

# Nandya

*by* Feby Indriana Yusuf

---

**Submission date:** 15-Dec-2021 10:46PM (UTC-0600)

**Submission ID:** 1707525068

**File name:** Jurnal\_Penelitian.pdf (212.26K)

**Word count:** 2460

**Character count:** 13561

# PHYTOCHEMICALS AND ANTIOXIDANT OF SEAWEED TEA *Padina australis*

Nandya Fitri R<sup>1</sup>., Ika Faiz Nuryanti<sup>2</sup>, Dewi Mutamimah<sup>3</sup>, dan Nadya Adharani<sup>4</sup>

**Abstract**—Seaweed contains bioactive compounds that can be used to support human health. One of the seaweeds that are widely found in Indonesia is sea weed / brown algae. An example of brown algae, one of which is *Padina australis*. *Padina australis* is a seaweed that contains many bioactive compounds, such as alkaloids, flavonoids, saponins, tannins and antioxidants. However, *Padina australis* is not widely applied and used in processed food products. So in seaweed research *Padina australis* is used as seaweed tea. In this study, *Padina australis* seaweed tea was carried out the difference in length of immersion with hot water and the treatment of immersion time is 0 minutes, 5 minutes, 10 minutes and 15 minutes. The bioactive compounds studied are alkaloids, flavonoids, saponins, tannins and antioxidant activity. The results showed that the difference in immersion time there are bioactive components in the form of phytochemicals contained in *Padina australis* tea, among others: alkaloids, flavonoids, tannins and saponins in each treatment (0 minutes, 5 minutes, 10 minutes, and 15 minutes). In the test the highest antioxidant activity on P4 treatment (15 minutes) was 47.7% and for the lowest on treatment P2 (5 minutes) by 44.8%.

**Keywords**—Seaweed, *Padina australis*, Phytochemicals, Antioxidants

## I. INTRODUCTION

Fishery catches in Indonesia are quite high, which is the catch in the form of marine life including seaweed. Seaweed or also called algae, is a natural resource or commodity that has a high economic value, easy to cultivate and low production costs. Peraturan Menteri Kelautan dan Perikanan [8] seaweed cultivation production data in 2020 reached 10.99 million tons and in 2021 reached 11.55 million tons. The results are due to the government distributing seaweed seed aid to the community which was recorded at 200,000 kg in 2020 and 350,000 kg in 2021.

Sarwanto [10] Seaweed grows in many areas of shallow waters with sandy conditions, little mud or a mixture of both that have inherent properties because seaweed has thaluss. Good seaweed quality, will be much in demand by the industry because it contains sources of caraginan, gelatin, and high alginate. It also contains bioactive compounds such as carotenoids, phenol compounds and their derivatives, polysaccharide sulfates and vitamins, as well as antioxidants.

Antioxidant compounds can come from natural compounds and synthetic compounds. However, antioxidant compounds derived from natural compounds have an important role because they do not cause carcinogenic properties when applied to products. One of the bioactive compounds of natural antioxidants is found in seaweed, which is also the result of Indonesia's abundant fisheries and marine [1].

Nandya Fitri R. is with Fisheries Products Technology study program, Faculty of Agriculture, PGRI Banyuwangi University, Banyuwangi, 41482, East Java, Indonesia. Email : [nandyarachmawati@gmail.com](mailto:nandyarachmawati@gmail.com)

Ika Faiz Nuryanti is with Fisheries Products Technology study program, Faculty of Agriculture, PGRI Banyuwangi University, Banyuwangi, 41482, East Java, Indonesia. Email : [ikafaiznuryanti97@gmail.com](mailto:ikafaiznuryanti97@gmail.com)

Dewi Mutamimah is with Fisheries Products Technology study program, Faculty of Agriculture, PGRI Banyuwangi University, Banyuwangi, 41482, East Java, Indonesia. Email : [dewimuti1@gmail.com](mailto:dewimuti1@gmail.com)

Nadya Adharani is with Fisheries Products Technology study program, Faculty of Agriculture, PGRI Banyuwangi University, Banyuwangi, 41482, East Java, Indonesia. Email : [nadya.adharani@gmail.com](mailto:nadya.adharani@gmail.com)

One of the areas in East Java Province producing seaweed is Banyuwangi. In Banyuwangi region, seaweed developed is *Eucheuma cottonii*. This is because *Eucheuma cottonii* is easy to cultivate and affordable capital needs. Other types of seaweed that are often found, *Ulva lactuca*, *Sargassum*, *Padina australis*. *Padina australis* is a brown algae seaweed that is of economic value because it is useful as feed for livestock, as a supplement, fertilizer and as an antimicrobial in the field of health [2].

