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The organizing committee certifies that

Yurika Witazora

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at

The 3rd International Conference on Applied Sciences, Mathematics, and Informatics (ICASMI)
Virtual International Conference
***“Natural Science, Mathematics, and Informatics in Industrial Revolution (IR) 4.0
toward The Sustainable Development Goals (SDGs)”***

Held by Faculty of Mathematics and Natural Sciences, University of Lampung
September 3rd – 4th, 2020, Bandar Lampung, Indonesia



Dr. Eng. Supto Dwi Yuwono, S.Si., M.T.
Dean

Prof. Dr. Rudy TM Situmeang, M.Sc.
Chairman



Book of Abstracts

ICASMI

**3rd International
Conference on
Applied Science
Mathematics
and Informatics**



**“Natural Sciences,
Mathematics and Informatics in
Industri Revolution (IR) 4.0 Toward
The Sustainable Development Goals
(SGDs)”**

2020

**Faculty of Mathematics and Natural Sciences
University of Lampung**

Introduction

The 3rd International Conference on Applied Science,
Mathematics, and Informatics (ICASMI)

Bandar Lampung, 3-4 September 2020

Faculty of Mathematics and Natural Sciences, University of Lampung (FMIPA, UNILA) is honored and proud to organize the 3rd International Conference on Applied Science, Mathematics, and Informatics (ICASMI). The theme of the conference is theme "Natural Sciences, Mathematics and Informatics in the Industrial Revolution (IR) 4.0 toward the Sustainable Development Goals (SDGs)."

ICASMI is a biennial event with the aims to bring together international and local scientists, researchers, academicians, also students for sharing their research, exchanging ideas, networking, opening collaboration research. Even in the covid19 pandemic, ICASMI is still held this year. This year, all conference will be held online.

The Keynote speakers are competent in their filed of study. They come from different countries, such as, Japan, Malaysia, Turkey and Indonesia. This conference will provide an opportunity for presenters to present their

current research and results, and also for participants to learn up-to-date topics and researches in their field of study.

Best wishes and we welcome you to the 3rd ICASMI held in Bandar Lampung, Indonesia.

Organized by

Faculty of Mathematics and Natural Sciences,
University of Lampung (FMIPA, UNILA)

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Speech from the Rector of University of Lampung

Vice Rectors, Dean Faculty of Mathematics, Head of LPPM and LP3M in the University of Lampung. Distinguished Keynote Speaker, and participants.



Ladies and Gentlemen
Assalamu'alaykum Wr. Wb.
Tabik pun
Good morning

First of all I would like welcome all of you for participating in the 3rd International Conference on Applied Science, Mathematics, and Informatics (ICASMI) 2020, held by Faculty of Mathematics and Natural Sciences, University of Lampung. Thank you for participating in this Conference.

I would like to express my appreciation to our keynote speakers:

Prof. Kenji Satou (Kanazawa University, Japan)

Prof. Dr. Antonius Suwanto (IPB University, Indonesia)

Prof. Dr. Hasan Küçükbay (İnönü University, Turkey)

Prof. Harith Ahmad (Univeristy of Malaya, Malaysia)

Porf. Dr. Ismail Bin Mohd (AISMM, Malaysia)

Prof. Ivandini Tribidasari, A (University of Indonesia, Indonesia)

Prof. John Hendri, Ph.D (University of Lampung, Indonesia)

We are honored that you would be participating in this conference.

Even in this Covid-19 pandemic, we are still able participate in this conference.

Indonesia has been participating in ASEAN Economy Community (AEC) and Trans Pacific Partnership (TPP) since several years ago. If Indonesia is not prepared this can be a challenge for us. Global market, innovations and foreign workers with excellence skills will be faced by Indonesia. However, there are also opportunities. By improving research and innovations in Indonesia, also by strengthening the potency of the society in Indonesia, we can face these challenges. Our university, University of Lampung, also encourages strengthen the potency of Indonesian society and values ‘Creation and Innovation for the Nation’.

