“EDUCATIONAL CHALLENGES AND STRATEGIES OF HIGHER EDUCATION IN HEALTH ACHIEVEMENT OF SDGS 2030”

Hotel Damhil UNG, Gorontalo City, Sept 27th 2017

BOOK 3

SUSTAINABLE DEVELOPMENT GOALS

PUBLIC HEALTH DEPARTMENT
SPORT AND HEALTH FACULTY
GORONTALO STATE UNIVERSITY
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PREFACE

Assalamu’alaikum warrahatullahi wabarakatuh

Firstly, may we made our highest praise and thank to Allah The Almighty, for His bless so what we are able to conduct such an precious moment; Third International Seminar on Public Health and Education 2017 in Gorontalo Indonesia, to share our knowledge and ideas with so much warm and friendship from worldwide public health and education community.

International Seminar on Public Health and Education 2017 is aimed to gather all of experts, researchers, academicians and practitioners in health education field in general as well as national and international level in one prestigious academic forum which to discuss all health-education-related issues, ranging from human resources, curriculum, instiustionalization etc. The seminar also proposed to contribute to the focus of health development direction: by considering also situation and the status of local health condition from each region, both national and regional levels as well as its relation to global health trends.

I would like to deliver our highest respect and appreciation to our honorable speakers, Dr. Jihane Tawilah (WHO Indonesia Representative), Prof. Dr. dr. Oktia Woro K.H.,M.Kes (Keynote Speaker from Semarang State University), Febi Dwirahmadi, SKM, MSc.PH. PhD (Centre of Environment and Population Health School of Medicine, Griffith University, Australia), Prof. Kraichat Tantrakarnapa (Mahidol University), and Dr. Kukiat Tudpor, PhD (Mahasarakham University). I really expect that this seminar will be beneficial for all of us and to the development of the Public Health and Education field.

Allow me to express my gratitude to the participants and audiences from Indonesia and other foreign countries who are enthusiastic in attending this seminar. I do hope that all audiences will gain important values and collaborate it into our fields and make significant changes in the future. Besides that, I also
convey my appreciation to all of organizing committee who has given their outstanding commitment for presenting this occasion.

Wassalamu’alaikum warrahmatullahi wabarakatuh
Content

Cover ........................................................................................................................................... i
Preface ........................................................................................................................................... iii
Content ........................................................................................................................................... v

ORAL PRESENTATIONS

1. **Ecosocial Analysis Of Dengue Fever Incident In Sub District Of Kota Tengah, Gorontalo City**
   Lintje Boekoesoe, Gorontalo State University. Indonesia ...................................................... 1

2. **Relationship Between Socio-Cultural And Socio-Economic With Nutritional Status Of Children Under Five Years In Pkm Kabila, Bone Bolango Regency**
   Sunarto Kadir. Gorontalo State University. Indonesia ................................................................. 2

3. **Analysis Of Zink And Fe In Blood To Children Of Malaria Patients**
   Laksmyr Kadir. Gorontalo State University. Indonesia ............................................................... 14

4. **The Relationship Between Behavior Of Gorontalo People In Consuming Food With Coronary Heart Disease Incident In Rsud Prof.Dr.H.Aloe Saboe Gorontalo City**
   Herlina Yusuf¹, Siti Rahma², Edwina R. Monayo³, Ismet Habib⁴. Gorontalo State University. Indonesia ................................................................. 15

5. **Lead Content In Hair And Health Problems At Workers In Sbpu (Gas Station) Of Gorontalo City In 2017**
   Ekawaty Prasetya¹, Herlina Yusuf³. Gorontalo State University. Indonesia ............................... 16

6. **Supplementation Of Snakehead Fish Extract Toward Malondialdehyde(Mda)Level In Post-Stroke Patients**
   Vivien Kasim¹, Sri Manovita Pateda², Veni Hadju³, Nurhaedar Jafar⁴. Gorontalo State University. Indonesia ................................................................. 17

7. **The Impact Of Lighting Intensity On The Issue Of Eyestrain Of Karawo Artisans In Gorontalo**
   Reni Hiola¹, Rama Hiola², Lanto Mohamad³, Kamil Amali⁴. Gorontalo State University. Indonesia ................................................................. 18
8. The Influence Of Characteristic And Motivation Toward Performance Of Basic Immunization Workers At Puskesmas At Bone Bolango District  
Rama Hila, Anti Igrisa. Gorontalo State University. Indonesia

9. An Analysis Of Factor Related To Malaria Incident At Elementary School Student  
Lia Amalia. Gorontalo State University. Indonesia

