



INTERNATIONAL CONFERENCE ON OPERATIONS RESEARCH (ICOR)

4th

Policies and Optimal Decisions on Energy and Environment

Sam Ratulangi University, Manado, Indonesia
19 - 20 September 2019

BOOK OF ABSTRACTS



The 4th ICOR 2019

Operations Research (OR) has become powerful decision making tools worldwide. In its use, Management Science (MS) is used as another term for OR. Concept of OR is borderless as it can be derived from various disciplines such as Mathematics, Statistics, Economics, Engineering, Social, etc. to make a new set of knowledge for decision making. Today, OR has become a professional discipline which deals with the application of scientific methods in decision making theory.

The scope of OR can be used to find best solution for both simple and complex problems. It is beneficial in every aspect of human life regarding resources optimization. OR is widely used in important and main fields such as national planning and budgeting, transportation, education, agriculture, environment, and many others. Therefore, research and study involving OR are inevitable.

Number of research and study about OR or using OR as tools is high these years. This is accommodated by Indonesian Operations Research Association (IORA) IORA as one of OR organisations in an annual international conference entitled International Conference on Operations Research (ICOR). ICOR 2019 is the fourth conference (iCOR 4.0). This initiates to bring together OR/MS researchers, academicians and practitioners, whose collective work has sustained continuing OR/MS contribution to decision-making in many fields of application. It can be considered as good platforms for the OR/MS community, particularly in Indonesia, to meet each other and to exchange ideas.

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WELCOMING SPEECH

The 4th International Conference on Operations Research 2019

Director General of Conservation of Natural Resources and Ecosystems,
Ministry of Environment and Forestry
Rector of Sam Ratulangi University Prof. Dr. Ir. Ellen Joan Kumaat,
MSc, DEA.
IORA President and Dean of FMIPA University of Padjadjaran Prof. Dr.
H. Sudradjat Supian, MSc.



Distinguished Guests, Ladies and Gentlemen.

On behalf of ICOR 2019 Organizing Committee, I would like to Welcome you all and thank you for being here. Especially to Rector of Universitas Sam Ratulangi for fulfilling our invitation and to give opening speech for this conference. Special thanks also for Keynote Speakers, Plenary Speakers, Contributed Speakers and All Participants of this conference.

This conference can be held in collaboration of Indonesian Operations Research Association (IORA) and Faculty of Science Universitas Sam Ratulangi.

The point of this conference is to provide a perfect event for researchers, academics, and practitioners of Operations Research, to share experience, build communication and network with experts from all over the world. Furthermore, this conference is aimed at promotion and spread of scientific operations research field in Indonesia through Indonesian Operations Research Association (IORA).

The same conference had previously been held three time, initially hosted by Universitas Pakuan Bogor, followed by Universitas Terbuka Tangerang as second host and the third hosted by Universitas Sam Ratulangi. This conference is now held at Universitas Sam Ratulangi Manado for the forth time, that is why it is known as the 4rd International Conference on Operations Research (ICOR) under a main theme entitled Policies and Optimal Decisions on Energy and Environment.

Number of participants of this conference are more than 300, from 15 countries. Selected Papers will be published on scopus indexed Journal and IOP Publications.

Lastly, we want to gratefully thank again rector for her help and support, all keynote speakers, plenary speakers, contributed speakers, all participants, and all organizing committee who have given contribution to make this conference happen.

Dr. Nelson Nainggolan, MSi
Conference Chair

FOREWORD

From the Dean
Faculty of Mathematics and Natural Sciences, Sam Ratulangi
University
Prof. Benny Pinontoan, M.Sc

It is a great honor for the Faculty of Mathematics and Natural Sciences (FMIPA), Sam Ratulangi University (UNSRAT), Manado, Indonesia, to organize again the International Conference on Operations Research (ICOR); this year the 4th ICOR (iCOR 4.0), after organized the 3rd ICOR also by FMIPA UNSRAT in 2018. We thank, therefore, the Indonesian Operations Research Association (IORA) for this opportunity. It is an opportunity to open collaborations with other institutions, it is an opportunity to know other researchers, it is an opportunity to look at the problems more intense and eventually suggest some solutions, optimal solutions, to the problems.



The theme of iCOR 4.0 is Policies and Optimal Decisions on Energy and Environment. The motivation to suggest this theme as that we are facing decreasing of fossil energy sources on one side, but on the other side finding new energies, e.g. renewable energies, seems to create other conflict problems either with the efficiency of costs or with the sustainability of the environment. To look at these problems from the point of view of Operations Research is, therefore, relevant and can give better and optimal solutions.

This year, there are more than 300 participants registered. In compare with the 3rd ICOR with the theme Optimal Decisions for Marine Tourism [1], this is an increasing of about 50% more participants. The number of countries participated this year is 15 which is also increased. This shows increasing interests to both the ICOR and the theme of the conference. We also hope that number the papers successfully published in IOP Proceeding indexed in Scopus this year will be much more than last year.

Welcome to iCOR 4.0, Welcome to UNSRAT, Welcome to Manado. Enjoy your stay, enjoy the nature, the food, the hospitality and experience wonderful moments in Manado and surrounding areas.

Pakatuan wo Pakalawiden. God bless you.

Reference

[1] Pinontoan B 2019 From the Dean Faculty of Mathematics and Natural Sciences, Sam Ratulangi University IOP Conf. Series: Material Science and Engineering 567 pp. 6.

CONGRATULATORY SPEECH BY THE PRESIDENT OF THE INDONESIAN OPERATIONS RESEARCH ASSOCIATION (IORA)

Distinguished Guest, All invited Speakers, Participant, Ladies and Gentlemen,
It is a great pleasure for me on behalf of the Association of the Indonesian Operations Research Association, I would like to welcome you all at this special event International Conference on Operations Research at the Universitas Sam Ratulangi. This event is the fourth event for IORA-ICOR and congratulations to the Universitas Sam Ratulangi for being able to host.



The theme of the conference, Policies and Optimal Decisions on Energy and Environment, reflects our belief that many future challenges in our life need involvement of operations research and typical analytic operations research. Our future and our capacity to reach sustainable development goal such as ensure availability and sustainable management of water and sanitation for all; ensure access to affordable, reliable, sustainable and modern energy for all; take urgent action to combat climate change and its impacts; end poverty in all its forms everywhere; conserve and sustainably use the oceans, seas and marine resources for sustainable development; end hunger, achieve food security and improved nutrition and promote sustainable agriculture, ensure healthy lives and promote well-being for all at all ages, and other challenges require the advances the roles of operations research in collaboration with other disciplines. Operations Research is the application of scientific & mathematical methods to the study & analysis of problems involving complex systems. Analytics is defined as the scientific process of transforming data into insights for making better decisions. Operations Research is multi-disciplinary therefore interaction with other fields of science is indispensable and proven to have given rise to new areas that improve the ability in decision making and techniques used are modeling.

Typically, applications of Operations Research in these and other areas deal with decisions involved in planning the efficient allocation of scarce resources - such as material, skilled workers, machines, money and time - to achieve stated goals and objectives under conditions of uncertainty and over a span of time. Efficient allocation of resources may entail establishing policies, designing processes, or relocating assets. OR analysts solve such management decision problems with an array of mathematical methodologies. Completely of the operations research field can be seen in AMS 2000 or MCS 2010.

