PROPOSAL
JOINT RESEARCH PROGRAM

DEVELOPMENT OF WET NOODLE FROM RED SPINACH (*Amaranthus tricolor* L) AND CATFISH (*Clarias gariepinus*) AS FUNCTIONAL FOOD FOR ANEMIA PREVENTION

Universitas Alma Ata
The Globe Inspiring University

Member of Project:

Veriani Aprilia	**(Lecturer of Universitas Alma Ata)**
Muhammad Bin Ibrahim	**(Lecturer of International Islamic University Malaysia)**
Lisana Shidiq Aliya	**(Lecturer of Universitas Alma Ata)**
Hastrin Hositanisita	**(Lecturer of Universitas Alma Ata)**
Anisa Farah L.	**(Student of Universitas Alma Ata)**
Leni Ardhiati	**(Student of Universitas Alma Ata)**
Sinta Wulandari	**(Student of Universitas Alma Ata)**
Yessie Novitha	**(Student of Universitas Alma Ata)**
Ismiantisa Handayani	**(Student of Universitas Alma Ata)**
Anindya Ayu Pramesti	**(Student of Universitas Alma Ata)**
Novia Eka Khofifah	**(Student of Universitas Alma Ata)**
Asti Dwi Lestari	**(Student of Universitas Alma Ata)**
Fadia Anastasya A.	**(Student of Universitas Alma Ata)**
Alfida Nasywa M.	**(Student of Universitas Alma Ata)**
Septiana Rifa W.	**(Student of Universitas Alma Ata)**
Ananda Rahma S.	**(Student of Universitas Alma Ata)**
Indriana Krisdian	**(Student of Universitas Alma Ata)**
Indira Amalia P.	**(Student of Universitas Alma Ata)**
Irsalina Julianingtyas	**(Student of Universitas Alma Ata)**
Sinta Bela Lestari	**(Student of Universitas Alma Ata)**
Ghaitsani Aulia P.	**(Student of Universitas Alma Ata)**

2025

APPROVAL SHEET

Title	:	DEVELOPMENT OF WET NOODLE FROM RED SPINACH (Amaranthus tricolor L) AND CATFISH (Clarias gariepinus) AS FUNCTIONAL FOOD FOR ANEMIA PREVENTION
Project Leader		
Full Name	:	Dr. Veriani Aprilia, M.Sc
Identity Number	:	0530048301
Study Program	:	Nutrition Program, Faculty of Health Sciences, Universitas Alma Ata
Email	:	verianiaprilia@almaata.ac.id
Member (1)		
Full Name	:	Lisana Shidiq Aliya, M.Sc
Identity Number	:	3462768669231082
Study Program	:	Nutrition Program, Faculty of Health Sciences, Universitas Alma Ata
Member (2)		
Full Name	:	Hastrin Hositanisita, M.Sc.
Identity Number	:	0508080703
Study Program	:	Nutrition Program, Faculty of Health Sciences, Universitas
	:	Alma Ata
Identity of Collaborator		
Partner Name		Muhammad bin Ibrahim
Address		Jln Gombak, 53100 Kuala Lumpur, Selangor, Malaysia
Person in charge		
Year of Implementation		2025/2026
Overall Cost		Rp 26.400.000,-

Yogyakarta, month day year

Head of IRCS UAA

Project Leader

Name: Dr. Daru Estiningsih

Name Dr. Veriani Aprilia, STP, M.Sc.

