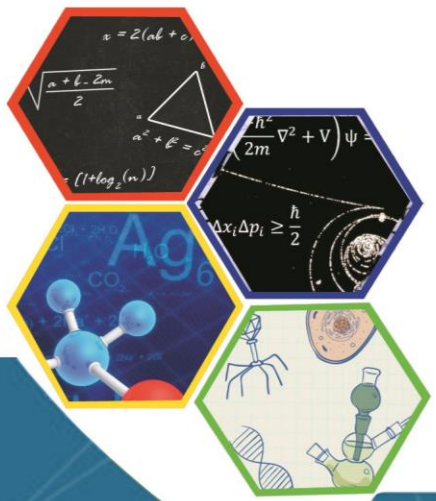
PROCEEDING

The 2nd International Seminar of Basic Science

Natural Science For Exploration The Sea-Island Resources

Ambon, May 31st 2016



Organized by

Faculty of Mathematics and Natural Science

Pattimura University

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The 2nd International Seminar of Basic Science

"Natural Science for Exploration The Sea-Island Resources"

Poka-Ambon, 31st May 2016

Mathematic and Natural Science Faculty
Universitas Pattimura
Ambon
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Mathematic and Natural Science Faculty
Universitas Pattimura
Ir. M. Putuhena St.
Kampus Poka-Ambon
Pos Code 97233
Email:fmipa_unpatti@gmail.com

2nd edition

Welcoming Address By The Organizing Committee

Today, We have to thank the The Almighty Allah SWT for the implementation of this international seminar. This is the second seminar about Basic Science in The Faculty of MIPA Pattimura University. The seminar under the title “Natural Sciences for Exploration the Sea-Island Resources” will be carried out on May 31st 2016 at Rectorate Building, Pattimura University. There are 200 participants from lecturers, research institute, students, and also there are 34 papers will be presented.

My special thanks refer to the rector of Pattimura University and the Dean of MIPA Faculty, Prof. Dr. Pieter Kakissina, S.Pd., M.Si. I also would like to express my deepest gratitude to Prof. Amanda Reichelt-Brushett, M.Sc., Ph.D. ; Kazuhiko Ishikawa, Ph.D. ; Nicolas Hubert, Ph.D. ; Prof. Dr. Kirbani Sri Brotopuspito ; Prof. Dr. Marjono, M.Phil. ; Gino V. Limon, M.Sc., Ph.D. as the keynote speakers.

The last, We hope this international seminar usefull for all of us, especially Mollucas People and very sorry if any mistake. Thank you very much.

Dr. La Eddy, M.Si.
Chairman of Organizing Committee

Opening Remarks
By Dean of Mathematic and Natural Sciences Faculty

I express my deepest gratitude to The Almighty God for every single blessing He provides us especially in the process of holding the seminar until publishing the proceeding of International Seminar in celebrating the 18th anniversary of MIPA Faculty, Pattimura University. The theme of the anniversary is under the title "Natural Sciences for Exploration the Sea-Island Resources". The reason of choosing this theme is that Maluku is one of five areas in Techno Park Marine in Indonesia. Furthermore, it is expected that this development can be means where the process of innovation, it is the conversion of science and technology into economic value can be worthwhile for public welfare especially coastal communities.

Having the second big variety of biological resources in the world, Indonesia is rich of its marine flora and fauna. These potential resources can be treated as high value products that demand by international market. Basic science of MIPA plays important role in developing the management of sustainable marine biological resources.

The scientific articles in this proceeding are the results of research and they are analyzed scientifically. It is expected that this proceeding can be valuable information in terms of developing science and technology for public welfare, especially people in Maluku.

My special thanks refer to all researchers and reviewers for your brilliant ideas in completing and publishing this proceeding. I also would like to express my gratefulness to the dies committee-anniversary of MIPA Faculty for your creativity and hard working in finishing this proceeding, God Bless you all.