The aim is to improve quality of local products, varieties of invention in all field of study, such as: chemistry, biology, mathematics, physics, and computer science. It

is important to bring together experts in these fields, in hope that we can have better knowledge and produce innovations in Indonesia.

Ladies and Gentlemen,

Hopefully in this Conference, there will be new ideas, discussion, collaboration between participants. I strongly believe that through the 3rd International Conference on Applied Science, Mathematics, and Informatics, we are able to improve our potency to face all challenges, and achieve more opportunities in the future.

I hope this Conference is able to inspire and deliver benefits to all participants, in which together we are able to contribute to science and research.

Once again, welcome to this conference and have a wonderful discussion.

Thank you very much.

Wassalamu'alaikum Wr. Wb.

Prof. Karomani,
Rector of University of Lampung





Speech from the Dean of Faculty of Mathematics and Natural Sciences

*Assalamu'alaikum Wr. Wb.
In the Name of Allah, The Most
Beneficent, the Most Merciful.
Tabik pun*

It is my great honor on behalf of Faculty of Mathematics and Natural Science, to welcome all participants to the 3rd International Conference on Applied Science, Mathematics, and Informatics (ICASMI). The theme of the conference is theme "Natural Sciences, Mathematics and Informatics in the Industrial Revolution (IR) 4.0 toward the Sustainable Development Goals (SDGs)." Even though in this Covid19 pandemic, we are still able to organize this Conference.

We hope this conference can be a platform to gather and disseminate new innovations and research in science, in particular natural science, applied science, mathematics, and also computer science/ informatics. Researchers, academicians, and students are able to share and discuss new findings and applications of science. The aim is to initiate collaborations academics, researches and industries, both national and international. As it stated in

the conference theme we encourage innovations and research to achieve the Sustainable Development Goals (SDGs).

Ladies and Gentlemen,

Faculty of Mathematics and Natural Sciences is one of the popular Faculty in University of Lampung. Currently, Our Faculty has more than 2,900 students, spread across 11 study programs. We have 1 Diploma Program, 6 Undergraduate Program, 4 Master Program, and 1 Doctoral Program. Our faculty member also includes 11 Professors and more than 50 Assistant Professor, therefor with these resources, there are many opportunities to conduct collaborations with Our Faculty. Besides, International Conference, Our Faculty also periodically organize National Conference that we call SNSMIAP. We have held this conference regularly also.

Thank you to the Rector of University of Lampung, Head of LPPM, the Head of LP3M, all the keynote speakers and participant. I would also like to give my gratitude to the organizing committee for their hard efforts in organizing this conference.

Wassalamu'alaykum Wr. Wb.

Dr. Eng. Suropto Dwi Yuwono, M.T
Dean of Faculty of Mathematics and Natural Sciences



Speech from the Conference Chairman

Good morning

Tabik pun

*Honorable Rector of University
of Lampung Prof. Karomani,*

*Dean of Faculty of Mathematics and Natural Sciences,
Dr. Eng. Suropto Dwi Yuwono, M.T,*

Head of LPPM and LP3M,

Prof. Kenji Satou (Kanazawa University, Japan)

Prof. Dr. Antonius Suwanto (IPB University, Indonesia)

Prof. Dr. Hasan Küçükbay (İnönü University, Turkey)

Prof. Harith Ahmad (Univeristy of Malaya, Malaysia)

Porf. Dr. Ismail Bin Mohd (AISMM, Malaysia)

*Prof. Ivandini Tribidasari, A (University of Indonesia,
Indonesia)*

*Prof. John Hendri, Ph.D (University of Lampung,
Indonesia),*

First of all, I would like to express my gratitude to the Rector of University of Lampung and the Dean of Faculty of Mathematics and Natural Sciences. Thank you for the support and encouragement the 3rd International Conference on Applied Science, Mathematics, and Informatics (ICASMI) can be held, even in this covid-19 pandemic. This year, the

conference is held online. All presentations and posters will be held online.