And now, I need to clarify that IORA is a new association in Indonesia which is beginning to be piloted in workshops in Operations Research and Optimization modelling on June 4, 2011 in the Department of Mathematics Faculty of Mathematics and Natural Science, Universitas Padjadjaran, then to be disseminated to several universities, government and industry.

IORA is a container that provides a forum for scientists in Operational Research and to expand our horizons through the exchange of knowledge and application technology, IORA established on August 25, 2014 by deed of Notary Number 42 and the Minister of Justice and Human Rights Number. AHU-00439.60.10.2014.

IORA members come from a variety of fields, education, researcher, government, industry, practitioners etc, in 2017 members numbered 130 members and until now IORA members numbered 240 members, and we wait for those who have become members through www.iora.or.id.

Ladies and gentlemen,

We need to inform that at the current conference will also be held meeting IORA board. Finally, Have a nice International Conference on Operations Research. I hope there are plenty of benefits we can share and empower through this and hopefully your participations and contributions will make this conference a productive and successful one.

President, The Indonesia Operations research Association

Prof. H. Sudradjat Supian, M.Sc., Ph.D

CONTENTS

No.	Authors	Title	Pages
1	Prof. Dr. Heike Wägele, Nani Undap, Adelfia Papu	Biodiversity Research on marine Heterobranchia in Indonesia – in the light of national and international regulations, collaborations and networking	1
2	Dr. Prasad Kaparaju	Biomethane production from agricultural crops and residues for vehicle use	2
3	Prof. Dr. Seiya Negami	Approach to Big Data Analysis Using Topological Graph Theory	3
4	Prof. Dr. Abdul Talib Bon, Ph.D	Optimization on Overall Equipment Effectiveness for Conveyor System to Energy Saving	5
5	Christian A. Lombogia, Max Tulung, Jimmy Posangi, Hard N. Pollo, Trina E. Tallei	Genetic Variations of DNA Barcode Region of <i>Apis nigrocincta</i> (Hymenoptera: Apidae)	6
6	Marina Silalahi	<i>Morinda citrifolia</i> (Utilization and Bioactivity)	9
7	Rafdinal, Ramadhanil Pitopang	Decomposition Rate and Litterfall Dynamics of Tembawang Agroforestry Area, West Kalimantan, Indonesia	11
8	Mokosuli Y. Semuel, Revolson A. Mege, Gianni Versya, Christny Rompas	Antihyperlipidemic activity of <i>Apis dorsata</i> Binghami nesting extract in atherogenic diet-induced hyperlipidemic rats	13
9	Ernest Hanny Sakul, Jacklin Stella Salome Manoppo	The Efficacy Of Bio-Insecticides Derived From Four Minahasa Plant Extracts To Control The <i>Spodoptera exigua</i> (Hübner) (Lepidoptera: Noctuidae) IN Tonsea Lama Village, North Sulawesi, Indonesia	18
10	Kawilarang W. A. Masengi, I.U. Ali, L. Manu, B. Pinontoan, I.F. Mandagi, A. Luasunaung, A. Thamin, A. W. R. Masengi, S. Timbowo, D. P. Pandara, G. H. Tamuntuan, A. Angmalisang, E.I. KG. Masengi, N. Zebua, A. Lawelle, F. Wongkar, J. Tumbal, H. Kobayashi, J. Montenegro, M. Iwata, K. Yamahira	Study On Some Physical Oceanography Aspects Of The COELACANTH 'S (<i>Latimeria menadoensis</i>) Habitat At Manado Bay Of North Sulawesi	21
11	Hurip Pratomo	<i>Eurycoma longifolia</i> 's Function To Increase Mature Spermatids Formation Inside Seminiferous Tubules Of White Rat.	24
12	Yosevita Th. Latupapua, C.K. Pattinasarany, Jhon Sahusilawane	Analysis of Diversity and Distribution of Bird Animals as Birdwatching Ecotourism Objects in Manusela National Park Area in North Seram District, Central Maluku Regency, Maluku	28
13	Sasube, L.M, A.H. Luntungan	The Relationship among Nutrition Knowledge, Vegetables diet and Nutritional Status of Elementary Students at Don Bosco Catholic School Manado- North Sulawesi	31
14	Trina E. Tallei, Johanis J. Pelealu, Beivy J. Kolondam, Lianda Lubis	A molecular phylogeny of <i>Taeniophyllum</i> THRJ inferred from DNA barcode regions	33
15	Henny V.G. Makal, Max M. Ratulangi, Denny S. Sualang	Exploration And Identification Trichoderma Spp. As A Biological Control Agents To Plant Pathogens And Starter Making Biological Fertilizers	35

No.	Authors	Title	Pages
16	Rumengan, I.F.M.,Kubelaborbir, T.M.Malintoi, A.H. Luntungan, A. Rondonuwu	Ascidians associated with the symbiont Microbe, Prochloron didemni in Manado Bay, North Sulawesi, Indonesia	37
17	Elvy Like Ginting, Gladys G. Poluan, Veibe Warouw, Stenly Wullur	Identification of Bacteria symbiont sponge strain of Bacillus sp. with Chitinase Degrading Activity	39
18	Rosita A.J. Lintang, Deiske A. Sumilat, Esry T. Opa	Antibacterial Activity of PvBa-RL8 Isolate, Bacterium Associated with Nudibranchia Phyllidia varicosa	41
19	Fatimawali,Billy Kepel,Widdhi Bodhi	Standardization of Specific and Non-specific Parameters of Red Galangal (<i>Alpinia purpurata</i> K. Schum) Rhizome Extract as an Antibacterial Agent	43
20	Febby Ester Fany Kandou Remy E.P. Mangindaan, Rizald M. Rompas,Herny I. Simbala	Marine Endophytic Fungi that isolated from the Gorgonian <i>Annella sp</i> from the Bunaken National Park Manado North Sulawesi Indonesia: Macroscopic and Microscopic Morphology Characters	45
21	Sri Sudewi, Paulina V.Y. Yamlean, Hosea Jaya Edy	Proliferating Cell Effect Of <i>Abelmoschus manihot</i> L. Towards HeLa Cell Line	48
22	Paulina Yamlean, Edwin de Queljoe, Dingse Pandiangan	<i>Theonella swinhoei</i> Extract Shampoo Formulation and <i>Candida albicans</i> Anti-fungal Activity Test <i>in vitro</i>	51
23	Dingse Pandiangan, Paulina V. Y. Yamlean, Hendra Pratama Maliangkay,Michael Vallery,Loueis Tumbol	Potential of Drug Degenerative Anticolesterol of Purple Leaf Extract (<i>Catharanthus roseus</i> (L.) G. Don) On White Wistar Rat (<i>Rattus norvegicus</i>)	53
24	Marina Flora Oktavine Singkoh, Desy Maria Helena Mantiri, Cyska Lumenta, Henky Manoppo	Biomaterial Characterization and Identification Bioactive Compound of Red Algae <i>Kappaphycus denticulatum</i> from Nain Island Waters North Sulawesi	58
25	Ratna Siahaan,Nio Song Ai, Susan Marlein Mambu ,Henry Fonda Aritonang	P and K Retention in Riparian Soil of Ranoyapo River, North Sulawesi, Indonesia	62
26	Adelfia Papu,Robert Bara, Heike Wägele	Diversity Of Heterobranchia In Lembeh Strait	64
27	Henny L. Rampe,Ratna Siahaan,Stella D. Umboh,Johnly. A. Rorong	Rhizobacteria Exploration From Mount Masarang and Elicitor Potential on Peanut (<i>Arachis hypogaea</i> L.)	66
28	Saroyo,Trina E. Tallei,Marnix L.D. Langoy ,Parluhutan Siahaan	Conservation of Tarsier (<i>Tarsius spectrum</i>) in Agricultural Areas Near Water Sources in North Sulawesi: Density, Threats and Conservation Aspects	69
29	Stella D. Umboh, Febby E.F. Kandou, Marina O.F. Singkoh , Henny R. Rampe	Isolation And Identification Of Soil Fungus Indigenous Rhisosphere Spring Onion Plants Exposed To Fungicide Azoxistrobin And Difenconazol	74
30	Agustina Monalisa Tangapo, Febby Ester Fany Kandou, Pience Veralyn Maabuat1	The Isolation And Characterization Of Endophytic Bacteria Isolated From Mangrove In Manado, North Sulawesi That Produce Gelatinase	84
31	Antonius P. Rumengan,Veibe Warow,Fitje Losung,Wendy, Alexander Tanod, Elvi S. Mandiangan, Darus S. J. Paransa, Carolus P. Paruntu Desy M. H. Mantiri	Study Of Pigment Beta Carotene From Mangrove Leaf <i>Rhizophora mucronata</i>	86

