



**WEBINAR & ABSTRACT BOOK**

# **HEALTHCARE IN PANDEMIC ERA: "THE NEW NORMS"**

4th USIM INTERNATIONAL HEALTH E-  
CONFERENCE  
in conjunction with the  
3rd INTERNATIONAL CONFERENCE ON  
MEDICINE AND HEALTH SCIENCES (ICMHS)

16th - 17th December 2020

**ORGANISED BY:**

**FACULTY OF MEDICINE AND HEALTH  
SCIENCES**

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# WELCOME MESSAGE



In the Name of Allah, the Most Beneficent, the Most Merciful.

Welcome to the virtual 4th USIM International Health E-Conference 2020 (IHeC 2020) in conjunction with the 3rd International Conference on Medicine and Health Sciences (ICMHS). I would like to start by wishing you and your families my personal best, for your health and safety in these difficult times. Covid-19 is causing tragic loss of life; and the measures needed to fight it have turned our world upside down, affecting billions of people from all walks of life. Humanity is facing one of its darkest periods in living memory, a crisis like no other. However, in the wake of this once in a lifetime tragedy, as Muslims, we must always remember that Allah s.w.t has stated "And We will surely test you with something of fear and hunger and a loss of wealth and lives and fruits, but give good tidings to the patient, Who, when disaster strikes them, say, "Indeed we belong to Allah, and indeed to Him we will return." Those are the ones upon whom are blessings from their Lord and mercy. And it is those who are the [rightly] guided." [Quran 2:155-57]. In turmoil, the international community has come together to help the most vulnerable countries addressing urgent health needs and mitigating the economic impact of the crisis.

These are exceptional times, which requires exceptional action. We must continue to learn, change and adapt in order to continue to thrive. The conference theme and sub-themes capture contemporary issues surrounding COVID-19 on the impact, challenges and while paving the way forward via science and technological advances and policy-decisions that will shape the society in which we operate and which we serve by investigating relevant issues and suggesting some answers, or even asking more questions. The programme assembled are interesting, relevant and varied, both in terms of disciplinary coverage but also in the mix of the scholars.

I have no doubt in my mind that this will be a very memorable experience for those who are attending this conference for the first time. For those of us who are seasoned in the area, it is an opportunity to create an enduring legacy in mentorship for research and dissemination for the early career academics and researchers in our younger faculty and the students present. I hope this will grow to become a regional hub for the exchange of ideas and experiences in your respective disciplines.

Professor Dr Mohamed Ridza bin Wahiddin  
Vice Chancellor,  
Universiti Sains Islam Malaysia (USIM)

# WELCOME MESSAGE

From the Dean



In the Name of Allah, the Most Beneficent, the Most Merciful.

It is with great pride and pleasure that I welcome all the participants to the 4th USIM International Health E-Conference 2020 (IHeC 2020) in conjunction with the 3rd International Conference on Medicine and Health Sciences (ICMHS).

The Prophet Muhammad (peace be upon him) said 'Acquire knowledge and impart it to the people.' (Al Tirmidhi). The quest for knowledge has been from the beginning of time but knowledge only becomes valuable when it is disseminated and applied to benefit humankind. In this unprecedented era of COVID-19, this value holds true more than ever. Despite the hardships we have endured, this has become an opportunity for us to come together and help one another. It is hoped that this conference will be a platform to gather and disseminate the latest knowledge and updates on a wide variety of topics in addressing COVID-19 from public health challenges, economic growth and opportunities, science and technology. Academicians, Scientist, Researchers and Clinicians across disciplines will be able to share and discuss new findings, and their experience in dealing with this pandemic in their own localities. It is envisaged that the intellectual discourse will result in future collaborations between universities, research institutions and industry both locally and internationally. In particular, it is expected that focus will be given to issues on impact on global healthcare and our preparation post-pandemic.

