KP3RL

Book of Abstracts

1st INTERNATIONAL SYMPOSIUM OF INDONESIAN SEAWEED CONSORTIUM

"Seaweed for Food Security Enhancement and Sustainable Development"

Makassar, October 25th, 2016

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PREFACE

The 1st International Symposium of Indonesian Seaweed Consortium, ISISC was initiated by the Consortium of Center for Development and Utilization of Seaweed (CCDUS/ KP3RL) Hasanuddin University with collaboration of BALITBANGDA SUL-SEL, BPPBAP Maros & Takalar, POLITEKNIK Negeri Ujung Pandang, POLITANI Pangkep, PUSLITBANG LP3K UNHAS, and ASPPERLI.

This abstract book contains extended abstracts of the contributions to whole sessions including keynote speakers, invited speakers, oral presentations, and the poster session. The papers cover a wide range of five main topics including; seaweed diversity and environment; biotechnology and pharmacy; seaweed culture; post harvesting and product processing; and socio-economic, organization, and marketing.

The papers reflect the growing interest in the seaweed utilization for food security enhancement and sustainable development, which is our theme for this first symposium. It will become obvious that our goal to contribute to finding comprehensive solutions in food security is feasible. Furthermore, the mission may be achieved relatively quickly for introducing seaweed to more harnessed effectively.

We would like to thank the members of the Consortium, Collaborators, and the valuable resources of Organising Committee for their active support in organizing the Symposium.Special thanks go to the Symposium and Program Coordinator, Asmi Citra Malina, S.Pi., M.Agr., Ph.D. Finally we are deeply grateful to the all contributors of this abstract book.

The 1st ISISC Team

Acknowledgement

We wish to thank the following for their contribution to the success of this conference:

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International Symposium of Indonesian Seaweed Consortium
"Seaweed for Food Security Enhancement & Sustainable Development"
Ibis Hotel, Makassar, 25th of October 2016

TIME SCHEDULE

Time	Description
08:00 – 08:30	Registration
08:30-09:00	*OPENING CEREMONY* Report from Committee-**Dr. Ir. Asmi Citra Malina, M.Sc.** Greetings from Rector of Hasanuddin University- **Prof. Dr. Dwia Ariestina Pulubuhu.** Opening by The Governor of South Sulawesi Province- **Dr. H. Syahrul Yasin Limpo, SH., MH.**
09:00-09:15	Coffee Break
	KEYNOTE SPEAKERS *Moderator: Subehan Lallo, PhD.*
09:15-10.00	**Dr. Nicholas Paul**- James Cook University, Australia.
10.00-10.45	**Cyr Couturier, M.Sc**. –Marine Institute, Canada
10.45-11.30	**Dr. Ir. Rd. Nilanto Perbowo, M.Sc**. – Directorate General of Fish Product Competitiveness Strengthen, Ministry of Marine Fisheries
11.30-12.00	**DISCUSSION**
12.00-13.00	**LUNCH**
	INVITED SPEAKERS *Moderator: Prof. Dr. Ir. A. Akhmad Mustafa, MP.*
13.00-13.30	Group Chief Executive Officer of MARDI HOLDING SDN BHD- **Engr. Anas Ahmad Nasaruddin**
13.30-14.00	Agency for Marine and Fisheries Research & Development - **Muh. Zulfikar Mochtar, ST., M.Sc**
14.00-14.30	Alfred-Wegener-Institute for Polar and Marine Research, List/ Sylt, Germany-**Dr. Dominik Kneer**
14.30-15.00	Consortium of Center for Development and Utilization of Seaweed (CCDUS)-**Prof. Dr. Ir. Ambo Tuwo, DEA.**

Time	Description
15:00-15:30	Coffee Break
	Parallel Session
15.30-16.30	Session I
16:30-17:30	Session II
17.30-18.00	**Closing Ceremony**

