



## Acceptability of dried patin fish dried noodles substituted with yellow pumpkin flour in toddler wasting

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### ABSTRAK

**Latar Belakang:** Upaya penanganan masalah gizi kurang pada balita sangat penting dilakukan agar balita tidak masuk ke dalam kondisi gizi buruk dan menimbulkan masalah kesehatan yang lebih serius. Upaya pemilihan pangan lokal yang berprotein tinggi dapat ditambahkan/disubstitusi pada produk mi. Mi kering ikan patin yang disubstitusi tepung labu kuning dengan komposisi tepung labu kuning 7,5% memiliki kualitas kadar air terbaik berdasarkan SNI 8217-2015), sehingga direkomendasikan untuk dimodifikasi dengan berbagai resep dan teknik pengolahan. Pengolahan mi kering dapat diolah menjadi mi goreng, mi rebus atau variasi lainnya. Penyajian mi instan dalam bentuk mi goreng lebih disukai oleh balita usia 24 - 60 bulan.

**Tujuan:** Menguji daya terima mi kering ikan patin yang disubstitusi tepung labu kuning pada balita gizi kurang di wilayah kerja Puskesmas Telogosari Wetan Kota Semarang.

**Metode:** Jenis penelitian yang digunakan adalah pre-experimental design dengan rancangan one- shot case study. Tahapan penelitian terdiri dari: tahap pembuatan produk dan tahap uji daya terima produk, yaitu dengan 3 modifikasi resep yang akan diberikan pada hari ke-1 sampai hari ke-3, yaitu Mi Gosis (Mi Goreng Sosis), Mi Goreng Telur Puyuh (Mi Teluh) dan Mi Gong (Mi Goreng Kampung).

**Hasil:** Tiga resep modifikasi mi kering ikan patin substitusi tepung labu kuning ini memiliki nilai gizi 224,6 kalori- 385,115 kalori, hal ini dapat memenuhi rata-rata 15% kebutuhan sajian makanan balita sebagai selingan. Pada uji daya terima dari 3 resep, sisa tertinggi (>20%) pada hari ke-2 sebanyak 56,7% balita. Daya terima tertinggi balita adalah pada olahan mi kering ikan patin hari ketiga atau mi goreng kampung yaitu sebanyak 22 orang (73,3%).

**Kesimpulan:** Balita dapat menerima mi kering ikan patin dengan daya terima tertinggi adalah pada olahan mi goreng kampung yaitu sebanyak 22 orang (73,3%).

**KATA KUNCI:** daya terima; mi kering ikan patin tepung labu kuning; 3 modifikasi resep; balita wasting

## ABSTRACT

**Background:** Efforts to deal with malnutrition problems in toddlers are very important so that toddlers do not enter into malnutrition conditions and cause more serious health problems. Efforts to select high-protein local foods can be added/substituted to noodle products. Dried patin fish noodles substituted with yellow pumpkin flour with a composition of pumpkin flour of 7.5% have the best moisture content quality based on SNI 8217-2015), so it is recommended to be modified with various recipes and processing techniques. Dry noodle processing can be processed into fried noodles, boiled noodles, or other variations. The presentation of instant noodles in the form of fried noodles is preferred by toddlers aged 24 – 60 months.

**Objectives:** This study aimed to test the acceptability of patin fish dried noodles substituted with yellow pumpkin flour in malnourished toddlers in the working area of the Telogosari Wetan Health Center in Semarang City.

**Methods:** The type of research used is a pre-experimental design with a one-shot case study design. The stages of the research consist of the product Preparation Stage and Product Acceptability Test Stage, namely with 3 recipe modifications that are said to be given on days k-e 1 to 3, namely Mi Gosis (Sausage Fried Noodles), Quail Egg Fried Noodles (Teluh Noodles), and Gong Noodles (Village Fried Noodles).