Researchers in USIM have a keen interest to be a part of this global discussion while incorporating the Naqli aspect to all that we do. Finally, I would like to congratulate the organizing committee for their tremendous effort in organizing and adapting the conference to a virtual format, that is accessible globally, a norm that all of us need to embrace. I would also like to thank all of our co-hosts and sponsors for their continual support and participation. I pray to Allah s.w.t that the conference will be a success.

Prof. Dr. Muhammad Shamsir Mohd Aris  
Dean,  
Faculty of Medicine and Health Sciences,  
Universiti Sains Islam Malaysia

# WELCOME MESSAGE

From the IHEC 2020 Director



In the Name of Allah, the Most Beneficent, the Most Merciful.

Welcome to the 4th USIM International Health E-Conference 2020 (IHeC 2020) in conjunction with the 3rd International Conference on Medicine and Health Sciences (ICMHS). As we embrace the new norm for conferencing, we have also adapted the webinar format for the course of this conference.

2020 has been a challenging year to say the least. We are all experiencing an unprecedented, once in a lifetime global COVID-19 pandemic. A virus that is not visible to the naked eye, has put the entire world on pause. However, as the saying goes, "the show must go on". The question before us is where do we go from here and what do we do now?

To address these important questions, it is most fitting that the theme of this year's conference is "Healthcare in a Pandemic Era: The New Norm". We have assembled a program that will hopefully shed light on a number of subjects including, public health issues and challenges, discussion of the economic impact, education in health sciences, current understanding of the science behind COVID-19 and the psychosocial impact during and post-pandemic. Speakers who are experts in their respective fields of interest, from Malaysia and around the world will meet-up virtually to share their knowledge and experience with COVID from their own country and discuss its impact globally.

On behalf of the organising committee, I would like to express my deepest thanks and gratitude to all of our co-hosts for their unwavering commitment and overwhelming participation I would also like to thank all our sponsors for their continual support to the success of this conference. And last but not least, to all the committee members in Malaysia and abroad who have defied all odds and have made this conference a virtual reality.

We truly are a global community and we are all in this together.

