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PHYTOCHEMICAL AND ANTIOXIDANT ACTIVITY of MANGROVE PLANT *Soneratia sp*.

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INTRODUCTION

At the moment, plants use as medicine are mostly land plants, while plants derived from water such as mangroves have not received much attentions. Some of the mangrove plants that can be used as medicine are *Acanthus ilicifolius, Avicennia alba, Avicennia marina, Avicennia offinalis, Bruguiera cylindrical, Bruguiera exaristata, Bruguiera gymnorrhiza, Ceriops tagal, Hisbiscus tiliaceus, Ipomoea pes-capre, Lumnitzera racemosa, Nypa fructicans, Pluchea indica Rhizophora apiculata, Soneratia sp.*, dan *Sonneratia alba*. The plants were utilized as antiasma, antidiuretic, antidiabetic, itch relieve, etc. Purnobasuki, 2004).

One of the mangroves that are often found on the East Coast of Surabaya, East Java is *Soneratia sp* .. which is classed as true mangrove flora. Ethnobotanically, the wood and stem are used as traditional medicine as pain reliever. Based on research conducted by Mahmiah (2012)studying phytochemical aspect of *Avicennia marina* from east coast region of Surabaya,it was known that the stem and leaves of the plant contained phenolic compounds.

Taking into account the existence of the waves and extreme weather conditions in the East Coast region of Surabaya, it was hypothesized that the secondary metabolite compounds produced by the plants would be different. Based on that hypothesis it was necessary to do a research on *Soneratia sp.* plant located on the East Coast of Surabaya with the aim of exploring the content of secondary metabolites from the stem of the plant.

Methods that were used to accomplish that aim were (1) preliminary test; (2) phytochemical screening; (3) GC-MS analysis and (4) antioxidant test

METHODS

Research Materials

Research materials including *Soneratia sp*. plant sample that were gathered from mangrove forest on the East Coast of Surabaya, East Java.

Chemical substances which were used on the research were technical and p.a. (pro analysis) grade organic solvents, such as n-hexane, methylene chloride, chloroform, ethyl acetate, acetone, methanol, distilled, TLC plate, silica gel 60 7731, silica gel 60 7734, cerium sulfate ($Ce(SO_4)_2$) reagent, cotton, filter paper, aluminum foil, UV slide reagent : NaOH, $AlCl_3$ and HCl, KBr, and methanol (CD3OD) for NMR. Substances used for bioactivity test were DMSO and DPPh.

Dry sample of stem, wood, leaves, and seeds of *Soneratia sp.*Plants as much as 10 g was finely ground and then phytochemical screening test was done using reagents specific tosecondary metabolite compounds which included phenolic acids ($FeCl_3$reagent), alkaloids (Dragendroft reagent), terpenoids and steroids (Meyer reagent). From the phytochemical screening resultswas known that the *Soneratia sp.* sample had an active component compounds based on secondary metabolite groups.

Antioxydant Test

Antioxidant in vitro test was done by measuring % Absorbance of DPPh against the extracted samples with UV-Vis spectrophotometer. Measurements were made at different extract concentrations, which were 125, 250, 500, and 1000 ppm. Read absorbances were subsequently converted and IC_{50} were counted to determine the inhibitions as antioxydants. If the extract had IC_{50} value <1000 ppm, the extract wa said to be active as an antioxidant (Cos, 1998).

RESULT

Phytochemical Screening of Mangrove Plant *Soneratia sp.*

Based on themaceration result performed for 3 x 24 hours against the stem of mangrove*Soneratia sp*. using a variety of different polar solvents such as n-hexane, acetone, ethyl acetate, and methanol had different results. The extraction results showed that methanol solvent was the solvent that could extract the secondary metabolites at most compared to other organic solvents.

The next step was phytochemical screening to determine the secondary metabolite groups such as terpenoids, steroids, phenolics and saponins contained in the *Soneratia sp.* sample. Phytochemical test results of the mangrove plant is presented in Table 1.

Based on phytochemical screening on Tabel 1, it was known that the methanol extract contained terpenoid, alkaloid, phenolic, and saponin compounds.