No.	Authors	Title	Pages
32	Henky Manoppo, Reiny A., Tumbol, Cindy C. Mudeng,, Novelita Pangalila	Isolation of probiotic and its use to improve growth and feed efficiency of carp (<i>Cyprinus carpio</i> L)	88
33	Ockstan J. Kalesaran, Cyska Lumenta, Sartje Lantu	Nacre Characterization of Freshwater Bivalve <i>Sinanodonta woodiana</i> (Lea, 1834)	90
34	F Fatimah, J M Tungadi, V S Kamu, S Gugule, P A Kaurong, T E Tallei	Processing Optimization of Bakasang from Skipjack Fish (<i>Katsuwonus pelamis</i>) Viscera Using Surface Response Methods	92
35	Vivi B. Montong, Christina L. Salaki, Denny S. Sualang	Diversity, Density And Foraging Patterns Of Kepok Banana Blossom Visitors That Bring <i>Ralstonia Solanacearum</i> Phylotype Iv In South And Minahasa Districts	94
36	Cathrien A.L. Sinjal, Defny S. Wewengkang Heard C. C. Runtuwene Henki Rotinsulu	The Use Of DPPH (1,1-Diphenyl-2-Picrylhydrazyl) Method In Testing The Antioxidant Activities Of Spons <i>Aplysina</i> sp., Collected From Lembeh Strait, Bitung City	96
37	Pricilia. O.M. Ompi, Yehezkiel. Marpaung, Frans Lumoindong, Stella T. Kaunang, Medy Ompi	Monitoring marine Gastopod (Nudibranchia) in North Sulawesi: what do we know about <i>Phyllidia</i> sp., and <i>Nembrota</i> sp., in Lembeh Strait?	98
38	Deiske A. Sumilat, Rosita A. J. Lintang, Alfa W.W.S. Mongi, Farnis B. Boneka	Marine derived fungi <i>Aspergillus</i> sp. isolated from unidentified algae	102
39	Robert A. Bara, Fitje Losung, Calvyn F. Sondak, Jimmy Posangi, Remus Maradou, Stefan Kehraus, Ekaterina Eguereva, Alexander Bogdanov, Gabrielle Koenig	Investigation of antifouling compound from sponge <i>Siphonodictyon</i> sp.	104
40	Fitria Fresty Lungari, Ishak Bawias	Technology Evaluation (Humanware) of the Fishing Industry in Tahuna Bay, Sangihe (Case Study: Outrigger Boat Fishermen)	105
41	Sanger G, Rarung L.K Assa Y. , Kaseger B.E.	Antioxidant Capacity And Alpha Glucosidase Inhibitory Activity Of Ethyl Acetic Extract Edible Marine Algae (<i>Halimenea Durvillae</i>).	107
42	Joudy R.R. Sangari, Grevo S. Gerung, Unstain N. Rembet, Ridwan Lasabuda	Socio-Ecological System (SES) of Small-Scale Crab Fisheries Cluster in South Minahasa Regency, North Sulawesi	110
43	Sanusi Gugule, Chaleb Paul Maanari, Feti Fatimah, Djefri Tani	Synthesis and Characterization of Biodiesel from Virgin Coconut Oil (VCO)	112
44	A Armid, R Shinjo, Takwir A, R Ruslan	Spatial Distribution and Pollution Assessment of Heavy Metals Pb, Cu, Ni, Fe and As in the Surface Seawater of Starring Bay, Indonesia	114
45	Feny Mentang, S. Berhimpon, Henny A. Dien Kristhina P. Rahael Nurmeilita Taher, Ayub U.I Meko , Roike I. Montolalu	Effect Of Concentration Of Collagen Skin Fish Extraction As An Edible Coating On Sensory Properties Of Smoked Fish Nugget And Fish Stick.	116
46	Rumengan, I.F, N.D. Rumampuk, M. S. Siby, L.C. Mandey, A.H. Luntungan, G. Citraningtyas	The phenolic contents of bitter leaf (<i>Vernonia amygdalina</i>) extracts coated with the nanochitosan derived from fish scales and its activity againts HIV-Protease by Autodock Vina	118