Dr. Nor Eyzawiah Hassan  
Chairperson,  
Organizing Committee 4th USIM IHeC 2020

# CONFERENCE PROGRAMME

Day 1: Wednesday 16th December 2020

Time	Activity			
0900	Registration			
0900-0935	<b>Plenary 1</b> <b>Pandemic and Healthcare: Challenges Against an Unexpected Battle, The Way Forward.</b> Tan Sri Dr Jemilah Mahmood, Ministry of Health Malaysia			
1000	Opening ceremony			
1010	<b>Welcoming address</b>			
1030	Officiating Montage			
1035	<b>Keynote address by Guest of Honour: "Holistic Hospital Preparedness Strategies Against COVID-19: Malaysian Experience in Managing COVID-19"</b> Datuk Dr Hj Rohaizat Bin Hj Yon, Deputy Director General, Ministry of Health Malaysia			
1120	Morning Tea break/ E-Poster presentation			
<b>Symposiums</b>				
	<b>Symposium 1: Challenges and Innovation in Handling COVID-19</b>	<b>Symposium 2: Managing Psychosocial Impact During and Post Pandemic</b>	<b>Symposium 3: Public Health Issues</b>	<b>Symposium 4: Dental Practice and Social Issues</b>
1135		Frontliners Psychological Trauma. <i>Dr Zul Azlin Razali, USIM</i>	Risk Communication Strategies During a Pandemic In Malaysia. <i>Dr Maria Suleiman, Ministry of Health Malaysia</i>	Dental Challenges During COVID-19 Pandemic <i>Dr Nor Azura Ahmad Tarmidzi, USIM</i>
1155	Improving Science Communication to Create Safer Communities. <i>Ms. Gea Abigail Ecoy, University of San Carlos</i>	COVID-19: Effect of Lockdown on Mental Health. <i>Assoc Prof Dr Amer Siddiq Amer Nordin, University of Malaya</i>	Implementing Health Strategies in An Emerging Pandemic. <i>Datuk Dr Norhayati Rusli, Ministry of Health Malaysia</i>	Infection Control Strategies and Patient Management Protocols to Provide Optimal Dental Care and to Prevent Healthcare Associated Infections (HAIS) in RSGM. <i>Prof. drg. Dwi Prijatmoko, University of Jember</i>
1215	Medical Innovation to Overcome Challenges During the COVID-19 Pandemic using 3D printing Technology. <i>Dr Mohd Ifwat Mohd Ghazali, USIM</i>	Adapting to The New Norm: A Daily Routine. <i>Dr Ahmad Izzat Ahmad Tajjudin, USIM</i>	Mitigation Responses of the Impact of COVID-19 on Nutrition in Indonesia. <i>Prof. Dr. dr. Abdul Razak Thaha, M.Sc, Sp.GK, Universitas Muhammadiyah Makassar</i>	Humanity versus Law: Finding The Balance During A Pandemic. <i>Dr Muzaffar Syah Mallow, USIM</i>
1235	Application of Nanosized Materials for the Treatment of Viral Infection. <i>Dr. apt. Lina Winarti, University of Jember</i>	NGO Approach to COVID-19 Among Vulnerable Population. <i>Dr Abdul Rahman Ahmad Badayai, Mercy Malaysia</i>	Applying Prevention Strategies for A Pandemic in Islam. <i>Prof Dr Irwan Mohd Subri, USIM</i>	Impact of the COVID-19 Pandemic on High Risk Medical Health Professionals: The Solutions. <i>Dr. Abd. Azis, Sp.U, Universitas Muhammadiyah Makassar</i>
1255	Q&A	Q&A	Q&A	Q&A
1330	Lunch break			
1430	Oral presentation	Oral presentation	Oral presentation	Oral presentation
1630	COVID-19 Pandemic Modelling in Context: Uniting People and Technology Across Nations. Prof Lisa J White, Oxford University			

End Session For Day 1



# CONFERENCE PROGRAMME

Day 2: Thursday 17th December 2020

Time	Activity			
0830	<b>Plenary II</b> Introduction			
0835	<b>Understanding COVID-19 Based on Current Evidence.</b> Assoc Prof Dr Noor Fadzilah Zulkifli, USIM			
0905	<b>COVID-19: The Infinite War?</b> Dr Lo Ying-Ru Jacqueline, WHO Representative to Malaysia, Brunei Darussalam and Singapore			
0935	<b>Pharmacy Education in the Philippines: Resilience and Response to COVID-19.</b> Dr. Gerard Lee See, University of San Carlos			
1005	Morning Tea break/ E-Poster presentation			
<b>Symposiums</b>				
	<b>Symposium 5: Medical Science of COVID-19</b>	<b>Symposium 6: Education in Health Sciences: Lessons from a Pandemic</b>	<b>Symposium 7: Economics impact during a pandemic</b>	<b>Symposium 8: Impact of COVID-19 locally</b>
1045	The Update on Medical Management of COVID-19: Current & Future Perspectives. <i>Dr Alif Adlan bin Mohd Thabit Hospital Sungai Buloh, Ministry of Health</i>	COVID-19 Pandemic: A Paradigm Shift in Delivery of Dental Education. <i>Dr Faizah Abdul Fatah, USIM</i>	Casemix System: Managing Resources and Information During COVID-19 Pandemic. <i>Prof Dato' Dr Syed Mohamed Al-Junid, Kuwait University</i>	Agromedicine: Farmers health and Safety During COVID-19 Pandemic. <i>Dr Supangat, M. Kes., University of Jember</i>
1105	Challenges in Vaccine Production in a Pandemic. <i>Mr Leon Cruz, CCM Duopharma</i>	Key Strategies to Ensure Safe Education Environment in The Clinical Setting. <i>Prof Dr Muhammad Shamsir Muhammad Aris, USIM</i>	Economic Impact of COVID-19 to Healthcare System. <i>Prof Dr Maznah Dahlui, University of Malaya</i>	Convalescence Plasma Therapy For COVID-19: Is it Effective? <i>Dr Angga Mardro Raharjo, University of Jember</i>
1125	Laboratory Diagnosis of COVID-19: Current Issues & Challenges. <i>Assoc Prof Dr Noor Zetti Zainol Rashid, UKM</i>	Building Resilience in Medical Education: Lesson Learned from the Pandemic. <i>Dr. Suhaila Sanip, USIM</i>	Economic Impacts of Pandemics: What History Taught Us. <i>Dr Amirah Azzeri, USIM</i>	Promoting Nurses Wellbeing During COVID-19 Outbreak Through Work Arrangement Model. <i>Dr Nurfika Asmaningrum, University of Jember</i>
1145	Enhancing COVID-19 Prevention Strategies. <i>Assoc Prof Dr Nurul Azmawati Mohamed, USIM</i>	Alternative Learning Strategies in Health Sciences. <i>Dr Rahman Omar, USIM</i>	Willingness-to-pay and Ability-to-pay for COVID-19 Preventions and Treatments: Are We Ready? <i>Dr Mohd Hafiz Jaafar, USIM</i>	Effects of Snakehead Fish Extract Consumption on COVID-19 Patients. <i>Dr H. Iwan Setiawan Adji, Universitas Muhammadiyah Surakarta</i>
1205	Does Lockdown Affect Health Information Seeking Behavior of COVID-19 Preventive Measures Among Indonesians? A Google Trends Analysis. <i>Antonius Nugraha Widhi Pratama, University of Jember</i>	Q&A	Q&A	Q&A
1225	Q&A			
1300	Lunch break			
1400	Oral presentation	Oral presentation	Oral presentation	Oral presentation
1600	E-poster viewing			
1630	Awards and Closing Ceremony			