10. Risk Assessment Of Heavy Metals Exposure On Oreochromis Musambicus In Limboto Lake Gorontalo Province  
Nurayini S. Lalu. Gorontalo State University. Indonesia

11. Effects Of Self Efficacy And Collective Efficacy On Prevention Behavior Of Community With Hypertension In Gorontalo Province  
Irwan. Gorontalo State University. Indonesia

12. Determinant Analysis Male Partner Involment In Prevention Of Hiv Transmission From Mother Tochild Program In Pkm Jumpandang  
Sabrina Nadjib M. Gorontalo State University. Indonesia

13. Diseases Of Jembrana In Bali Cattle In Gorontalo  
Tri Ananda Erwin Nugroho, Nibras K. Laya, Syam Kumaji, Asmarani K., Peny Humaida. Gorontalo State University, Gajah Mada Of University. Indonesia

14. Protein Analysis Oftilapia Fish Flour  
Lilik Hidayanti, SKM, MSi Sri Maywati, SKM, Mkes Faculty of Health Science, Universitity of Siliwangi, Tasikmalaya, Indonesia

15. Identify The Number Of Medical Recorder Along With Educational Qualification At Non- Government Hospital In Gorontalo City  
Rahman Suleman, M.Kes, Gorontalo. Indonesia

16. Working Station Model Based On Antropometry Mathematic Model For Employment Workers  
Asep Suryana, TasikMalaya. Indonesia

vi
17. **Sexual Behavior Differences In Adolescent Risk Students Who School In Urban And Rural Schools Gorontalo**  
Dewi Kartika, Gorontalo University. Indonesia. 59

18. **Analysis Of Use Of Health Care Service In Jkn Program By Participants Pbi**  
Rian Arie Gustaman, Kamil Roesman Bachtiar. Indonesia 67

19. **The Relationship Among Knowledge Andmotivation Withsmoking Behavior Of Adolescent At Smkn 3 Gorontalo City**  
Edwina R Monayo, Kevin E. Tololiu, Gorontalo. Indonesia 68

20. **Analysis Of Neonatal Competency Risk Factorsin Gorontalodistrict**  
Wahyuni Hafid, Novita Sari. Gorontalo. Indonesia 81

21. **General Risk Factors Of Gravidarum Hiperemesis In Pregnant Woman In General Hospital Regions Bolaang Mongondow Selatan,**  
Rahmawati¹, Rifai Ali² Bolaang Mongondow Selatan. Indonesia__________________________________________________________________________88

22. **Spatial – Temporal Analysis Incidence Of Dengue Hemorrhagic Fever (Dhf) Against Weather Variable In Limboto And Telaga Biru District, Gorontalo Regency Year 2012-2015**  
Ririn Pakaya¹. Gorontalo University, Indonesia__________________________________________________________________________99

23. **Analysis The Differences Incidence Of Stunting Age 24 -59 Months In Mountains Area And Coastal Marine In Gorontalo Regency,**  
Yeni Paramata, Rahmawati, Zul Adhayani Arda, Faculty of Public Health, Gorontalo University. Indonesia____________________________________________________100

24. **Influence Of Leader’s Behaviour, Motivation, And Work Satisfaction Toward Organizational Citizenship Behaviour (Ocb) Of Nurses.**  
Wirda Y. Dulahu¹, Dzohra Puasa². Gorontalo State University. Indonesia__________________________________________________________________________101

25. **Identification of Bacteri Racing and Nutrition Content In Pindang Tuna Fish For Sale In Traditional Market Clawi District Tasikmalaya**
Dian Saraswati\textsuperscript{1)} dan Ai Sri Kosnayani\textsuperscript{1)}. Siliwangi University Tasikmalaya. Indonesia

26. **Intestinal Parasite - Zoonosis Disease Study Of Goat In Gorontalo District**
\textsuperscript{1}Tri Ananda Erwin Nugroho, \textsuperscript{2}Nibras K. Laya, \textsuperscript{3}Sarifudin H. Hiola, \textsuperscript{4}Sarwono S. Prasejo, \textsuperscript{5}Herman S. Wahab, Gorontalo State University, Indonesia

27. **Analysis Of Factors That Contribute To Targets Baby Visit In Halmahera Clinic Semarang**
Muhammad Iqbal\textsuperscript{1)}, Bambang Wahyono\textsuperscript{2)}. Semarang State University. Indonesia

28. **Factors Associated With Disability On Leprosy Patients**
Nanang R. Paramata\textsuperscript{1)}, Zuhriana K. Yusuf\textsuperscript{2)}, Wirda Y. Dulah\textsuperscript{3)}. Gorontalo State University. Indonesia

