GUIDELINES FOR WRITING JURNAL ILMU DAN TEKNOLOGI KELAUTAN TROPIS

I. General Provisions

The article is the result of scientific research in the field of tropical marine science and technology and has never been published or in the process of submission in other scientific publications. The proposed article can come from the fields of tropical marine science and technology as follows: marine biology, marine ecology, oceanographic biology, oceanographic chemistry, oceanographic physics, oceanographic geology, oceanographic dynamics, coral reef ecology, marine acoustics, marine remote sensing, marine geographic information systems, marine microbiology, marine pollution, marine aquaculture, marine fisheries technology, marine biotechnology, air-sea interaction, and ocean engineering.

Articles written in Indonesian or English typed with MS-Word, Times New Roman font size 12 on quarto or A4 paper including Pictures and Tables with top and bottom margins 3 cm and left and right 2.5 cm. For articles in Indonesian, the writing is completed with titles in Indonesian and English, abstract (English) followed by keywords and abstracts (Indonesian) followed by keywords. While the article is in English, writing the title in English, abstract (English) followed by keywords, and abstract (Indonesian) followed by keywords.

The author of the article written in Indonesian follows the General Guidelines for Indonesian Language Spelling, refined based on Minister of National Education Regulation No. 46 of 2009. Writing fractions in Indonesian-language papers use commas, while in English-language papers using dots.

All communication with publishers is done electronically (email: jurnalitk@apps.ipb.ac.id). The article manuscript is by the format and guidelines for JITKT writing, and please send it to the web: http://journal.ipb.ac.id/index.php/jurnalikt. All incoming texts will receive an acceptance reply. The results of reviews from reviewers (sustainable partners) will also be sent via web and email.

II. Systematics of Article Composition

2.1. Systematics article structure generally results as follows:

- Title (as short as possible) and accompanied by an English translation typed italic.
- Author's name, name, and the city of agency location, and corresponding author e-mail.
- Abstract in English (contains a little background, objectives, methods, research results and conclusion and no more than 225 words. All written in English with italics)
- Maximum words eight words (English). The word "Keywords:" is written in bold
- Abstract in the Indonesian language (contains a little background, objectives, methods, research results, and conclusion and no more than 225 words).
- Maximum keyword eight words (Indonesian). "Keywords:" written in bold
- Introduction (without subtitles, containing background, problems, problem formulation, a summary of theoretical studies, scientific reviews related to titles based on current references (literature), and research objectives)). In this introduction also presented a scientific question (a scientific question) or hypothesis that will be answered in the study.

- Research methods (clearly written time, location, material (data), and analysis of research data to allow other researchers to repeat related experiments). This section can be made in several sub-chapters.
- Results and discussion (the results are presented first and then followed by an explanation or discussion. The discussion must use references or be compared (reviewed) with the latest references (literature). Results and discussions can be put together or separated in separate sub-chapters.
- Conclusions (written in the form of essays (paragraphs) in a concise and clear manner and must be able to answer (explain) the title and also the purpose of the study). Suggestions are included in the discussion if deemed necessary.
- Acknowledgments (written clearly and concisely to whom the gratitude is given. Research that is funded by DIPA, grants, or the like to include the contract number).
- Bibliography (see the next provisions)
- Attachment (if available, but not recommended)
- Some pages of paper between 5-15 pages (starting from the title to the bibliography).
- The author is required to use 80% of the total references used in scientific journals.

III. Writing Technique

3.1. Title

The title is written in capital letters, in bold, in the center (center), Times New Roman font 12, black. Under the title of the manuscript in the Indonesian language, the title translation in English is italic.

Example:

INTERAKSI PADA HUMIN UNTUK ADSORPSI Mg (II) DAN Cd (II) DALAM MEDIUM AIR LAUT

INTERACTION ON HUMIN FOR Mg (II) AND Cd (II) IN THE SEA WATER MEDIUM

3.2. Writer's Name

The author's name is written without a title with a capital letter at the beginning of the name, in bold, in the middle, Times New Roman font 12, black. Equipped with name and city of agency location and E-mail for the corresponding author with Times New Roman 12 font, black with one space.