# CONFERENCE PROGRAMME

Day 2: Thursday 17th December 2020

Time	Activity
Symposiums	
<b>Symposium 9: Practical efforts in Responding to COVID-19</b>	
1045	Challenges in Managing PPE and Clinical Pharmacy Services at A COVID-19 Referral Teaching Hospital. <i>Dr Budi Suprapti, Airlangga</i>
1105	Screening in Non-Communicable Disease and How Community Pharmacist can Play A Role During Pandemic COVID-19. <i>Dr Elida Zairina, Airlangga</i>
1125	Swabbing for COVID-19: Is it All in The Nose? <i>Dr Nor Eyzawiah Hassan, USIM</i>
1145	Staying Safe in A Pandemic: Perioperative Care <i>Dr Razrim Rahim, USIM</i>
1205	Challenges to Effective Pandemic Responses and Determining Priority Measures to Prepare for The Future. <i>Dr Febi Dwirahmadi, University of Jember</i>
1225	Q&A
1300	Lunch break
1400	Oral presentation                      Oral presentation                      Oral presentation                      Oral presentation
1600	E-poster viewing
1630	Awards and Closing Ceremony

## UTILIZATION OF MORINGA LEAF FLOUR AND CATFISH TO FISH BALL FOR IMPROVING NUTRITIONAL STATUS DURING THE COVID-19 PANDEMIC

Rohmawati, Ninna<sup>1</sup>; Hidayati, Manik Nur<sup>2</sup>

*1 Department of Nutrition, Faculty of Public Health, University of Jember, Jember, Indonesia*

*2 Nutrition Science Program Study, Public Health Faculty, Universitas Jember, East Java, Indonesia*

**Introduction:** The COVID-19 (Coronavirus) pandemic has caused many changes in our life. Protein source diet is essential to maintain immunity during the COVID-19 pandemic, especially for PEM (Protein Energy Malnutrition) children. Catfish and Moringa leaf flour are local food products that can be used to fulfil a children's nutrition with PEM. Catfish are rich in leucine and lysine, which are good for helping children's growth and development. Moringa leaf flour contains nine times the protein found in yoghurt and ten times beta-carotene found in carrots. Catfish and Moringa leaves are available in the market.

