



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



PROCEEDINGS

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
2016**

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2nd edition

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The 2nd International Seminar of Basic Science

May, 31st 2016

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

PROCEEDINGS

The 2nd International Seminar of Basic Science

May, 31st 2016

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

The following personal and organization are greatfully
acknowledgment for supporting
“The 2nd International Seminar of Basic Science 2016”

Hotel Mutiara Ambon

PROCEEDINGS

The 2nd International Seminar of Basic Science

May, 31st 2016

Contents

	<i>Page</i>
Welcoming Address by The Organizing Committee	ii
Opening Remarks by Dean of Mathematic and Natural Science Faculty	iii
Acknowledgment	iv
Contents	v–vii
Papers	
1. Hyperthermophilic Cellulase from Deep-Sea Microorganisms Surviving in Extreme Environment <i>Kazuhiko Ishikawa</i>	1–6
2. Challenges for Risk Assessment Associated with Waste Disposal and Mineral Activities in Deep Sea Environments <i>Amanda Reichelt-Brushett</i>	7–12
3. The Importance of Geophysics Education at The University of Pattimura, Ambon <i>Kirbani Sri Brotopuspito</i>	13–18
4. The Lost Paradise: Term Observation of Coral Reef in Ambon Bay <i>Gino V. Limmon</i>	19–24
5. Mathematical Model for The Sustainable Development in Exploring The Sea-Island Resources <i>Marjono</i>	25–36
6. Quality Characteristics of Redtail Scad (<i>Decapterus kurroides</i>) SMOKE Pressure Using Different Liquid Smoke and Mechanical Mixing <i>Joice P. M. Kolanus, Sugeng Hadinoto</i>	37–48
7. Antidiabetic and Antioxidant Activity of Endophytic Fungi From Sirih Hitam Plant (<i>Piper betel</i> L) <i>Edward J. Dompeipen</i>	49–57
8. Influence Each Stages by Processed on Quality Dry Sea Cucumber (<i>Holothuria scabra</i>) <i>Voulda D. Loupatty, R. V. Tehubijuluw</i>	58–64
9. Exploration For Fishing Areas Through SPL (<i>Suhu Permukaan Laut</i>) <i>Pentarina Intan Laksmitawati</i>	65–68
10. Development of Algorithm Model for Estimating Chlorophyll-a Concentration Using <i>In Situ</i> Data and atmospherically corrected landsat-8 Image By 6SV (Case Study: Gili Iyang'S Waters) <i>Resti Limehuwey, Lalu Muhamad Jaelani</i>	69–77
11. Earthquake Epicenter Positioning With Inversion Method In Central Maluku District <i>R. R. Lokollo, J. R. Kelibulin</i>	78–83
12. Spatial Distribution Analysis of Oxygen (O ₂) By Using <i>In Situ</i> Data and	

PROCEEDINGS

The 2nd International Seminar of Basic Science

May, 31st 2016

	Landsat 8 Imagery (Study Case: Gili Iyang, Sumenep) <i>Rovila Bin Tahir, Lalu Muhamad Jaelani</i>	84–90
13.	Interpretation of Geothermal Reservoir Temperature In The Nalahia Nusalaut, Central of Moluccas <i>Helda Andayany</i>	91–96
14.	Temporal Statistical Analysis of The Volcanic Eruption in Mt. Banda Api, Banda Islands, Moluccas <i>J. R Kelibulin, R.R Iokollo</i>	97–103
15.	FTIR Spectrum Interpretation of Vegetable That Contains Pesticide <i>Diana Julaidy Patty, Grace Loupatty, Lorenzya Mairuhu</i>	104–109
16.	Landslide Susceptibility Analysis using Weighted Linear Combination (WLC) Combined with The Analytical Hierarchy Process (AHP) <i>Romansah Wumu, Teguh Hariyanto</i>	110–116
17.	Application of Principal Component Analysis Based on Image for Face Recognition <i>Y. A. Lesnussa, N. A. Melsasail, Z. A. Leleury</i>	117–130
18.	Learning Mathematics By Involving The Left and The Right Brains In Processing Information <i>Magy Gaspersz</i>	131–139
19.	The Total Irregularity Strength of The Corona Product of A Path With A Wheel <i>Faldy Tita, F. Y. Rumlawang, M. I. Tilukay, D. L. Rahakbauw</i>	140–145
20.	Spectrum Analysis Near-Infrared Spectroscopy (NIRs) of Cajuput Oil <i>Gian Kirana Efruan, Martanto Martosupono, Ferdy S. Rondonuwu</i>	146–152
21.	Analysis Aromatic Compounds of Citronella Oil by Using Near Infrared Spectroscopy (NIRS) and Gas Chromatography-Mass Spectroscopy (GC-MS) <i>Welmince Bota, Martanto Martosupono, Ferdy S. Rondonuwu</i>	153–159
22.	The Study of Waters Quality at Rosenberg Strait, Tual City, Maluku <i>Marsya Jaqualine Rugebregt</i>	160–168
23.	The Relationship Between Physical-Chemical Factors and Diversity of Sea Urchin (Echinodea) in The Kampung Baru Coastal of Banda Island Central Moluccas <i>Deli Wakano, Mechiavel Moniharapon</i>	169–178
24.	Volume and Production of Bee Propolis on Various Media <i>Trigona Spp</i> Natural Nest in The Village Waesamu Kairatu West District District West Seram <i>Debby D. Moniharapon, Jacobus S. A. Lamerkabel, Thresya S. Kwalomine</i>	179–186
25.	The Effect of Essence Red Fruit (Pandanus Conoideus Lam) To Gastric Mucosa Rat (<i>Rattus novergicus</i>) Induced Type of Alcohol Drinks Sopi <i>Mechiavel Moniharapon, Pieter Kakisina, Jantje Wiliem Souhaly</i>	187–195