Example 1:

Evi Maya Sari
Program Studi Teknologi Hasil Perikanan, FPIK-UNDIP, Semarang
E-mail: evimayasarii@yahoo.com

If the article is written by more than one person and the address of the institution is different, then each author's name is followed by a number written superscript. Email addresses that are listed only for the corresponding author.

Example 2:

Tuti Wahyuni[1*] dan Dendy Mahabror[2]
[1]Pusat Riset Teknologi Kelautan, Balitbang KP-KKP, Jakarta
[2]Balai Riset Observasi dan Kelautan, Balitbang KP-KKP, Jakarta
[*]E-mail: tuti@dkp.go.id

Example 3:

Tuti Wahyuni[1*], Dendy Mahabror[2], dan Rani Ulawi[3]
[1]Pusat Riset Teknologi Kelautan, Balitbang KP-KKP, Jakarta
[2]Balai Riset Observasi dan Kelautan, Balitbang KP-KKP, Jakarta
[3]Departemen Ilmu dan Teknologi Kelautan, FPIK-IPB, Bogor
[*]E-mail: tuti@dkp.go.id

3.3. Abstract in English and Keywords

The words "Abstract" are written in capital letters, the center (center) is bold-italic (italic), font Times New Roman 11, black, space 1. The contents are not bolded. Left and right flat writing, without paragraph (the overall abstract is a paragraph).
Writing "Keywords" is written in capital letters at the beginning of the word, in bold, font Times New Roman 11, black, given a colon, then bold. The writing is left flat.

Example:

ABSTRACT

A study of interaction on humin for Mg(II) and Cd(II) in the seawater medium was investigated..... and so on.

Keywords: *absorption, humin, cadmium, magnesium*

3.4. Abstract in Indonesian and Keywords

The text "Abstract" is written in capital letters, the middle (center) is bold, font Times New Roman 11, black, space 1. The contents are not bold. Left and right flat writing, without paragraph (the whole abstract is a paragraph).
The words "Keywords" are written in capital letters at the beginning of the word, in bold, font Times New Roman 11, black, given two dots, then bold. The writing is left flat.

Example:

ABSTRAK

Penelitian tentang studi interaksi pada humin untuk absorpsi Mg(II) dan Cd(II) dalam medium air laut .... dan seterusnya.

Kata kunci: absorpsi, humin, magnesium

3.5. Chapters and Sub-Chapters

The chapter is written in Roman numerals, in capital letters, in bold, left edge, font Times New Roman 12, black while sub-chapter is written in regular numerical order, capital letters at the beginning of words, bold, left edge flat, Times New Roman font 12, black. If in the sub-section there are still more sub-sections, then the writing is given a parallel number

with the previous sub-chapter followed by a point, a title with a capital letter at the beginning of the word, bold, left-sided flat, Times New Roman font 12, black.
The following example:

I. INTRODUCTION

II. RESEARCH METHODS

2.1. Time and Place of Research
2.2. Material and Data
2.3. Data analysis

III. RESULTS AND DISCUSSION

3.1. Surface Temperature
3.1.1. Chlorophyll-a concentration
(Note: sub chapter results and discussion can be put together)

IV. CONCLUSION

ACKNOWLEDGMENT

REFERENCES

3.6. Footnotes

Footnotes are given a numeric symbol after the phrase/term (1) will be explained. Footnote which is a description of words/phrases written in Times New Roman 8 font, black.

3.7. Table

The table title is placed above the table. The table title is written in capital letters at the beginning of the word, placed on the left (left), font Times New Roman 12. The table is numbered, followed by the point, then the table title (for example Table 1. Title ..., Table 2. Title ...). The distance between placing the table from the sentence above is two spaces, and the distance of the table to the new sentence below is two spaces. The distance from the table title to the table itself is one space. If there is a footnote for the table, the distance from the table is one space. If more than one line uses space 1.
Example:

Table 1. Humin and humic acid content from the isolation of peat soil.