Prof. Dr. Pieter Kakisina, S.Pd., M.Si.
Dean of Mathematic and Natural Sciences Faculty

ACKNOWLEDGMENT

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"The 2nd International Seminar of Basic Science 2016"

Hotel Mutiara Ambon

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The 2nd International Seminar of Basic Science
May, 31st 2016

INFLUENCE EACH STAGES BY PROCESSED ON QUALITY DRY SEA CUCUMBER (*Holothuria scabra*)

Voulda D. Loupatty*, R. V. Tehubijuluw, and A. E. de Fretes

Institute of Research and Standardization Industry of Ambon
Kebun Cengkeh Street, Ambon, Moluccas, Indonesia
*Email: voulda_loupatty@yahoo.co.id

ABSTRACT

Sea cucumber (*Holothuria scabra*) is potential marine resource and economic value. The research "Influence Each Stages by Processed On Quality Dry Sea Cucumber (*Holothuria scabra*)", conducted purpose to study of processing techniques in relation the best quality of sea cucumber (*Holothuria scabra*) processing stages .
The stages of sea cucumber (*Holothuria scabra*) processing include: raw material handling, boiling, smoking and drying. Parameters were observed include: visual observation (appearance, odor, texture), chemical tests (water, protein, ash and acid insoluble ash) and weight loss.
The results showed that the nutritional value of sea cucumber (*Holothuria scabra*) at each stage of the process are: fresh (after mowing) that is 84.31% water; 2.15% ash ; 0.22% acid-insoluble ash and 4.03% protein. After boiling, 59.27% water; 6.46% ash; 0.32% acid insoluble ash and 12.57% protein. After curing, 42.63% water; 11.74% ash; 0.70% acid insoluble ash and 13.90% protein. After drying, 14.62% water; 14.58% ash; 1.18% acid insoluble ash and 42.06% protein. But weight loss from fresh sea cucumber to dry sea cucumber is 2,89%.

***Keywords*:** Processing, quality, *Holothuria scabra*.

INTRODUCTION

An export commodity sub-sector potential to be developed is a sea cucumber. Sea cucumbers including Holothuroidea class of Echinodermata nations that are invertebrate animals with elongated cylindrical body with oral and aboral line as the axis that connects the anterior and posterior. The shape resembles a cucumber so that sea cucumbers known as sea cucumber (sea cucumber), body length of about 5-40 cm. Mouth and anus is located at the opposite end of the shaft, the mouth in the anterior and posterior anus, around the mouth of sea cucumbers are tentacles that can be extended and withdrawn quickly. Tentacle is a modified tube feet that serves to capture food (Fechter 1969; Gosner 1971; Wibowo et al. 1997).

Utilization of sea cucumbers as one of the high-protein foodstuffs already known long ago and the effort has grown in the Indo West Pacific and has grown into a pretty important source of income for fishermen.

Approximately 53 species of sea cucumber have been identified are in Indonesia and seven (7) types of which have been utilized by the public into refined products that have

added value is quite high as dried sea cucumber, sea cucumber smoke and crackers (*Holothuria scabra*), cucumbers koro (*H. nobilis*), cucumbers pineapple (*ananas Thelonata*), gamma sea cucumber (*Stichopus variegates*), stone sea cucumbers (*Actonopyga lecanora*), cucumbers rice cake (*A. miliaris*) and (*A. echinittes*).

Sea cucumbers sand *(Holothuria scabra)*	Sea cucumbers koro *(Holothuria nobilis)*	Sea cucumbers pineapple *(Thelenota ananas)*
		
Sea cucumbers gamat *(Stichopus variegatus)*	Sea cucumbers stone *(Actinopyga lecanora)*	Actinopyga echinites
		

Source: Thenu Johanna

This commodity has economic value is important because the content or nutritional levels are high, so the potential to be developed into processed products that have a high value. In table shows the type of sea cucumber in Indonesia have commercial value and market value in Indonesia (Darsono, 2005).

Table 1. Types of Sea Cucumbers in Indonesia and Leading Market Value

No	Type / species	Local Names	The Price Level
1	*Holothuria scraba*	Sea cucumbers white sand	Expensive
2	*H. nobilis*	Teripang koro / black milk	Expensive
3	*Thelonata ananas*	Sea cucumbers white pineapple	Expensive
4	*H. fuscogilva*	Sea cucumbers white milk	Expensive
5	*Stichopus variegatus*	Sea cucumbers gamat	Moderate
6	*Actinopyga lecanora*	Sea cucumbers stone	Moderate
7	*A. milliaris*	Sea cucumbers rice cake	Moderate
8	*H. edulis*	red sea cucumbers	Cheap
9	*H. leucospilota*	black sea cucumber	Cheap
10	*H. atra*	Sea cucumbers rivet	Cheap

Among the types mentioned above sea cucumbers is the one commodity that has high economic value both domestic and international markets. Sea cucumbers this type of spread in Maluku waters with a frequency high enough density (Yusron, 2007). Sea cucumbers including fisheries export commodities that also support regional development, increase the income of fishermen and add to the country's foreign exchange.