PARALEL SESSIONS

Room A. ***Seaweed Diversity and Environment***

Time	Code	Name of Speakers	Title
15:30 –16:30	A01	Muhammad Banda Selamat	Spatial Estimation of Suitable Site for Seaweed Cultivation in North Gorontalo
	A02	Nita Rukminasari	DNA Analysis of Six Commercial Seaweed from South Sulawesi for Breeding and Conservation Purposes
	A03	Lisda Haryani Hanaruddin	Rising Sea Surface Temperature might Negatively Impact Seaweed Aquaculture
	A04	Inayah Yasir	Macroalgae around Tanjung Buli Mining Area, East Halmahera
	A05	Abigail Moore	Tomini Bay Seaweed Trial Indicates Euchema spinosum Could Contribute To Climate Change Adaptation
17:30 – 18:00	**Back to the hall for closing ceremony**		

Room B. ***Biotechnology and Pharmacy***

Time	Code	Name of Speakers	Title
15:30 – 16:30	B01	St. Hidayah Triana	The method of *Agrobacterium tumefaciens*-Mediated MmCu/Zn-SOD Gene Transformation in the Red Seaweed *Kappaphycus alvarezii*
	B02	Muhammad Ikbal Illijas	Fatty Acid Composition of Individual Galactolipids and Phosphatidylcholi-ne Extracted from Brown Seaweed *Padina australis* Collected from Saugi Island of Pangkep District, Indonesia
	B03	Huyyirnah	Maceration Kinetic Method to Analyze Bioactive Potential of Green Seaweed *Ulva reticulata* Against Potato Plant Pathogenic Bacteria
	B04	Ahmad Wadi	Production of Bioethanol from Seaweed, *Gracilaria verrucosa* and *Eucheuma cottonii*, by Simultaneous Saccharification and Fermentation
	B05	Nasriani	Effect of Multi-Cycle Use of Potassium Hydroxide Solution on Physical Properties of Carrageenan Extracted from Seaweed *Kappaphycus alvarezii*
16:30 – 17:30	B06	Adiansyah Syarifuddin	Physical and Mechanical Properties of Emulsion Films Based on κ-Carrageenan/Gelatin, Incorporated with canola oil
	B07	Metusalach	Antibacterial Activity Characteristics of Seaweed Extract
	B08	Syaharuddin	Optimation of fermentation process of *Bacillus alcalophilus* isolated from *Eucheuma cottonii* for antibiotic production
	B-09	Octovianus SR. Pasanda	The Effect of Carrageenan Precipita-tion Material on Yield and Quality of Carrageenan
17:30 – 18:00	**Back to the hall for closing ceremony**		

Room C. *Seaweed Culture*

Time	Code	Name of Speakers	Title
15:30 – 16:30	C01	Ma'ruf Kasim	The Growth of *Kappaphycusalvarezii* and *Eucheumadenticulatum* cultivatedin Floatingcages
	C02	Gunarto Latama	Study of *Kappaphycus alvarezii* (Doty ex. P.C. Silva, 1996) during Low Growth Condition in Jeneponto District, South Sulawesi, Indonesia
	C03	Nally Yans Grispinomia Fraly Erbabley	Seasonal variation of *Kappaphycus alvarezii* Growth in Letvuan Waters, Southeast Maluku
	C04	Ruslaini	The Effect of Different Initial Weight on *Gracilaria verrucosa* Growth Cultivated with Verticulture Method in Pond
	C05	Najamuddin	Development of Integrated Seaweed Culture with Fish Capture
16:30 – 17:30	C06	Lideman	The Use of Polyethylene and Rafia Ropes as Substrates for Spores of Seaweed *Gracilaria* sp. for Seed production in the sea
	C07	Ambo Tuwo	The Effect of Extreme Salinity on Growth and Agar Concentration of Seaweed *Gracilaria* sp.
	C08	Joeharnani Tresnati	The Effect of Salinity on Polycultured Seaweed *Gracilaria* sp. and Vannamei shrimp *Litopenaeus vannamei*
	C-09	Yusnaini	The Growth of Seaweed *Kappaphycus alvarezii* with Lobster *Panulirus ornatus*in Floating Net Cage.
	C-10		
17:30 – 18:00	**Back to the hall for closing ceremony**		

