Cytotoxicity of Heterophyllene A, the Derivative of Arylbenzofuran from Stem Bark of *Artocarpus calophylla*

Rumzil Laili[1*], Nanik Siti Aminah[2], Tin Myo Thant[2], Yoshiaki Takaya[3], Ainun Sa'adah[1], Alfinda Novi Kristanti[2*]

[1]*Student of Magister Chemistry Program, Science and Technology Faculty, Airlangga University, Jl. Ir Soekarno, Surabaya, 60115*

[2]*Chemistry, Science and Technology Faculty, Airlangga University, Jl. Ir Soekarno, Surabaya, 60115*

[3]*Faculty of Pharmacy, Meijo University, 468-8503, Tempaku Nagoya, Japan*

Keywords: Artocarpus calophylla, Arylbenzofuran, Cytotoxicity

Abstract: Exploration of secondary metabolites was the focus of this research, especially of *Artocarpus calophylla* species to look for a potential cytotoxic agent. An arylbenzofuran derivative compound, namely heterophyllene A was isolated from the stem bark of *Artocarpus calophylla*. Structure determination of this compound has been elucidated using UV-Vis spectroscopy, 1D, and 2D NMR analysis. This compound has a lower IC_{50} than ethyl acetate extract. The IC_{50} of this compound (57,54 µg/mL) to HeLa and (25,80 µg/mL) to T47D cells, ethyl acetate extract (>100 µg/mL) to HeLa and (84,16 µg/mL) to T47D cells.

1 INTRODUCTION

Moraceae is a family of plants that is a source of a bioactive compound in large quantities. The main genus in Moraceae is *Artocarpus* which consists of more than 60 species. *Artocarpus* plants spread from Southest Asia, South Asia, Nothern Australia and Central America (Kochummen 1987; Verheij and Coronel, 1992). Some *Artocarpus* species commonly found in Indonesia include jackfruit (*A. heterophyllus* Lamk), cempedak (*A. champeden*), breadfruit *(A. altilis* [Park] Fosberg) (Ilyas, 2013) and others which are endemic in Myanmar such as *A. lakoocha* and *A. calophylla* KURZ (Takahashi et al., 2004).

There are some secondary metabolites which are proven capable to be produced by this genus, for instance, terpenoid, steroid, and phenolic compound (Barik et al., 1997; Wang et al., 2007; Chen et al., 2010; Nguyen et al., 2012). A number of pharmacologically active constituents have been isolated from *Artocarpus* species, with this having a variety of activities including antibacterial (Khan et al., 2003), antiplatelet (Weng et al., 2006), antifungal (Jayasinghe et al., 2004), antimalarial (Widyawruyanti et al., 2007; Boonlaksiri et al., 2000) and cytotoxic (Ko et al., 2005; Hakim et al., 2002; Syah et al., 2006).

In this study, it was reported that heterophyllene A is an arylbenzofuran derivative compound isolated from ethyl acetate extract of the stem bark of *A. calophylla. A. calophylla* is one of the species in the genus *Artocarpus* that has not been widely studied both from the study of phytochemicals and its biological activity. The chemical structure of the compound was determined by UV, 1D, and 2D NMR. Cytotoxic activity of the compound and ethyl acetate extract to HeLa and T47D cells is also described.

2 EXPERIMENTALS

2.1 General

NMR spectra were recorded on JEOL 600 ECA spectrometer using $CDCl_3$ at 600 (^1H) and 125 (^{13}C) MHz. The UV spectrum was recorded using UV-1800 Shimadzu spectrophotometer. Vacuum Liquid Chromatography (VLC) and Gravity Column Chromatography (GCC) were carried out using Si gel 60 GF254. Meanwhile, Si gel PF254 was used in

Laili, R., Siti Aminah, N., Myo Thant, T., Takaya, Y., Sa'adah, A. and Novi Kristanti, A.
Cytotoxicity of Heterophyllene A, the Derivative of Arylbenzofuran from Stem Bark of Artocarpus calophylla.
DOI: 10.5220/0008863201560159
In *Proceedings of the 1st International Conference on Chemical Science and Technology Innovation (ICOCSTI 2019)*, pages 156-159
ISBN: 978-989-758-415-2