**Objective(s):** The purpose of this study was to analyze the effect of adding Moringa leaf flour to protein content, moisture content, beta-carotene content, and acceptability of catfish meatballs.

**Methodology:** This research is experimental research with a quasi-experimental type. Protein content, water content, and beta-carotene levels were analyzed using the Kruskal Wallis and Mann Whitney tests, and the acceptability test used the Friedman test and the Wilcoxon Sign Rank Test with a confidence level of 5% ( $\alpha = 0.05$ ).

**Results:** The addition of Moringa leaf flour had a significant effect on protein content, water content, beta-carotene content and acceptability (taste, colour, aroma, and texture) on catfish meatballs. The recommended treatment is X1 with the addition of 10% Moringa leaf flour which has high protein and beta-carotene content according to 1/3 RDA (Recommended Dietary Allowance) of children aged 5-12 years, protein and water content meet the quality requirements of SNI 01-3818-1995 (BSN) and can be accepted by panellists.

**Conclusion(s):** There is an effect of adding Moringa leaf flour to protein content, water content, beta-carotene content, and acceptance of catfish meatballs to maintain immunity during the COVID-19 pandemic.



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## Utilization of Moringa leaf flour and catfish to fish ball for improving nutritional status during the COVID-19 pandemic

Ninna Rohmawati<sup>1</sup>, Manik Nur Hidayati<sup>2</sup>.

Malaysian Journal of Medicine and Health Sciences (browse-journal-view.php?id=104) (Volume 17, SUPP 1, January 2021, Pages 74 to 0 (issue-view.php?id=12890&amp;journal\_id=104))

Times cited: 0 (<https://mycite.mohe.gov.my/en/article/articles-citing/article/174975>)

Introduction: The COVID-19 (Coronavirus) pandemic has caused many changes in our life. Protein source diet is essential to maintain immunity during the COVID-19 pandemic, especially for PEM (Protein Energy Malnutrition) children. Catfish and Moringa leaf flour are local food products that can be used to fulfil a children's nutrition with PEM. Catfish are rich in leucine and lysine, which are good for helping children's growth and development. Moringa leaf flour contains nine times the protein found in yoghurt and ten times beta-carotene found in carrots. Catfish and Moringa leaves are available in the market. Objective: The purpose of this study was to analyze the effect of adding Moringa leaf flour to protein content, moisture content, beta-carotene content, and acceptability of catfish meatballs. Methodology: This research is experimental research with a quasi-experimental type.

Protein content, water content, and beta-carotene levels were analyzed using the Kruskal Wallis and Mann Whitney tests, and the acceptability test used the Friedman test and the Wilcoxon Sign Rank Test with a confidence level of 5% ( $\alpha = 0.05$ ). Results: The addition of Moringa leaf flour had a significant effect on protein content, water content, beta-carotene content and acceptability (taste, colour, aroma, and texture) on catfish meatballs. The recommended treatment is X1 with the addition of 10% Moringa leaf flour which has high protein and beta-carotene content according to 1/3 RDA (Recommended Dietary Allowance) of children aged 5-12 years, protein and water content meet the quality requirements of SNI 01-3818-1995 (BSN) and can be accepted by panellists. Conclusion: there is an effect of adding Moringa leaf flour to protein content, water content, beta-carotene content, and acceptance of catfish meatballs to maintain immunity during the COVID-19 pandemic.

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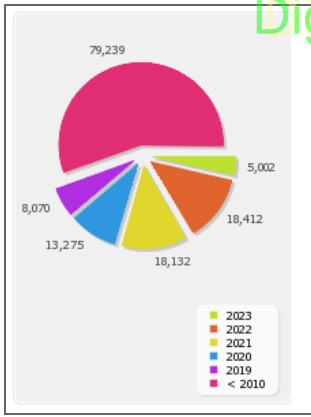
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# Utilization of Moringa Leaf Flour and Catfish to Fish Ball for Improving Nutritional Status during the Covid-19 Pandemic