No.	Authors	Title	Pages
		simulation	
47	Suzanne L. Undap, Markus T. Lasut, Sebastian C. A. Ferse	Tributyltin Contamination On Tropical Marine Fish In Coastal Water Of North Sulawesi	121
48	Jeffrie F. Mokolensang, Lusia Manu, Gaspar D. Manu, Henneke Pangkey	Effect of Distillery By-products on Growth Performance of Common Carp (<i>Cyprinus carpio</i> L.)	123
49	Revol D.C. Pamikiran, Frangky E. Kaparang, Heffry V. Dien, Lusia Manu	Stability due to the shape of Small Purse-seiner in North Sulawesi	126
50	Lena J. Damongilala, Defny S. Wewengkang, Fitje Losung	Phytochemical Screening and DPPH Test of Tropical Red Algae of <i>Eucheuma spinosum</i> in North Sulawesi Waters, Indonesia	128
51	Frans Augusthinus, Asmuruf Yohanis Irenius, Mandik, Jonathan, Kiwasi Wororomi, Yane Oktovina Ansanay	Novelty Of Producing Maltodextrin From Local Sago Of Papua	133
52	Yohanis I. Mandik, Frans A. Asmuruf, Jonathan K. Wororomi, Yane O. Ansanay, Octolia Togibasa	Optimization of A Direct Sonication-Assisted Transesterification Process in Biodiesel Production from a Newly Jayapura Freshwater Microalgae Isolate (<i>Scenedesmus</i> sp.) using Response Surface Methodology (RSM)	135
53	H F Sangian, B H Manialup, A R Rashma, Gerald H. Tamuntuan, R Purwadi, Godlief F. Neonufa, Achil Sadjab, Zulfazri Zulfazri, Veckey A. J. Masinambow, Johnly A. Rorong	Analysis of water-ethanol-gasoline (RON88) compositions in one phase substance	137
54	Henry F. Aritonang, Agres, K. Tarigan, Audy D. Wuntu	Synthesis and Characterization of Ag-Doped ZnO Nanoparticles and Their Photocatalytic Degradation Activity	143
55	F Fatimah, S Gugule, J A Rorong, V S Kamu, J M Tungadi, P A Kaurong, T E Tallei	Processing Optimization of Bakasang from Skipjack Fish (<i>Katsuwonus pelamis</i>) Viscera Using Surface Response Methods	145
56	Julius Pontoh, Alvy Muhamat Umage	Gas Chromatographic Analysis of Fatty Acids in the Head of Snakehead Fish (<i>Chana striate</i>) Oil from Wild and Cultured Sources	147
57	Sendy B. Rondonuwu, John S. Kekenusa, Farha Dapas, Beivy J. Kolondam	Bioremediation of Mercury Waste Using Bacteria in Bioreactors in Small Scale Gold Mining in Talawaan-Tatelu Village, North Minahasa Regency, North Sulawesi Province	150
58	Jaka F P Palawe, Eko Cahyono	Potential Of Electrolysis Water From Sea Water As Fresh Fish Preservation	152
59	Julita Nahar, Elis Hertini, Fatimah Khonsa S., Sudrajat Supian	Application Of Principal Component Analysis (PCA) In The Relationship of The Phytoplankton Community Structure With The Physical-Chemical Structure In The Territorial Waters Of Kelabat Bangka West Bay	156
60	Stenly Wullur, Elvy L. Ginting, Veibe Warouw Inneke F.M. Rumengan	Molecular identification of bacteria isolated from culture medium of pearl oyster <i>Pinctada maxima</i> fed on fishwastes diet	158
61	Billy J. Kepel, Widdhi Bodhi, Fatimawali	Isolation And Identification Of Arsenic-Resistant Bacteria From The Buyat Estuary And Beach Of North Sulawesi That Can Be Used For Arsenic Remediation	160
62	Rondonuwu A.B., J.L. Tombokan, R.Dj. Moningkey, K.J. Antou	Survival Rate and Growth of <i>Acropora</i> sp. Transplanted on Artificial Substrate in Kampung Ambong, Likupang Timur	162

No.	Authors	Title	Pages
63	Rembet U.N.W.J., Ari B. Rondonuwu, L.T.X. Lalamentik	Survival Rate, Length Growth And Growth Rate Of Coral Transplants In Artificial Substrats In Poopoh Village, Minahasa District, North Sulawesi Province	164
64	Sandra O. Tilaar, Kristin I. Kondoy, Esther D. Angkow	Effect Of Salinity On Seaweed Growth <i>Kappaphycus Alvarezii</i>	166
65	Lusia Manu, Gaspar D., Manu, Jeffrie F., Mokilensang	Morphological Change at the Mouth of Tondano River Delta	168
66	H. Sambali, J.D. Mudeng, G.O. Tambani, D.M. Makapedua, S.B. Pratasik	Propagation of Coral Fragment <i>Acropora formosa</i> as Ornamental Coral for Economic Development, Rehabilitation, and Conservation in Manado Bay, North Sulawesi	170
67	Hermawan, Yulian Syahputri, Adriana Sari Aryani	Sustainability Index and Value Added of Oleochemical Products as Raw Material for Polyurethane Industry	173
68	Max R.J Runtuwene, Vanda S Kamu, Paulina Veronika Y Yamlean, Ratna Siahaan	Etnomedicine And Antioxidant Activity of Medicinal Plants of Sangihe Ethnic Group In North Sulawesi	175
69	Grevo S. Gerung, Veibe Warouw, Edwin A. Ngangi, Stenly Wullur	Development of DNA extraction technique for algae Rhodophyte <i>Kappaphycus alvarezii</i>	178
70	Desy M.H. Mantiri, Rene C. Kepel, Henky Manoppo, Kurniati Kemer, Nasprianto	Comparison of Metal Concentrations of Cadmium, Chromium and Lead in Water, Sediment and Brown Algae <i>Thallus, Padina australis</i> , Hauck in North Sulawesi Waters	179
71	Erny J.N. Nurali, Thelma D.J Tuju, Rawung, Elisabeth M. Meray	The Chemical Composition of Gluten Free Casein Free Snack Bars Made from Goroho Plantain (<i>Musa Acuminata</i> , Sp) and Gedi Leaves (<i>Abelmoschus Manihot</i> L.)	182
72	Vanda Kamu, Max R.J Runtuwene, Edy Lengkong	Antioxidant Activity And Total Phenolics Of Several Medicinal Plants Used As Anticancer From North Sulawesi And North Maluku	184
73	Indah Nur Safitri, Sudrajat, Eman Lesmana	Stock Portfolio Analysis Using Markowitz Model	187
74	Fadli Azis, Sudradjat Supian, Eman Lesmana	An Inventory Model for Deteriorating Items With Exponential Declining Demand and Return	191
75	James U.L. Mangobi, Vivian, E. Regar	Mathematical Model of Agricultural Land Optimization in Efforts to Increase the Profit of Farmers	196
76	M Faudzi Bahari, Eman, Lesmana, Subiyanto	Flow Shop Scheduling To Minimize 3-Machine and n-Job Rental Costs by considering Job-block criteria	198
77	Sudradjat, M Faudzi Bahari, Lesmana Eman, Subiyanto	Flow Shop Scheduling to Minimize Rental Costs by Considering Job-Block Criteria	202
78	Sudradjat, Hazman Hiwari, Titan Malik Ibrahim, Subiyanto	Hydrodynamic Model Simulation of Cikidang River Estuary, Pangandaran based on Two Seasons in Indonesia	204
79	Riana Magdalena	Analysis of Aggregate Heuristic Planning For Planning and Controlling The Amount of Production To Minimize Costs	206
80	Subiyanto, Titan Malik Ibrahim, Hazman Hiwari, Yuyun Hidayat, Yudi Nurul Ihsan, Sudradjat	Coastline Change Analysis through Numerical Flow Modelling On Batu Hiu, Pangandaran	208
81	Diah Chaerani, Eman Lesmana, Siti Sarah Amirah SP	Solving Uncertain Online Shopping Problem with Discount using Robust Counterpart Methodology.	210
82	Suci Astutik, Umu Sa'adah, Darmanto, Bima Anoraga	Algorithm of Hidden Markov Model with Bayesian Approach on Rainfall Data	214
83	Umu Sa'adah, Budi Santosa	Maximal Overlap Discrete Wavelet Transform-Neural	216

