

***Dim Sum* Formulation of Tuna, Chicken, Sweet Corn, and Chayote as Additional Food for 12-23 Months Old Toddler at Risk of Stunting**

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ABSTRACT

Stunting is a severe health problem in toddlers. Considering the impact of stunting, which risks hampering cognitive development, there is a provision of additional food, in which *Dim Sum* with tuna fish will be developed. This study analyzed the nutritional quality, energy value, descriptive, and organoleptic quality of *Dim Sum* with the formulation of yellow fin tuna fish (*Thunnus albacares*), chicken meat, sweet corn, and chayote as the additional food for toddlers at risk of stunting ranging 12-23 months old. The approach is qualitative through descriptive and organoleptic analysis on the product and quantitative through mean calculation and nutritional value are obtained by calculating the value with the estimated yield and retention factor. The procedures were first performed by formulating three treatments with chicken and tuna as the comparison ratios. In all treatments, treatment 3 had the highest nutritional value, receptivity, containing 367 kcal of energy, 21,1 grams of protein, 14 grams of fat, and 39 grams of carbohydrate. These limitations were due to the lack of intervention during the process. *Dim Sum* Formulation of tuna fish is a healthy local snack containing high energy and protein for toddlers at risk of stunting in 12-23 months old.

KEYWORDS: formulation, *Dim Sum*, toddlers, stunting, additional food

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I. INTRODUCTION

Stunting is a severe health problem for toddlers. According to UNICEF (2020), stunting is a situation where a child is too short for his age due to growth failure caused by poor nutrition and health of the child before and after birth. Stunting is defined as height for age below -2 standard deviations according to the growth curve.

Considering the impact of stunting which risks hampering cognitive development, there is provision of additional food. Fulfillment of quality food in sufficient quantity is one of the efforts that must be taken to achieve public welfare and health in terms of overcoming stunting. In general, babies aged 6-24 months start to sit up and show interest in food by trying to pick up a spoon or watching people around them eat and drink.

Dim Sum is a food from China which has recently become popular in Indonesia. *Dim Sum* is served in the form of small snacks, either steamed or fried, and is usually served with tea (Kah, 2014 in Ardhanareswari, 2019). *Dim Sum* is generally made from fish which is rich in protein, with children's preferences for foods high in protein and can be adjusted to suit their tastes. Thus, in this research, *Dim Sum* with tuna

fish will be developed. These food ingredients were chosen due to their high nutritional availability and affordable prices.

II. OBJECTIVE

The objective of this research is to analyze the nutritional quality, energy value, descriptive and organoleptic quality of *Dim Sum* with the formulation of tuna, sweet corn and chayote as the additional food for stunted toddlers ranging from 12-23 months old. This research objective is also to determine the best level of treatment for *Dim Sum* with the formulation of tuna fish, sweet corn and chayote.

This research will be helpful as an alternative type of local additional food (PMT) that can be accepted and implemented in society while also addressing the nutritional problem of stunting in Indonesia.

III. MATERIALS AND METHOD

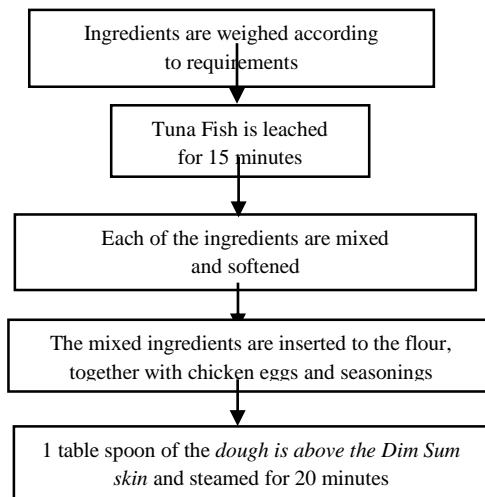
The material of this study was *Dim Sum*. Choosing Tuna Fish with *Yellow Fin* as the processed product was due to the effectiveness of shape and visually tempting, which provides high animal protein inside. Chicken meat is considered to be mixed due to its colour and taste that is familiar and high

Dim Sum Formulation of Tuna, Chicken, Sweet Corn, and Chayote as Additional Food for 12-23 Months Old Toddler at Risk of Stunting

acceptability. All of the materials are obtained by the local store of organic food. The tools used in the process of making *Dim Sum* are *food weigher*, spoon, knife, and mixer.

This research uses a qualitative and quantitative approach by analyzing the descriptive result and organoleptic of *Dim Sum*, determining the best treatment of formulation by using IBM SPSS Statistics 23, and calculating the nutrition value using the yield factor and retention factor of each composition. This research was conducted from March 2023 to April 2023 in Puskesmas Kedungkandang.

Formula Processing Procedures



IV. RESULTS

Energy and Nutritional Value of each Treatments

Quantitative nutritional quality assessment is carried out by considering empirical nutritional levels using the Indonesian Food Composition Table (TKPI) and Calculated Value is found through calculating Yield Factor and Retention Factor.