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**Abstract-** The Covid-19 (Coronavirus) pandemic has caused many changes in our life. Protein source diet is essential to maintain immunity during the Covid-19 pandemic, especially for PEM (Protein Energy Malnutrition) children. Catfish and Moringa leaf flour are local food products that can be used to fulfill a children's nutrition with PEM. Catfish are rich in leucine and lysine, which are good for helping children's growth and development. Moringa leaf flour contains nine times the protein found in yogurt and ten times beta-carotene found in carrots. Catfish and Moringa leaves are available in the market. Objective: The purpose of this study was to analyze the effect of adding Moringa leaf flour to protein content, moisture content, beta-carotene content, and acceptability of catfish meatballs. Methods: This research is experimental research with a quasi-experimental type. Protein content, water content, and beta-carotene levels were analyzed using the Kruskal Wallis and Mann Whitney tests, and the acceptability test used the Friedman test and the Wilcoxon Sign Rank Test with a confidence level of 5% ( $\alpha = 0.05$ ). Results : The addition of Moringa leaf flour had a significant effect on protein content, water content, beta-carotene content and acceptability (taste, color, aroma, and texture) on catfish meatballs. The recommended treatment is X1 with the addition of 10% Moringa leaf flour which has high protein and beta-carotene content according to 1/3 RDA (Recommended Dietary Allowance) of children aged 5-12 years, protein and water content meet the quality requirements of SNI 01-3818-1995 (BSN) and can be accepted by panelists. Conclusion: there is an effect of adding Moringa leaf flour to protein content, water content, beta-carotene content, and acceptance of catfish meatballs to maintain immunity during the Covid-19 pandemic.

**Keywords---** moringa leaf flour, catfish, nutritional status

## I. INTRODUCTION

The Covid-19 (Coronavirus) pandemic has caused many changes in everyday life. Maintaining a protein source diet is very important to maintain body immunity during the Covid-19 pandemic, especially for nutritional problems with Protein Energy Malnutrition (PEM). In children, PEM can inhibit growth, making them susceptible to diseases, especially infections and resulting in low levels of intelligence [2]. Local food products that can be combined to fulfill nutrition for PEM children are catfish and Moringa leaf meal. Catfish is rich in leucine and lysine which are good for helping the growth and development of children. Moringa leaf flour has a protein content of nine times the protein found in yogurt and ten times the beta-carotene found in carrots.

Nationally, the prevalence of wasting (according to BMI / U) in children aged 5-12 years is 11.2%, consisting of 4% very thin and 7.2% underweight. In East Java, according to (BW / U) the prevalence of very undernutrition is 2.0% and

the prevalence of malnutrition is 10.3% [3]. PEM in children can cause vitamin A deficiency due to low protein intake which is usually followed by low vitamin A intake, besides it can result in inhibition of absorption, transportation, and conversion of vitamin A which causes vitamin A deficiency. Therefore, the first step in overcoming PEM is to increase consumption of foods high in protein and vitamin A such as fish and vegetables.

Catfish is rich in leucine and lysine which are good for helping the growth and development of children. The nutritional value of catfish increases if it is properly processed. The nutritional value in 100 grams of fresh catfish includes 240 kcal calories, 14.53 grams of fat, 17.57 grams of protein and 3.54 grams of carbohydrates, 0.0 grams of fiber, 20.7 mcg of selenium, 4 mcg of vitamin B12, potassium. 459 mg, niacin 3.6 mg, omega-3 0.259 grams from EPA 0.049 grams, DHA 0.128 grams, and ALA 0.082 grams [5]. The nutritional content of Moringa leaves will increase in quantity if the Moringa leaves are consumed after drying and making powder (flour), except for vitamin C. Moringa leaf flour has a protein content of 9 (nine) times the

protein found in yogurt, calcium which is equivalent to 17 (seventeen) times the calcium found in milk and the equivalent of 25 (twenty five) times the iron found in spinach [7]. One of the foods that is liked by all people is meatball. The purpose of this study was to analyze the effect of adding Moringa leaf flour to protein content, water content, beta-carotene content and acceptability of catfish meatballs.