No.	Authors	Title	Pages
		Network for Jakarta Islamic Index Forecasting	
84	F. L. Fredrik G. Langi, Ribka E. Wowor	Analysis of Health Survey Data with Non-Ignorable Missing Covariates and Unknown Sampling Mechanism	218
85	Irfan Wahyudin, Eneng Tita Tosida, Fredi Andria, Taufik Djatna, Irman Hermadi	An Information Retrieval System for Indonesian SME Business Risk Analysis based on Vector Space Model and Latent Semantic Analysis	221
86	Herlina Napitupulu, Ema Carnia, Asep K. Supriatna	Comparison of Different Crossover Procedures in Genetics Algorithm Applied to Backcross Breeding Problem	224
87	Ema Carnia, Herlina Napitupulu, Asep K. Supriatna	Geometric Representations for Eigen Spaces of Pairwise Comparison Matrix	226
88	Herlina Napitupulu, Sukono, Trisha Magdalena A	Centrality Measurement of Indonesia Flight Routes Using Gephi	228
89	John S. Kekenusa, Sedy B. Rondonuwu, Marline S. Paendong	Determination of the status of utilization and effort of little tuna (<i>Euthynnus affinis</i>) caught in the North Minahasa waters North Sulawesi	230
90	Stephanie E. Chungdinata, Christie E. J. C. Montolalu, Therechia A. F. Soares, Altien J. Rindengan, Yohanes A.R. Langi, Rinancy Tumilaar, Mans Mananohas, Charles E. Mongi	Shortest Path to Determine Evacuation Route from Lokon Volcano Eruption on Warembungan Village using Floyd Warshall Algorithm	238
91	Hanny A.H. Komalig, Weny I. Wiyono, Charles E. Mongi	Analysis Of The Patient Satisfaction With Multivariate Methods (Case Study At Several Hospitals In North Celebes)	240
92	Febrina D. Simatupang, Hanny Komalig	The Optimal Decision In Choosing The Tourism Locations's Routes In Lolak District, Bolaang Mongondow, North Sulawesi	243
93	Christie E. J. C. Montolalu, Luther A. Latumakulita, Deiby T. Salaki, Stephanie E. Chungdinata, Therechia A. F. Soares, Altien J. Rindengan, Yohanes A.R. Langi, Rinancy Tumilaar, Mans L. Mananohas, Charles Mongi	Optimization of Tsunami Evacuation Route using Floyd Warshall Algorithm (Case Study: Manado City)	244
94	Djoni Hatidja, Winsy Ch. D. Weku, Sedy B. Rondonuwu	Spatial Distribution of Temperature and Tides in Lumintang Beach, Minahasa Tenggara Regency, North Sulawesi	246
95	Altien J. Rindengan, Marline S. Paendong, Mans L. Mananohas, Yohanes A.R. Langi, Rinancy Tumilaar, Christie Montolalu, Charles Mongi, Luther A. Latumakulita, Deiby T. Salaki	Tuna Fish Freshness Classification Based on the Length of Exposure at Room Temperature Using Digital Image Analysis	248
96	Yohanes A R Langi, A J Rindengan, C E Mongi, W Appi', M L Mananohas, R Tumilaar, C E J C Montolalu, Fernando Pongoh, Martina Langi	The Best Allometric Rergresian Equations Models to Estimate Biomass and Carbon Stocks in the Agroforestry Stand of the Minahasa Distric	251
97	Sukono, Stanley Pandu, Dewanto, Dwi Susanti, Candra Budi Wijaya, Nurfadhline Binti Abdul, Halim	Capital Allocation with Activity and Incremental Methods Based on Solvency II	253

No.	Authors	Title	Pages
98	Sukono, Betty Subartini, Herlina Napitupulu, Ela Novitasari, Puspa Liza Ghazali	Analysis of Premium Determination using the Peak Over Threshold (POT) Approach for the Disaster Reinsurance Program	255
99	Endang Soeryana, Hasbulah, Sukono, Alberto Simanjuntak, Nurfadhlina, Binti Abdul Halim	ARIMA-GARCH Model for Estimation of Value-at-Risk and Expected shortfall of Some Stocks	257
100	Riaman, Bety Subartini, Sudradjat Supian, Sukono	Analysis of Determination of Adjusted Premium Reserves for Last Survivor Endowment Life Insurance Using the Gompertz Assumption	259
101	Agus Santoso, Diki, Tina Ratnawati, Mulyatno	Detection of Student Inactive Status at the Faculty of Science and Technology Universitas Terbuka Using the Polytomous Logistics Regression Model	263
102	Nurita Andayani	Comparison of Generalized Estimating Equation (GEE) Method with Poisson and Negative Binomial Connecting Functions in Underdispersion Data (In the Case of Asthma Sufferers in Jakarta, RS Persahabatan)	265
103	Aceng Sambas, Sundarapandian, Vaidyanathan, Sen Zhang, Sukono, Yuyun Hidayat, Gugun Gundara	Dynamic Analysis and Synchronization of a New Chaotic System with a Circle Equilibrium and Two Perpendicular Lines of Equilibrium Points	267
104	Riaman, Sudradjat Supian, Sukono	Analysis of Coronary Heart Disease Survival Data using Hazard Cox Proportional Model	269
105	Rini Cahyandari, Asep Solih Awalluddin, Dara Selvi Mariani, Tika Karlina, Rachmawati Wahyudin Darmalaksana, Sukono, Puspa Liza Ghazali	Motor Vehicle Insurance Integration Model	273
106	Mochamad Suyudi, Mustafa Mamat, Sudradjat Supian, Sukono	Using The Branch And Bound Method For Solving The Travelling Salesman Problem	275
107	Usman Abbas Yakubu, Ibrahim Mohammed, Sulaiman, Mustafa Mamat, Puspa Liza Ghazali, Kamil Khalid, Eneng Tita Tosida	The Global Convergence of a Descent Conjugate Gradient Coefficient	277
108	Saber Syouri, Ibrahim, Mohammed Sulaiman, M.M. Alghrouz, Mustafa Mamat Suliadi Firdaus Sufahani, Eneng Tita Tosida	Conformable Fractional Derivative	280
109	Saleh Nazzal Alsuliman, Ibrahim Mohammed, Sulaiman, Mustafa Mamat, Puspa Liza Ghazali, Kamil Khalid, Eneng Tita Tosida	A new Hestenes-Stiefel and Fletcher-Reeves Conjugate Gradient Method with descent properties for Nonconvex functions	283
110	Ibrahim Mohammed, Sulaiman, Mustafa Mamat, Puspa Liza Ghazali, Hazimi Foziah, Kamilu Kamfa, Eneng Tita Tosida	An Improved Shamanskii Method for Solving Nonlinear Equation	286