PROCEEDINGS

The 2nd International Seminar of Basic Science

May, 31st 2016

26. Inventory of Medicinal Plants and Its Utilization Potential In Pombo Island, Central Moluccas
Adrien Jems Akiles Unity, Veince Benjamin Silahooy 196–199
27. Extraction of Timbal (Pb) from Sediment at Inside of Ambon Bay with Bioleaching Method by Using Bacteria *Thiobacillus ferrooxidans*
Yusthinus T. Male, Martha Kaihena, Rodrich R. Ralahalu 200–206
28. Histological of Haemocyte Infiltration Changes During Pearl Sac Formation in *Pinctada maxima* Host Oysters Reared at Different Depths
La Eddy, Ridwan Affandi, Nastiti Kusumorini, Wasmen Manalu, Yulvian Tsani, Abdul Rasyid Tolangara, Cornelia Pary 207–212
29. Isolation and Identification of Lipase Producing Thermophilic Bacteria From a Hot Spring at Seram Island, Moluccas
Edwin T. Apituley, Nisa Rachmania Mubarik, Antonius Suwanto 213–218
30. Effect of Ethanol Extract Gambir Laut Leaves (*Clerodendrum inerme* L) To Ovaries Weight of Mice
Chomsa Dintasari Umi Baszary, Feliks Pattinama 219–221
31. The Performance of Morphological and Physiological Effect of Three Accessions of Cowpea on Drought Stress
Helen Hetharie 222–230
32. Relationship of Length-Weight and Size Structure of Skipjack (*Katsuwonus pelamis*) In Marine Waters of Moluccas, Indonesia
Immanuel V. T. Soukotta, Azis N. Bambang, Lacmuddin Sya'rani, Suradi Wijaya Saputra 231–237

PROCEEDINGS

The 2nd International Seminar of Basic Science

May, 31st 2016

HISTOLOGICAL OF HAEMOCYTE INFILTRATION CHANGES DURING PEARL SAC FORMATION IN *Pinctada maxima* HOST OYSTERS REARED AT DIFFERENT DEPTHS

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ABSTRACT

This study was designed to determine the effect of different depths of rearing on the haemocytes infiltration in *Pinctada maxima* oyster. *Saibo* used was aged 28 months *Pinctada maxima* oyster, nucleus position in the ventral gonad and using female oysters. The first factor was the depth of rearing consisted of 4 levels i.e., 3, 6, 9, and 12 meters. The second factor was time after implantation with 4 levels i.e., 1, 2, 3, and 4 weeks. The results of histological observations showed that the haemocytes and inflammatory cells infiltrations were similar in the *Pinctada maxima* host oysters of the depth of rearing 3, 6, 9 and 12 meters. It was concluded that haemocyte infiltration in oysters reared at the depth of 3, 6, 9 and 12 meters no differences.

Keywords: Depth of rearing, *Pinctada maxima*, Pearls sac formation

INTRODUCTION

Pearl oyster survival is influenced by exogenous factors, such as temperature, a period of months, depth, abundance, mechanical factors, the availability of food, and light intensity, and endogenous factors such as genetic and hormonal (Wada 1984).