DETAIL OF THE PROGRAM

A	**IDENTITY OF THE COLLABORATOR**	
i	Name of Institution	**International Islamic University Malaysia**
ii	Address	Jln Gombak, 53100 Kuala Lumpur, Selangor, Malaysia
B	**PROGRAM APPLICATION DETAILS**	
i.	Program Title	Join Research
ii.	Program Duration	12 Months
iii.	Research Cluster	Science & Technology (v)
		Social Science ( )
		Public Health ( )
		Education ( )
iv.	Type of Research	Fundamental Research (v)
		Applied Research ( )
v.	Research Area	Social Sciences & Management ( ) Computer Science & Information Systems ( ) Life Sciences & Medicine (v) Teaching, Learning, and Development ( )
C	**PROJECT DETAIL**	
	Project Leader	Dr. Veriani Aprilia, STP, M.Sc.
	Title of The Project	DEVELOPMENT OF WET NOODLE FROM RED SPINACH (Amaranthus tricolor L) AND CATFISH (Clarias gariepinus) AS FUNCTIONAL FOOD FOR ANEMIA PREVENTION
	Research Objectives	To determine the effect of substitution of wheat with red spinach flour and catfish meal on the sensory properties, nutritional value, physical properties, cooking quality, and digestibility of "Mie LeBay" noodle
	Details of Achievements and Activities	1. International Journal indexed in Scopus/WoS (v) 2. International Journal ( ) 3. International Proceedings ( )

TABLE OF CONTENTS

CHAPTER I
INTRODUCTION

A. Background

Anemia is a medical condition characterized by low levels of hemoglobin in the blood, which can result in health problems. Anemia is a major health problem throughout the world. Anemia mostly occurs in pregnant women and girls. According to the World Health Organization (WHO), the prevalence of anemia in the world in 2019 reached 29.9% among women of childbearing age, 36.5% among pregnant women and 29.6% in non-pregnant women (WHO, 2021). Based on data from the 2018 Basic Health Research Survey (Riskesdas), the prevalence rate of anemia in Indonesia is 23.7% with a proportion of 32% in women of childbearing age, namely the 15-24 year age group (Kementerian Kesehatan Republik Indonesia, 2018). This means that more than a quarter of women of childbearing age in Indonesia experience anemia. Women are more susceptible to the risk of anemia because they menstruate every month. Another factor that causes anemia is a lack of nutritional intake, especially iron, which means there are no iron reserves in the body, which affects the process of hemoglobin formation. Several other nutrients that are also associated with anemia include protein, zinc, vitamin C, vitamin B12 and folic acid (Chairunnisa et al., 2019). Nutritional anemia due to iron deficiency can result in decreased physical abilities, work productivity and thinking power. In addition, nutritional anemia can cause a decrease in antibodies, making the body more susceptible to infection and getting sick easily (Utama et al., 2013).

One way to meet your iron needs is to eat foods high in iron content, such as red spinach. However, red spinach is still less popular than green spinach, even though it is rich in nutrients. Red spinach contains around 7 mg of iron per 100 g, which is twice as much as green spinach (Ministry of Health of the Republic of Indonesia, 2017). Red spinach also contains protein, fat, carbohydrates, fiber, minerals, vitamins and oxalic acid (Hapsari et al., 2018). Spinach is a perishable commodity, so one way to extend its shelf life is to preserve and process spinach into other products such as red spinach leaf flour. Red spinach is classified as a source of non-heme iron, whose absorption is slower than sources of iron-heme. Therefore, to speed up the process of iron absorption in red spinach, a source of heme iron can also be added, one of which is catfish.

Catfish is a type of fish that is now widely cultivated, but its use is still limited as food. Catfish is often chosen as an ingredient for food diversification because it has a high protein content and is relatively affordable. Just like red spinach, catfish

is also a food that spoils quickly. Now, to extend the shelf life of catfish, a product has been made in the form of catfish meal. Catfish meal has a high protein content. 100 g of catfish meal has a protein content of up to 56 g (Nastiti & Christyaningsih, 2019). Apart from that, it also contains iron, namely 2 g. The addition of catfish meal can be an alternative to increase the protein content in food.

Previously, a combination of spinach and catfish has been studied, but it uses green spinach and is intended to be a dry bread product that diversifies MPASI (Farameita & Wati, 2022). Apart from that, research was also found (Riestamala et al., 2021) which used a combination of green spinach with catfish, white bread rissoles products and was intended as an additional snack for toddlers. In this research, a wet noodle product will be developed that uses a combination of red spinach flour and catfish flour to prevent anemia. This research has the advantage of being formulated from the start according to the Indonesian National Standards (SNI) and Nutritional Adequacy Rates (AKG), then identifying the nutrient content, physical properties, up to the level of protein digestibility. The choice of wet noodles in this development is because noodles are a product that many people like and can be an alternative to wheat flour.

