

Chlorophyll Contents of *Ipomoea pes-caprae* (L.) R. Br. in Cilacap Coastal Areas in Relation to Habitats

by Puji Widodo

Submission date: 16-Mar-2022 02:53PM (UTC+0700)

Submission ID: 1785489415

File name: 19.Artikel-EP_PW2020_IOP_Conf._Ser.-Ipomoea-2-4.pdf (188.17K)

Word count: 1336

Character count: 7216

Chlorophyll Contents of *Ipomoea pes-caprae* (L.) R. Br. in Cilacap Coastal Areas in Relation to Habitats

E Proklamasiningsih and P Widodo

Faculty of Biology, Universitas Jenderal Soedirman, Jl. Dr. Soeparno 63 Purwokerto 53122, Indonesia

E-mail: elly.proklamasiningsih@unsoed.ac.id

Abstract Bayhops (*Ipomoea pes-caprae* (L.) R. Br.) is a kind of creeping herb growing in the coastal areas which can produce specific metabolites that are beneficial to humans. A study on the chlorophyll contents of this plant is important to find alternative sources of chlorophyll for health food supplements. This study aims to determine the chlorophyll contents of the bayhops in the coastal areas of Cilacap, i.e. Kamulyan, Bunton, and Sodong. The research method was experimental arranged in a completely randomized design of 6 treatments with three replications. The treatments used consisted of sea sand and soils from Kamulyan, Bunton, and Sodong. The parameters measured were the contents of chlorophyll a, chlorophyll b and total chlorophyll. The determination of chlorophyll contents was performed with acetone solvent, which was then measured by using a spectrophotometer. The results showed that growing habitat influences the chlorophyll contents. The bayhops found on further inland of Sodong contained the highest chlorophyll a, chlorophyll b and total chlorophyll.

1. Introduction

Bayhops (*Ipomoea pes-caprae*) is a creeping herb in the coastal areas that can be used as a medicinal plant because it contains high active compounds that can act as antioxidants. It also contains alkaloids, flavonoids, polyphenols, and steroids [1]. Hence, it can be used for treatments on several diseases, such as inflammation and algescic [2], antibacterial [3], anti-inflammatory, antispasmodic, analgesic, antinociceptive activity [4]. Besides producing active compounds, bayhops also contain chlorophyll, which can be an alternative source of chlorophyll for health food supplements.

Some studies showed that chlorophyll can be used as a health supplement containing nutrients required for the human body. The use of chlorophyll has expanded widely in the world of medicine. Some of the beneficial uses of chlorophyll that have been recognized include antibacterial [5].

Chlorophyll is a pigment contained in chloroplasts along with carotene and xanthophyll in plant cells to carry out photosynthesis. In plants, most of the chlorophyll is in two forms, namely chlorophyll a and chlorophyll b. Chlorophyll a is less polar and blueish green, while chlorophyll b is polar and yellowish-green [6].

The aims of this study are to determine the chlorophyll contents of the bayhops in the coastal areas of Cilacap, i.e. Kamulyan, Bunton, and Sodong.

2. Methods

The study was conducted in Cilacap coastal area employing experimental method arranged in a Completely Randomized Design of 6 treatments and three replications. The treatments consisted of 6 growing habitats, namely Kamulyan inland, Kamulyan seashore, Bunton inland, Bunton seashore, Sodong inland, and Sodong seashore (Figure 1). Inland habitat is an area with a distance of more than 200 m from the coastline, while seashore habitat is those less than 200 m from the coastline.



Content from this work may be used under the terms of the [Creative Commons Attribution 3.0 licence](#). Any further distribution of this work must maintain attribution to the author(s) and the title of the work, journal citation and DOI.

Published under licence by IOP Publishing Ltd



Figure 1. *Ipomoea pes-caprae* on a) sea sand of Kamulyan Beach, b) soil habitat of Kamulyan Beach, c) sea sand of Bunton Beach, d) soil habitat of Bunton Beach, e) sea sand of Sodong Beach, f) soil habitat of Sodong inland. Photos: Widodo

The parameters observed were the contents of chlorophyll a, chlorophyll b and total chlorophyll. The determination of chlorophyll contents was performed by spectrophotometric methods using acetone solvents. The procedures consisted of sample extraction, measurement, and calculation. The leaf sample used was the third leaf from the tip, weighed 0.1 g, softened, added with 10 ml of 85% acetone, then filtered with Whatman 4.2 filter paper while poured into a test tube, to obtain clear extracts. Measurements were made using a UV-Vis spectrophotometer at wavelengths of 644 nm and 663 nm. Chlorophyll levels can be expressed in mg of chlorophyll per g of leaf samples. The data were analysed with analysis of variance (Anova) followed by Duncan's New Multiple Range Test (DMRT).