Group	Group	
	Humin[1]	Humin[2]
Total acidity	677	543
-COOH	115	199
-OH Phenolic	562	344

[1]Isolated peat soil from Siantan Hulu, West Kalimantan
[2]Isolated peat soil from Siantan Hulu, West Kalimantan (Saleh, 2004)

3.8. Picture

Images can be diagrams, graphs, maps, photos (which convey data) and others. The title of the image is placed below the picture, written in capital letters at the beginning of the word, placed flat left (left), font Times New Roman 12. The distance from the title of the image to the image itself is one space. If there is a footnote for the image, the distance from the table is one space. The picture is numbered followed by the point, then the title of the image (e.g., Figure 1. Title ..., Figure 2. Title ...). If the title is more than two lines use space 1.

Examples of writing as follows:

[Show pictures here without the box line]

Figure 1. The dock remains in the research area.

3.9. Decimal Number Writing

The Journal of Tropical Marine Science and Technology adopts the technical and scientific writing system including the writing of decimal numbers following the enhanced spelling by the Minister of National Education, Republic of Indonesia Regulation Number 46 of 2009 concerning General Guidelines for Enhanced Indonesian Spelling.

Abstract and text in Indonesian are writing the decimal number followed by a comma, for example, sea surface temperatures of 31.26°C (thirty-one point twenty-six degrees Celsius). Meanwhile, abstract or text in English, decimal number writing is written with a dot, for example, the sea surface temperature of 31.26°C.

3.10. Reference and References

Reference writing techniques in text and bibliography, using styles commonly used in scientific writing guidelines, especially in the International Journal. Bibliography only lists the sources referenced in the text only. Conversely, references referred to in the text must be included in the bibliography. The bibliography is sorted alphabetically, using Times New Roman font 12, black. If the references are more than one, they are sorted by the most recent published year. The way to write library sources (references) is as follows.

Write Referrals in Text

- Writing references, writing the surname of the author followed by a comma or point and year of publication of articles/papers / reports / proceedings / etc. For authors, more than two people are written using "*et al.*" (Italics).
- Writing "and" or "and" before the last name is written according to the title of the article, "dan" for Indonesia and "and" for the UK.

Example:
Anastasi (1997) states ... or ..... (Anastasi, 1997).
Kiswara dan Winardi (1994) concluded ... or ... (Kiswara dan Winardi, 1994).
Berk and Romly (1984) research ... or ..... (Berk and Romly, 1984).
Ali *et al.* (2008) explain .... or ..... (Ali *et al*., 2008).

Writing Bibliography

- Write a family name followed by a comma, a space spacing, an abbreviation of the first or second name (if any) followed by a dot, a space spacing, year of publication followed by a

point, a space spacing, Title of article / paper, journal name (written in italics) followed point, volume (edition), colon, page number of the paper / article in the journal followed by a point.

- If more than one line, then the next row enters with nine beats (1.25 cm hanging left).

Example of a Scientific Journal:

Wastu, A.D. and T. Masumoto. 2017. Growth and protein content of *Ulva prolifera* maintained at different flow rates in integrated aquaculture system. *J. Ilmu dan Teknologi Kelautan Tropis,* 9(2):429-441. http://dx.doi.org/10.29244/jitkt.v9i2.19257.

Erik, M., I. Jaya, dan A.S. Atmadipoera. 2018. Rancang bangun dan uji kinerja *wave buoy* sebagai alat pengukur tinggi gelombang pesisir. *J. Ilmu dan Teknologi Kelautan Tropis,* 10(1):1-14. http://dx.doi.org/10.29244/jitkt.v10i1.21664.

Sample Textbook:

Anastasi, A. 1997. Psychological testing. 4th ed. MacMillan Press. New York. 234 p.

Berk, R.A., B.A. Romly, and N.N. Siogu. 1984. A guide criterion referenced test construction. The John Hopkins University Press. Baltimore. 389 p.