No.	Authors	Title	Pages
111	Talat Alkhouli, Mohd Rivaie, Mustafa Mamat, Ibrahim Mohammed Sulaiman, Suliadi Firdaus Sufahani, Eneng Tita Tosida	A Modified Hestense–Stiefel for Solving Unconstrained Optimization Problems	288
112	Mouiyad Bani Yousef, Ibrahim, Mohammed Sulaiman, Mustafa Mamat, Puspa Liza Ghazali, Mohd Rivaie, Nelson Nainggolan	A New Hybrid MMR-PRP Conjugate Gradient Methods with Inexact Line Search	291
113	Wan Noor Afifah Wan Ahmad, Suliadi Firdaus Sufahani, Mustafa Mamat, Alan Zinober, Kamil Khalid, Nelson Nainggolan	The Combination of Newton with a Minimization Method in Shooting Technique for Solving Royalty Problem with Piecewise Function	294
114	Umar Omesa Abdu, Ibrahim, Mohammed Sulaiman, Mustafa Mamat, Muhammad Yusuf Waziri, Hazimi Foziah Nelson Nainggolan	New Hybrid Conjugate Gradient Method for Solving Fuzzy Nonlinear Equations	298
115	I Aisah, B Subartini, Muhaemin	Endomorphism Representation Matrix From Standard Genetic Code	300
116	Aceng Sambas, Sukono, Sundarapandian, Vaidyanathan, Sen Zhang, Yuyun Hidayat, Gugun Gundara	Coexisting Chaotic Attractors and Bifurcation Analysis in a New Chaotic system with Close Curve Equilibrium Points	302
117	Chang-Hua Lien, Sundarapandian, Vaidyanathan, Aceng Sambas, Sukono, Mustafa Mamat, Nelson Nainggolan	A New 4-D Hyperchaotic Two-Wing System with a Unique Saddle-Point Equilibrium at the Origin and its Analysis	304
118	Esteban Tlelo-Cuautle, Sundarapandian, Vaidyanathan, Sukono, Aceng Sambas, Mustafa Mamat, Nelson Nainggolan	Multistability in a New Chaotic System with Line of Equilibrium Points	307
119	Saad Fawzi AL-Azzawi, Hani Rubiani, Sukono, Aceng Sambas, Nelson Nainggolan	Chaotic Lorenz System and it's Suppressed	310
120	Sundarapandian, Vaidyanathan, Sukono, Chang-Hua Lien, Aceng Sambas, Mustafa Mamat, Nelson Nainggolan	Analysis and Adaptive Synchronization of a New Chaotic System with a Hyperbola of Equilibrium Points	313
121	Volodymyr Rusyn, Diana Purwandari, Sukono, Aceng Sambas, Nelson Nainggolan	Chaotic and Controlling Regimes of a New Modified Chua's Generator	315
122	Felliks Tampinongkol, Sahid Hudjimartu, Wim Iqbal Nursalam, Lilik Budi Prasetyo, Yudi Setiawan	Support Vector Regression for Estimations Canopy Cover Based on LiDAR and Landsat 8 Data	317
123	Nurma Dewi Mufa'ati, Toni Bakhtiar, Jaharuddin	The optimal control of infectious disease transmission under linear and quadratic performance criteria	319

No.	Authors	Title	Pages
124	Hizkia H. D. Tasik	Can Energy Consumption and Benefit Programs Really Explain Living Standards Afterwards? Evidence from Northern Sulawesi, Indonesia	321
125	Ashma Nur Afifah, Ratna Djuwita	Drive and Barrier Factors of Waste Segregation Behavior using The Theory of Planned Behavior: Case Study at Student Dormitory Canteen of XYZ University	323
126	Romadhani Ardi, Asyari Fauzan	Assessing the Funding Scheme of WEEE Management System in Indonesia Using System Dynamic Model	326
127	Dimas Teguh Prasetyo, Ratna Djuwita	Lecturer as Role Model to Prevent Food Waste in University: Baseline Study to Design an Intervention	328
128	Nansi Margret Santa, Hengkie J. Liwe, Merry A.V. Manese	Utilization of Agricultural Waste as an Alternative Feed in Increasing Household Income of Pig Farmers	331
129	Ferdi Antonio, Putri Astika	In Search of Customer Values which Drive Intention to Use and Recommend the Green Products; Empirical Study Among Post Graduate Students	333
130	Indah Suciati, Alice Salendu, Eka Gatari	Stay or Leave? The Moderating Effect of Psychological Capital on Workplace Ostracism	335
131	Agung Stefanus Kembau, Vekky Supit, Cysca Langi	Implementation of Integrated Marketing Communication (IMC) In Higher Education As An Adaptive Step In Era of Industrial Revolution 4.0: A Case Study In Manado State Polytechnic	337
132	Mikke Marentek, Agung Kembau, Arief Kumaat	Word-Of-Mouth Behavior On Social Media: Study Of Y And Z Generation Instagram Users	340
133	Sri Setyaningsih, Lina Novita, Third C. Author	Optimization of Improving Organizational Commitment through Organizational Cultural Transformational Leadership and Knowledge Management	343
134	Nur Rochaeti, Pujiyono, Aista Wisnu Putra	Criminological Juridic Study on The Ban of The Use of Cantrang Net For Fishermen Communities In Tegal Area	349
135	Natelda R. Timisela, S. Titaley	Effect of Product Attributes on Consumer Satisfaction of Organic Vegetables at Dian Pertiwi Supermarket, Ambon City	350
136	Mira Novana Ardani	The Importance of Land Registration to Support Successful Environmental Management	353
137	Erika Revida, Hadriana Marhaeni Munthe, Sukarman Purba	The Influence of Effectiveness of the Tourism Village Program on The Community Motivation in Developing Tourism Villages At Meat Tourism Village Toba Samosir, North Sumatera	355
138	Agung Sutrisno, Shinta, Virdhian, Lioris Panata,, Cynthia E.A. Wuisang, I.N. Gede	Mapping Critical Organizational Risk Variables Using ISO 31000 Framework	358
139	Friska M. Makalew, Prudensy F. Opit, Ronaldo M. Rottie	Pre-positioning Planning for Flood Emergency Supplies: A Case Study in North Sulawesi, Indonesia	360
140	J I Kindangen, M K Umboh, J C Mandey	Integration of Solar Panels and Zinc-Roofed Buildings for Thermal Comfort and Renewable Energy Sources	363
141	Liza Evelyn Joe, Tajuddin Nur, Marsul Siregar, Karel O. Bachri	Investigation the Influence of Magnet Edge Shaping of Fractional Slot Number on the Air-gap Magnetic Flux Distribution and Leakage Flux Shaft in Permanent Magnet Machine	366
142	Liza Evelyn Joe, Tajuddin Nur, Marsul Siregar, Catherine O. Sereati	Compounding of Fractional Slot Number Technique and One Step of Slotting in Magnet Edge on the Cogging Torque Reduction in Permanent Magnet Generator.	368
143	Dolly Ramly Wohon, Tajuddin Nur, Marsul Siregar, Lanny W Pandjaitan.	Investigation the Step of Slotting in Magnet Edge on the Cogging Torque Reduction of Fractional Slot Number of 24S/10P in Permanent Magnet Generator	370