Research into the development of wet noodles by adding red spinach flour and catfish flour is important to know the whole characteristics from the formula, sensory evaluation, iron content, nutritional value, protein digestibility, physical properties, and cooking quality. This product may become an alternative local functional food that has the potential to prevent anemia.

B. Research Question (s)

This research questions are:

1. What is the formula of wet noodles substituted with red spinach and catfish flour?
2. What are the sensory characteristics of wet noodles substituted with red spinach and catfish flour?
3. How many iron are there in wet noodles substituted with red spinach and catfish flour?
4. How many macronutrients are there in wet noodles substituted with red spinach and catfish flour?
5. What are the starch, amylose, reduction sugar, total sugar content of wet noodles substituted with red spinach and catfish flour?
6. What are the protein digestibilites of wet noodles substituted with red spinach and catfish flour?

7. What are the physical properties of wet noodles substituted with red spinach and catfish flour?
8. What are the cooking quality of wet noodles substituted with red spinach and catfish flour?
9. What are the antioxidant activity of wet noodles substituted with red spinach and catfish flour?

C. Objectives of The Research

The objectives of this research are:

1. To determine the formula of wet noodles substituted with red spinach and catfish flour.
2. To evaluate the sensory characteristics of wet noodles substituted with red spinach and catfish flour.
3. To know the iron contents of wet noodles substituted with red spinach and catfish flour.
4. To evaluate the macronutrients (water, ash, protein, fat, carbohydrate contents) of wet noodles substituted with red spinach and catfish flour.
5. To evaluate the starch, amylose, reduction sugar, total sugar content of wet noodles substituted with red spinach and catfish flour.
6. To determine the protein digestibilites of wet noodles substituted with red spinach and catfish flour.
7. To measure the physical properties (water sorption, elasticity, breaking power, color profile, texture profile) of wet noodles substituted with red spinach and catfish flour.
8. To know the cooking quality (cooking loss, cooking time, cooking yield) of wet noodles substituted with red spinach and catfish flour.
9. What are the antioxidant activity of wet noodles substituted with red spinach and catfish flour?

CHAPTER II
LITERATUR REVIEW

A. Functional Food

Functional food is food that has a physiological function and is beneficial for a person's immune system and health. Even though functional foods contain compound components that are beneficial for health, the natural ingredients are not converted into tablets or capsules, instead they must be consumed in their natural form. It is recommended to consume these foods as part of your daily routine, because they have special benefits when digested that help speed up certain body processes, such as increasing the body's biological defense system, preventing certain diseases, curing certain diseases, controlling physical and mental conditions and preventing aging. At the First International Conference on East-West Perspective on Functional Foods which was held in 1996, it was said that functional food is food whose active components can provide health benefits, apart from the benefits provided by the nutrients contained therein (Khoerunisa, 2020).

According to The Japanese of Health and Welfare in 1991, amino acids, peptides and proteins, alcohol glycosides, dietary fiber, oligosaccharides, sugar alcohols, isoprenoids and vitamins, choline, lactic acid bacteria (LAB), minerals, polyunsaturated fatty acids (PUFA), phytochemicals, and antioxidants are components that can be beneficial and help improve health. In developed countries such as the United States, England and Germany, people choose food based on taste, nutritional content and function for health.

B. Anemia

Anemia is a condition in which a person experiences a decrease in the number of erythrocytes as indicated by a decrease in hemoglobin levels, hematocrit and erythrocyte count (Andriani et al., 2021). Anemia is a condition where the hemoglobin level is less than normal. Hemoglobin levels are normal in adolescent girls is >12 g/dl (Rahmawati, 2023). Anemia has several types and causes, one of which is anemia which is caused by iron deficiency. Iron deficiency in the body is caused by iron intake that does not meet needs or frequent consumption of tea and/or coffee which can inhibit iron absorption in the body.