Examples of Articles in a Book / Proceedings (if the editor is more than five people, then written et al. (Eds.):

Berk, R.A. 1988. Selecting index or reliability. *In*: Berk, R.A. (*ed.*). A guide to posting construction. The John Hopkins University Press. Baltimore. 200-217 pp.

Ramdi, N.S., B.K. Roland, dan D. Torres. 2010. Variabilitas konsentrasi klorofil-a di Laut Jawa. *Dalam:* Nababan *et al*. (*eds.*). Prosiding pertemuan ilmiah tahunan VI ISOI 2009, International Convention Center, Botani Square, Bogor, 16-17 November 2009. Hlm.: 223-247.

Berk, R.A. 1984a. Selecting index or reliability. *In:* Berk, R.A. (*ed.*). A guide to posting construction. The John Hopkins University Press. Baltimore, 234-345 pp.

Berk, R.A. 1984b. Conducting the item analysis. *In:* Berk, R.A. (*ed.*). A guide to posting construction. The John Hopkins University Press. Baltimore. 123-134 pp.

Examples of translations:

Gagne, R.M., L.J. Briggs, and W.W. Wage. 1988. Prinsip-prinsip desain instruksional, (3rd Ed.). Soeparman, K. (penterjemah). Holt, Rineahart, and Winston Press. Chicago. 236 p.

GROWTH AND PROTEIN CONTENT OF *Ulva prolifera* MAINTAINED AT DIFFERENT FLOW RATES IN INTEGRATED AQUACULTURE SYSTEM

PERTUMBUHAN DAN KANDUNGAN PROTEIN Ulva prolifera YANG DIPELIHARA DENGAN LAJU ALIRAN BERBEDA PADA SISTEM BUDIDAYA TERPADU

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ABSTRACT

Efforts to reduce the impact of waste improvement on degradation of water quality can be transferred by utilization of inorganic waste as a source of seaweed nutrition. This study aimed to determine the growth and protein content of *Ulva prolifera* maintained at different flow rates in integrated aquaculture system. 9 Yellowtail stocked with 5.095 g with an average weight of 566.11±81.51 g were kept in 540 L tank for 24 days, by water flowing at the rate of 10 L min^{-1}. Water from the fish tank was distributed into the sediment tank and go to 6 *Ulva* tanks with the flow rate of 0.5, 1.0 and 1.5 L min^{-1}. Test parameters measured were growth performance of Yellowtail, biomass of *Ulva prolifera*, protein content of *Ulva prolifera*, and total ammonia nitrogen. The measurement results showed that the biomass of fish increased to 5.408 g, then biomass of *Ulva* increased to 42 g, 156 g and 155 g for flow rate of 0.5 L, 1 L and 1.5 L min^{-1}, respectively. The protein content of *Ulva* for all the treatments was the same (P> 0.05). A total of ammonia in the tank outlet of *Ulva* (0.0202 - 0.1137 mg N L-1) were smaller than those were in the inlet (0.0286 - 0.1394 mg N L-1).

Keywords: growth, integrated aquaculture system, protein, *Ulva prolifera*

ABSTRAK

Upaya mereduksi dampak peningkatan limbah terhadap penurunan kualitas air dapat dialihkan dengan cara memanfaatkan limbah anoganik sebagai sumber nutrisi rumput laut. Penelitian ini bertujuan untuk menentukan tingkat pertumbuhan dan kandungan protein Ulva prolifera yang dipelihara dengan debit air yang berbeda pada sistem budidaya terpadu. Ikan Yellowtail sebanyak 9 ekor dengan biomassa 5,095 g dan berat rata-rata 566,11±81,51 g dipelihara dalam tangki kapasitas 540 L selama 24 hari, dan diberi air mengalir dengan debit 10 L min^{-1}. Air dari tangki budidaya ikan didistribusikan ke dalam tangki sedimentasi kemudian dialirkan ke dalam 6 tangki pemeliharaan Ulva pada debit 0,5, 1,0 dan 1,5 L min^{-1}, masing-masing 2 ulangan. Parameter uji yang diukur adalah kinerja pertumbuhan ikan Yellowtail, biomass Ulva prolifera, kandungan protein Ulva prolifera, dan total ammonia nitrogen. Hasil pengukuran menunjukakan bahwa biomass ikan meningkat menjadi 5,408 g, sedangkan biomassa Ulva meningkat menjadi 42 g, 156 g dan 155 g untuk masing-masing laju aliran 0,5 L, 1,0 L dan 1,5 L min^{-1}. Kadar protein dari Ulva di semua perlakuan sama (P>0,05). Total ammonia pada tangki outlet (0,0202 – 0,1137 mg N L^{-1}) Ulva lebih kecil dari inletnya (0,0286 – 0,1394 mg N L^{-1}).