Depth is associated with the availability of food, salinity, and temperature. Temperature is one of the factors that may affect survival, including growth and reproduction (Helmuth *et al.* 2006; Menge *et al.* 2008). Salinity also affects the growth of pearl oysters. Stress hiperosmotic make changes to the system of osmoregulation and osmotic signal that ultimately affect gene expression (Lockwood & Somero 2011; Zhao *et al.* 2012; Meng *et al.* 2013). Stress salinity affects calcium signal transduction pathways (Zhao *et al.* 2012; Meng *et al.* 2013).

PROCEEDINGS

The 2nd International Seminar of Basic Science

May, 31st 2016

These data and information are essential in understanding the biological basis of the effect of the different depths of rearing on the haemocytes infiltration in *Pinctada maxima* oysters.

MATERIALS AND METHODS

Experimental Materials

This study was conducted from July 2012 to November 2012 at the commercial pearl farm of CV. Aru Duta Indah in the Garaga, Obi Island (01°25'S, 127°20'E) North Moluccas Province, Indonesia. Host oysters used in this experiment were *Pinctada maxima* oysters that were cultured by the commercial pearl farm. The first factor was the depth of rearing consisted of 4 levels i.e., 3, 6, 9, and 12 meters. The second factor was time after implantation with 4 levels i.e., 1, 2, 3, and 4 weeks. Forty eight (48) (4 x 4 with 3 replications) oysters succeeded in implantation were used for measurement of histological haemocyte infiltration during pearl sac development.

Pinctada maxima oysters used in the experiment as hosts were selected by criteria of normal morphology (without shell malformation), the same level of gonad maturity (gonadal development phase), with similar dorso ventral margin (DVM) of 12 cm and anterior-posterior margin (APM) of 11 cm, and body weight ranged of 180-210 gram.

Parameters Measured

The histological preparation of the haemocyte infiltration during pearl sac developing pearl sac used the haematoxylin eosin staining (HE) technique. Data analysis was done descriptively.

RESULTS AND DISCUSSION

Results

The effect of 3 meters depths of rearing on the haemocytes infiltration change during pearl sac formation in *Pinctada maxima* oysters presented in Fig.1. The inflammatory cells and haemocytes infiltrations were high 1 week after implantation. Two weeks after implantation, the number of inflammatory cells and haemocytes began to decline. Three and four week after implantation, no haemocytes and inflammatory cells was found.

The effect of 6 meters depths of rearing on the haemocytes infiltration change during pearl sac formation in *Pinctada maxima* oysters presented in Fig.2. One week after implantation, the inflammatory cells and haemocyte were high. Two weeks after implantation, the number of inflammatory cells and haemocyte began to decline. Three weeks after implantation, the number of inflammatory cells and haemocytes were very low and the injury began to recover. Four weeks after implantation, there was no haemocyte and inflammatory cell was found.

The effect of 6 meters depths of rearing on the haemocytes infiltration change during pearl sac formation in *Pinctada maxima* oysters presented in Fig.2. One week after implantation, the inflammatory cells and haemocyte were high. Two weeks after implantation, the number of inflammatory cells and haemocyte began to decline. Three weeks after implantation, the number of inflammatory cells and haemocytes were very low and the injury began to recover. Four weeks after implantation, there was no haemocyte and inflammatory cell was found.

PROCEEDINGS

The 2nd International Seminar of Basic Science

May, 31st 2016

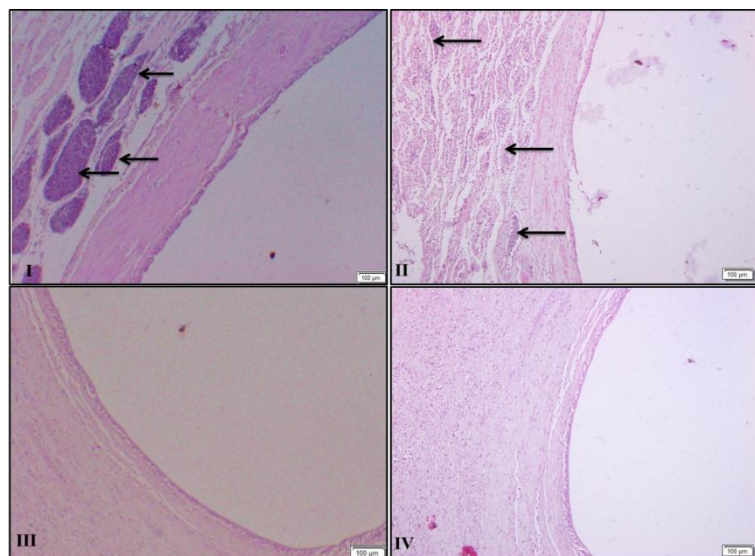


Figure 1. The effect of 3 meters depths of rearing on the haemocytes infiltration change during pearl sac formation in *Pinctada maxima* oysters. Arrows indicated haemocytes. One week after implantation (I), inflammatory cells and haemocytes were high. Two weeks after implantation (II), the number of inflammatory cells and haemocytes began to decline. Three and four weeks after implantation, there was no haemocyte. H&E. x100.