**Results:** These three modified dry catfish noodle recipes have a nutritional value of 224.6 - 385,115 calories, this can fulfill an average of 15% of toddlers' food needs as a distraction. In the acceptability test of 3 recipes, the highest remaining (>20%) was on the 2nd day for 56.7% of toddlers. The highest acceptability for toddlers is processed dried catfish noodles on the third day or village fried noodles, namely 22 people (73.3%).

**Conclusions:** Toddlers can accept dried catfish noodles with the highest acceptability being processed village fried noodles, namely 22 people (73.3%).

**KEYWORD:** acceptability; dried patin fish noodles yellow pumpkin flour; 3 recipe modifications; toddler wasting

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## INTRODUCTION

Toddlers are vulnerable to malnutrition, which is often associated with protein-energy deficiency over a long period (1). Efforts to address undernutrition in toddlers are very important so that toddlers do not get into malnutrition conditions and cause more serious health problems (2). The prevalence of toddler wasting in Indonesia is 7.1% (3). In Central Java Province there are 35 districts/cities, 37% of which have toddler wasting which is above the national prevalence (3), while in Semarang City, this data has increased by 1.01% from 2020 (4). Efforts and strategies of the Central Java Provincial Health Service to overcome this are by implementing a supplementary feeding program (5).

Supplementary food can be provided in the form of local food-based family food in the form of recommended recipes with the condition that it

contains 300-400 calories, 6-18 grams of protein per 100 grams of product, and targets toddlers 24-59 months with malnutrition status (weight-for-height indicator) z-score value  $-3SD \leq z \leq -2SD$  (6–8). The analysis carried out by Nurul Wandasari (2014)., which is cited by Asiati (2020) shows a significant relationship between mothers's knowledge of the consumption of instant noodles in toddlers (9). Another study (10) on elementary school children from farming families shows that the consumption pattern of instant noodles is  $>3x/day$  and  $1x/day$  as much as 48% of 58 respondents. Consuming instant noodles poses dangerous risks to health because they contain ingredients monosodium glutamate (MSG), coloring and preservatives, and propylene glycol which cannot explained in the body until it settles and lowers immunity. Instant noodles put a burden

on the digestive system are forced to work long hours to understand food while food stays in the digestive tract for long periods have an impact on the nutrient absorption of other food (10).

Efforts to select local foods high in protein can be added/substituted to noodle products. Giving noodles with the addition of patin fish proved to be acceptable to elementary school students in Pekanbaru. Analysis of the addition of 3 types of fish showed that dry noodles with the addition of patin fish had the highest protein content compared to tilapia and cork (11). Further development of 7.5% pumpkin flour substitution into dry noodle products was selected because it had the lowest moisture content (<10%) and was organoleptically acceptable (13). addition, dried patin fish noodles substituted with pumpkin flour with this composition also has the best quality of moisture content based on SNI 8217-2015, so it is recommended to be modified with various recipes and processing techniques (13). Children with vitamin A deficiency (VAD) had 43% higher odds of stunted growth than those without VAD (12). Many complex interplaying factors influence nutritional problems. Inadequate parenting styles applied by mothers/caregivers to toddlers can be among the causes of malnutrition in children under five at the household level (9).

The Tlogosari Wetan Health Center Data Report shows the nutritional status in March 2023 of toddlers aged 24-59 months with malnutrition

status (weight-for-height indicator) as much as 69.49%). Based on the above background, researchers are interested in testing the acceptability of dried patin fish noodles substituted with pumpkin flour on undernourished toddlers in the Telogosari Wetan Health Center working area in Semarang City.

## MATERIALS AND METHODS

This research has passed the ethical review with No. 1060/EA/KEPK/2023. This research went through several stages as follows:

### Product preparation stage

The manufacture of pumpkin flour dried patin fish noodles (based on the formulation of Fitriani and Roziana) was carried out in the food technology & nutrition laboratory of the Poltekkes Kemenkes Semarang. The Patin fish used in this research was the Jambal patin fish measuring 35 cm or weighing 700 grams/fish. This type of Patin fish is widely distributed in the waters of Sumatra, Kalimantan, and Java. The yellow pumpkin chosen was Parang pumpkin because it has a brighter orange color and sweet taste.