Kata kunci: pertumbuhan, sistem budidaya terpadu, protein, *Ulva prolifera*

I. INTRODUCTION

A rapid development of aquaculture industry in coastal areas throughout the world has been accompanied by an increase in environmental impacts (Diana *et al*., 2013). Moreover, In

Japan, yellowtail *Seriola quinqueradiata* was the most economically important fish. The production per year was around 150,028 ton in 2004 (Nakada, 2008).

As part of an effort to develop integrated aquaculture technology, Al Hafedh *et al.* (2014) had evaluated tank-based in-tegrated system using green alga, *Ulva lactuca*. However, as the ability of seaweeds for growing depends on several culture conditions, such as the water flow and nutrient concentration (Buschmann *et al*., 2001). The nutrient uptake efficiency is defined as the average reduction (%) in the nutrient concentration. Meanwhile, the nu-trient uptake rate is the amount of nutrient removed per unit of time. Stocking densities and water turnover rate greatly affect the two concepts for a certain period. (Buschmann *et al*., 2001).

In tank culture, water flow is an important aspect to managing nutrient availability. By increasing the water flow, nutrient flux increases that determine that seaweeds will not be nutrient limited, per-mitting a higher biomass production, and in this condition, the nutrient uptake efficiency will be lower. Moreover, if the flow rate is low, nutrients will become limiting, biomass production will decrease, but the nutrient uptake efficiency will be higher. Conse-quently, it is essential to establish the main target of the culture to intend to optimize its functioning (Buschman *et al*., 2001). There-fore, It is important to utilize the physio-logical potential of the seaweed to design an efficient integrated aquaculture system (Troell *et al*., 2003). Al-Hafedh *et al*. (2014) found that effluent flow rate has a significant impact on the performance of seaweed than stocking density. This experiment had been applied on Yellowtail *Seriolla quinqueradiata* and Seaweed *Ulva prolifera*. This study aimed to determine the growth and protein content of *Ulva prolifera* maintained at different flow rates in integrated aquaculture system.

II. METHODS

2.1. Integrated Aquaculture System

Integrated aquaculture system was installed at Usa Marine Biological Center, Kochi University as a layout described in Figure 1. The system consisted of one rectangular fish culture tank (1.5 m length, 0.9 m width, 0.6 height and 0.4 depth, total volume approximately 540 L), one rec-tangular sediment tank (0.8 m length, 0.6 width, 0.4 m depth, total volume appro-ximately 192 L) and six round seaweed culture tanks (each with total volume 30 L). The fish tank was covered by a net and plastic roof to avoid direct sunlight. Fish tank and seaweed tank were aerated using air stones connected to a 13 mm pipe with an air blower (Hi blow air pump 17.7 kpa, 120 L/min, the Phillippines).

2.2. Experimental Set-up

The experimental fish culture tank was watered with non-filtered seawater from USA bay about 10 L min^{-1} and stocked with 5,095 g of the 9 fish with an average weight of 566.11 ± 81.51 g (Fig. 1A). Water was flowed continously from the sea to the fish tank (Figure 1A) and subsequently to sedimen-tation tank (Figure 1B) and finally to seaweed tanks (Figure 1C) in a water flow-through model.