Anemia is often found in early morning women because every month they experience menstruation which produces a lot of blood. If anemia occurs in young women, there is a risk of impaired physical and mental function, and can increase the risk of problems during pregnancy later. This can become a serious disease if it is not treated properly, for example if young women do not receive treatment immediately which can disrupt their concentration in studying because they are physically weak due to inadequate nutritional intake. If it continues during pregnancy, it can cause miscarriage, bleeding, premature birth, fetal disorders, problems with labor and the postpartum period, and has the potential to give birth to stunted children (Andriani et al., 2021).

C. Red Spinach

Red spinach (Amaranthus tricolor L) belongs to the Amaranthaceae family which originates from America and is often found in tropical and subtropical areas, such as Indonesia. The nutritional content of red spinach is superior to green spinach (Ratri Yulianingsih, 2019). Red spinach is rich in nutrients which are very beneficial for maintaining a healthy body. Among other things, red spinach contains vitamin C, folic acid and iron which play an important role in supporting the absorption of Fe tablets. The combination of these nutritional contents helps increase iron absorption in the body, which is effective in preventing anemia (Indrayani et al., 2022). The nutritional content of red spinach per 100 g includes protein (2.2 g), carbohydrates (6.3 g), fiber (2.2 g), Fe (7.0 mg), vitamin C (62 mg) (RI Ministry of Health , 2017).

D. Catfish

Catfish (Clarias Gariepinus) is a fishery commodity that is quite popular among Indonesian people. One type of catfish is the African catfish which has several advantages over other types of catfish. The advantages of African catfish include cheap and easy maintenance, ability to adapt to the environment, fast growth, good taste, high nutritional content and an affordable price. The nutritional composition of catfish includes protein (17.7%), fat (4.8%), minerals (1.2 %), and water (76 %).

The protein content in catfish plays the most important role in structuring tissues and cells in the body. Protein also functions to help form red blood cells which are very important for carrying oxygen from the lungs to all body tissues. Protein also plays a role in transporting iron to the spinal cord to form new hemoglobin molecules (Andriani et al., 2021).

Catfish also contains higher levels of amino acids, namely leucine and lysine, compared to other types of fish. Leucine ($C_6H_{13}NO_2$) is an amino acid that is very important and necessary for growth, tissue repair, formation of muscle protein. Meanwhile, lysine is one of the 9 essential amino acids needed by the body for growth and repair of body tissue (Riza, 2024).

E. Wet Noodle

Wet noodles are a food made from wheat flour. Noodles are very popular among Indonesian people, especially wet noodles, because they are an alternative food to replace rice. There are several stages in making wet noodles, namely the process of mixing, kneading, resting the dough, forming sheets, forming noodles, boiling and cooling. Wet noodles have a water content of approximately 52%. Storing wet noodles does not last long, but if made properly, wet noodles can last for 36 hours in the hot or dry season, whereas in the rainy season they only last for 20-22 hours. The content of noodles is mostly carbohydrates and in general Indonesian people consume noodles without using additional ingredients such as vegetables or protein to fulfill nutritional needs. Increasing nutrition can be done by adding additional ingredients that contain iron and high protein. Ingredients that can be added are red spinach flour and catfish flour (Koswara, 2009).

Therefore, it is necessary for wet noodle products to substitute red spinach flour and catfish flour as additional iron and protein to prevent anemia and make these wet noodles a functional food (Devi Maharani et al., 2023).

CHAPTER III
RESEARCH METHODOLOGY

This is a collaboration research between Universitas Alma Ata (UAA) and International Islamic University Malaysia (IIUM). The research will be divided into two main stages, namely formula selection and main product analysis. The formula selection stages will be carried out at IIUM and product analysis will be carried out at UAA.

