CHAPTER I
INTRODUCTION

1.1 Reaserch Background

The First 1000 Days of Life, also known as the Golden Period, is a critical period for closely monitoring toddlers' growth and development so that abnormalities can be detected as early as possible.[1] This period's growth rate is faster than that of other periods, and the brain and other organ systems develop at an extraordinary rate. This periode is reflected in toddlers higher nutritional needs than adults, expressed in nutrients per kilogram of body weight.[2]

According to UNICEF data from 2020, there were 47 million underweight children under five were in 2019.[3] According to the Indonesian Nutrition Status Survey in 2022, the prevalence of underweight in Indonesia has increased in recent years. The prevalence of underweight in 2022 is 17.1%, up from 16.3% in 2019. This prevalence rate shows that being underweight is still a significant challenge in Indonesia, including in the 6-8-month age group.[4]

Proper complementary feeding can improve infants' nutritional status. Mistakes in complementary feeding can disrupt nutrient intake and the risk of early complementary feeding results in anaemia and malnutrition.[5] The principles of complementary feeding, namely, given at 6 months, should consider the age, amount, frequency, texture, and variety of food prepared and stored hygienically, using clean hands and utensils, and given correctly.[6]

The provision of complementary feeding aims to fulfil the nutritional needs of toddlers and develop their ability to accept a variety of foods with different

[1] Fransiska R.D, et al., (2023). Edukasi Kesehatan Online Untuk Optimalisasi Peran Masyarakat Dalam 1000 Hari Pertama Kehidupan, 2 : 5–12.

[2] Anugrahini C., Fatimah M., Seukasa S. M., Naitboho J. (2024). 1000 Hari Pertama Kehidupan (HPK) Pada Ibu Hamil Dan Keluarga Beresiko Stunting Di Desa Kabuna Haliwen Atambua Nusa Tenggara Timur, 6, no. 5 : 1–23.

[3] UNICEF, WHO, and World Bank, (2023). Level and Trend in Child Malnutrition, *World Health Organization*, 4, https://www.who.int/publications/i/item/9789240073791.

[4] SSGI, (2022). Hasil Survei Status Gizi Indonesia, *Kementerian Kesehatan Republik Indonesia*, 1–99, Https://Promkes.Kemkes.Go.Id/Materi-Hasil-Survei-Status-Gizi-Indonesia-Ssgi-2022.

[5] Widyaningrum R, Matahari R, and Sulistiawan D, (2021). MP-ASI Berbahan Pangan Lokal Dan Bergizi.

[6] Kemenkes RI, (2023). Buku Resep Makanan Lokal, Kemenkes RI.

flavours and shapes by adjusting foods that contain high energy.[7] Providing safe, appropriate, and nutritious food to toddlers as complementary food is one way to overcome the problem of undernutrition in toddlers. Toddlers aged 6-8 months need about 200 calories. This age is an essential stage for introducing the texture of complementary foods gradually, starting with providing textures in the form of thick porridge or mashed food.[8]

Instant porridge complementary foods are recommended to provide high-density, long-lasting energy for easy consumption. The preparation of these foods must fulfil the nutritional needs of toddlers.[9] Baby porridge is of course easier to find anywhere in instant form, relatively cheaper, and easily consumed by toddlers.[10] Instant porridge, a complementary food currently available on the market, is made from rice flour, skim milk powder, sugar, and vegetable oil. Other food ingredients must be developed to increase the nutritional content. However, the additional amount must still be considered so that the nutritional content meets the National Standards of Indonesia (SNI) of instant porridge complementary foods.[11]

Most Indonesians like to consume tempeh because it is affordable, easy to obtain, and easy to process. Tempeh one source of protein readily available to the general public. This helps optimal physical and mental growth, repair of damaged body tissues, and the formation of antibodies in the toddler's body.[12] Tempeh is a good source of protein but is not on par with milk, meat or eggs in protein quality.[13] Every 100 g of tempeh provides 201 kcal of energy, 13.8 g of carbohydrates, 20.8 g of protein, 8.8 g of fat, and 1.4 g of fiber.[14]

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[7] Rismawati, (2023). Gambaran Pemberian Mp Asi Pada Anak Didesa Wanadadi Skripsi, Gambaran Pemberian Mp Asi Pada Anak Usia 6-24 Bulan Didesa Wanadadi *Skripsi*, 14–63.