In this study, *Ulva prolifera* with the length of 1 cm was obtained from seaweed laboratory, Kochi University. The initial protein content of this seaweed was 5.63 % (in dry weight). The seaweed was cultivated in 3 different tanks (with a different flow rate of 0.5 L min^{-1}, 1 L min^{-1} and 1.5 L min^{-1}, low, medium and high flow rate) in two replicates to seaweed.

The seaweed was stocked at a stocking density of approximately 0.83±0.02 g in each 30 L seaweed tank. Seaweed was set up with strong aeration thus allowing the seaweed floated in the water column (Hiraoka and Oka, 2008).

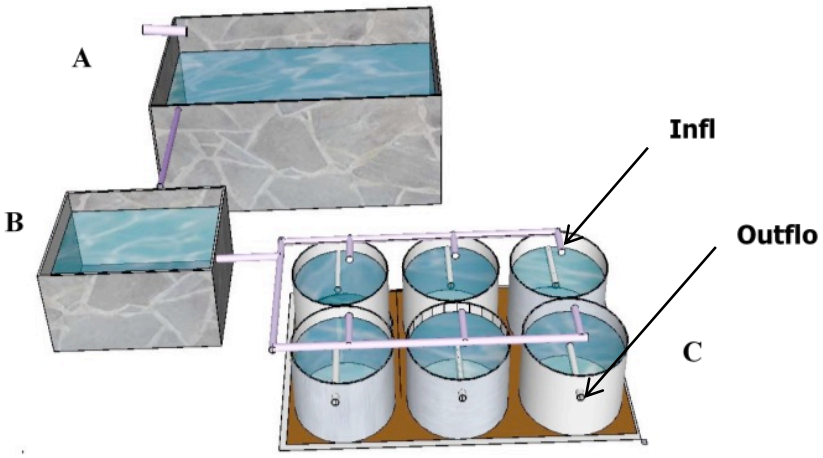

Figure 1. The integrated tank-based aquaculture system for the marine fish and seaweed culture experiments. A. fish tank, B. sediment tank, C. seaweed tanks.

The fish were fed once daily at 10.00 am (6 days a week) with a commercial diet (Nisshin marubeni feed co, Japan) containing 42% protein until satiation, and total feed given per day was recorded. A long pipe was used to siphon solids from the bottom of sedimentation tank. The airflow was adjusted to be strong enough to enable the rotation of seaweed. The seaweed tank was cleaned every 3 days, at the same time seaweed biomass was weighed. The experiment was conducted in 24 days for growth performance of seaweed.

2.3. Protein Content of *Ulva prolifera*

At the end of the experiment, sample collection was conducted to determine the quality of the seaweed. The seaweed tissues from each tank in the integrated aquaculture system were stored in freezer at -30^{o}C. Furthermore, at the analysis time they were dried at 60^{o}C for 24 hours and then stored in a dry place until protein determination at Fish Nutrition laboratory, Kochi University. All samples were analyzed according to the method described by Takeuchi (1988) and determined by using Kjeldahl.

2.6. Statistical Analysis

Data analyses were performed using variance (ANOVA) with F test at 95% confidence interval using the program Ms. Exel and SPSS 20.0. The further test of the difference among the treatments could be performed using Tukey test (Steel and Torrie, 1993).

The parameters analyzed were included the weight and growth rate of seaweed and yellow tail, the survival rate of yellow tail and ammonia content. Water quality data were analyzed descriptively.

III. RESULTS AND DISCUSSION

3.1. Results

The fish were fed *at satiation*. Initial and final average weights of the fish during the experiment were 566.11 g fish^{-1} and 600.89 g fish^{-1}, respectively (Table 1). Total initial fish biomass was 5,095 g, and the final fish biomass was 5,408 g. During 24 days rearing in the integrated system, the fish weight increased. The daily weight gain and total gain were 1.45 g fish day^{-1} and 313 g, respectively. Feed intake was 778.5 g, and the value for FCR was obtained to be 2.49.

Table 1. *Seriola quinqueradiata* stocking and growth data in the integrated aquaculture system.