Tabel 1. Phytochemical Screening of Mangrove Plant*Soneratia sp.*

No	Secondary Metabolite Compounds	Phytochemical Screening Test Result
1	Terpenoid	Brown Precipitation
2	Alkaloid	Brown Precipitation
3	Phenolic	Brownish Green Solution and Brownish Red Precipitation
4	Saponin	Foam
5	Steroid	Negatif

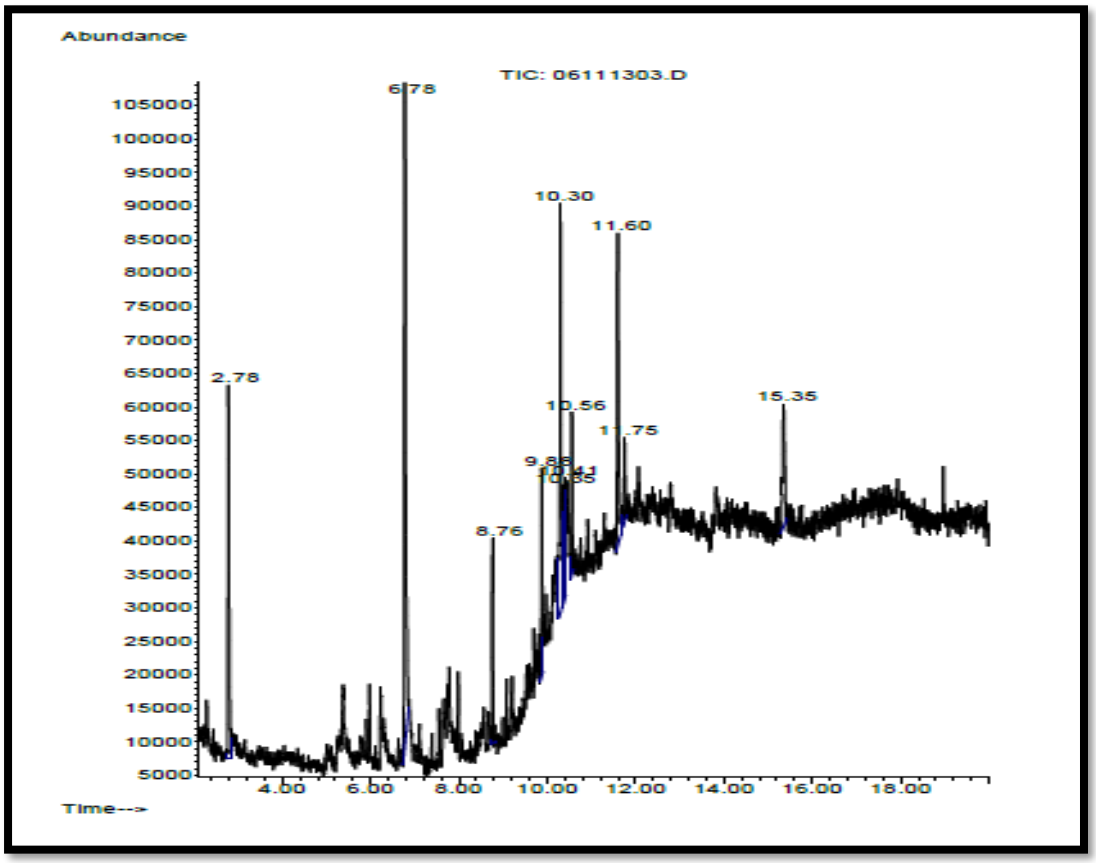

Figure 1. GC Chromatogram of Methanol Extract of *Soneratia sp.* Mangrove Stem

Tabel 2. GC-MS Data Literaturer of *Soneratia sp.* Mangrove Stem Extract

No	Compound	RT	% Area
1	Glycerin	2.78	11.69
2	1,2,3-Benzenetriol	6.78	25.42
3	1,2- Benzenedikarrboxylic acid, dietyl ester	8.76	4.6
4	4-((1E)-3-Hidroxy-1-propenil)2-metoxy fenol	9.88	5.86
5	Propanoic acid, 3-amino-3(4-fluorophenyl)-	10.30	13.91
6	Dodecanoic acid, 1,2,3-propanetryl ester	10.35	4.75
7	4-hidroxy-3-nitro benzoic acid	10.41	5.63
8	3-dibenzofuranamine	10.56	4.84
9	Hexadecanoic acid	11.60	12.89
10	Benzothiazole-2-methyl	11.75	3.09
11	Dodecanoic acid, 1,2,3-propanetryl ester	15.35	7.30