Room D. ***Post Harvesting and Product Processing***

Time	Code	Name of Speakers	Title
15:30 – 16:30	D01	Arham Rusli	Models of Edible Film Based Agar, Carrageenan, and Agar-Carrageenan Composite
	D02	Elmi Nurhaidah Zainuddin	Cytotoxicity and Anticancer Activity of Seaweed from Takalar Waters, Indonesia
	D03	Ruri. A. Sari	Physicochemical Properties Of Seaweed Fishball
	D04	Fajriyati Mas'ud	Optimization of Alginate Extraction from *Sargassum siliquosum*
	D05	Yunita Triana	Utilization of Seaweed *Sargassum duplicatum* Extract as Organic Inhibitor for API 5L Steel
16:30 – 17:30	D06	Kartini Zailani	The effect of Fucoxanthin from *Sargassum filipendula* on Lipid Profile of White Wistar (*Rattus fovergicus*)
	D07		
	D08		
	D-09		
	D-10		
17:30 – 18:00	**Back to the hall for closing ceremony**		

KEYNOTE SPEAKERS ABSTRACT

Diversification of Seaweed Products and Applications - from Research to Development of Food and Feed

Nicholas Paul
MACRO – the Centre for Macroalgal Resources & Biotechnology,
College of Marine and Environmental Sciences, James Cook University,
https://research.jcu.edu.au/portfolio/nicholas.paul

ABSTRACT

Indonesia is the world's largest producer of red seaweedsyet only a fraction of this commodity (20%) is processed in-country. This means that the "value adds" of extraction and product development primarily occur overseas. However, the government of Indonesia and researchers are now focused on creating new products to enable further growth in both volume and value for the industry. It is therefore timely to take a fresh look at the seaweed value chain as it relates to food, specifically the R&D requirements for creating higher value seaweed products, including functional food and nutraceuticals for human health as well as applications in animal feed and health for agriculture.

An Evaluation of Indonesia Seaweed Farming - Future Prospects and Constraints

Cyr Couturier

Research Scientist and Chair Aquaculture Programs
Fisheries and Marine Institute of Memorial University, Box 4920, St. John's, NL, Canada A1C 5R3. Email: cyr@mi.mun.ca

ABSTRACT

Seaweed farming and output is increasing rapidly on a global scale, and Indonesia is one of the largest producers. Global trends for seaweed production show an increasing demand for seaweed production for food security and for high-end seaweed food products. Raw carrageenan demand does not appear to be growing, and alternate, higher-end extracts and products from seaweed will lead the future. The majority of seaweed farmers in the world are smallholder farms consisting of a few ponds or a few hectares of the sea for farming purposes. They are mostly family type businesses, disconnected from markets, and their growth and success are constrained by a variety of factors. These impediments include: lack of access to capital or technical support, lack of market insight, a poor understanding of the value and supply chains for seaweed products, and a changing climate that is impacting production in a variety of ways. Moreover, up to 80% of the world's seaweed production occurs with ongoing disease management issues, and a lack of new seed stocks to address climate change impacts. Indonesia seaweed farming suffers from the same constraints as the rest of the world. A recent evaluation of the status of seaweed farming in South Sulawesi is presented, and some potential solutions to improving seaweed farming outcomes for farmers are proposed.

Rd. Nilanto Perbowo
Directorate General of Fish Product Competitiveness Strengthen
Ministry of Marine Fisheries

ABSTRACT

Invited Speaker

Malaysian Experience in Industrialising Seaweed Industry

Anas Ahmad Nasaruddin, Sukena Safari, & Jacob Kasolan
MARDI Holdings, Malaysia

ABSTRACT

Would seaweed industrial sector be another significant economic contributor? As Malaysia is known to have successfully established global industry benchmarks such oil palmand rubber production, attempts to evolve new agro-based alternatives necessary needs to be driven on a systematic supply chain development approach. Seaweed farming started in 1978 in the Eastern Coast of the State Sabah. From mere productionof dried seaweeds as the endproduct in early 2000 through a government technology development programme, a secondary processed product, semi refined carrageenan (SRC) factory was built. As market for SRC widen and grew, much due to export market, the demandfor dried seaweeds increase consequently. For Malaysian factories, raw material is now a limiting factor. This is however a positive twist as it leads to the feasibility of expanding the seaweed farming industry. The paper examines the role of the stakeholders such as the related government agencies, the seaweed farmers, and processors, traders is fostering the growth of the Malaysian seaweed industry supply chain.