[8] Widyaningrum, Matahari, and Sulistiawan, MP-ASI Berbahan Pangan Lokal Dan Bergizi.

[9] Al Rahmad A.H., (2017). Pemberian Asi Dan Mp-Asi Terhadap Pertumbuhan Bayi Usia 6–24 Bulan, Jurnal Ilmu Kedokteran Syiah Kuala, , https://jurnal.usk.ac.id/JKS/article/view/7982.

[10] Lidia dan Triyono, (2024). Implementasi Model Bisnis Canvas Pada Usaha Bubur Organik, Jurnal Manajemen Dan Bisnis Islam 1, no. 1 : 64–78.

[11] Lizawati, Afrinis N dan Erlinawati, (2021). Hubungan Pengetahuan Ibu Tentang MP-ASI Dengan Motivasi Memberikan MPA-SI Tepat Waktu, Jurnal Doppler 5, no. 1 : 72–77

[12] Rachmawati N, Pontang G.S dan Mulyasari I, (2020). Daya Terima Formula Bubur Instan Dari Tempe Kedelai Sebagai Makanan Pendamping Asi Untuk Bayi Usia 6-12 Bulan, Jurnal Gizi Dan Kesehatan 12, no. 27: 1–10, https://doi.org/10.35473/jgk.v12i27.55

[13] Purnamasari, V.I dan Febry, (2023). Perbandingsn Asupan Protein Hewani Dan Protein Nabati Pada Balita Stunting Di Indonesia, Malahayati Nursing Journal 5, 2655–2728 : 1116–29.

[14] Kemenkes RI, (2019). Tabel Komposisi Pangan Indonesia (TKPI). Kemenkes RI, 2019.

Tempeh is a fermented soybean that contains plant based protein.[15] The fermentation process that occurs when making tempeh produces enzymes from Rhizopus spp. molds that convert complex macromolecular compounds, such as proteins, fats and carbohydrates into simpler compounds such as peptides, amino acids, fatty acids and monosaccharides. Proteins, fats and carbohydrates in tempeh are more easily digested and absorbed by the body compared to whole soybeans due to the presence of digestive enzymes (protease, lipase and amylase) produced by the tempeh mold.[16]

The nutrient content in tempeh can be used as a cheap source of protein for toddler food in developing countries.[17] To extend the shelf life and facilitate tempeh processing, make tempeh flour.[18] Every 100g of tempeh flour contains 450 kcal, 46.5g protein, 19.7g fat, and 30.2g carbohydrate.[19] One alternative in making instant porridge for complementary feeding, aside from using rice flour, is by using kepok banana flour.[20] Banana flour contains 338 kcal of energy, 2.9 grams of protein, 0.4 g of fat, 80.6 grams of carbohydrate, and 5.3 grams of fiber in 100 grams.[21]

Bananas can help toddlers aged 6-8 months overcome gastrointestinal diseases, help them feel full longer to control their weight, maintain endurance, reduce the risk of heart disease, reduce colon cancer, and strengthen bones.[22]

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[15]Kårlund A., *et al*., (2020). Harnessing Microbes for Sustainable Development: Food Fermentation as a Tool for Improving the Nutritional Quality of Alternative Protein Sources, *Nutrients* 12, no. 4

[16] Madani A, et al., (2023). Analisis Kandungan Proksimat Cookies Tepung Tempe, *Journal of Food Security and Agroindustry* 1, no. 2 : 40–49, https://doi.org/10.58184/jfsa.v1i2.87.

[17]Winarti P.A, Kristianto Y, Setyobudi S. I, Palupi F.D. (2024). Formulasi Biskuit Sebagai Makanan Tambahan Balita Gizi Kurang Menggunakan Tepung Tempe, 352–61.

[18] Yuspitasari G, Rejeki S dan Ansharullah, (2023). Pengaruh Substitusi Tepung Tempe Kedelai Terhadap Nilai Organoleptik, *J. Sains Dan Teknologi Pangan* 8, no. 1: 5882–96.

[19] Depiyana T, Kusumawati D dan Ma'rifah B. (2024). Jurnal Teknologi Pangan Dan Gizi Tepung Ubi Jalar Ungu Dan Tepung Tempe Sebagai Alternatif Pmt Balita Gizi Kurang Jurnal Teknologi Pangan Dan Gizi(Journal of Food Technology and Nutrition), no23: 8–17.