ICASMI aims is align with the vision and mission of University of Lampung which is to promote education and research in the field of science. On behalf of the committee, we are glad to report that we received great response from participants and from keynote speakers. There are more than 100 participants from various universities and institutions that will present their research in this conference. The keynote speakers are also very qualified in their field of research.

Ladies and Gentlemen,

I would also like to report that the paper presented in this conference like the previous conference, will be Published in Journal of Physics: Conference Series. This is a reputable Proceedings as it indexed by Scopus Q3 and with SJR 0.23.

Finally, I hope this Conference is able to inspire and deliver benefits to all participants, in which together we are able to contribute to science and research.

Thank you very much for your attention and I hope you will enjoy this conference.

Prof. Dr. Rudy T.M. Situmeang
Chairman of the 3rd IC

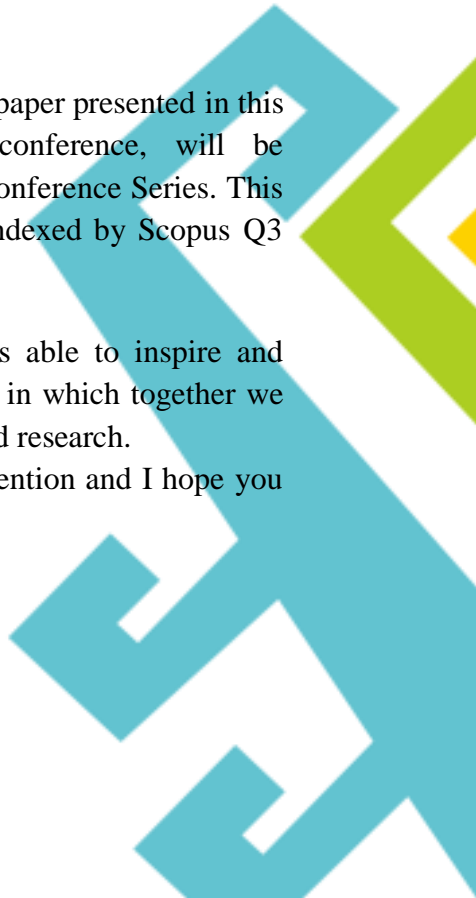


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Effect of glutaraldehyde addition on the stability of the α -amylase from *Bacillus subtilis* ITBCCB148

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ABSTRACT

α -Amylase is widely used in industry because of its ability to hydrolyze starch to glucose. Limited enzyme activity in extreme pH and temperature makes it necessary to increase enzyme stability. The purpose of this study was to improve the stability of the α -amylase from the bacteria *Bacillus subtilis* ITBCCB148 by chemical modification using glutaraldehyde (GA). The results showed that the specific activity of the α -amylase from the purification of 4,008.733 U/mg increased 5 times compared to the crude extract of the enzyme which had a specific activity of 787.851 U/mg. This native enzyme has an optimum pH of 5.5; optimum temperature of 50°C; $KM = 2.08$ mg/mL substrate; $V_{max} = 188.68$ $\mu\text{mol mL}^{-1} \text{min}^{-1}$; $k_i = 0.0298$ min^{-1} ; $t_{1/2} = 23.26$ min and $\Delta G_i = 99.829$ kJ mol⁻¹. Modified enzymes using glutaraldehyde 0.01; 0.03 and 0.05% have an optimum pH of 5.5; optimum temperature of 55°C; KM of 4.74; 5.03 and 3.87 mg/mL substrate,; the V_{max} of 285.71; 270.27 and 212.77 $\mu\text{mol mL}^{-1} \text{min}^{-1}$; k_i of 0.0183; 0.0111 and 0.0160 min^{-1} ; half-life ($t_{1/2}$) 37.87; 62.43 and 43.31 min; ΔG_i 101.091; 102.365 and 101.407 kJ mol⁻¹, respectively. Chemical modification of the α -amylase from *B. subtilis* ITBCCB148 using glutaraldehyde can increase thermal stability by 1.6-2.7 times which can be seen from a decrease in the value of k_i , an increase in half-life and ΔG_i .

keyword : α -amilase, *B. subtilis* ITBCCB148, glutaraldehyde, enzyme stability