Preparation of pumpkin flour dried patin fish noodle recipes into 3 processed recipes, namely original fried noodles, Javanese fried noodles, and sweet and sour fried noodles, followed by calculation of desk analysis of modified recipes (**Figure 1**).

**Table 1. Formulation of patin fish dry noodles substituted with\_pumpkin flour**

Material	Material Weight (gram)	Percentage of material (%)
Wheat flour	92.5	56.90
Pumpkin flour	7.5	4.61
Patin fish	30	18.45
Chicken egg	20	12.30
Garlic	10	6.15
Salt	2	1.2
Baking powder	0.25	0.15
Ash water	0.25	0.15
Whiting lime	0.15	0.09

### Product acceptability test stage

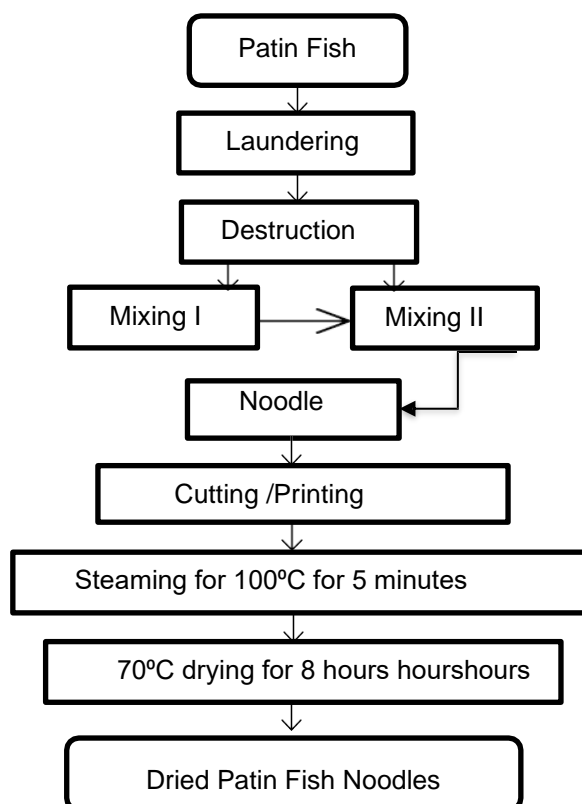
Providing the processed patin fish noodle product with dried pumpkin flour to malnourished toddlers is carried out 3 times, alternately given in stages; giving fried noodle dishes to toddlers

according to the portion the toddler needs, observed using the Comstock method which is given at 15.00 as a Toddler PMT (snack). Furthermore, the comstock results are categorized into 2 groups, namely  $\leq 20$  and  $> 20\%$

referring to the minimum percentage of food waste (20). The study population was all undernourished toddlers (wasting) aged 24-60 months who were in the working area of the Telogosari Wetan Health Center, Semarang City. Toddlers who were taken as samples were toddlers aged 24-60 months, weight-for-height  $-3$  SD to  $<-2$  SD. The distribution

of toddlers who were tested for acceptability was distributed in 8 sub-districts, the names of the subdistricts: Tlogosari Wetan (6 toddlers), Tlogosari (4 toddlers), Pedurungan Tengah (4 toddlers), Pedurungan Lor (1 toddler), Pedurungan Kidul (2 toddlers), Plamomgan Sari (5 toddlers), Palebon (8 toddlers).

### Manufacturing Procedure



**Figure 1. Manufacturing Process Dried Patin Fish Dried Noodles Substituted with Yellow Pumpkin Flour (17, 18).**

The research time starts from March to October 2023, while the data collection of the acceptance test will be carried out in July 2023. This research has passed ethical review with No./1060/EA/KEPK/2023. The research flow diagram can be seen in the following **Figure 2**.