29. **Effectiveness Of Nutritional Mentoring In Implementation Of Energy Consumption And Nutrition Status On Taekwondo Athletes**
Irwan Budiono. Semarang State University. Indonesia

30. **Assistance Of Health Volunteers In Integrated Post Service Toward The Pattern Of Complementary Feeding Among 6-24 Months Old In Sukoharjo Regency**
Ainur Rohmah\textsuperscript{1)}, Mardiana\textsuperscript{2)}, Lukman Fauz\textsuperscript{2)}. Semarang State University. Indonesia

31. **Changes Of Amino Acid Content In Manggabai Fish Of Fermentation Results**
Faiza A. Dali\textsuperscript{1)}, Rita Marsuci Harmain\textsuperscript{2)}. Gorontalo State University. Indonesia

32. **Contribution Percentage Of Fatty Body Thickness To Physical Fitness Index Athlete Wrestling**
Rubianto Hadi\textsuperscript{1)}, Rivan Saghita Pratama\textsuperscript{1)}. Semarang State University, Indonesia

33. **The Effect Of Theobromine And Caffeine On The Level Of Muscle Fatigue After Physical Activity Maximum**
34. **Case-Finding Model Of Malnourished Children (Under And Over-Nutrition) In Indonesia**  
Lukman Fauzi¹, Oktia Woro Kasmini Handayani¹, Setya Rahayu². Semarang State University, Indonesia  

35. **The development of personal computer based accelerometer To find out the characteristics of sprint**  
**By using wireless technology**  
Andry Akhiruyanto, S.Pd, M.Pd¹. Semarang State University. Indonesia
ORAL PRESENTATIONS
CHANGES OF AMINO ACID CONTENT IN MANGGABAI FISH OF FERMENTATION RESULTS

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Abstract

This study aims to determine the content of amino acids in fresh manggabai fish and fermented products. Manggabai fresh fish obtained from fishermen in the waters of Limboto lake, Gorontalo. Manggabai fish washed, cut into small pieces then fermented with 15% salt mixture, 20% and 40% carbohydrates for 15 days anaerobically at ± 45 °C. Amino acid testing was performed on fresh manggabai fish and dried fermented products. Test results obtained that fresh manggabai fish and fermented products contain the highest amino acids in glutamic acid and the lowest in histidine. Levels of amino acids contained in manggabai fish increased after the fermentation process with carbohydrate 20%. The existence of fermentation technology can increase the nutritional value of manggabai fish. The amino acid content decreases in value after fermented 40% carbohydrate.

Keywords: manggabai fish, Limboto lake, salt, carbohydrate

PRELIMINARY

Foods that have many benefits for human health include fish. Currently the Indonesian people have a consumptive nature of fish, due to the nutritional content of fish, especially proteins that are needed to stabilize the performance of the human body. Fish meat has shorter protein fibers than protein fibers of chicken and beef.

Fish protein content of 15-25% w / w composed of amino acids. The content of amino acids in fish meat varies depending on the type of fish. One of the freshwater fish that people love Gorontalo is manggabai fish, living in the waters of Lake Limboto. Suryandari and Krismono (2011) stated that biologically manggabai fish are carnivorous fish and spawn more than once a year. Gorontalo people consume manggabai fish in the form of fried foods, broth or baked. Utilization of manggabai fish to be a variety of food has not been optimally done, especially to avoid fish from decay.
Fermentation includes processing technology in preserving fish by utilizing enzymes in fish tissues and microorganisms. During the fermentation process the food will undergo changes in physical and chemical properties. Fermented food products made from fish, for example in Indonesia, namely bakasang (Yanti and Dali 2013), former (Nuraini et al 2014), peda (Thariq et al 2014), terasi (Suwandi et al 2017). Fish fermented products are also found outside of Indonesia, for example in India called Lona ilish (Majumbar and Basu 2010).

Carbohydrate sources for the fermentation process are limited in the fish body, so additional carbohydrates are needed from the outside. Carbohydrates in the fish body mostly in the form of polysaccharides is glycogen. Kalista et al. (2012) states that the amylopectin content in rice flour is lower than other carbohydrate sources, so the bacteria more easily use it as a medium for growth of BAL and better fermentation results. Carbohydrates, protein and fat in fish is a medium used as a source of nutrients for microorganisms that play a role in the process of fermentation. The fermentation process is influenced by several factors such as acid, temperature and oxygen (aerob or anaerob). This study was conducted with the aim of knowing the amino acid content in fresh mangabai fish and fermented products.

