

**LEMBAR**  
**HASIL PENILAIAN SEJAWAT SEBIDANG ATAU PEER REVIEW**  
**KARYA ILMIAH : JURNAL ILMIAH**

Judul Jurnal Ilmiah (Artikel) : Formation of Eco-friendly Silver Nanoparticle Microalgae using *Chlorella vulgaris*  
 Penulis Jurnal Ilmiah/ Jumlah penulis : Hermin Pancasakti Kusumaningrum , Muhammad Zainuri , Widianingsih  
 Widianingsih, Wahyu Dewi Utari Haryanti, Indras Marhaendrajaya, Robertus  
 Triaji Mahendrajaya/6 orang  
 Status Pengusul : Penulis Pertama  
 Identitas Jurnal Ilmiah :  
 a. Nama Jurnal : Ilmu Kelautan/Indonesian Journal of Marine Sciences  
 b. Nomor ISSN : 08537291, 24067598  
 c. Volume, no, : 24 (1): 7-14, 2019  
 bulan, tahun  
 d. Penerbit : FPIK Universitas Diponegoro  
 e. DOI artikel (jika : 10.3923/ijps.2018.392.404  
 ada)  
 f. Alamat web : <https://ejournal.undip.ac.id/index.php/ijms>  
 jurnal  
 g. Terindeks di SCOPUS, Q3, SJR 2022 0.21, H Indeks 3  
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<b>Nilai pengusul = 60% x 39,15 = 23,49</b>				<b>23,49</b>

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Semarang, 27 April 2023

Reviewer I

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NIP. 196105051986032003

Unit kerja : Departemen Biologi Fakultas Sains dan Matematika Universitas Diponegoro Semarang

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Semarang, 28 April 2023

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## Redefining Dispersal Boundaries of *Siganus fuscescens* In The Coral Triangle Area

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### Abstract

The increasing demand of fish in the Coral Triangle Area has led to overexploitation of some species of fishes. One of the commercial fishes, which is also known to be the source of food and income for local communities, is the Mottled Spinefoot (*Siganus fuscescens*). Population studies on this species are important in order to manage sustainable stock populations. Genetic variation of the mitochondrial DNA was analyzed to examine the population structure of *Siganus fuscescens* in Indonesia, as part of the Coral Triangle Area. In total, 789 basepairs of control region mtDNA sequences were determined from 133 specimens collected from six localities, including Seribu Islands (n=27), Karimunjawa (n=19), Komodo (n=39), Selayar (n=20), Lembah (n=19) and Luwuk (n=9). From the data, 27 variable sites and 24 haplotypes were detected, with most of the haplotypes unique to each location. Haplotype data show that one haplotype was shared among all populations, three haplotypes were shared between two populations (Komodo & Selayar; Lembah & Seribu; Komodo & Karimunjawa), and 20 were unique to a single population. Haplotype diversity ( $h=0.444$ ) and nucleotide diversity ( $\pi=0.00165$ ) were low. The diversity result, i.e. the  $\Phi_{ST}$  value (0.0658,  $P < 0.0001$ ) revealed genetic structure in *S. fuscescens* populations in Indonesia. A non-dispersal strategy led to restricted gene flow and genetic structuring in *S. fuscescens*. However, both the neutrality test and the mismatch distribution indicated that *S. fuscescens* might have been in populations at demographic equilibrium, with restriction to the population expansion. Although indicating unexpected minor population structure pattern, the overall result still suggest the management of this species population as a single unit across Indonesia.

**Keywords:** Indonesia, genetic, *Siganus* sp.

### Introduction

Indonesia is located at the center of a Coral Triangle, an area with the highest marine biodiversity. Recognized as a biodiversity hotspot, it is home to a remarkable diversity of marine species (Carpenter et al., 2011; Hoeksema, 2007; Veron et al., 2009). Widely known as an archipelagic country, Indonesia has extensive coastal areas that hold high economical value supporting its community. Another wealths of Indonesia's resources is its abundance and diversity of marine species (Hughes et al., 2003; Hoeksema, 2004).