*Padina australis* is one of the seaweeds that are widely found in the waters of Banyuwangi but has not been widely used or applied in processed products, even though *Padina australis* seaweed kayak will be bioactive compounds, one of which is antioxidants. According to Hidayati et al. [4] *Padina australis* has the potential as a natural antioxidant and contains active compounds in it such as flavonoids, alkaloids, tannins, triterpenoids, saponins, phenolics, and pigments such as chlorophyll a, chlorophyll b, karotenoid, fucosantin, fukoxantol and  $\beta$ -carotene. This study aims to determine phytochemical tests and antioxidant tests of *Padina australis* seaweed tea with differences in length of immersion.

## II. METHODS

In this study uses qualitative and quantitative descriptive research design. Qualitative methods to determine the phytochemical results of seaweed tea *Padina australis* which includes alkaloids, flavonoids, tannins, saponins, triterpenoids and steroids. While quantitative methods to find out antioxidant activity. *Padina australis* seaweed collection in Sumber Kencono village, Wongsorejo Subdistrict, Banyuwangi Regency, East Java. This study made seaweed tea *Padina australis* with a difference in immersion with hot water that is 0 minutes, 5 minutes, 10 minutes and 15 minutes.

### A. Analysis of Alkaloid Compounds

Rumagit et al. [9] a total of 4 mL of sponge ethanol extract is inserted into the test tube then added 2 mL of chloroform and 5 mL of ammonia 10%, then added 10 drops of sulfuric acid 2 M to clarify the separation of the formation of 2 different phases. The upper part of the formed phase is taken, then added Mayer reagent. The presence of alkaloids in the sample is characterized by the formation of red deposits.

### B. Analysis of Flavonoid Compounds

3 ml of extract is put into the test tube then add 1 ml NaOH 2% then add 10 drops of solution (HCl 1:5). If the extract solution is fading, it indicates the presence of flavonoid compounds [5].

### C. Analysis of Saponin Compounds

2 ml of extract is put into the test tube in addition 2 ml of water (1:1) while shaken for 1 minute, if it causes foam in addition HCl 1 N. If the foam formed can last for 10 minutes with a height of 1-3 cm, then it indicates the presence of saponin compounds [5].

### D. Analysis of Tannin Compounds

2 ml of extract is put into a test tube, then added with 3-5 drops of 5% FeCl<sub>3</sub> solution. If the solution produces a blackish green color or ink blue, then the material contains tannins [5].

### E. Antioxidant Activity Analysis

The test solution has been made, each taken as much as

1 mL and reacted with a 1.5 mL solution of 1.1 diphenyl-2-picrylhydrazil (DPH) in ethanol and divortex for 2 minutes. The change in the color of the solution from purple to yellow indicates the efficiency of free radical antidotes. Furthermore, in the last 5 minutes leading up to 30 minutes of incubation, absorbance is measured at a wavelength of 520 nm using a UVVis spectrophotometer [9].

## III. RESULTS AND DISCUSSIONS

Phytochemical test is a qualitative test to find out the active compounds contained in plants. The basic principle is the presence of a color tester reaction with a reaction. Phytochemical tests were conducted on seaweed tea *Padina australis* with a difference in the length of immersion of 0 minutes, 5 minutes, 10 minutes and 15 minutes using 96% ethanol extract that can be seen in Table 1.