A. Design of Research

The research is an experimental research with a completely randomized design (CRD) design with the addition of red spinach flour (*Amaranthus tricolor* L.) and catfish flour (*Clarias gariepinus*). This research will conduct at the Food Processing Laboratory of Unievrsitas Alma Ata and Food and Chemical Laboratory at IIUM.

The ingredients use in making wet noodles are wheat flour, water, salt, cooking oil, red spinach flour, and catfish flour. Red spinach flour will be obtained from the online store "Kusuka Ubiku" and catfish flour will be bought from "Natura Innovation House".

The tools used to make wet noodles are digital food scales, basins, gloves, pans, spatulas, noodle making machines. Tools for analysis include a chromameter, Monyl T13 cloth, drying oven, UV spectrophotometer (double beam/single beam) Spectronik 200, centrifuge (Incucell 50), vortex machine, beakers, cuvettes, pipettes and incubators, filter paper, Soxhlet tubes, extraction tube, desiccator, Kjeldahl heater, Kjeldahl flask, complete distillation apparatus, burette, flask measuring pipette, erlenmeyer, analytical balance, magnetic stirrer, drop pipette, grinder, spatula, return cooler, Atomic Absorption Spectrophotometer, texture analyzer.

B. Stage of Research

This research will be done in 2 main steps, that is:

1. Formula Selection

   At this stage, a formula will be selected using the Response Surface Methodology method. The formula will be selected from 20 different formula options with the composition of wheat flour, catfish flour and red spinach flour. The formula can be seen in Table 1.

Table 1. Formula of wet noodle that will be seleceted based on iron content and protein content.

Formula	Wheat flour (g)	Catfish flour (g)	Red spinach flour (g)
1	85	10	1,59
2	85	10	10
3	85	10	10
4	90	15	5
5	85	10	10
6	80	5	15
7	90	15	15
8	85	10	10
9	90	5	15
10	80	15	5
11	85	18,41	10
12	90	5	5
13	93,41	10	10
14	85	1,59	10
15	85	10	18,41
16	80	15	15
17	80	5	5
18	76,59	10	10
19	85	10	10
20	85	10	10
Total	1700	200	200

Formulas will be selected based on protein and iron content, namely 1 formula with high protein content, 1 formula with high iron content, and 1 formula with medium protein and iron content. This stage will be implemented at IIUM.

2. Main Product Analysis

This main research stage will be carried out at UAA. The selected formula is then continued for several analyzes as follows.

a. Preparation of wet noodle

Wet noodle is made by mixing wheat flour, red spinach flour, and catfish flour for 15 minutes. The dough is then incubated in a closed bowl for 30 minutes. This process is repeated twice. The dough is slice forming and then noodle forming. The noodle is bowling for 5 minutes.

b. The laboratory analysis of sample

The analysis that will be done can be seen int Table 2.

Analysis	Methods
Sensory characteristics	Hedonic test
Fe content	Atomic Absorption Spectrophotometry
Total protein	Kjeldhal (AOAC, 2007)
Water content	Gravimetry (AOAC, 2007)
Ash content	Gravimetry (AOAC, 2007)
Fat content	Soxhlet (AOAC, 2007)
Digestibility of protein	Multienzim In Vitro
Carbohydrate content	By different (AOAC, 2007)
Crude fiber content	AOAC, 2007
Texture profile (Springiness, Chewiness, Gumminess, Adhesiveness, Cohessiveness, Hardness)	Texture Profile Analyzer
Colour (L, a, b)	Chromameter CR-400
Cooking quality (cooking yield, cooking loss, cooking time)	Physical analysis
Reduction and total sugar	Spectrometry
Antioxidant activity	DPPH (1,1-diphenyl-2-picrylhydrazyl)

C. Program Research Activity

Phase (Months)	1	2	3	4	5	6	7	8
Initial Discussion	■							
Literature Review	■	■						
Collecting Data			■	■				
Data Analysis				■	■			
Final Report Writing & Article					■	■	■	
Report Submission								■