Parameters	Values ± Standard Deviation
Average initial fish weight (g)	566.11 ± 81.51
Average final fish weight (g)	600.89 ± 87.79
Total initial fish biomass (g)	5,095
Total final fish biomass (g)	5,408
Culture period (days)	24
Weight gain (g fish day^{-1})	1.45
Total gain (g)	313
Total feed consumed (g)	778.5
Feed conversion ratio (FCR)	2.49
Survival Rate (%)	100

Growth and fresh biomass production of the green seaweed, *Ulva prolifera* were compared at three different flow rates (0.5 L min^{-1}, 1.0 L min^{-1} and 1.5 L min^{-1}) (Fig. 2). *Ulva prolifera* yield achieved values of 42 g at low flow rate, 156 g, and 155 g at medium and high flow rates, respectively.

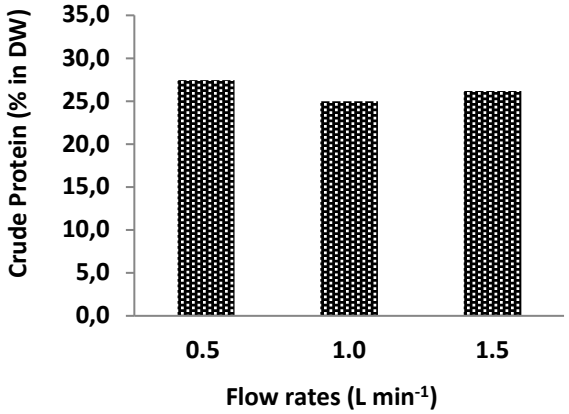

Figure 4. Crude protein content (% in DW) of Seaweed *Ulva prolifera* cultured at different flow rates with fish culture outflow water.

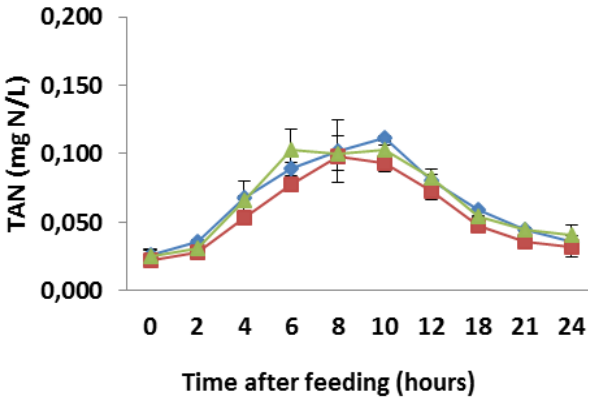

Figure 6. Total ammonia nitrogen (TAN) of yellow tail *Seriolla quinqueradiata* in the outlet water of seaweed tanks at different flow rates (0.5 L min^{-1} (♦), 1 L min^{-1} (■) and 1.5 L min^{-1} (▲)) in day 20.

3.2. Discussion

Ulva prolifera has potential as a tool for bioremediation because they have the characteristics of opportunistic, i.e. high growth rates and easy to be maintained across a broad range of environments (Fan *et al*., 2014). Natural populations of *U. prolifera* in Japan occur only in limited location during a short period, especially in early spring. Furthermore, wild stocks of this alga have been decreasing due to water pollution (Ohno and Miyanoue, 1980). All needs for consumption of *Ulva* come from cultivated stock (Dan *et al*., 2002). However, annual cultivated production of *U. prolifera* has fluctuated due to salinity and temperature (Pandey and Ohno, 1985).

Flow rates of 1.0 L min and 1.5 L min^{-1} in this study obtained biomass of 156 g and 155 g. However, the biomass of the seaweed only reached 42 g on a flow rate of 0.5 L min^{-1}. It indicates that the higher the value of the flow rate was applied, then the higher the growth of seaweed was obtained. Likewise, DGR of 1.0 L min and 1.5 L min^{-1} yielded in this study were not significantly different (P>0.05), with the values of 21.87% and 21.76% respectively. In this study, seaweed was cultured in 30 L tanks with the initial biomass of 0.83 g each tank. However, the final biomass of 1.0 L min^{-1} and 1.5 L min^{-1} were 3.7-fold from flow rate of 0.5 L min^{-1}. These experiments suggest that an increment of the flow rates in seaweed culture tanks allowed to almost 200 times the biomass yield obtained in 24 days experiment.