Table 1.  
Results of Phytochemical Analysis

Seaweed tea <i>Padina australis</i> Treatment	Identification of Compounds				
	Alkaloid		Flavonoid	Tanin	Saponin
	Mayer	Wanger			
Treatment P1 (0 minute)	+	+	++	++	++
Treatment P2 (5 minute)	+++	+++	++	++	++
Treatment P3 (10 minute)	+++	+++	+++	+++	+++
Treatment P4 (15 minute)	+++	+++	+++	+++	+++

Information :  
+++ : more compounds  
++ : contains enough compounds  
+ : contains compounds  
- : not contain compounds

In the table above, the results of alkaloids in Mayer reagents for P1 treatment (0 minutes) are seen in the treatment containing alkaloid compounds in the presence of brown deposits. In the treatment of P2 (5 minutes), treatment P3 (10 minutes) and treatment P4 (15 minutes) seen the presence of enough chocolate deposits in the extract of seaweed tea *Padina australis*. While the results of alkaloids in Mayer reagents on P1 treatment (0 minutes) are seen in the treatment contains alkaloid compounds in the presence of white deposits. In the treatment of P2 (5 minutes), P3 treatment (10 minutes) and P4 treatment (15 minutes) there is a considerable white precipitate. Rumagit

et al. [9] in general the form of alkaloids is in the form of crystals called alkaloid salts. Nuraini et al. [7] the content of active chemicals in plants include primary metabolite compounds and secondary metabolites such as alkaloids, terpenoids, steroids and flavonoids.

In the analysis of flavonoid compounds, the results obtained flavonoid results in the treatment of P1 (0 minutes) and P2 treatment (5 minutes) seen in the treatment contains flavonoid compounds in the presence of a slightly faded discoloration. In the treatment of P3 (10 minutes) and P4 treatment (15 minutes) there was more alkaloid compounds with discoloration in the tea extract of seaweed tea *Padina*

australis. According to Soamole et al. [11] if in a plant extract contained many flavonoid compounds, flavilium salts will be formed when added Mg and HCl that are red or orange. Nuraini et al. [7] secondary metabolite compounds are widely used as antioxidants, anti-inflammatory, antipiritic and antimicrobial, especially for phenolic compounds, flavonoids and alkaloids.

In the analysis of tannin compounds, it can be seen in the treatment of P1 (0 minutes) and P2 treatment (5 minutes) seen in the treatment contains tannin compounds with enough with the occurrence of discoloration to green. In the treatment of P3 (10 minutes) and P4 treatment (15 minutes) there is more tannin compounds with a change of color to blackish green in the extract of seaweed tea *Padina australis* Soamole et al. [11] tannins can be divided into two groups that give different color reactions to FeCl<sub>3</sub>. There are hydrolysis tannins that will produce a blackish blue color and condensation tannins that will produce a blackish green color. Tannins have complex biological roles ranging from protein tapping to metal lilating. Tannins can also serve as biological antioxidants [6].

In the analysis of saponin compounds, it can be seen in the treatment of P1 (0 minutes) and the treatment of P2 (5 minutes) seen in the treatment containing saponin compounds with the formation of foam. In the treatment of P3 (10 minutes) and P4 treatment (15 minutes) it is seen that it contains saponin compounds with the formation of enough foam in the extract of seaweed tea *Padina australis*. Soamole et al. [11] in principle for saponin testing, the hydrolysis reaction of saponin compounds into aglicon and glycon is characterized by the formation of a stable foam. Saponins are compounds that have hydrophobic and hydrophilic groups. Saponins are glycosides that have aglicon in the form of steroids and triterpenoids. Saponins have various glycosyl groups that are bound to the C<sub>3</sub> position, but some saponins have two sugar chains attached to positions C<sub>3</sub> and C<sub>17</sub> [12].

Antioxidant activity in a sample is related to the content of bioactive compounds that the sample has. Polyphenol compounds are found in brown seaweed. The results of the antioxidant activity of seaweed tea *Padina australis* can be seen in Figure 1.