## RESULTS AND DISCUSSIONS

### General Description

The working area of Puskesmas Tlogosari Wetan is bordered by the north (Genuk sub-district), south (Tembalang sub-district), west (Tlogosari Kulon & Kalicari villages), and east (Mranggen), with a working area of 2.896 km<sup>2</sup>,

with 8 villages as working unit areas 16. Obtained data on 30 toddlers distributed in 8 working areas of Puskesmas Tlogosari Wetan. Based on **Table 2**, the highest number of respondents in the toddler group aged 24-36 months (36.7%), male gender 56.7% greater than female. For the nutritional status of toddlers with indicators of weight-for-height  $-3$  SD to  $<-2$  SD by 56.7% while 43.3% of toddlers in addition to malnutrition are also accompanied by the results of height-for-age measurements with Z-score  $<-2$  SD sd  $-3$  SD there are 10 toddlers and with Z-score  $<-3$  SD as many as 3 toddlers. There were 30 undernourished toddlers with indicators of weight-

for-height - 3 SD to <- 2 SD. Selected who met the criteria who became subjects in this study and 43.3% of them were classified as stunting.

According to Minister of Health Regulation No. 28 of 2019 concerning Nutritional Adequacy Rates recommended for Indonesian people, the nutritional adequacy of toddlers aged 1 - 3 years is energy of 1350 kcal, protein 20 g, fat 45 g, carbohydrates 215 g, fiber 19 g, calcium 650 mg,

phosphorus 460 mg, iron 7 mg, vitamin A 400 RE, vitamin B1 0.5 mg, vitamin C 40 mg, potassium 2600 mg, sodium 800 mg. The nutritional adequacy of children aged 4 - 5 years is energy of 1400 kcal, protein 25 g, fat 50 g, carbohydrates 220 g, fiber 20 g, phosphorus 500 mg, calcium 1000 mg, iron 10 mg, vitamin A 450 RE, vitamin C 45 mg, vitamin B1 0.6 mg, sodium 900 mg, potassium 2700 mg (14).