Indonesia is also distinguished by the threats that plague its marine biodiversity (Carpenter et al.,

2011). Nowadays, the escalating human population is increasing the demand for fish, which is causing overfishing of some species of marine fishes (Sala & Knowlton, 2006). Directorate General of Capture Fisheries recorded that the volume of fisheries production in Indonesia reached five million tonnes in 2010, while the lowest trend reached three million tonnes in 2000 (KKP, 2011). In order to maintain the supply of fish stock so it can comply with the market demand, marine aquaculture was established in several areas throughout Indonesia. Indonesia is also on the list of the top ten countries with the highest marine aquaculture production in 2010 with 2,304,828 tonnes of fish (FAO, 2012). *Siganus* is one of the economically important species because of its value as food commodity and

## Nutrient Composition of Dried Seaweed *Gracilaria gracilis*

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### Abstract

The nutrient composition of dried red seaweed *Gracilaria gracilis* collected from Barru waters, South Sulawesi including proximate, dietary fiber, minerals, fatty acid and amino acid profile has been investigated. The objective of this study was to evaluate the various nutritional parameters of *G. gracilis* for utilization in human nutrition. Results show that the content of moisture (19.045), protein (10.86%), ash (6.78%), fat (0.18%), carbohydrate (63.13%) and dietary fiber (27.48%) basis on the dry weight. The content of calcium (429.11 mg.100 g<sup>-1</sup>), sodium (290.89 mg.100 g<sup>-1</sup>), phosphor (57.01 mg.100 g<sup>-1</sup>), iron (15.20 mg.100 g<sup>-1</sup>) and potassium (1380.42 mg.100 g<sup>-1</sup>). Leucine was the major essential amino acid found to be 9374.22 mg.kg<sup>-1</sup>, while glutamic acid was the major non-essential amino acid found to be 10848.98 mg.kg<sup>-1</sup>. Palmitic acid was the major saturated fatty acid found to be 0.08%, while oleic acid was the major unsaturated fatty acid found to be 0.05%. The nutrient composition of *G. gracilis* was discussed in this study and suggested that the seaweed species have potentially be used as raw material or ingredient of a healthy food for human.

**Keywords:** Barru waters, nutrition, healthy food, red seaweed

### Introduction

Seaweeds have been utilized globally for different purposes (Nazni and Deepa, 2015). Currently, seaweeds are consumed as part of modern diet in the western countries. Changing of food patterns increase in Asia-style food and people become more comfortable consuming edible seaweeds, particularly *Porphyra* and *Undaria* spp. that are commonly found in Korea and Japanese dishes (Smith et al., 2010). Especially in China, *Gracilaria* originally were utilized as food and as binding material in the preparation of lime for painting walls. The use of seaweed as food spreads to several Asian countries, until the content of agar was discovered by the western countries and the Japanese (Santelices, 2014).

Seaweeds (fresh or dried form) are extensively consumed, especially by people living in the coastal region. Seaweeds are generally suitable for making cool, concoctions or gelatinous dishes. The nutrient composition of seaweeds varies and are affected by geographical area, species, temperature, of water and season of the year (Jensen, 1993).

However, there are no published data on the nutrient composition of the dried red seaweed *G. gracilis* from Barru waters, South Sulawesi. This paper presents data on the various nutrient

composition of *G. gracilis*, including proximate, dietary fiber, minerals, fatty acid and amino acid profile. The potential of *G. gracilis* as a source of healthy food nutrients is discussed.

### Materials and Methods

The red seaweed *G. gracilis* was collected from Barru waters, South Sulawesi during low tide. The seaweed was picked by hand and cleaned immediately using sea water to remove debris, sand, epiphytes and other unnecessary matter and transported to the laboratory. The sample was sorted and thoroughly cleaned by rinsing distilled water. The sample was dried under the sun for 6 days and then ground in a blender. The powdered samples were kept in the dark container and stored in the room temperature for future analysis.

#### Proximate analysis

The moisture content was determined by drying 2 g *G. gracilis* in an oven at 105°C for 3 hours. The dried sample was put into a desiccator and weighed (AOAC, 1990). The ash content was determined by heating 2 *G. gracilis* in a muffle furnace at 550°C for 4 hours. The sample was put into a desiccator and weighed immediately (AOAC, 1990).