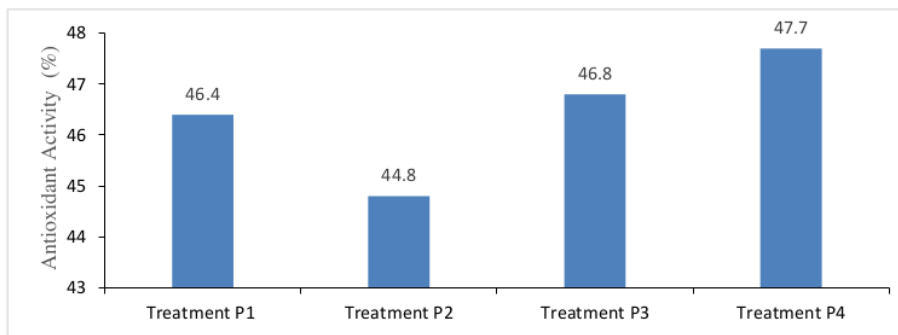


Figure 1. Antioxidant Activity Results of seaweed tea *Padina australis*

The highest antioxidant content was produced by samples soaked at P4 treatment by 46.7%, and the lowest antioxidant content was produced in samples soaked at P2 treatment by 46.2%. The low treatment used in the immersion process causes the levels of antioxidants produced by seaweed tea *Padina australis* to decrease. The function of antioxidants is to prevent and extend the shelf life of food products from damage caused by oxidation. Brown seaweed has been shown to have bioactive compounds that are efficacious as antioxidants. One of the factors that affect antioxidant ability is temperature. The temperature of raw material preparations also affects the power of antioxidants. Rosella extract fresh raw materials higher antioxidant activity than from dry ingredients [3]. Soamole et al. [11] that seaweed is also known to have a function as a functional food source because it has a high antioxidant content and is needed by the body. Antioxidant function can inhibit the growth of free radicals that can cause a source of disease for the human body. In addition, seaweed also serves to increase endurance, anticancer, prevent premature aging and maintain skin smoothness.

#### IV. CONCLUSION

The results showed that the difference in immersion time there are bioaktif components in the form of phytomias contained in *Padina australis* tea, among others: alkaloids, flavonoids, tannins and saponins in each treatment (0 minutes, 5 minutes, 10 minutes, and 15 minutes). In the test the highest antioxidant activity on P4 treatment (15 minutes) was 47.7% and for the lowest on treatment P2 (5 minutes) by 44.8%.

#### ACKNOWLEDGMENT

The authors thank Jember State Polytechnic Food Analysis Laboratory for helping the authors in completing their research.

#### REFERENCES

- [1] Firdiyani, Fiya., Tri Winarni A., Widodo Farid M., "Ekstraksi Senyawa Bioaktif Sebagai Antioksidan Alami *Spirulina platensis* Segar Dengan Pelarut Yang Berbeda," JPHPI Vol 18 (1) : 28-37, 2015.
- [2] Haryani, Tri Saptari, Triasinumiatiningsih, Weni Ardiani, "Efektivitas Ekstrak *Padina australis* Sebagai ANtibakteri *Vibrio cholera* dan *Salmonella tphyi*", *Ekologia* Vol. 15 (2) : 16-20, 2015.

- [3] Hastuti, Ningrum D., "Pembuatan minuman fungsional dari maru dan ekstrak rosella (*Hibiscus sabdariffa* Linn.)," *Jurnal Teknologi Pangan*, 3(1):29-63, 2012.
- [4] Hidayati, Jelita Rahma., Ali Ridlo dan Rini Pramesti., "Aktivitas Antioksidan Ekstrak Rumput Laut *Padina* sp. Dari Perairan Bandengan Jepara Dengan Metode Transfer Elektron," *Buletin Oseanografi Marine*, Vol 6 (1) : 46 – 52, 2017.
- [5] Khoiriyah, S., "Uji Fitokimia Dan Aktivitas Antibakteri Fraksi Etil Asetat, Kloroform Dan Petroleum Eter Ekstrak Metanol Alga Coklat *Sargassum vulgare* Dari Pantai Kapong Pamekasan Madura," *Fakultas Sains Dan Teknologi Universitas Islam Negri (IN) Maulana Malik Ibrahim Malang* : 46-47, 2017.
- [6] Liberty, P Malangini., Meiske S. Sangi., Jessy J. E. Paedong., "Penentuan Kandungan Tanin dan Uji Aktivitas Antioksidan Ekstrak Biji Buah Alpukat (*Persea americana* Mill.)," *Jurnal MIPA SRAT Online* Vol 1 (1) : 5-10, 2012.
- [7] Nuraini, Asriani Ilyas dan lin Novianty., "Identifikasi Dan Karakterisasi Senyawa Bioaktif Antikanker Dari Ekstrak Etanol Kulit Batang Kayu Bititi (*Vitex Cofassus*)," *Al Kimia* : 15- 27, 2012.
- [8] Peraturan Menteri Kelautan dan Perikanan, "Rencana Strategis Kementerian Kelautan dan Perikanan Tahun 2020-2024," Menteri Kelautan dan Perikanan Republik Indonesia, 2020.
- [9] Rumagit, Hanna M., Max R.J. Runtuwenw, Sri Sudewi., "Uji Fitokimia dan Uji Aktivitas Antioksidan dari Ekstrak Etanol Spons *Lamellosysidea herbacea*," *Jurnal Ilmiah Farmasi-UNSRAT* Vol 4 (3) : 183-192, 2015.
- [10] Yanto, Catur., "Peluang Usaha dan Investasi Rumput Laut," *Direktorat Usaha dan Investasi Ditjen Penguatan Daya Saing Produk Kelautan dan Perikanan Kementerian Kelautan dan Perikanan*, 2019.
- [11] Soamole, H. H., Sanger, G & Harikedua, D. S., "Kandungan Fitokimia Ekstrak Etanol Rumput Laut Segar (*Turbinaria* sp., *Gracilaria* sp., Dan *Halimeda macroloba*)," *Jurnal Media Teknologi Hasil Perikanan*, Vol. 6(3), 96-97, 2018.
- [12] Yanuartono, H. Pumamaningsih, A. Nururrozi dan S. Indarjulianto., "Saponin : Dampak terhadap Temak (Ulasan)," *Jurnal Peternakan Sriwijaya* Vol 6 (2) : 79-90, 2017.