No.	Authors	Title	Pages
144	Marsul Siregar, Tajuddin Nur, Dolly Ramly Wohon, Sandra O.B.W	Novel Cogging Torque Reduction Technique of Integral Slot Number in Permanent Magnet Generator	373
145	Marsul Siregar, Tajuddin Nur Ranto Valentio Tambunan Karel O. Bachri	Optimization of Mini Hydropower Plants in High-Rise Buildings in Indonesia by Introducing the Low Cogging Torque Generator	375
146	Tajuddin Nur, Marsul Siregar, Lukas, Maria Kartawidjaja	Analysis the Effect of Slotting in Magnet Edge on the Air Gap Magnetic Flux Distribution in Permanent Magnet Generator using Numerical Analysis	377
147	Tajuddin Nur, Marsul Siregar, Sandra O.B.W, Liza E. Joe	Improvement of Cogging Torque Reduction Technique of Fractional Slot Number in Permanent Magnet Machine	379
148	Franky Reintje Tulungen	Problem Identification and Its Solution through the Competitive Intelligence Application. Case of Geothermal Power Plant Development in Tompasso, North Sulawesi, Indonesia	381
149	Titik P. Artiningsih, Heny Purwanti, Budiono	Blended Cement: improve the properties of concrete using environmentally friendly blends	383
150	Franky E.P. Lapien, Prabendra A. Atmakusuma	Effect of Limestones on Compressive Strength of Laterite Soil-Portland Cement Composite	386
151	Teti Syahrulyati, Vijaya Isnaniawardhani, Mega Fatimah Rosana, Winantris	The Bojongmanik Formation Deposition Environment Gajrug Area And Surroundings Lebak District - Banten Province	388
152	Gerald Tamuntuan, Seni Tongkukut, Guntur Pasau, Hanny F. Sangian, Adey Tanauma, Agnes T. Mandagi, Octolia Togibasa	Magnetic Properties and X-Ray Spectroscopy of Fe-Rich Coastal Sand from North Sulawesi	390
153	Gerald H. Tamuntuan, Brian B. Mambu, Guntur Pasau, Agnes T. Mandagi, Dolfie P. Pandara, Ferdy	Characteristic of Tsunami Interference in the Strait Perpendicular to Wave Propagation: Case Study of TUNAMI Modeling in the Lembeh Strait, North Sulawesi, Indonesia	392
154	Dolfie P. Pandara, Buldan Muslim, Bambang Sunardi Ferdy, Mans Mananohas, Kristian Ango	Analysis of Ionosphere disturbance caused by the Lokon Volcano Eruption using GPS TEC data from GNSS satellites for optimal decision on a disaster mitigation	394
155	Dolfie P. Pandara, Buldan Muslim, Guntur Passau, Ferdy Mans Mananohas, Kristian Ango	Analysis of seismo-ionospheric relationship using cross wavelet transformation for detection of The Lokon explosive activity as an optimally mitigation effort	396
156	Gerald Tamuntuan, Hanny Sangian, Guntur Pasau, Silvia J. Fajar, Abdul Hafidz, La Ode Safiuddin	Preliminary Rock Magnetic Study on The Quaternary Tuff Originated from Two Different Episodes of Tondano Volcano Eruption	398
157	Ridwan, Mutiara Nurmanita	Maintenance Of 60 Mva Power Transformers In Pauh Limo Substation Padang	400
158	Aceng Sambas, Sundarapandian, Vaidyanathan, Sen Zhang, Sukono, Yuyun Hidayat, Gugun Gundara	Dynamic Analysis and Synchronization of a New Chaotic System with a Circle Equilibrium and Two Perpendicular Lines of Equilibrium Points	402
159	Riaman, Sudradjat Supian, Sukono	Analysis of Coronary Heart Disease Survival Data using Hazard Cox Proportional Model	404

No.	Authors	Title	Pages
161	Rini Cahyandari, Asep Solih Awalludin, Dara Selvi Mariani, Tika Karlina, Rachmawati, Wahyudin Darmalaksana, Sukono, and Puspa Liza Ghazali	Motor Vehicle Insurance Integration Model	408
162	Mochamad Suyudi, Mustafa Mamat, Sudradjat Supian, Sukono	Using the Branch and Bound Method For Solving The Travelling Salesman Problem	410
163	Hadi Sutanto, Chin-Tu Lu, Hodik Chaiyadi	Optimization of Symmetrical Airfoil of the Darrieus Vertical Axis Wind Turbine Using Computational Fluid Dynamics Method	412
164	Eliezer Mangoting Rongre	Algorithm Of Identifying Objects Using Quantitatif Indicators Built By Making Use Of Analogy Of Points In n-Dimensional Space	414
165	Alfrets Septy Wauran, Imriani Moroki	Weather Prediction in Manado Bay as Real Time System Using Fuzzy Logic Methods	417
166	Agus Susanto, Sumartono Edi, Sodikin	Mangrove Deforestation Analysis Using Remote Sensing Technology in Pasekan and Cantigi Districts, Indramayu Regency, West Java, Indonesia	419
167	Christina Rahayu Wulandari, Ratna Djuwita	Video-Based Waste Sorting's Literacy to Increase Waste Sorting Behavior of "XYZ" University's Students	421
168	Luh Kesuma Wardhani, Fajar Nugraha Wahyu, Nashrul Hakiem	Development of Service Desk System based on ITIL V3 at a Higher Education Institution	424
169	Ottopianus Mellolo, Toban T. Pairunan, Eliezer M. Rongre	Bundle Feature Extraction Contained in Coconut Wood Digital Image	426
170	Andi Chairunnas, Endah Putri Sriwahyuni	Application Of Firebase Realtime Database Technology On Cemetery Management At Sirnalaya 1 Cianjur Public Cemetery Based On Mobile Application	428
171	Putra Sumarto, Debby Paseru, Michael Sumampouw	Application of Obesity Determination Using the K-Nearest Neighbors (KNN) Method	431
172	R Patadjenu, A M Adrian, T Ch. Suwanto	Web Search Application for Nearest Location of Halal Restaurant in Manado Using Dijkstra Algorithm	433
173	Willy Permana Putra, Alifia Puspaningrum, Hayatun Nupus, Damar Nurcahyono, Yonatan Parassa	Tuberculosis Disease Management Using Naive Bayes Method Website Based	435
174	Damar Nurcahyono, Abdul Najib, Farindika Metandi	Distributed Database Design With Parsial Replications (Case Study: Rumah Nutrisi)	439
175	A Sumarudin, Willy Permana Putra, Ahmad Rifai	Design Multi Input Automatic identifier System Class B for Indonesian Fishery	442
176	Erman Arif	Disaster Management Information System Design in Indonesia Based on Digital News Portal	444
177	Robert Molenaar, Freeke Pangkerego, Hildy Wullur	The Design And Construction Of A Configurable Ecosystem Simulation Workbench	446
178	Latumakulita, L. A, Salaki, D. T, Montolalu, C. E. J. C. Rindengan, A. J	An Intelligent Prediction System for Bidikmisi Scholarship Selection Process Using Artificial Neural Network	448
179	Eneng Tita Tosida, Agung, Djati Waluyo, Deden, Ardiansyah	Optimization of Web Based Finansial Transaction Information System : Reinforcing of Tourism Based Small and Medium Enterprises (SMEs)	451