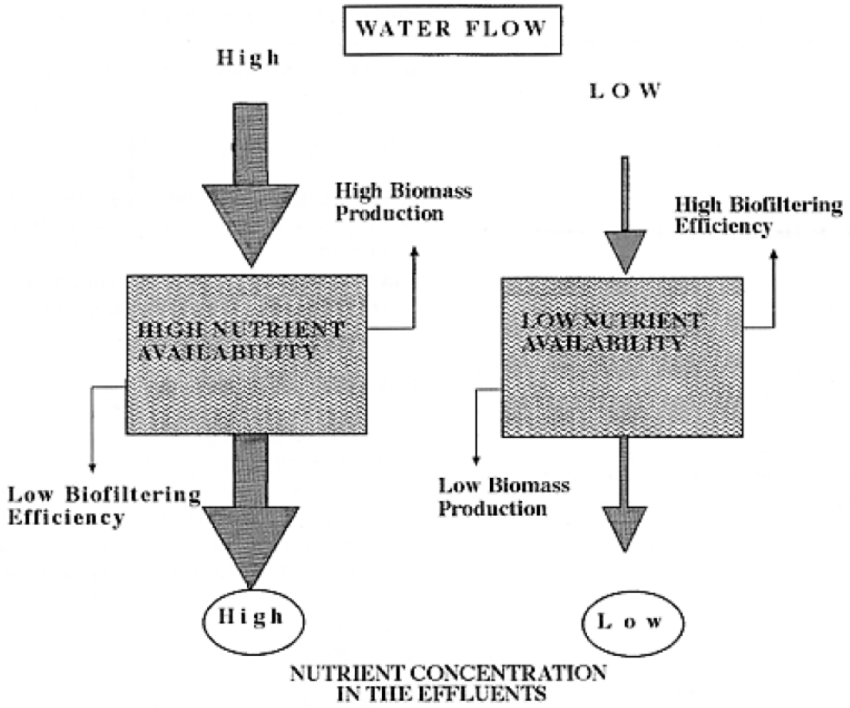

Figure 7. General showing the effect of the water turnover rate on growth and biofiltering efficiency (Buschman *et al*., 2001).

The protein contents of the *Ulva* at the end of the experiment were the same because the seaweed got the same nutrient sources from fish tank effluent. Then, the effluent was distributed into 3 different flow rates with 2 replications. This causes nutrient values generated in *Ulva* also similar in each treatment. However, the protein contents of this seaweed at the end of maintenance for 24 days increased approximately 4.4 to 4.9 times. This value indicates that the nitrogen in water affected the growth of seaweed. Although the protein values were not

significantly different between treatments. However, the protein harvested at the end of the maintenance was different each treatment. It can be seen from the protein obtained by biomass converted so that the effectiveness values of the use of different flow rate were different. Protein content on flow rate of 0.5 L, 1.0 L and 1.5 L min^{-1} had different effectiveness values namely, 11.54%, 38.96% and 40.83%, respectively. Therefore, it could be said that the harvested protein was higher on flow rates of 1.0 L and 1.5 L min^{-1}.

IV. CONCLUSION

The seaweed *U. prolifera* can be cultured in integrated aquaculture system. Flow rates of 1.0 L min^{-1} and 1.5 L min^{-1} obtained biomass of 156 g and 155 g, respectively. The flow rate affected the growth of the seaweed. However, the flow rate did not affect nitrogen content of the algae.

ACKNOWLEDGMENTS

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The code of ethics of scientific publications in the Jurnal Ilmu dan Teknologi Kelautan Tropis (JITKT) is used to ensure that all the works/writings published in this journal have followed ethical principles in academic publications to prevent misunderstandings and conflicts. This document presents several articles related to the field of tropical marine science and technology and guidelines on ethics in this journal publication (authors, editors, best partners, publishers, and readers).

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