3. Results

The results showed that growing habitat influences the content of chlorophyll a, chlorophyll b and total chlorophyll. Duncan's test results (Table 1) showed that the chlorophyll contents of the bayhops, which grows in Kamulyan and Bunton do not differ between inland and seashore habitats. Chlorophyll b in plants in Bunton inland was relatively the same as those growing in Sodong inland, whereas plants in other locations were lower. The highest total chlorophyll content was found in Sodong inland.

Table 1. The content of chlorophyll a, chlorophyll b and total chlorophyll in *I. pes-caprae* growing along coastal line of Cilacap

Locations	Concentration (mg/g)		
	Chlorophyll a	Chlorophyll b	Total Chlorophyll
Kamulyan inland	0,865 cd	0,547 c	1,146 c
Kamulyan sea shore	0,634 d	0,524 c	0,921 c
Bunton inland	1,135 bc	1,198 a	1,819 b
Bunton sea shore	0,893 cd	0,533 c	1,163 c
Sodong inland	2,028 a	1,097 a	2,565 a
Sodong sea shore	1,478 b	0,868 b	1,914 b

Notes: Numbers followed the same letter in the same column has no significant difference with Duncan's test at 0.05 level

Table 2. Soil pH and salinity of 6 locations

Locations	Soil pH	Salinity (‰)
Kamulyan Inland	6	32
Kamulyan Sea shore	6	32
Bunton Inland	5	31
Bunton Sea shore	6	32
Sodong Inland	6	30
Sodong Sea shore	4,5	37,5

4. Discussion

Chlorophyll is a pigment that plays a role in the process of photosynthesis so that it influences photosynthates which in turn affects growth. Differences in the structure of chlorophyll a ($C_{55}H_{72}O_5N_4Mg$) and chlorophyll b ($C_{55}H_{70}O_6N_4Mg$) cause differences in spectrum absorption, bluish-green for chlorophyll a and yellowish-green for chlorophyll b [5].

Chlorophyll is easily degraded due to heat exposure, high light intensity, and environmental pH conditions. In seashore habitats that have high light intensity, low soil pH, and high salinity, the bayhops contain lower chlorophyll content. If the condition is acidic, chlorophyll will undergo a peofitination reaction, namely the loss of Mg^{2+} ions. Mg^{2+} ion, which is the nucleus of a molecule, will be separated and replaced by hydrogen ions.

5. Conclusion

The habitat texture affects the chlorophyll contents. Bayhops which grow in Sodong inland areas contains the highest chlorophyll a, chlorophyll b and total chlorophyll. Meanwhile, bayhops produces low chlorophyll in coastal sandy habitat. Bayhopes produce high chlorophyll contents in soil habitats with low light intensity.

References

- [1] Fermanasari D, Zahara T A and Wibowo M A 2016 Uji Total Fenol, Aktivitas Antioksidan dan Sitotoksitas Daun Akar Bambak (*Ipomoea* sp.) *Jurnal Kimia Khatulistiwa* **5** 68-73
- [2] de Souza M M, A Madeira, Berti C, Krogh R, Yunes R A and Cechinel-Filho V 2000 Antinociceptive Properties of the Methanolic Extract Obtained from *Ipomoea pes-caprae* (L.) R. Br. *Journal of Ethnopharmacology* **69** 85-90
- [3] Nagababu P and Umamaheswara Rao V 2015 Pharmacological Potential of *Ipomea pes-caprae* (L.) R. Br. *Whole plant extracts Pelagia Research Der Pharmacia Sin* **6** 52-60
- [4] Bandaranayake W N 2002 Bioactivities, Bioactive Compounds and Chemical Constituents of Mangrove Plants *Wetlands ecology and management* **10** 421-52
- [5] Satyavani K, Gurudeeban S, Ramanathan T and Balasubramanian T 2013 *Ipomoea pes-caprae* Mediated Silver Nanoparticles and Their Antibacterial Effect *Science International* **1** 155-9
- [6] Taiz L and Zeiger E 2002 *Plant Physiology 3rd ed* (Sunderland: Sinauer Associates Inc)

Chlorophyll Contents of Ipomoea pes-caprae (L.) R. Br. in Cilacap Coastal Areas in Relation to Habitats

ORIGINALITY REPORT

5%

SIMILARITY INDEX

%

INTERNET SOURCES

5%

PUBLICATIONS

%

STUDENT PAPERS

PRIMARY SOURCES

1

S Sukmaningrum, S Suryaningsih, A Nurhaeni.
"Sexual Dimorphism Characterization of
Splendid threadfin (Philimanus perplexa
Feltes, 1991)", IOP Conference Series: Earth
and Environmental Science, 2020

Publication

5%

Exclude quotes On

Exclude bibliography On

Exclude matches < 50 words