Tabel 3. Analysis Data of In Vitro Antioxydant Test of Methanol Extract of Soneratia sp. Mangrove Stem

Concentration (ppm)	Absorbance at λ (nm)			%Absorbanceof DPPh
	497	517	537	
1000	0.217	0.192	0.173	-2.409638554
500	0.128	0.114	0.105	38.25301205
250	0.098	0.088	0.08	95.78313253
125	0.073	0.067	0.063	62.65060241
Reference Solution	0.14	0.16	0.152	

GC-MS Analysis

Based on GC-MS chromatogram data of *Soneratia sp.* stem extract (Figure 1) known that there were 11 (eleven) of secondary metabolite compounds contained in the extract and was dominated by phenolic and alkaloid group compounds (Table 2). The analysis provided information in accordance with the result of phytochemical screening where *Soneratia sp.* stem containedphenolic, terpenoid, alkaloid and saponin group compounds.

In Vitro Antioxydant Test of Methanol Extract of *Soneratia sp.* Mangrove Stem

The antioxidant activity of the methanol extract of *Soneratia sp.* mangrove stem could be tested in vitro using Diphenil Picril Hydrazine (DPPh) reagent. The antioxidant activity was demonstrated by measuring the Absorbance of solution test with varying concentrations using UV-Vis spectrophotometer in order to determine the inhibition of which concentration that the compound was active as an antioxidant by calculating the IC_{50} values. Analysis result data of in vitro antioxidant test of the *Soneratia sp.* mangrove stem methanol extract of the stem mangrove is shown in Table 3.

The antioxidant activity test result of the methanol extract of *Soneratia sp.* magrove stem in Figure 2 provides information that the highest %Absorbance of DPPh was seen at a concentration of 250 ppm. The curve gave linear regression result of y = -0,094x + 92.99. Based on the result of the linear regression it was known the inhibition (IC_{50}) of *Soneratia sp.* stem methanol extract of 457.34 ppm. The IC_{50}Result wasless than 1000 ppm, which meant that the methanol extract was active as an antioxidant (Cos, 1998).

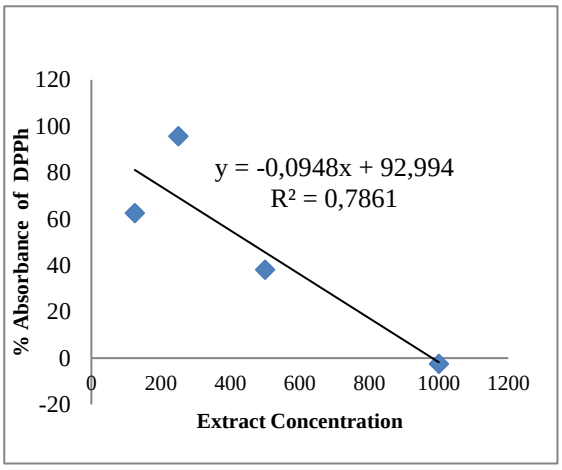

Figure 2. In Vitro Antioxydant Test Curve of Methanol Extract of *Soneratia sp.* Mangrove Stem

CONCLUSION

From the research on mangrove plant*Soneratia sp.* extract from the East Coast of Surabaya (Madura Strait) from solubility test data of *Soneratia sp.* parts it was known that methanol solvent was the best to dissolve *Soneratia sp.* stem extract. These solvents could be used the next isolation process. Phytochemical screening result and GC-MS analysis data to *Soneratia sp*.extract from East Coast of Surabaya waters was known to contain phenolic, terpenoid, alkaloid, and saponin groups. Methanol extract of mangrove Stem actived as an antioxidant by IC_{50} inhibition of 457.34 ppm.

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