To get a good quality dried sea cucumber, then each stage of processing sea cucumbers should be done well. The stages of processing sea cucumbers include: raw material handling, boiling, smooking and drying. Thus, do research on the impact each stage of the processed sea cucumbers (*Holothuria scabra*) dry to quality.

This research purpose to study of processing techniques in relation the best quality of sea cucumber (*Holothuria scabra*) processing stages .

MATERIALS AND METHODS

Material

The main material used is fresh sea cucumbers types of *Holothuria scabra* . Auxiliary materials used are salt, enzymes, ice, firewood and others.

Instrument

The equipment used is a wash basin, boiling pot, tool fumigation, drying apparatus and others.

Procedure, based on Setiabudi (1992) ; Sudrajat (2002) ; Wibowo et al. (1997)

- **Gutted of sea cucumber fresh / live**

  As soon as the sea cucumbers are gutted with a piece of wood is then rotated until the muscles of the anus disconnected. Further pressing cucumbers body parts so that all the entrails out through the anus and through washed in sea water.

- **Boiling**

  Boiling is carried out in three phases:
  - Boiling use sea water (4% salt solution) for 60 minutes, counted after the boiling water for a second time.
  - Boiling with using the enzyme papain 4% of the volume of water, the boiler water temperature of 50 - 70^0C, for 60 minutes. The elimination of the layer of lime done while still warm sea cucumbers. Sea cucumber skin rubbed with sand or brush until the entire limestone apart. Furthermore washed clean.
  - Boiling in boiling water for 30 minutes.

- **Smooking**

  After the boiling process is carried out fumigation for about 3 hours, to get the scent of smoke.

- **Drying**

  After smooking process, followed by a drying process until completely dried sea cucumber.

- **Packaging**

Observations

Observation were collected for each stage of processing sea cucumbers include: Losing weight, organoleptic observation (appearance, odor, texture) and chemical tests include (water, protein, ash and acid insoluble ash).

RESULTS AND DISCUSSION

Losing Weight

In the processing of dried sea cucumber weight loss occurs at each stage of the treatment process, this can be seen in Table 2.

Table 2. Losing Weight On Each Stage of Processing Cucumbers

Stages of Processing	Weight (Kg)	Percentage Losing Weight (%)
Fresh Sea Cucumbers	45	-
After gutted	14	31,11
After Boiling	4,5	10,00
After Curing	3,5	7,78
After Drying	1,3	2,89

From the table above shows that the largest percentage of weight loss occurred at an early stage of processing is in the process of weeding (abdominal evisceration). Where the sea cucumber entrails consists mostly of water and sand or soil particles sediment as well as other foods. Rahman et al. (2011), Offal and gonads are part of the body of sea cucumbers. Offal is composed of the intestinal tract, stomach and other channels that contain lots of water and sand. Water and dirt which consists of the remnants of food in the digestive tract is a part of sea cucumber reached 31.54%. The innards of this should be removed in order to clean and do not break when boiled, which in turn will affect the shape of the dried sea cucumber. Instead smallest percentage of weight loss occurred at the stage of boiling until the fumigation. The evaporation process is intended to accelerate the reduction of the water of the sea cucumber body and also to provide color and scent of smoke in the sea cucumber. But the actual water content is lost in the process is not too much, it is characterized by sea cucumbers are still pliable and solid. It is necessary to proceed with the process of drying up perfectly dried sea cucumber, which is characterized by texture a hard texture and supple . Thus, the overall processing of sea cucumbers, then of fresh sea cucumber to obtain dried sea cucumber obtained yield of ± 3%.