## II. MATERIAL AND METHODS

This research is an experimental research with a quasi-experimental type with the research design of Posttest Only Control Group Design. The variables in this study were protein content, water content, beta-carotene content and acceptability. The study was conducted from October to December 2020. The number of samples in this study were 25 respondents selected based on the simple random sampling method. The data collection method used for testing the protein content used laboratory tests with the Kjeldahl method, the moisture content used the air oven method and the beta-carotene levels used the spectrophotometric method. The acceptance test used the hedonic scale test form. The results of the test data for protein, water and beta-carotene levels were analyzed using the Kruskal Wallis test and the Mann Whitney test, acceptance was analyzed using the Friedman test and the Wilcoxon Sign Rank Test with a confidence level of 5% ( $\alpha = 0.05$ ). The processed data is then presented in the form of tables, graphics and text.

## III. RESULTS

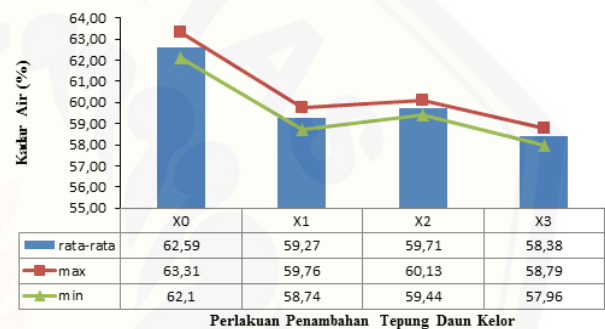
This research is an experimental research with a quasi-experimental type with the research design of Posttest Only Control Group Design. Variables in: There is an effect of adding Moringa leaf flour on protein content, water content, beta-carotene content and acceptability (taste, color, aroma and texture) on catfish meatballs. The protein content and beta-carotene content of catfish meatballs increased along with the high addition of Moringa leaf flour, while the water content decreased with each addition of Moringa leaf flour. The highest levels of protein and beta-carotene were the addition of Moringa leaf flour by 30% (X3), while the highest water content was the addition of 0% (X0) Moringa leaf flour. The catfish meatballs most received by panelists were based on the Hedonic Scale Test on catfish meatballs with the addition of 0% Moringa leaf flour or without the addition of Moringa leaf flour (X0). The highest average value for the acceptance test for catfish meatballs that received the addition of Moringa leaf flour based on taste, color, aroma and texture using the Hedonic Scale Test method was the addition of 10% Moringa leaf flour (X1).

The Effect of Addition of Moringa Leaf Flour on Protein Content, Water Content, Beta-Carotene, and Acceptability in Catfish Meatballs

Based on the results of the analysis of protein content (Figure 1), it can be seen that the average protein content of

catfish meatballs with or without the addition of Moringa leaf flour with 4 treatment levels (X0, X1, X2, and X3) ranged from 14.81% (without addition of Moringa leaf flour) up to 16.25% (with the addition of Moringa leaf flour as much as 30%). It can be seen that along with the addition of Moringa leaf flour, the protein value of catfish meatballs also increases.

This research is protein content, water content, beta-carotene content and acceptability. The study was conducted from October to December 2020. The number of samples in this study were 25 respondents selected based on the simple random sampling method. The data collection method used for testing the protein content used laboratory tests with the Kjeldahl method, the moisture content used the air oven method and the beta-carotene levels used the spectrophotometric method. The acceptance test used the hedonic scale test form. The results of the test data for protein, water and beta-carotene levels were analyzed using the Kruskal Wallis test and the Mann Whitney test, acceptance was analyzed using the Friedman test and the Wilcoxon Sign Rank Test with a confidence level of 5% ( $\alpha = 0.05$ ). The processed data is then presented in the form of



tables, graphics and text.

