical screening using reagents, and confirmed by FTIR (Fourier-transform Infrared) Spectroscopy. The anticancer potential test was performed by testing the angiogenesis inhibition potential of the extract and palmitic acid, on the chick chorioallantoic membrane, using in ovo CAM assay method. Antiangiogenesis potential was done using 3 variations of extract concentration, 5%, 10%, and 15%, compared with palmitic acid. The absence of blood vessel growth indicates a great potential of angiogenesis inhibition. The fewer the blood vessels that grow, the greater the angiogenesis inhibition potential.

The results show that the secondary metabolites from shield lichen can be extracted through maceration using ethanol 96%. The phytochemical screening, which was confirmed by FTIR, proves the presence of flavonoid, alkaloid, triterpenoid, steroid, tannin, saponin, and palmitic acid, in shield lichen extract. Angiogenesis inhibition potential of shield lichen extract towards chick chorioallantoic membrane of chicken eggs, surpasses palmitic acid at 5% concentration, although they are equivalent at 10% and 15% concentration.

In conclusion, shield lichen extract is very potential in inhibiting angiogenesis, surpassing palmitic acid, thus serves as an innovative solution for anticancer that is safe and effective

Keywords: *Parmelia sulcata*, palmitic acid, angiogenesis, anticancer, in ovo CAM assay