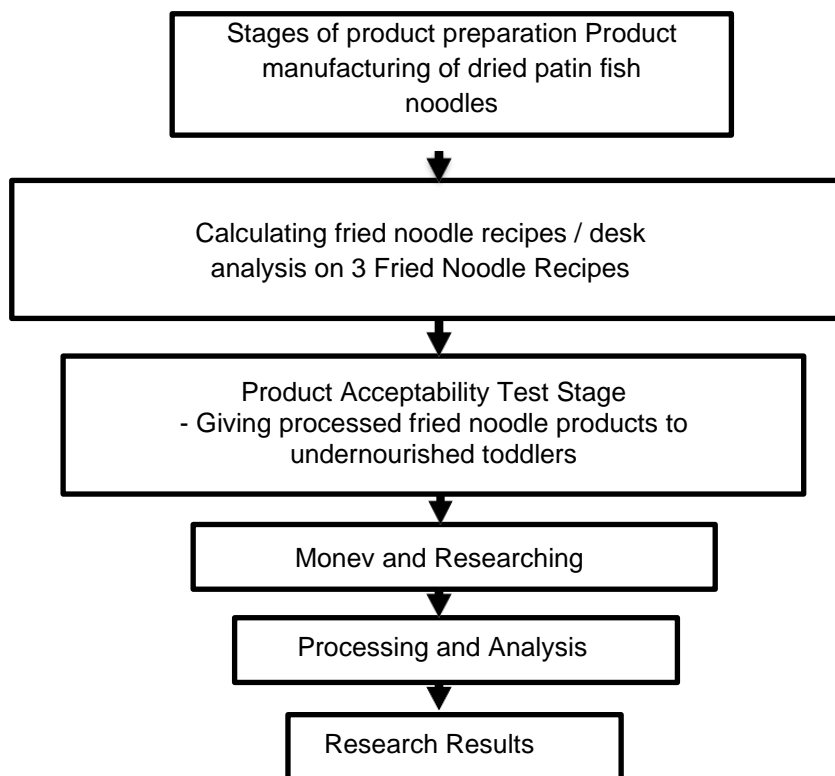


Figure 2. Research flow chart result

Table 1. Distribution of toddlers by age, sex, and nutritional status

Characteristics	Frequency	Percentage (%)
Age		
24-36 months	11	36.7
37-48 months	9	30
49-60 months	10	33.3
Gender		
Female	13	43.3
Male	17	56.7
Nutrition Status		
Wasting	17	56.7
Wasting + Stunting	13	43.3

Supplementary feeding is an activity of providing food to toddlers in the form of safe and quality snacks and other supporting activities by paying attention to aspects of food quality and safety and containing nutritional values in accordance with target needs. The type and form of food are prioritized based on local food ingredients. If local food ingredients are limited, manufactured food available in the local area can be used by paying attention to packaging, labeling, and expiration dates for food safety.

Patin fish was chosen as one of the raw materials for this research because the protein content in patin fish is high protein. Every 100 grams of catfish contains 17 grams of protein.

Previous research has also proven that dry noodles using patinfish produce higher protein than tilapia and snakehead fish, besides that it is also preferred by panelists (17).

Dried patin fish noodles with pumpkin flour substitution used in this study have a fairly crunchy texture and when boiled have a chewy texture. For serving dry noodles, boiling is done for 4 minutes, after which the noodles are drained and can be processed as needed. The smell and taste are normal according to SNI requirements, while the color is more yellow than dried noodles in general due to the addition of pumpkin flour(15). The following are the nutrients of dried patin fish noodles with pumpkin flour substitution(15).

**Table 2. Physical characteristics in mocaf brownies with the addition of snakehead fish**

Composition	Unit	Nutritional Value
Energy	Kkal/100 g	383.005
Protein	%	17.78
Fat	%	4.865
Carbohydrates	%	67.025
Zink	mg/100 g	2.155
Iron	mg/100 g	4.16
Calcium	mg/100 g	36.87
Albumin	%	0.01
Betacarotene	µg	4.066.83

Based on the nutritional content, this dried noodle is very suitable as a basic ingredient for alternative variations of toddler PMT.

#### **Overview of the results of acceptability of patin fish dried noodles substituted with yellow pumpkin flour**

Dried patin fish noodles substituted with pumpkin flour are processed into 3 processed fried noodle menus, namely sausage fried noodles, quail egg fried noodles, and village fried

noodles. **Table 4** shows the nutritional value composition of the three recipes. The results showed the nutritional composition of 3 recipes of dried patin fish noodles per 100 grams with the composition of dried patin fish noodles from each recipe is 25 grams. Each recipe has a food ingredient composition consisting of protein sources (from sausage, meatballs, quail eggs), carbohydrates (from dried patin fish noodles), and fat (palm oil).

**Table 3. Nutritional Composition of 3 Reciper per 100 g recipe and distribution of acceptability of toddlers based on the type of patin fish dried noodle preparation**

Variable	Sausage Fried Noodles	Quail Egg Fried Noodles	Village Fried Noodles
Composition			
Energy (kcal)	337.1	224.6	385.115
Total fat (g)	20.6	11.57	25.15
Protein	14.7	9.8	17.835
Total carbohydrate	25.7	21.6	23.45
Zinc (mg)	0.5	0.54	0.54

Variable	Sausage Fried Noodles	Quail Egg Fried Noodles	Village Fried Noodles
Iron (mg)	5.8	3.1	3.2725
Beta Carotene (µg)	1018.1	1018.1	1018.1
Food Waste (%)			
≤ 20%	18 (60%)	13 (43.3%)	22 (73.3%)
>20%	12 (40%)	17 (56.7%)	8 (26.7%)

Based on **Table 5** above, shows that the highest acceptance of toddlers to these processed noodles is on the third day of processed noodles or Village Fried Noodles, amounting to 22 people (73.3%), while the lowest acceptance was seen on the second day on quail egg fried noodles. Some of the factors causing the toddler's acceptance of this dry noodle dish include: a) The child has been given other food (such as snacks) before being given processed noodles. b) The child is sleepy, so when consuming processed noodles, the child falls asleep. c) Some of the toddlers have the nature of getting bored quickly with certain foods, so on the 2nd or 3rd day, the noodles are not spent.