No.	Authors	Title	Pages
180	Eneng Tita Tosida,Irfan, Wahyudin, Fredi Andria, Fajar Delli Wihartiko,Andi Hoerudin	Optimization of Indonesian Telematic SMEs Assistance Classification : Reinforcing by Adaboost and Bagging Algorithm	454
181	Eka Julianti	Maximizing Green Computing in Utilizing ICT to Support the Performance of Academic Community: An Analysis	458
182	Prihastuti Harsani, Arie Qurania, Mulyati, Triastinurmiatiningsih, Lili Wulandari, Alexander Gunawan, Widia Anggraeni	Pathogen Identification in Turmeric (<i>Curcuma domestica</i>) Using Neural Networks	460
183	Meidy Atina Kuron, Mita Liani Tompdung	Development Of Integrated Offline Learning Multimedia To Improve Student Learning Outcomes	463
184	Arie Qur'anía, Prihastuti Harsani, Triastinurmiatiningsih, Lili Ayu Wulandhari, Alexander, Agung Santoso Gunawan, Dona Putra Por	Hue Saturation Value (HSV) color detection to identify nutrient deficiencies in chili (<i>Capsium annuum</i> L) using K-Nearest Neighbor	465
185	Fajar Delli Wihartiko, Eneng Tita Tosida, Aziz Kustiyo, Hermawan	Model & Simulation of Sawit Smart Transportation : Case Study of Sei Tandun / Sei Rokan Distric, PT Perusahaan Nusantara V	469
186	Henny Suharyati, Griet Helena Laihad, Eka Suhardi	Development Of Teacher Creativity Models To Improve Teachers' Pedagogic Competency In Educational Era 4.0	473
187	Juliet M Eva Mamahit, Jusuf Manueke, Vivi B Montong	Effectiveness of Seed Extract Hutumn (<i>Baringtonia asiatica</i> L.) as Botanical Insecticide to Control the Papaya Mealybug <i>Paracoccus marginatus</i> (Hemiptera : Pseudococcidae)	475
188	C. J. Pontoh, A. Rumambi, Y. L.R. Tulung, B. Bagau, E. S. Tangkere	The Use Of Arbuscula Mikorizae Fungi In Mixed Plant <i>Arachis Pintoi</i> And <i>Stenotaphrum Secundatum</i> Under Coconut Plants	478
189	Aaltje E. Manampiring, Joice N Engka, Josef B. Tuda	Metabolic Syndrome In Adolescents In Manado City	479
190	Stevianus Titaley, Natelda R. Timisela	Assessment Of Waste Management to Small Island (Case Study on a Saparua Island)	483
191	E L Baideng, H J Lengkong, T M Frans	The Influence of Biopesticides on Natural Enemy Populations in The Potato Plants of Modoinding	487
192	Lidya Irma Momuat, Rizald Max Rompas, Julius Pontoh, Grace Sanger	Comparative Study of The Hypocholesterolemic Effects of <i>gracilaria</i> spp.	490
193	Netty Salindeho, Engel Pandey	Characteristics of Chemical and Policyclic Aromatic Hydrocarbon Physics Julung Fish (<i>hemirhampus marginatus</i>) Smoke Liquid of Nutmeg Shell	492
194	Nelson Nainggolan, Hanny A. H. Komalig, Tohap Manurung	Generalized Space Time Autoregressive (GSTAR) Model and the Application on Commodity Prices of Cloves, Nutmeg and Copra	495
195	Meiske Sangi, Julius Pontoh	Determination of Total Phenolic Content and Antioxidant Activity from Several Fractions of Aren's (<i>arenga pinata</i>) Midrib Flour	497
196	Dewa Gede Katja, Desi Harneti, Tri Mayanti, Unang Supratman	Stigmasterol Compound (Steroid) From <i>Chisocheton Celebicus</i> Koord (meliaceae) Bark	500
197	Desy M.H. Mantiri, Billy J. Kepel, James J.H.Paulus, Rene C. Kepel	Identification of Molecular Resistant Bacteria of Mercury, in Sediment at Totok Bay, Southeast Minahasa Regency	504

Nacre Characterization of Freshwater Bivalve *Sinanodonta woodiana* (Lea, 1834)

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INTRODUCTION

One of the economically valuable fisheries resources is the mussel group, which is a type of invertebrate with a body covered by two shells (bivalves) and lives in freshwater, brackishwater, and marine waters (Setyono [1]). The shell is the basic pattern of biologically controlled mineralization (Marin *et al* [2]). Nacre or “biang mutiara” as an organized internal layer of the shell, chemically complex, mechanical properties and optical effects of these biomineral materials are responsible for their beautifully sparkling properties (Joubert *et al* [3]; Southgate and Lucas [4]). The objectives of this study was to analyze the characteristic of microstructure and the composition of biomineral elements of nacre *Sinanodonta woodiana*.

RESULTS AND DISCUSSION

Shell of *S. woodiana* consists of three layers, namely the periostracum (Fig.1A), prismatic (Fig.1B) and nacre (Fig.1C).

Internal layer of shell is patterned labyrinthine (Fig.4) and tablet nacre is hexagonal form (Fig.5). Microstructure of nacre is composed of brick walls with an average tablet thickness of 0.43 μm - 0.59 μm (Fig. 2). The composition of the biomineral element of the nacre consists of C, O and Ca, where the Ca dominates the biomineral of nacre (Tabel 1).

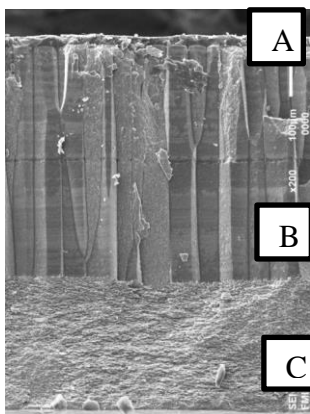


Figure 1. Layers of shell *S. woodiana*

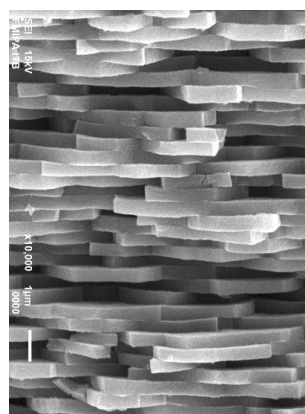


Figure 2. Microstructure of nacre



Figure 3. Shell of *S. woodiana*

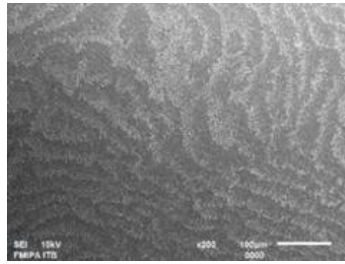


Figure 4. Labyrinthine pattern

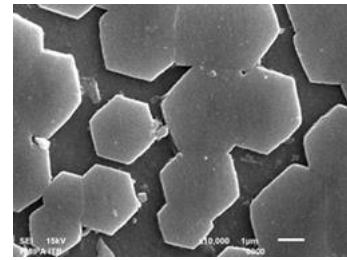
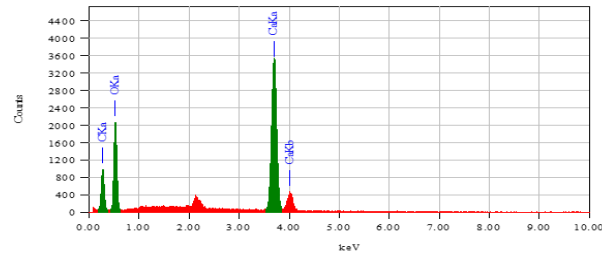


Figure 5. Tablet nacre

Tabel 1. Result of EDS



ZAF Method Standardless Quantitative Analysis

Fitting Coefficient : 0.3934

Element	(keV)	Mass%	Error%	Atom%	Compound	Mass%	Cation	K
C K	0.277	24.02	0.17	35.07		25.7733		
O K	0.525	48.12	0.46	52.74		20.9356		
Ca K	3.690	27.86	0.24	12.19		53.2911		
Total		100.00		100.00				

Keywords: biomineral, nacre, *S. woodiana*.

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