CHAPTER IV
FINANCIAL COMMITMENT AND BUDGET

A. Financial Commitment

Financial Commitment as agreed by both parties and clearly stated in MoA/MoU

Total Fund from UAA	Rp 13,414,400
Total Fund from Collaborator	Rp 16,981,576

B. Budget From UAA

No	Component	Proposed Cost (Rp)
1	Protein total (4 treatments), red spinach flour, catfish flour	799,680.00
2	Reduction sugar (4 treatments), red spinach flour, catfish flour	752,640.00
3	Phisical Analysis Sifat Fisik (water sorption, breaking power, elasticity) (4 treatments), red spinach flour, catfish flour	336,000.00
4	Antioxidant activity (DPPH) red spinach flour, catfish flour	1,599,360.00
5	Texture profile (Springiness, Chewiness, Gumminess, Adhesiveness, Cohessiveness, Hardness) (4 treatments), red spinach flour, catfish flour	799,680.00
6	Protein digestibility (4 treatments), red spinach flour, catfish flour	1,740,480.00
7	Fe content and total mineral (4 treatments), red spinach flour, catfish flour	1,262,016.00
8	Color properties (4 treatments), red spinach flour, catfish flour	504,000.00
9	Total fat (4 treatments), red spinach flour, catfish flour	1,001,280.00
10	Cooking Quality (Cooking Yield, Cooking Loss dan Cooking Time) (4 treatments), red spinach flour, catfish flour	336,000.00
12	Stach content (4 treatments), red spinach flour, catfish flour	947,520.00
13	Amylose content (4 treatments), red spinach flour, catfish flour	752,640.00
14	Total caroten (4 treatments), red spinach flour, catfish flour	1,048,320.00
15	Dissolved protein (4 treatments), red spinach flour, catfish flour	900,480.00
16	Total sugar (4 treatments), red spinach flour, catfish flour	900,480.00

17	Panelist of sensory analysis	300,000.00
18	Tools for sensory analysis	100,000.00
19	Laboratory fee (16 studentss)	1,600,000.00
20	Red spinach flour 3 kg	390,000.00
21	Wheat flour 3 kg	36,000.00
22	Catfish flour 3 kg	555,000.00
23	Shipping cost of noodle to Malaysia 4 kg	320,000.00
	Total	16,981,576.00

C. Budget From IIUM

No	Component	Proposed Cost (Rp)
1.	Researc assistant salary	2,520,000.00
2.	Laboratory rental	4,320,000.00
3.	Analysis of protein 20 samples @110.000	3,332,000.00
4.	Analysis of iron 20 samples	3,242,400.00
	Total	13,414,400.00

BIBLIOGRAPHY

Al Rasyid, H., Santoso, S. A., & Araminta, M. P. (2018). Kadar Lemak Jajanan Mahasiswa Fakultas Kedokteran Universitas Brawijaya. *Indonesian Journal of Human Nutrition*, *5*(1), 1–10. https://doi.org/10.21776/ub.ijhn.2018.005.01.1

Andriani, D., Hartinah, D., & Prabandari, D. W. (2021). Pengaruh Pemberian Jahe Merah Terhadap Perubahan Nyeri Disminorhea. Jurnal Ilmu Keperawatan Dan Kebidanan, 12(1), 171. https://doi.org/10.26751/jikk.v12i1.920

Chairunnisa, O., Nuryanto, & Probosari, E. (2019). Perbedaan Kadar Hemoglobin Pada Santriwati dengan Puasa Daud, Ngrowot dan Tidak Berpuasa di Pondok Pesantren Temanggung. Journal of Nutrition College, 8, 58–64.

Devi Maharani, A., Nurwantoro, & Priyo Bintoro, V. (2023). Karakteristik Fisik dan Hedonik Mie Basah Berbahan Dasar Terigu dengan Substitusi Tepung Labu Kuning dan Tepung Daun Kelor. Jurnal Teknologi Pangan, 7(1), 28–33. www.ejournal-s1.undip.ac.id/index.php/tekpangan.