# Nandya

---

## ORIGINALITY REPORT

---

19%

SIMILARITY INDEX

14%

INTERNET SOURCES

13%

PUBLICATIONS

9%

STUDENT PAPERS

---

## PRIMARY SOURCES

---

1	<a href="http://innovareacademics.in">innovareacademics.in</a> Internet Source	3%
2	Ernawati, E Suprayitno, Hardoko, U Yanuhar. " Extraction of bioactive compounds fruit from using sonication method ", IOP Conference Series: Earth and Environmental Science, 2019 Publication	2%
3	<a href="http://journal.ipb.ac.id">journal.ipb.ac.id</a> Internet Source	2%
4	Farah Fatimah, Natalia Christin Larasati, Rumpoko Wicaksono, Rifda Naufalin. " Optimization of temperature and time of extraction of kecombrang stem and leaf based on the quality of product bioactive components ", IOP Conference Series: Earth and Environmental Science, 2019 Publication	2%
5	<a href="http://123dok.com">123dok.com</a> Internet Source	1%
6	<a href="http://digilib.uinsby.ac.id">digilib.uinsby.ac.id</a> Internet Source	1%

7	<a href="http://ejournal.undip.ac.id">ejournal.undip.ac.id</a> Internet Source	1 %
8	<a href="http://prosiding-sntih.kemenperin.go.id">prosiding-sntih.kemenperin.go.id</a> Internet Source	1 %
9	<a href="http://impactfactor.org">impactfactor.org</a> Internet Source	1 %
10	Submitted to Indiana University Student Paper	1 %
11	<a href="http://repository.uin-malang.ac.id">repository.uin-malang.ac.id</a> Internet Source	1 %
12	<a href="http://www.melleq.com">www.melleq.com</a> Internet Source	1 %
13	<a href="http://kkp.go.id">kkp.go.id</a> Internet Source	1 %
14	Submitted to Universitas Brawijaya Student Paper	1 %
15	D A Tulandi, J V Tumangkeng. "Analysis of daily dynamics of thermal interaction of temperature and ocean flow in seaweed growth areas", Journal of Physics: Conference Series, 2021 Publication	<1 %
16	Finka Widyastris Pontoh, Grace Sanger, Bertie Elias Kaseger, Djuhria Wonggo et al. "KANDUNGAN FITOKIMIA, KADAR TOTAL	<1 %

FENOL DAN AKTIVITAS ANTIOKSIDAN  
EKSTRAK RUMPUT LAUT *Halymenia durvillae*,  
MEDIA TEKNOLOGI HASIL PERIKANAN, 2019

Publication

---

17

Hilka Yuliani, Maya Indra Rasyid. "Efek  
Perbedaan Pelarut terhadap Uji Toksisitas  
Ekstrak Pineung Nyen Teusalee", Jurnal  
Fitofarmaka Indonesia, 2019

Publication

---

<1 %

18

[www.coursehero.com](http://www.coursehero.com)

Internet Source

---

<1 %

---

Exclude quotes      Off

Exclude matches      Off

Exclude bibliography      Off