Cytotoxicity Test of Methanol Extract of Belajang Susu (Scindapsus pictus Hassk.) Against MCF-7 Breast Cancer Cells

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Abstract. Belajang Susu Plant (*Scindapsus pictus* Hassk.) is a species of the genus Scindapsus including the Araceae family which has been traditionally used by the Mambi people for medicine. Plants from the genus Scindapsus contain active compounds such as calcium oxalate, flavonoids sulfate and a mixture of flavones and flavonols sulfate which can be used as anti-inflammatory, analgesic, antioxidant, anticancer and anti-tumor. This study aims to determine the potential of methanol extract of *Scindapsus pictus* Hassk. as an anticancer. Extraction was carried out by maceration with methanol and then tested for cytotoxicity against MCF-7 cancer cells. The results showed that the methanol extract of *Scindapsus pictus* Hassk. was very active against MCF-7 breast cancer cells with an IC_{50} value of 3.9861 µg / mL.

Keywords: Belajang susu, *Scindapsus pictus* Hassk., MCF-7The first section in your paper

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INTRODUCTION

Indonesia is one of the countries rich in biodiversity. More than 20,000 types of medicinal plants are found in Indonesia, but only 1,000 types of plants have been recorded and only 300 are used as traditional medicines. Medicinal plants produce secondary metabolites which have the potential to be bioactive compounds and useful for human life. Each plant produces one or more bioactive compounds in the form of secondary metabolites, such as alkaloids, flavonoids, phenylpropanoids, steroids, terpenoids, tannins, and coumarins, which depend on the type of plant. The secondary metabolites produced causes plants could be used as medicines since hundreds or even thousands of years ago.

One of the plant families that are used as medicinal plants is Araceae. Species included in this family are rich in anthocyanin content in flowers, fruits, leaves or petioles (Kaur, Kuljeet and Rajiv, 2016). Several species that could be used as medicinal plants such as *Alocasia macrorrhiza* Schott is used as cough medicines, *Acorus calamus* L is used as a sedative and *Pistia Stratiotes* L. is used as a medicine for whooping cough, fever and for smoothing urine (Hutapea,2000) . Belajang susu (*Scindapsus pictus* Hassk.) is a species belonging to the Araceae family and the Scindapsus clan. Generally, members of this clan are used as ornamental plants. However, some are used as medicinal plants (Yuzammi and Reza, 2015), such as *Scindapsus officinalis* whose methanol extract contains active compounds that are anti-inflammatory, analgesic, antioxidant and anti-tumor (Kaur, Kuljeet and Rajiv, 2016).

Based on the results of special research on the exploration of local plants in Indonesia in Mambi ethnic community from Mambi District, Mamasa Regency, West Sulawesi, belajang susu plant (*S. pictus* Hassk.) is used as an anticancer (Jumadi et al, 2012). In addition, this plant is reported to contain oxalate which is usually in the form of calcium oxalate, flavonoid sulfate and a mixture of flavones and flavonol sulfate (Kaur, Kuljeet and Rajiv, 2016).

Cancer is a latent cellular disease and begins with a carcinogenesis process. The process of cancer can take up to decades (Sarkar et al, 2013). Cancer cells are aggressive and have the ability to be invasive (infiltrate and damage nearby tissue) and metastasis (spread to other tissues through the blood vessel and spleen systems) so due to the pathogenesis cancer is also declared a cellular disease (Schneider,2011).

Breast cancer is a type of cancer that affects women worldwide (WHO, 2010). Most of cancers (more than 95%) are caused by epigenetic influence where genes are influenced by various external factors such as food and environment [8,9]. Conditions causes the conversion of normal cells into cancer cells are hyperplasia, dysplasia and neoplasia (Weinberg,2007) . The uncontrolled cell growth is caused by DNA damage that causes mutations in vital genes (Ruddon,2012) . Various attempts were made to treat cancer, including using medicinal plants. Natural products have been shown to be useful in the development of anticancer drugs especially those derived from higher plants (Pan et al, 2012). Plants that have the potential to act as anticancer agents is belajang susu plant (*S. pictus* Hassk.).

Therefore, a study was carried out to assess the anticancer activity of belajang susu (*S. pictus* Hassk.) based on the scientific data collected.

RESEARCH METHOD

Extraction

The stem of *S.pictus* Hassk are cleaned and then cut into small pieces, then dried by aerating at room temperature and then ground. A total of 3 kg of powdered *S.pictus* Hassk stem is macerated with methanol for 3 x 24 hours. Then the macerate is filtered using a Buchner funnel and then concentrated using an evaporator.