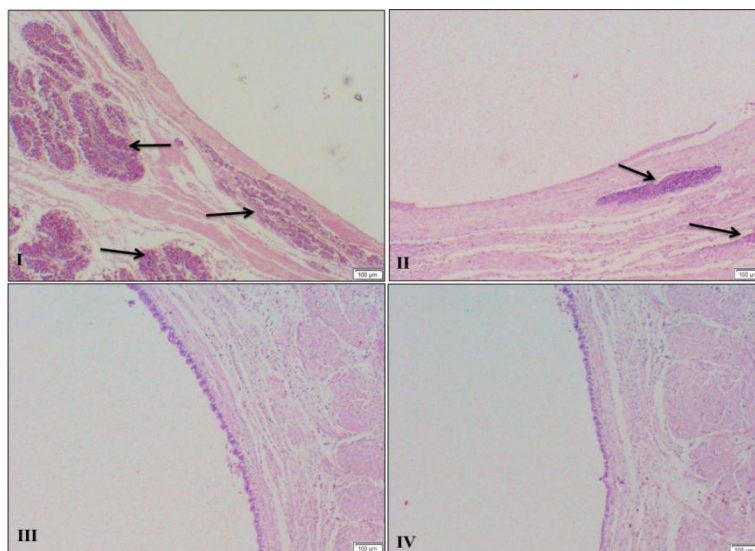


Figure 2. The effect of 6 meters depths of rearing on the haemocytes infiltration change during pearl sac formation in *Pinctada maxima* oysters. Arrows indicated haemocytes. One week after implantation (I), the inflammatory cells and haemocyte were high. Two weeks after implantation (II), the number of inflammatory cells and haemocyte began to decline. Three weeks after implantation (III), the number of inflammatory cells and haemocytes were very low and the injury began to recover. Four weeks after implantation (IV), there was no haemocyte and inflammatory cell was found. H&E. x100.

PROCEEDINGS

The 2nd International Seminar of Basic Science

May, 31st 2016

The effect of 9 meters depths of rearing on the haemocytes infiltration change during pearl sac formation in *Pinctada maxima* oysters presented in Fig.3. One week after implantation, haemocyte were high. Two weeks after implantation, haemocyte began to decline. Three weeks after implantation, the number of inflammatory cells and haemocytes were very low and the injury began to recover. Four weeks after implantation, there was no haemocyte and inflammatory cell was found.

The effect of 12 meters depths of rearing on the haemocytes infiltration change during pearl sac formation in *Pinctada maxima* oysters presented in Fig.4. One week after implantation, the inflammatory cells and haemocyte were very high. Two weeks after implantation, the number of inflammatory cells and haemocyte began to decline. Three weeks after implantation, the number of inflammatory cells and haemocytes were very low and the injury began to recover. Four weeks after implantation, there was no haemocyte and inflammatory cell was found.

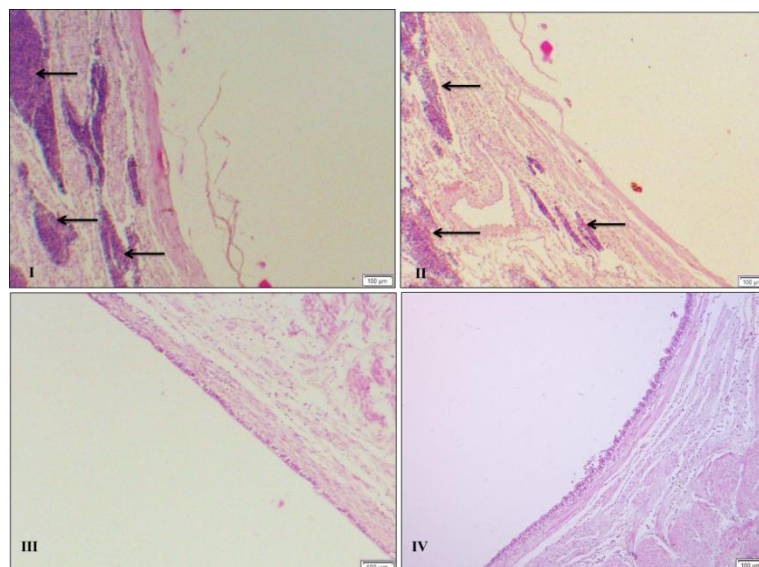


Figure 3. The effect of 9 meters depths of rearing on the haemocytes infiltration change during pearl sac formation in *Pinctada maxima* oysters. Arrows indicated haemocytes. One week after implantation (I), haemocyte were high. Two weeks after implantation (II), the haemocyte began to decline. Three weeks after implantation (III), the number of inflammatory cells and haemocytes were very low and the injury began to recover. Four weeks after implantation (IV), there was no haemocyte and inflammatory cell was found. H&E. x100.

