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Submission date: 29-May-2022 01:42PM (UTC+0700)

Submission ID: 1846237604

File name: Scopus_Nurlaili_2019_J._Phys._Conf._Ser._1277_012021_DPPH.pdf (485.62K)

Word count: 1293

Character count: 7010

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To cite this article: Nurlaili *et al* 2019 *J. Phys.: Conf. Ser.* **1277** 012021

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DPPH radical scavenging activity of methanol extract of Indonesian *Etlingera elatior* flower and leave

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Abstract. This research goal was to investigate the antioxidant activity of methanol extract of kecombrang (*Etlingera elatior*) flowers and leaves. Extraction processes by using maceration technique. Dried samples were extracted by using commercial methanol for 48 h. Antioxidant activity was measured as DPPH radical scavenging activity. The results showed that IC₅₀ of the methanol extract of kecombrang shoot leaves was 14.53 ppm; the methanol extract of kecombrang mature leaves was 28.97 ppm; and the methanol extract of kecombrang flowers was 105.90 ppm. It is indicated that the extracts can be used as an agent to scavenging free radicals.

1. Introduction

Antioxidant compounds are widely found in some parts of plants [1]. Antioxidant is a substance that, when present concentration much lower than that of an oxidizable substrate, significantly delays or inhibits the substrate oxidation [2]. Many plants have been reported to have strong antioxidant activities [3]. Many parts of plant such as wood, bark, stems, leaves, fruits, roots, flowers, pollen and seeds, are sources of antioxidant and commonly known as polyphenols [4].

Indonesia has around 40,000 endemic plant species and 6,000 medicinal plants. Thus, Indonesia is known as the second largest biodiversity in the world [5]. Family of Zingiberaceae is one of the medicinal plants distributed in tropical and subtropical areas such as Indonesia, Brunei, Malaysia, Papua New Guinea, Philippines, Singapore and South of Thailand. *Etlingera elatior* is one of species in the family of Zingiberaceae [6].

E. elatior has been known as kecombrang and honje in Indonesia. It is also known as porcelain rose and torch ginger (English) and kantan (Melayu). Many parts of kecombrang such as flowers (buds, receptacle, and petal), fruits, hearth of young leafy pseudostems, rhizome and seeds can be used as condiments, eaten as salad and pickled, cooked as foods, produced as “manisan” [7]. Researches on some parts of kecombrang have been done including its antioxidant, anticancer, hepatoprotective, and tyrosinase inhibition activities [7-9]. Ghasemzadeh and his colleagues reported that aqueous and ethanol extract of kecombrang flowers from different area in Malaysia resulted significantly different on its total phenolic contents, total flavonoid contents and total tannin contents as well as its antioxidant activities [8].



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Based on the introduction above, this research was conducted to analysis antioxidant activity of flowers and leaves of Indoneisan kecombrang by using DPPH Radical scavenging method.

2. Materials and Methods

2.1. Plant materials and chemicals

The flowers and leaves of kecombrang were collected from villager at Lubuk Sawah, Mugirejo, Samarinda, Indonesia. Methanol was a commercial grade and other used chemicals were purchased from Sigma Aldrich GmbH (Germany).

2.2. Preparation of the extracts

Both of flowers and leaves of kecombrang were dried under shade for 7 days. The dried samples were crushed into powder by using commercial blender. Then, the powders of samples ca 50 g were extracted with methanol for 48 h. and the mixture was filtered by using filter paper to get extract solution. Afterwards the extract solution was concentrated by using a rotary evaporator at 39°C.

2.3. DPPH antioxidant assay

DPPH (2,2-diphenyl-1-picrylhydrazyl) radical scavenging assay was done by using a method which described by Sukemi et al with few modifications [10]. Five hundred microliters of each concentration of methanol solution of tested sample was mixed with 500 μ L of 30 ppm DPPH methanol solution. Then, the mixture was kept in the dark for 20 minutes and its absorbance was measured at 517 nm using UV-Vis spectrophotometer. Ascorbic acid was used as positive control. The DPPH scavenging activity (%) was calculated using equation 1.

$$\text{DPPH scavenging activity} = \frac{A_0 - A_1}{A_0} \times 100\% \quad (1)$$

where A_0 was the absorbance of control and A_1 was the absorbance of tested sample. The value of IC_{50} was obtained from the line corresponding to the line plotted concentration versus the percentage of scavenging activity.

3. Result and discussion

Data of IC_{50} value of the methanol extract of kecombrang flowers and leaves to scavenge DPPH radical are shown in the table 1.

Table 1. IC_{50} value of methanol extract of kecombrang flowers and leaves, and ascorbic acid

No	Samples	IC_{50} (ppm)
1	Methanol extract of kecombrang flowers	105.90
2	Methanol extract of kecombrang mature leaves	28.97
3	Methanol extract of kecombrang shoot leaves	14.53
4	Ascorbic acid	13.06

The capability of plant extract or compound as donor of hydrogen to DPPH radical can be evaluated by using DPPH radical scavenging assay [10]. As shown in table 1, ascorbic acid showed a good performance to scavenge DPPH radical with an IC_{50} of 13.06 ppm. It was clear that methanol

extract of kecombrang shoot leaves had insignificantly less DPPH radical scavenging activity with an IC_{50} value of 14.53 ppm than ascorbic acid. However, the IC_{50} of methanol extract of kecombrang mature leaves and flowers were significantly lower about twice and eight times than that of ascorbic acid, respectively.

4. Conclusion

The present study suggests that the methanol extract of kecombrang shoot leaves possessed DPPH radical scavenging activity. Thus, the methanol extract of kecombrang shoot leaves can be considered as an agent of potential antioxidants.

Acknowledgment

The authors thank to Chemistry Laboratory of Teacher Training and Education Faculty of Mulawarman University

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