Table 1. shows the energy and nutritional value of each treatments.

| Parameter | Energy Value and Nutritional Quality of <i>Dim Sum</i> per serving size | | | Standard |
|------------------|-------------------------------------------------------------------------|------|-------|------------|
| | T1 | T2 | T3 | |
| Energy (Kcal) | 225 | 344 | 376 | 225 – 275 |
| Protein (g) | 13,6 | 17,8 | 21,1 | 4,5 – 11 |
| Fat (g) | 5,6 | 5,6 | 14,7 | 5,6 – 17,9 |
| Carbohydrate (g) | 35 | 23 | 39,67 | - |
| Zinc (mg) | 1,32 | 1,2 | 1,3 | - |

Table 1. Energy Value and Nutritional Quality of *Dim Sum*
The research results showed that the formulation of tuna fish, sweet corn and chayote provided energy changes in *Dim Sum*, namely in the range of 225 – 275 grams. Increasing the energy content is influenced by the ingredients that make it up, ingredients that contain less fat can reduce the energy content of the *Dim Sum* produced (Widodo & Sirajuddin,

2018), (Forsalina, Nocianitri, Pt, & Pratiwi, 2020), (Mu'is, 2019).

The energy content of *Dim Sum* in each treatment is influenced by the carbohydrate, fat and protein content of the basic ingredients used. The fat content in tuna is lower than chicken, thus influencing the low or high fat content and energy value of *Dim Sum*. Based on the Indonesian standard requirements for *Dim Sum* quality standards, the general energy value is for toddlers in 12-23 months old additional food are 225 Kcal of energy, 4,5 grams of protein, and 5,6 grams of fat. In addition, Tuna fish contains good nutrients for the body, such as vitamins A, D, E, omega-3, Calcium (Ca), Iron (Fe), and Zinc (Zn), which supports the growth hormone of toddlers. Therefore, all of the *Dim Sum* formulation of tuna fish, sweet corn and chayote meets Indonesian standard requirements.

Protein Quality Analysis

Protein quality assessment consisting of SAA, Digestibility Quality, NPU and BV. SAA shows the proportion of essential amino acids utilized by the body compared to those absorbed. Based on the content of essential amino acids, a food protein can be assessed as whether it is high or low in nutrition. A protein is said to have high nutritional value if it contains essential amino acids whose composition is complete and whose composition is in accordance with the body's needs and these amino acids can be used by the body (BPOM RI, 2019).

Table 2. Dim Sum Formulation Protein Quality and Analysis

| Treat ment | Amino Acid Score | Theoretical Digestibility Quality | Net Protein Utilization (NPU) | Biologic al Value (BV) |
|------------|------------------|-----------------------------------|-------------------------------|------------------------|
| T1 | 100 | 94,3 | 95 | 134,2 |
| T2 | 100 | 94,8 | 95,4 | 126,1 |
| T3 | 100 | 95 | 95 | 116,4 |

The chemical score is expressed by the lowest amino acid score number. In this calculation, the lowest amino acid score is threonine with the value used to determine the SAA score, namely from each treatment, P1 116, P2 113, and P3 109,4, where the calculation number is above 100. This means that limiting amino acids can meet the requirements. This is in line with the theoretical digestibility quality values which have high numbers of 94.3 for P1, 94.8 for P3, and 95 for P3.

These results are consistent with research conducted by Peng et al (2013) which states that the highest amino acids in yellowfin tuna are leucine and lysine. Apart from that, yellowfin tuna also contains high levels of glutamic acid and aspartic acid which represent non-essential amino acids. Peng et al (2013) explained that the amino acids glutamate and proline are high in yellowfin tuna.

Dim Sum Formulation of Tuna, Chicken, Sweet Corn, and Chayote as Additional Food for 12-23 Months Old Toddler at Risk of Stunting