PROCEEDINGS

The 2nd International Seminar of Basic Science

May, 31st 2016

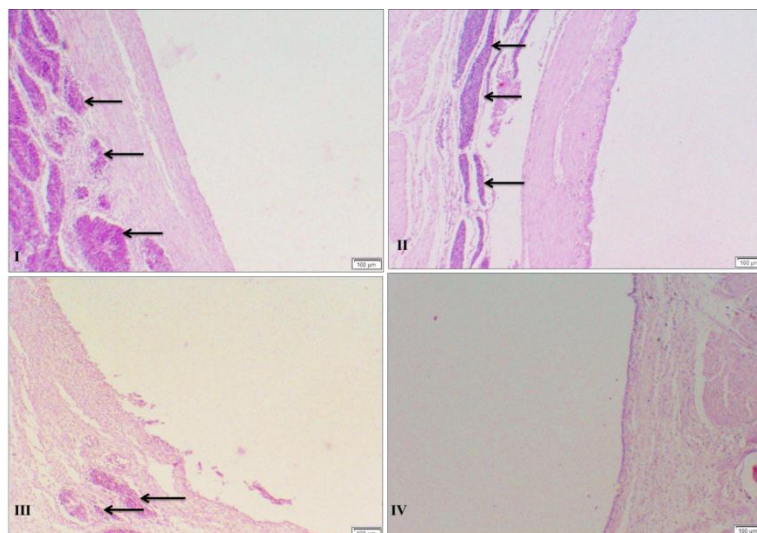


Figure 4. The effect of 6 meters depths of rearing on the haemocytes infiltration change during pearl sac formation in *Pinctada maxima* oysters. Arrows indicated haemocytes. One week after implantation (I), the inflammatory cells and haemocyte were very high. Two weeks after implantation (II), the number of inflammatory cells and haemocyte began to decline. Three weeks after implantation (III), the number of inflammatory cells and haemocytes were very low and the injury began to recover. Four weeks after implantation (IV), there was no haemocyte and inflammatory cell was found. H&E. x100.

Discussion

This results that effect of differences depths of rearing on the haemocytes infiltration change during pearl sac formation in *Pinctada maxima* oysters as the same. There was no haemocyte and inflammatory cell was found 4 weeks after implantations. This result indicated differences depths of rearing in *Pinctada maxima* oysters no affect. Operation process during nucleus implantation caused the oyster stress. Stress increases the total haemocytes on the *Crassostrea gigas* oyster. Stress affects several hormones activities such as CRH (corticotrophin releasing hormone), ACTH (adrenocorticotrophic hormone), cytokines, noradrenaline, adrenaline, dopamine, and cortisol (Lacoste *et al.* 2002). Stress activates the endocrine system such as corticotrophin releasing hormone (CRH), which stimulates the release of adrenocorticotrophic hormone (ACTH). The presence of ACTH stimulates the release of biogenic amino acids, which eventually lead to secondary effects on oysters (Hooper *et al.* 2007).

Exogenous factors, such as depth and mechanical factors no effect in infiltration haemocytes, (Hooper *et al.* 2007) that was associated with the increased glucose concentrations. Increased stress during early implantation increased haemocyte infiltration and haemolymph glucose concentration. When the implantation injury was cured, haemocytes was low and haemolymph glucose concentration reached the lowest levels. The decreased haemolymph glucose concentration with the advance of pearl sac growth after implantation could indicate the possibility of increased glucose uptake without increased in glucose mobilization or uptake to the haemolymph. Glucose are required for energy source for basal metabolism and for supporting synthetic activities as well as for synthesis of

PROCEEDINGS

The 2nd International Seminar of Basic Science

May, 31st 2016

material build up from glucose, such as conchiolin. Conchiolin is organic in nature and consists of mucopolysaccharides (Chellam *et al.* 1991).

CONCLUSION

Haemocyte infiltration during pearls sac formation in *Pinctada maxima* oysters reared at the depth of 3, 6, 9 and 12 meters no differences.

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