Rina Yenrina, M. (2015). Metode Analisis Bahan Pangan dan Komponen Bioaktif. In Andalas University Press (Vol. 2).

Fadlilah, A., Rosyidi, D., & Susilo, A. (2022). Karakteristik warna L*a* b* dan tekstur dendeng daging kelinci yang difermentasi dengan Lactobacillus plantarum. Wahana Peternakan, 6(1), 30–37. https://doi.org/10.37090/jwputb.v6i1.533.

Farameita, M., & Wati, D. A. (2022). pembuatan roti kering dengan penambahan ikan lele (clarias batracus) dan bayam (amarantus tricolor,l)Sebagai snack alternatif MP-ASI sumber protein dan zat besi. Jurnal Gizi Dan Kesehatan, 14(2), 207–2015. http://jurnalgizi.unw.ac.id/index.php/JGK.

Hapsari, tarisa Y., Madani, M. P., Tsany, A. M., Khofifah, T., Atmadinina, W., & Achyani, F. (2018). brownis bayam merah (bromer)pencegah anemia. 59–63.
Helrich, K. (2024). official methods of analysis. Honey Bees, Beekeeping and Bee Products, 1(Volume 1), 69–87. https://doi.org/10.1201/9781003354116-6

Hesti Marliza, Suci Fitriani Sammulia, & Delladari Mayefis. (2023). Analisis Proksimat Dan Skrining Fitokimia Tumbuhan Di Perairan Pantai Sekilak Kota Batam. The Journal General Health and Pharmaceutical Sciences Research, 1(2), 41–54. https://doi.org/10.57213/tjghpsr.v1i2.225.

Indiarto, R., Nurhadi, B., & Subroto, E. (2014). Kajian Karakteristik Tekstur (Texture Profil Analysis) Dan Organoleptik Daging Ayam Asap Berbasis Teknologi Asap Cair Tempurung Kelapa. Jurnal Teknologi Hasil Pertanian, V(2), 106–117.

Indrayani, T., Difha Febriani, A., Widowati Program Studi Kebidanan, R., Ilmu Kesehatan, F., Nasional Jakarta, U., Sawo Manila No, J., Barat, P., Minggu, P., &

Selatan, J. (2022). Pemangfaatan komsumsi bayam merah dan bayam dan bayam hijau terhadap peningkatan kadar HB ibu hamil anemia Triana. Jurnal Peduli Masyarakat, 4(4), 715–720. http://jurnal.globalhealthsciencegroup.com/index.php/JPM

Kausar Suryani. (2022). Penetapan Kadar Protein Kulit Pisang Kepok (Musa acuminata balbisiana colla) dan Kulit Pisang Tanduk (Musa corniculata) dengan Metode Kjeldahl. Jurnal Analisis Farmasi, 7(2), 164–174.

Kemenkes RI. (2017). Tabel Komposisi Pangan 2017. In Tabel Komposisi Pangan Indonesia.

Khoerunisa, T. K. (2020). Pengembangan Produk Pangan Fungsional Di Indonesia Berbasis Bahan Pangan Lokal Unggulan A Review : Development of Functional Food Products in Indonesia based on Local Ingredients. Indonesian Journal of Agricultural and Food Research, 2(1), 49–59. https://journal.uniga.ac.id/index.php/IJAFOR

Koswara, S. (2009). Teknologi pengolahan mie. EBookpangan.Com, 1–13.

Kristiandi, K., Rozana, R., Junardi, J., & Maryam, A. (2021). Analisis Kadar Air, Abu, Serat dan Lemak Pada Minuman Sirop Jeruk Siam (Citrus nobilis var. microcarpa). Jurnal Keteknikan Pertanian Tropis Dan Biosistem, 9(2), 165–171. https://doi.org/10.21776/ub.jkptb.2021.009.02.07.