Hedonic and Descriptive Analysis

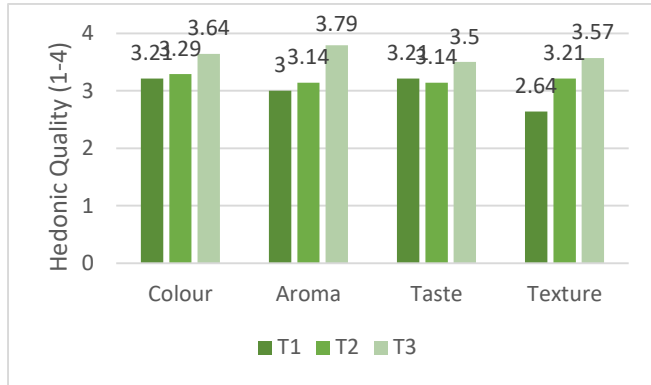


Figure 1. Hedonic Mean Result

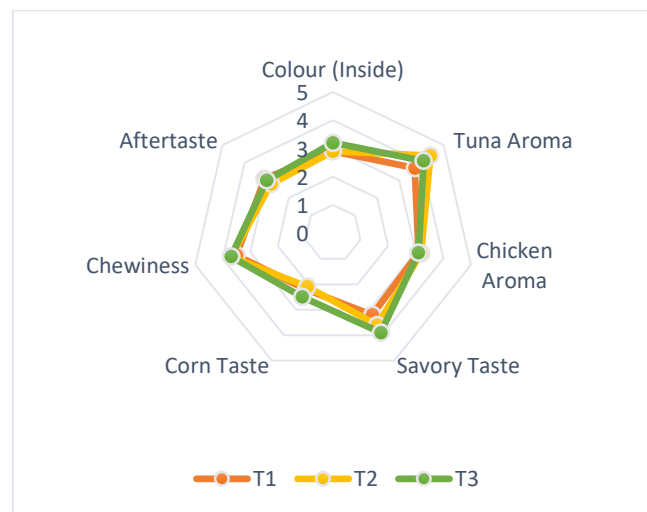


Figure 2. Descriptive Radar

Colour

The color of food is a factor in the quality of food ingredients, a color that does not deviate from the color it should be will give the impression of a separate assessment by the panelists (Negara, Rifkhan, Oktaviani, Wihansah, & Yusuf, 2016). Based on the descriptive analysis, treatment 3 has the most favorable and strong colour, which is light grey. Treatment 1 is 72% accepted due to its light grey colour, treatment 2 is 92% accepted due to the light grey colour, treatment 3 is 100% accepted since the colour is lighter and white dominated.

Aroma

Aroma is the smell of a food product. Testing of aromas in the food industry plays a very important role because it can quickly provide assessment results regarding products regarding whether the product is acceptable or not. Aroma perception is an interpretation of the stimulus produced by aroma component molecules that interact with the smell nerve (Afrianto, Restuhadi, & Zalfiatri, 2017; Tarwendah, 2017). Based on the descriptive analysis, three treatments has the same dominant aroma which is chicken meat aroma, and less of the panelists smells fishy.

The aroma of Dim Sum is also influenced by the presence of supporting ingredients, namely the allicin content in garlic, amino acids from tuna (Lalopua, 2021) and quercetin-4-glucoside from shallots (Setiawan et al, 2021). This is for research conducted by Yusfiani, et al (2021) that the soy sauce shrimp marinade contains supporting spices, namely salt, amino acids, sugar and other flavoring substances.

Taste

Taste helps in identification, acceptance and appreciation of food (Sharif, Sharif, Butt, & Nasir, 2017). Taste is an important factor that can influence a person's food selection and appetite. Food with a delicious taste will certainly be preferred over food with a bland taste (Afrianto et al., 2017). Based on the descriptive result, treatment 3 has the most acceptable taste compared to treatment 1 and 2. Treatment 3 has the higher proportion of chicken meat compared to tuna fish.

Glutamic acid is one of the main sources of umami taste which can be found naturally in foods and food products (Kurihara, 2009). Glutamic acid is one of the main components of amino acid compounds which give rise to a savory taste in flavoring products (Prayudi & Yuniarti, 2019).

Texture

Texture is an important parameter in knowing the types of soft food and crunchy food. Texture assessment is a parameter to identify density, hardness, water content, and product compactness (Sormin, 2020). Based on the descriptive result, the texture of all treatments are accepted, this is also influenced by the same proportion of pectin in chayote. Pectin is useful as a texturizing and thickening agent in food (Goycoolea and Cardenas, 2003).

Best Treatment

The highest productivity value of the sample was found in treatment 3, with a proportion of chicken and tuna fish of 80: 20, with the same composition of sweet corn and chayote as treatments 1 and 2. In determining the best treatment, nutritional quality, energy and hedonic test results were used. becomes an important thing. In treatment 3, the energy quality was 376 Kcal and the nutrients in treatment were 21.1 grams of protein, 14.7 grams of fat and 39.5 grams of carbohydrates.

It was found that treatment 3 had the highest acceptability, followed by treatment 2, then treatment 1. Treatment 3 had a bright color because it was dominated by chicken meat, hence it was much more attractive than other treatments. In terms of aroma, treatment 3 had good acceptability related to the dominant aroma of chicken meat. In terms of taste, treatment 3 has a predominantly savory taste and produces a chicken meat aftertaste. In the texture aspect, treatment 3 has a more important texture related to the dominant composition of chicken meat.

Dim Sum Formulation of Tuna, Chicken, Sweet Corn, and Chayote as Additional Food for 12-23 Months Old Toddler at Risk of Stunting

CONCLUSIONS

Dim Sum formulation of tuna fish, chicken, sweet corn, and Chayote provide insignificant differences in colour, aroma, taste, and texture. *Dim Sum* provides significant differences in energy value and nutritional quality for protein, fat, and carbohydrates among each treatments. The best level of treatment which was adjusted to the results of organoleptic tests, descriptive analysis, as well as nutritional quality and energy value was Treatment 3 with the compared ratios of tuna fish and chicken meat (20:80).

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