**METHOD**

Tools and materials

The equipment used in this study includes incubators, ovens, scales, large basins, knives, cutting boards, gloves and masks. The materials used, namely fresh manggabai fish purchased directly to fishermen on the coast of Limboto lake, salt and carbohydrates.

Research procedure

The fresh manggabai fish are washed with ice water, then the fish is drained, cut into small pieces to facilitate the process of mixing the ingredients. The fish was then weighed, then mixed with 15% salt and 20% floured carbohydrate (C) and 40% (D) of the starchy carbohydrate. After mixing the ingredients, the sample was put into a sealed container and incubated at ± 45 °C for 7 days, then dried at 60 °C for 8-12 hours, then fermented again for 8 days.

Fresh manggabai fish and fermented products were then tested for amino acid content. Test method for amino acid content in manggabai fish using HPLC (High Performance Liquid Chromatography).
RESULTS AND DISCUSSION

Amino Acid Fish Manggabai Fresh

The non essential content of amino acids in raw manggabai fish feedstock showed that the highest level was glutamic acid of 1.6%, followed by aspartic acid 0.97%, while the lowest value in tyrosine was 0.32%. The highest essential amino acid content in lysine and the lowest in histidine.

Manggabai fish have glutamic acid that can be used as a flavoring agent, as well as aspartic acid. Mouritsen (2012), reported amino acids aspartate can provide a savory taste (umami) after the amino acid glutamate.

Fermented Amino Acid

Fermentation of manggabai fish with 15% salt and 20% carbohydrate (C treatment) shows differences in amino acid levels. The highest non essential essential amino acid content in glutamic acid was 3.41% and the lowest in serine was 0.76%, while the highest essential amino acid in leucine was 1.62% and the lowest in histidine was 0.29%.

Treatment with 40% carbohydrate (D) showed changes in amino acid levels after fermentation. Non essential essential amino acids have the highest value on glutamic acid of 3.17% and the lowest in serine is 0.64%, while the highest essential amino acid in leucine is 1.57% and the lowest in histidine is 0.31%.

Fresh manggabai fish and fermented products obtain varying amino acid values. The nutritional value of amino acids is increased through the fermentation process can provide added value to manggabai fish for consumption. Pawiroharsono (2007), explains the benefits of fermented food products such as the value of nutritional food increased due to the formation of new nutrient compounds metabolism results. The results of the analysis can be seen in Table 1.

<table>
<thead>
<tr>
<th>Asam Amino</th>
<th>Manggabai Segar (%)</th>
<th>C (20%)</th>
<th>D (40%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non esensial:</td>
<td>Manggabai Segar</td>
<td>C (20%)</td>
<td>D (40%)</td>
</tr>
<tr>
<td>Asam Aspartat</td>
<td>0,97</td>
<td>1,84</td>
<td>1,73</td>
</tr>
<tr>
<td>Asam Glutamat</td>
<td>1,6</td>
<td>3,41</td>
<td>3,17</td>
</tr>
<tr>
<td>Alanin</td>
<td>0,64</td>
<td>1,45</td>
<td>1,15</td>
</tr>
<tr>
<td>Glisin</td>
<td>0,5</td>
<td>1,17</td>
<td>0,77</td>
</tr>
<tr>
<td>Serin</td>
<td>0,39</td>
<td>0,76</td>
<td>0,64</td>
</tr>
<tr>
<td>Tirosin</td>
<td>0,32</td>
<td>0,99</td>
<td>1,02</td>
</tr>
<tr>
<td>Esensial:</td>
<td>Arginin</td>
<td>0,57</td>
<td>0,84</td>
</tr>
<tr>
<td></td>
<td>Histidin</td>
<td>Isoleusin</td>
<td>Leusin</td>
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<tr>
<td></td>
<td>0,19</td>
<td>0,45</td>
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<td></td>
<td>0,29</td>
<td>1,12</td>
<td>1,62</td>
</tr>
<tr>
<td></td>
<td>0,31</td>
<td>1,09</td>
<td>1,57</td>
</tr>
</tbody>
</table>

Graphically the Amino Acid Content in Manggabai Fish is fresh, the fermentation of C (20%) and D (40%) both non essential and essential can be shown in Figure 1.

![Figure 1. Amino Acids content in fresh Manggabai fish, fermented C (20%) and D (40%)](image)

**CONCLUSION**

Changes in amino acid levels contained in manggabai fish occur in the presence of fermentation technology. The fresh manggabai fish and fermented yields of amino acids vary with the highest levels of glutamic acid and the lowest in histidine. Fish manggabai after fermented with 20% carbohydrate, the value of amino acid nutrition has increased.

**THANK-YOU NOTE**

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BIBLIOGRAPHY