Kurniasih, R. A., Dewi, E. N., Studi, P., Hasil, T., & Diponegoro, U. (2022). Analisa Kualitas dendeng giling ikan lele dumbo(Clarias Gariepinus)dengan penambahan tepung porang (Amorphophallus). 4(2), 120–125.

Lolo, A., Patandean, C. F., & Ruslan, E. (2020). Karakterisasi Air Daerah Panas Bumi Pencong Dengan Metode Aas (Atomic Absorption Spectrophotometer) Di Kecamatan Biringbulu, Kabupaten Gowa Propinsi Sulawesi Selatan. Jurnal Geocelebes, 4(2), 102–110. https://doi.org/10.20956/geocelebes.v4i2.8928

Mayasti, N. K. I., Ushada, M., & Ainuri, M. (2018). Analisa mutu produk spageti berbasis tepung beras, jagung, mocaf, dan kedelai. Jurnal Pangan, 27(2), 129–140.

Nastiti, A. N., & Christyaningsih, J. (2019). Pengaruh subtitusi tepung ikan lele terhadap pembuatan cookies bebas gluten dan kasien sebagai alternatif jajanan anak autism spectrum disorder
<i>[Effect of Catfish Flour Substitution towards Gluten-Free and Casein-Free Cookies as an Alternative Sna. Media Gizi Indonesia, 14(1), 35. https://doi.org/10.20473/mgi.v14i1.35-43

Nugroho, Muhammad, Fitri, A., & Murtini, Erni, S. (2017). Inovasi Peningkatan Kandungan Gizi Jajanan Tradisional Klepon dengan modifikasi bahan dan warna. Jurnal Pangan Dan Agroindustri, 5(1), 92–103.

Rahmawati, T. (2023). Penyuluhan Kesehatan Anemia pada Remaja dalam Upaya Meningkatkan Pengetahuan dan Mencegah Kejadian Anemia. Jurnal Abdimas Kesehatan (JAK), 5(1), 186. https://doi.org/10.36565/jak.v5i1.499.

Ratri Yulianingsih, R. (2019). Peningkatan Pertumbuhan Dan Hasil Tanaman Bayam Merah (Amaranthus Tricolor, L.) Dengan Pemberian Pupuk Organik Cair Urine Sapi. Piper, 15(28). https://doi.org/10.51826/piper.v15i28.292

Riestamala, E., Fajar, I., & Setyobudi, S. I. (2021). Formulasi Ikan Lele Dan Bayam Hijau Terhadap Nilai Gizi, Mutu Organoleptik, Daya Terima Risoles Roti Tawar Sebagai Snack Balita. Journal of Nutrition College, 10(3), 233–242. https://doi.org/10.14710/jnc.v10i3.30749.

Riskesdas. (2018). Laporan Riskesdas 2018 Nasional. In Lembaga Penerbit Balitbangkes (p.156). Lembaga Penerbit Badan Penelitian dan Pengembangan Kesehatan (LPB).

Riza, B. & F. (2024). Pemberian Makanan Tambahan pada Balita dengan Bahan Dasar Ikan Lele di Desa Macanan dan Desa Soco Jogorogo Ngawi Supplementary. Program Studi Keperawatan, Sekolah Tinggi Ilmu Kesehatan Surya Global Yogyakarta Informasi, 1, 1–6.

Saputra, D. (2014). Penentuan Daya Cerna Protein In Vitro Ikan Bawal (Colossoma Macropomum) pada Umur Panen Berbeda. ComTech: Computer, Mathematics and Engineering Applications, 5(2), 1127. https://doi.org/10.21512/comtech.v5i2.2430.

Utama, T. A., Listiana, N., & Susanti, D. (2013). Perbandingan Zat Besi dengan dan Tanpa Vitamin C terhadap Kadar Hemoglobin Wanita Usia Subur. Kesmas: National Public Health Journal, 7(8), 344. https://doi.org/10.21109/kesmas.v7i8.19.

WHO. (2021). World health statistics 2021: monitoring health for the SDGs sustainable development global. In Pharmacognosy Magazine (Vol. 75, Issue 17).