



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 Unversitas 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

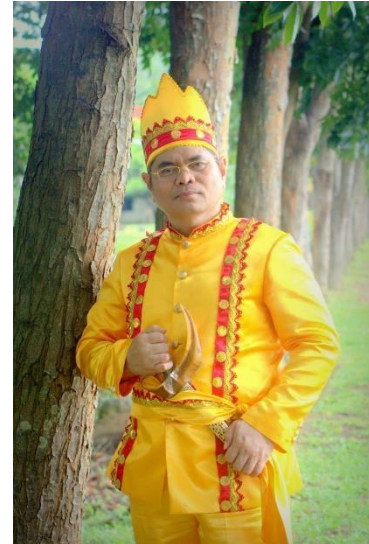
FMIPA UNSRAT in 2018. We thank, therefore, the Indonesian Operations Research Association (IORA) for this opportunity. It is an opportunity to open collaborations with other institutions, it is an opportunity to know other researchers, it is an opportunity to look at the problems more intense and eventually 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 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 be 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 discipline 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 new association in Indonesia he is beginning 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 be disseminated to several universities, government and industry.

IORA is a container that provides a forum for scientists 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 came 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 gentlement,

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

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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).



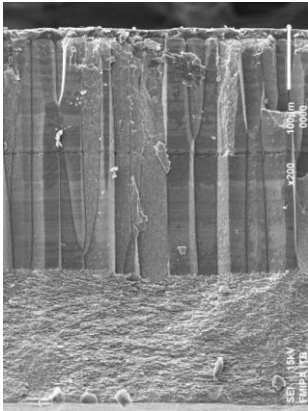


Figure 1. Layers of shell *S. woodiana*

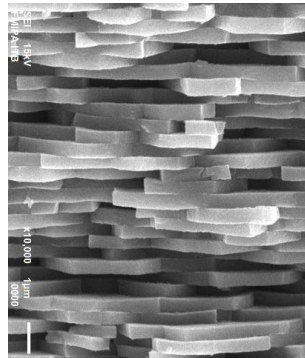


Figure 2. Microstructure of nacre



Figure 3. Shell of *S. woodiana*

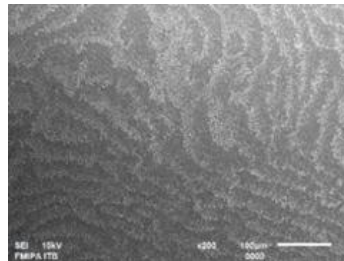


Figure 4. Labyrinthine pattern

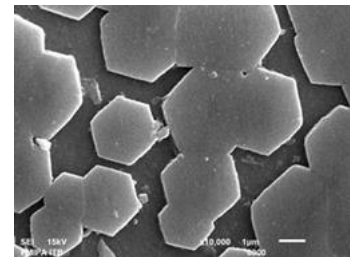
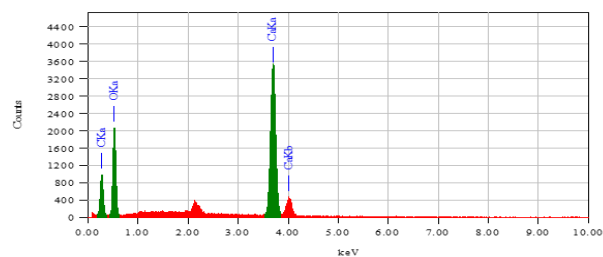


Figure 5. Tablet nacre

Tabel 1. Result of EDS



ZAF Method Standardless Quantitative Analysis

Fitting Coefficient : 0.3934

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

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

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