The following table shows the average acceptability of processed dried patin fish noodles based on age group. Table 5 shows that on day 2, 56.7% of toddlers still left the PMT served >20%. On the 2nd day, the toddlers had been fed and were full so the noodles were not eaten and or not spent. In addition, it is also possible that the time of giving the noodles was at 15.00 as an afternoon snack. But the toddler at that time was still taking a nap. The presentation of quail egg noodles, causes toddlers to consume the quail eggs

provided first, so they already feel full when they will consume the noodles provided. A child usually chooses the food on their menu like the different look so This is intended to be a solution when the child has difficulty eating (16).

Information from the toddler's mother who said she was full also consumed food other than that given. Attractive food appearance will help the subject finish the food served. The imbalance between variations in cooking color, consistency, and shape of food ingredients can cause the appearance of food to be unattractive. Variation food served in the family can increase a child's appetite. The other is to pay attention to the variety of types of food and dishes so that children do not saturation to meet nutritional requirements. Food variety is an arrangement The menu served is attractive and well presented in terms of color, taste, hardness, shape, etc the food arrangement made (16).

In the following table is the distribution of toddlers based on age groups with the intake of dried catfish noodles substituted for yellow pumpkin flour and separated into groups of wasting toddlers and wasting toddlers with stunting.

**Tabel 5. Distribution of average percentage of acceptability of dried patin fish noodles substituted with pumpkin flour based on age group and nutritional status**

Age (Month)	≤ 20% Food Waste		>20% Food Waste		Total
	wasting	wasting+stunting	wasting	wasting+stunting	
24-36	3 (27,3%)	2 (18,2%)	2 (18.2%)	4 (36.3%)	11 (100%)
37-48	2 (22,2%)	2 (22,2%)	2 (11.2%)	3 (.33.4%)	9 (100%)
49-60	5 (50%)	3 (30%)	1 (10%)	1 (10%)	10 (100%)

The food waste used as the basis here is in accordance with food service indicators of no more than 20% (20). in table 6 above shows the total remaining percentage ≤ 20% as shown by data from 10 (33.3%) toddlers from the wasting only group and 7 (23.3%) from the wasting group

with stunting **Table 5** above also explains that the highest distribution based on the age group of toddlers who have the least noodles left (≤ 20%) is in the group of toddlers aged 49-60 months with malnutrition status without stunting, namely 50% of their age group.

This condition also shows that wasting toddlers who are accompanied by stunting have an intake of  $\leq 20\%$  less than toddlers who are only wasting. It is known that the quality of animal protein is higher than vegetable protein. Inappropriate food consumption patterns, namely protein and fat, have an impact on the high prevalence of stunting. Several studies have proven that there is a relationship between protein intake and the incidence of stunting, and the nutritional intake of stunted toddlers is significantly different from that of toddlers with normal nutritional status (21). This is also in line with the condition that toddlers with stunting are thought to have less exposure to food diversity. Toddlers who have a diverse food intake are 3,213 times more likely to experience stunting compared to toddlers who have a diverse food intake (22).

## CONCLUSIONS AND RECOMMENDATIONS

Distribution of average percentage of acceptance of dried patin fish dried noodles substituted with yellow pumpkin flour based on age group and intake  $\leq 20$  as much as 17 (56.6%). The most popular type of Patin Fish Dried Noodles is Village Fried Noodles. It is recommended to add variations to processed dry patin fish noodles and test the effectiveness of intake and weight increase in toddlers (24-60 months).

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