Rahman, et al (2011), sea cucumber body broadly divided into four main parts: meat (38.26%), skin (21.14%), viscera and gonads (9.06%), water and impurities (31, 54%). Furthermore, according to Kustiariyah (2006), the proportion of dry weight and wet weight (fresh frozen) meat of sea cucumbers is 1: 6, while the proportion of dry weight and wet weight viscera and gonads of sea cucumbers is 1: 15. The results of the above table shows the proportion of dry weight and wet weight of cucumbers after mowing (flesh + shell) is 1: 4.

Observation Appearance and Chemical Test

a. Observations Appearance (Visual)

Observations organoleptic (visual) which includes such a baud an prosespengolahan texture at each stage of sea cucumbers can be seen in Table 3.

As explained in front of that quality smoked dried sea cucumber has the following specifications:

- The round shape straight, neat, no defects and parts of the abdomen tidy
- Muscles filled in sea cucumbers is still intact
- The color of golden yellow to golden brown or blackish brown
- The smell of smoke is typical of sea cucumbers thin and soft
- Texture grow hard, rigid and compact
- Characteristic of sea cucumbers are still visible
- Distinguished by two different types and sizes of sea cucumbers

From these explanations associated with visual observation in Table 3, it can be said that the quality of sea cucumber dry smoke these results, it has a good specification.

Table 3. Observations On Each Stage Prose Visual Processing Dried Sea Cucumber

No	Stages of Processing Cucumbers	Visual Observations		
		Appearance	Smell	Texture
1	Fresh sea cucumbers (before weeded)	Elongated round, black	Fresh, marine aroma	Chewy
2	Fresh sea cucumbers (after mowing)	Flat, elongated	Fresh, marine aroma	Flexible and solid
3	After boiling	Elongated round, brownish	Fresh, marine aroma	Chewy
4	After fumigation	Elongated round, black	Fresh, aroma smoke	Flexible and solid
5	After drying	Elongated round, straight	Fresh, aroma smoke	Hard and inflexible

b. Chemistry Test

Chemical test results include moisture, ash, ash insoluble in acid and protein at every stage of processing sea cucumbers can be seen in Table 4.

Table 4. Chemical Test Results At Every Stage of Processing Cucumbers

No	Parameter Test	Code				Information
		I	II	III	IV	
1	Water content (%)	84,31	59,27	42,63	14,62	I = Fresh (Having weeded)
2	Abu levels (%)	2,15	6,46	11,74	14,58	II = Boiled
3	Abu Insoluble In Acid (%)	0,22	0,32	0,70	1,18	III = Smoke
4	Protein Content (%)	4,03	12,57	13,90	42,06	IV = Dry

From the table above shows that the water content decreased significantly at each stage of processing. This affects other parameters were increased at each stage of processing, in particular protein has increased quite significantly by fresh 4.03% to 42.06% after the drying process.

Research conducted Kustiariyah (2006) showed the meat dry sand sea cucumber protein by 34.13%; 2.17% fat and 3.07% water.

Fluid and sea cucumber body contains more than 44% protein, carbohydrate and fat between 3-5% 1.5% (Ibrahim, 2003), whereas Dharmananda (2003) mentions the sea cucumber protein content of 55%. According Martoyo et al. (2000) nutrient content of dried sea cucumber is 82% protein, 1.7% fat; water 8.9%; ash 8.6%; and 4.8% carbohydrate. Based on the Indonesian national standard for dried sea cucumber has a maximum water content is 20% and acid insoluble ash is 1.5% maximum. As for the dried sea cucumber protein content ranging between 32% - 70%, depending on the type and age (Zeitsev et al, 1969). While the Indonesian National Standard (1992), the terms of dried sea cucumber is the maximum water content of 20%; acid insoluble ash maximum of 1.5%.

Thus, it can be said that the results of chemical tests of sea cucumbers dry smoke this research is good and meets the standards.

CONCLUSION

Based on this study concluded that:

The nutritional value of sea cucumber (*Holothuria scabra*) at each stage of the process are: fresh (after mowing) that is 84.31% water; 2.15% ash ; 0.22% acid-insoluble ash and 4.03% protein. After boiling, 59.27% water; 6.46% ash; 0.32% acid insoluble ash and 12.57% protein. After curing, 42.63% water; 11.74% ash; 0.70% acid insoluble ash and 13.90% protein. After drying, 14.62% water; 14.58% ash; 1.18% acid insoluble ash and 42.06% protein. But weight loss from fresh sea cucumber to dry sea cucumber is 2,89%.

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