[20] Rosalina Y., *et al*., (2021). Karakteristik Tepung Pisang Dari Bahan Baku Pisang Lokal Bengkulu Characteristics of Banana Flour from Bengkulu Local Banana Varieties, *Makalah Ketimpangan Sosial Non Ekonomi* 7 : 1–16.

[21] Kemenkes RI, (2019). Tabel Komposisi Pangan Indonesia.

[22] Kemenkes RI, (2019). Angka Kecukupan Gizi Mayarakat Indonesia, *Permenkes Nomor 28 Tahun 2019* Nomor 65, no. 879 : 2004–6, https://peraturan.bpk.go.id/Details/138621/permenkes-no-28-tahun-2019.

Kepok bananas have a high carbohydrate content that is good for toddler growth.[23]

The importance of choosing nutritious and beneficial foods, such as kepok banana flour, to support the health and growth of infants, in accordance with Allah SWT's command to pay attention to the types of food consumed so that the body can function optimally. Allah SWT commands humans to carefully consider and choose the food they consume for the proper functioning of their bodies, as mentioned in Allah SWT's words in Surah Abasa, verse 24, which means, “Then let man consider his food.”[24]

Based on the above background, researchers are interested in formulating instant porridge as a complementary food from tempeh flour and kepok banana flour. Tempe flour is suitable as a raw material for complementary food production due to its high protein content, and kepok banana flour has high dietary fiber and carbohydrate content.

1.2 Research Problems

The formulation of the problem in this research is:

1. Is there a difference in the preparation of instant porridge complementary food made from tempe flour and kepok banana flour in terms of the content of carbohydrates, protein, and dietary fiber for toddlers 6-8 months?
2. Is there a difference in making instant porridge, a complementary food made from tempeh flour and kepok banana flour, on an organoleptic test for toddlers 6-8 months?
3. Is there the best formulation of instant porridge complementary food made from tempe flour and kepok banana flour for the organoleptic test for toddlers aged 6-8 months?

1.3 Research Objectives

1. General Purpose

The results of this study were conducted to analyse the levels of carbohydrates, protein, and dietary fiber in the preparation of instant

[23] Malau M.S, Yusmarini dan Johan V.S, (2022). Pemanfaatan Tepung Pisang Kepok Dan Tepung Tempe Dalam Pembuatan Kukis, Sagu 21, no. 2 : 79.

[24] Mausufi N, Hidayat M, Fitriani, (2023). Makanan Halal Dan Thayyib Perspektif Mufassir Nusantara, Jurnal Hukum Islam Dan Humaniora.

porridge, a complementary food made from tempe flour and kepok banana flour for toddlers aged 6-8 months.

2. Specific Objectives

1. Analysing the differences in carbohydrate, protein, and dietary fiber levels in instant porridge complementary food made from tempeh flour and kepok banana flour for toddlers aged 6-8 months.
2. Analysing organoleptic differences in instant porridge, a complementary food made from tempeh and kepok banana flour, for toddlers aged 6-8 months.
3. Analysing the best formula for instant porridge, a complementary food made from tempeh and kepok banana flour, for toddlers aged 6-8 months.

1.4 Research Benefits

1. Theoretical Benefits

This research is expected to add insight into the knowledge of mothers who have toddlers about the importance of proper complementary feeding, which can be made complementary food from tempe flour and kepok banana flour.

2. Practical Benefits

a. Optimizing the potential of processing tempeh flour and kepok banana flour as an instant porridge complementary food production.
b. Instant porridge is a complementary food high in carbohydrates, protein, and fiber made from tempe flour and kepok banana flour. It can be used as an alternative to making complementary food and is easy to do in everyday life.

1.5 Authenticity Research

Research on instant porridge complementary food with various variants of raw materials has been conducted by several researchers, as shown in Table 1 below:

Table 1. Research Authenticity

No	Research Title	Research Methods	Research Variabel	Results	Research Differences
1.	Characteristics of Physiochemical Properties of Instant Baby Porridge Made from Pumpkin *(Cucurbita Maxima)* and Tempeh Composite Flour[25]	Experimental with a completely randomised design with 4 levels of treatment of the ratio of pumpkin flour (TLK) and tempe flour (TT)	Independent Variable: Pumpkin and Tempeh Flour. Dependent Variable: proximate test, rehydration time, slurry density, total energy, vitamin a in instant porridge.	Adding pumpkin and tempeh flour did not significantly affect instant baby porridge's rehydration time and Kamba density.	Independent Variable: tempeh flour and kepok banana flour Dependent Variable: carbohydrate, protein, dietary fiber analysis, and organoleptic test
2.	Chemical and Physical Characteristics of Instant Porridge Made from Pulut Corn Flour and Red Bean Flour [26]	Experimental with a completely randomised design	Independent Variable: Pulut corn flour and red bean flour Dependent Variable: proximate test, camba density, and rehydration power	The ratio of 80% pulut corn flour and 20% red bean flour has the characteristics of moisture content (3.44%), protein content (10.8%) and carbohydrate content (80.53%).	Independent Variable: instant porridge based on tempeh flour and kepok banana flour Dependent Variable: carbohydrate, protein, dietary fiber analysis, and organoleptic test.
3.	Development of Mother's Milk Companion Food (MP-ASIi) Instant Porridge with Substitution of Catfish Flour and Yellow Pumpkin Flour [27]	Experiment with a two-factorial complete randomised design with two repetitions to evaluate the product's sensory.	Indepent Variable: Catfish flour and pumpkin flour. Dependent Variable: proximate test, food safety test, organoleptic test	Using 15% catfish flour substitution and 10% pumpkin flour gave the best results on the sensory value of instant porridge.	Independent Variable: tempeh flour and kepok banana flour Dependent Variable: carbohydrate, protein, dietary fiber analysis, and organoleptic test

[25] Bawole M, Bait Y, and Kasim R. (2023). Karakteristik Sifat Fisikokimia Bubur Bayi Instan Berbahan Dasar Tepung Komposit Labu Kuning (Cucurbita Maxima) Dan Tempe, Jambura Journal of Food Technology (JJFT) 5, no. 2 : 217–29.

[26] Palijama, Breemer, Topurmera, (2020). Karakteristik Kimia Dan Fisik Bubur Instan Berbahan Dasar Tepung Jagung Pulut Dan Tepung Kacang Merah, AGRITEKNO: Jurnal Teknologi Pertanian 9, no. 1 : 20–27, https://doi.org/10.30598/jagritekno.2020.9.1.20.

[27] Darningsih S, Habibi N. A, Nurman Z, Ismanilda I, (2023). Pengembangan Makanan Pendamping Air Susu Ibu (Mpasi) Bubur Instant Dengan Substitusi Tepung Ikan Lele Dan Tepung Labu Kuning, Media Gizi Indonesia 18, No. 1 : 94–102.

4.	Physical and Organoleptic Characteristics of Instant Complementary Food Enriched with Catfish and Cork Fish by Freeze Dryer Method [28]	Experimental with a complete randomised design	Independent Variable: catfish and cork fish Dependent Variable: physical quality and organoleptic test	Determining the characteristics of complementary food porridge from physical properties (solubility and water absorption) and the level of liking with organoleptic tests	Independent Variable: instant porridge based on tempeh flour and kepok banana flour Dependent Variable: carbohydrate, protein, dietary fiber analysis, and organoleptic test
5.	Characteristics of Yellow Sweet Potato-based Instant Porridge as Complementary Food for the Prevention of Stunting [29]	Experimental Randomized Group Design with 3 treatments of pra gelatinisation time	Independent Variable: sweet potato Dependent Variable: physical properties analysis, chemical and microbiological analysis, organoleptic test	Produce selected formulation of yellow sweet potato flour 43% and milk skim milk powder 22%	Independent Variable: tempe flour and kepok banana flour Dependent Variable: carbohydrate, protein, dietary fiber analysis, and organoleptic test

[28] Anam C, Kawiji, Ariyoga U.N, Farhan R. (2021). Karakteristik Fisik Dan Organoleptik MP-ASI Instan Diperkaya Ikan Patin Dan Ikan Gabus Metode Freeze Dryer, Jurnal Ilmiah Inovasi 21, no. 2 : 116–23.

[29] Meisara N.D, Rialita T, Herminiata A. (2021). Karakteristik Bubur Instan Berbasis Ubi Jalar Kuning Sebagai Makanan Pendamping Air Susu Ibu (MP-ASI) Untuk Pencegahan Stunting, Nutri-Sains: Jurnal Gizi, Pangan Dan Aplikasinya 5, no. 1: 41–52,