Cytotoxic Activity Test on Breast Cancer Cells (MCF-7)

MCF-7 cells were grown on a 96 well microplate to obtain a density of 5 x 103 cells / well and incubated for 48 hours to get good growth. The medium was then replaced with a new medium then added the extract and the three fractions with DMSO co-solvent with concentrations of 10, 20, 50, 75, 100, 250 and 500 ppm and incubated at 37°C in a 5% CO_2 incubator for 48 hours. At the end of incubation, the media and extract were discarded and the cells were washed with PBS. To each well, 100µL of culture medium and 10µL of 5 mg / mL of MTT were added. Cells were incubated again for 4-6 hours in a 5%, 37°C CO_2 incubator. The MTT reaction was stopped with HCl 4N-isopropanol (1: 100), shaken on a shaker for 10 minutes. The uptake was read with an ELISA reader at a wavelength of 595 nm and compared to the IC_{50} value of doxorubicin as a positive control (Meyer et al, 1982).

RESULT AND DISCUSSION

The methanol extract obtained from maceration of 3.0 kg of mashed *S.pictus* Hassk. samples weighing 33,7097 g. Furthermore, the MCF-7 anticancer test was carried out on the methanol extract. This test was carried out by converting the absorbance value of the methanol extract in the ELISA Reader into percent inhibition of cell growth. This test is carried out to calculate the IC_{50} value parameter, which is the concentration that can inhibit breast cancer cells by 50%.

The cytotoxic activity of the extracts which attack cancer cells can be classified into three categories. The first category is very active if the IC_{50} is <10 µg / mL, the second category is active if the IC_{50} is10-100 µg / mL and the third is sufficiently active if the IC_{50} is 100-500 µg / mL (Weerapreeyakul et al, 2012). A substance is said to have no cytotoxic activity when the IC_{50} value is> 500 µg / mL (Machana, 2011). IC_{50} MCF-7 values can be seen in Table 1.

.***Table 1.*** MCF-7 Anticancer Test Data

Sample Code	IC_{50} (µg/mL)	Category
Methanol extract	3,9861	Very active

Based on the IC50 value that has been obtained, it can be seen that the methanol extract has a value of 3.9861 µg / mL (very active), meaning that the mixed compound shows anticancer activity that can inhibit cell proliferation and is very potential as a compreventive agent, compounds that can prevent the

carcinogenesis process which triggers cancer (Meiyanto, 2008). Picture 1 shows a graph of MCF-7 cell mortality percentage due to treatment of methanol extract samples.

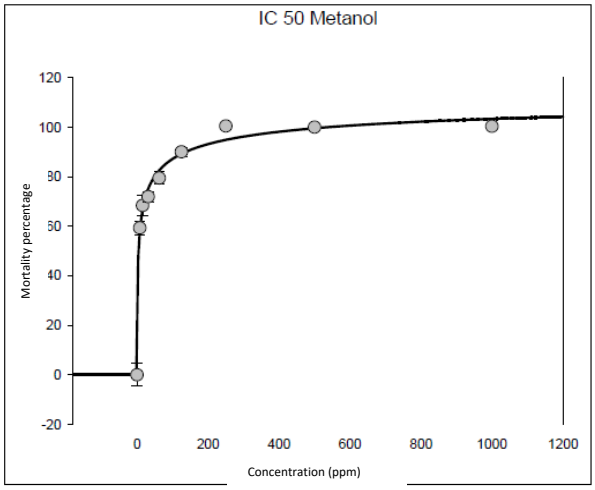

Figure 1. Graph of MCF-7 Cell Mortality Percentage due to Methanol Extract Sample Treatment

Table 2. Mortality percentage of MCF-7 cells due to treatment of methanol extract samples

Concentration (ppm)	Cell Mortality Percentage			Average
	1	2	3	
0	5,262	-1,824	-3,438	0,000
7,8125	61,810	59,705	56,618	59,378
15,625	68,405	72,615	64,266	68,428
31,25	71,352	74,158	70,370	71,960
62,5	80,472	81,384	76,614	79,490
125	87,839	91,414	90,926	90,061
250	100,327	100,678	100,538	100,514
500	99,766	99, 906	100,398	100,023
1000	100,678	100,398	100,117	100,398

CONCLUSION

The methanol extracts of belajang susu plant (*Scindapsus pictus* Hassk.) stem is very active against breast cancer cells MCF-7 with IC_{50} value of 3.9861 mg / mL.

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