Fig 1. Average Protein Content of Catfish Meatballs with 4 Treatment Levels

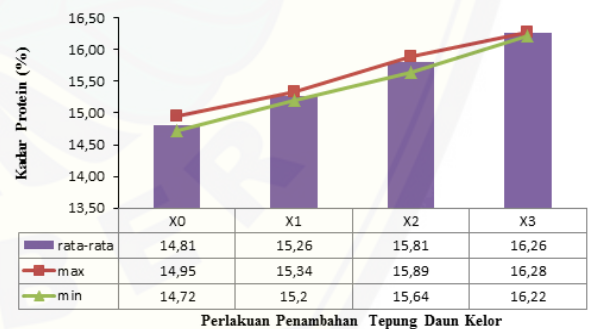


Fig 2. Average Moisture Content of Catfish Meatballs with 4 Treatment Levels



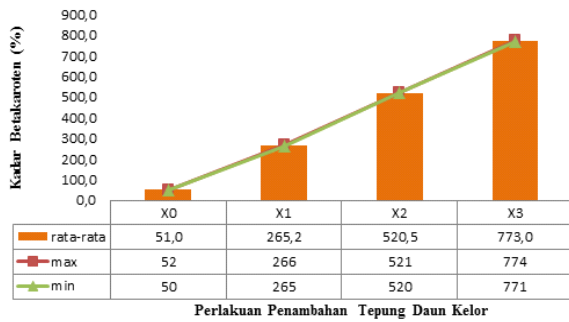


Fig 3. Average Beta Carotene Content of Catfish Meatballs with 4 Treatment Levels

Research conducted by Rudianto (2012) who added Moringa leaf flour to biscuits stated that the greater the proportion of adding Moringa leaf flour to biscuits, the greater the protein content in the biscuits [8]. Research conducted by Hasanah (2015) which added Moringa leaf flour as a mixture of catfish nuggets showed that the highest beta-carotene content was 0.0161  $\mu\text{g} / \text{g}$  contained in catfish nuggets with a proportion of 20% catfish meat and 80% Moringa leaf flour. [9].

The highest average value on texture acceptability was catfish meatballs without additional Moringa leaf flour with the highest average of 2.64. In the composition of the addition of 10% moringa leaf flour in catfish meatballs, there was a decrease in the level of consumer preference, because the more the percentage of moringa leaf flour was added, the chewiness of the catfish meatballs produced would decrease, so the texture of the catfish meatballs was getting harder [8]. The results of this study are the same as previous studies. This is because Moringa leaf flour does not have gluten like tapioca flour or wheat flour which functions as a forming elastic properties of meatballs.

Overall the results of the study obtained one recommended treatment, namely X1 with the addition of 10% Moringa leaf flour which has high protein and beta-carotene levels according to 1/3 of the RDA (Nutritional Adequacy Rate) of children aged 5-12 years, protein and water levels that meet the quality requirements of meatballs. SNI 01-3818-1995 (BSN) and can be accepted by panelists according to the hedonic scale test (taste, color, aroma and texture).

#### IV. CONCLUSIONS

Based on the results and discussion that has been described, it can be concluded that the addition of Moringa

leaf flour has a significant effect on protein content, moisture content, beta-carotene content and acceptability (taste, color, aroma, and texture) in catfish meatballs. The recommended treatment is X1 with the addition of 10% Moringa leaf flour which has high protein and beta-carotene content according to 1/3 RDA (Nutritional Adequacy Rate) of children aged 5-12 years, protein and water content that meet the quality requirements of SNI 01-3818 meatball. -1995 (BSN) and can be accepted by panelists according to the hedonic scale test (taste, color, aroma and texture).

Alternative suggestions or recommendations that can be given from this research are for further research, it is necessary to conduct research on the analysis of fiber and vitamin C levels in catfish meatballs with the addition of Moringa leaf flour and for other research by making new products such as cakes or foods that are liked by children. children with the addition of Moringa leaf flour use the basic ingredients of products that have high nutritional value but less diversification in order to improve the nutritional status of children

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