M. Zulficar Mochtar
Agency for Marine and Fisheries Research & Development

Climate Change, Coral Reefs and Seaweed Aquaculture: The Big Picture

Dominik Kneer

Postdoctoral research fellow, Alfred-Wegener-Institute for Polar and Marine Research, List / Sylt, Germany

ABSTRACT

Climate change is expected to lead to increasing sea surface temperatures, rising sea levels and ocean acidification. Especially high temperatures and decreases in ocean pH are expected to be detrimental to corals. Current predictions forecast that most corals will die, and the reefs fall apart, within the next 100 years. A significant proportion of the Indonesian coastline is currently protected by fringing reefs which serve as self-repairing wave breakers. If these fringing reefs are lost significant erosion will occur, especially with the sea level rising as well. Furthermore, almost all of the Indonesian seaweed aquaculture operations are located in shallow calm waters above fringing reefs. Some of these operations are already unsustainable because seagrass meadows are destroyed which releases carbon dioxide and enhances climate change, and because the hydrology of the reef flats is altered. With the reefs gone, seaweed farmers will have to relocate or find alternative incomes. However, relocation may be difficult as alternative protected coastal areas such as bays are already occupied by other aquaculture operations, and alternative incomes may be hard to come by once the reef is gone. It is concluded that in order to continue seaweed aquaculture, efforts to protect the coral reefs have to be dramatically increased.

Keywords: Seaweed aquaculture, coral reefs, climate change

Seaweed For Future Food Security

Ambo Tuwo
Consortium of Center for Development and Utilization of Seaweed (CCDUS)

ABSTRACT

Food security has declined dramatically in many developing countries due to human beings population growth that has increased dramatically. Thomas Malthus statement that "the human population grows geometrically, and at the same time decreasing the use of natural resources by 50%" is a reminder for a food insecurity. M. Cousteau statement that "In order to stabilize word population, we must eliminate 350,000 people per day" is also a reminder that related to a food insecurity. Seaweed could be a solution for the improvement of food security. There are three alternatives to make seaweed as a food source for the future i.e. integrated multitrophic aquaculture, use seaweed as ocean vegetables, and use seaweeds as animal feed. Seaweeds can become super foods. It is rich in essential minerals, brain-boosting fatty acids, a cancer-fighting and obesity inhibiting, brown, green or red, each variety packs heavy nutritional punch per serving, rich in omega-3 fatty acids, B vitamins, fiber, iodine, potassium and magnesium. Seaweed can also become an alternative for a better life. Processing and marketing of seaweed products boost incomes and improve livelihoods in vulnerable households. Benefit of seaweed products contributes to food security, employment and women's empowerment. Seaweed could strengthen food security and defeat the Malthusian Catastrophe. Seaweed could also show that M. Cousteau statement is not entirely correct. Seaweed could increase our food security by developing seaweed farming, obtaining more food or nutrient value from seaweed for human being consumption an animal feed.

Keywords: seaweed, food security, super foods, livelihoods, seaweed farming, animal feed

PARALEL SESSIONS

A. Seaweed Diversity and Environment

B. Biotechnology and Pharmacy

C. Seaweed Culture

D. Post Harvesting and Product Processing

E. Socio-economic, Organization and Marketing

Optimization of Alginate Extraction from *Sargassum siliquosum*

Fajriyati Mas'ud*[1], Zulmanwardi[2], & Leny Irawati[2]
[1]Student - Hasanuddin University
[2]Chemical Engineering - Politeknik Negeri Ujung Pandang
Email: fajri28672@gmail.com

ABSTRACT

Sargassum siliquosum is brown seaweed, containing alginate required by various industries that are currently imported. The aims this study is determine the optimum concentration of the chemical in alginate extraction. The study design using Central Composite Design. Response Surface Method used to see the effect of the treatment for maximum yield of alginate. The results showed that the optimum concentration of the chemicals to extract alginate are Na_2CO_3 14,2 %; $CaCl_2$ 14,1 %; and HCl 3,5 %. In this conditions, the yield of alginate was 26 g / 100 g. Verify the optimum conditions yielding 26,18 g / 100 g. Characteristics of alginate product was 3,7 % moisture content, ash content 18,43 %, cP viscosity 16,5 and pH 6. Metal content: As <0,01 ppm; Pb 23,43 ppm and Hg 0,054 ppm.

Keywords: *Sargassum siliquosum*, extraction, alginate

AUTHOR INDEX

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