Nutritional Value and Characteristics of Baby Biscuits made of Wheat Flour substituted by Pumpkin Flour and Cowpeas Bean Protein Isolates

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Abstract— Research aims to determine the amount of cowpeas bean protein isolate powder and pumpkin flour that can be added to baby biscuits and its effect towards chemical properties, physical and organoleptic of baby biscuits that produced. This study use a completely randomized design (CRD) with 5 treatments and 3 replications. The treatments are comparison between wheat flour (WF): pumpkin flour (PF): cowpeas bean protein isolates powder (CBPI) as follows; A = 300 g of WF (control), B = 200 g of WF + 100 g of PF, C = 200 g of WF + 100 g of mixture of PF and CBPI (37.5 g: 62.5 g), D = 200 g of WF + 100 g of mixture of PF and CBPI (25 g: 75 g), and E = 200 g of WF + 100 g mixture of PF and CBPI (12.5 g: 82.5 g). Pumpkin flour observation was conducted to composition such as ash, protein, crude fiber, fat, carbohydrate and beta carotene level. The observations done on cowpeas beans proteins isolate powder are the content of moisture, protein and ash. As for the baby biscuits produced observed chemical analysis of moisture content, ash, crude fiber, protein, carbohydrate, fat, amino acid and levels of beta carotene, and organoleptic tests include color, flavor, aroma, texture, and the most preferred product. Based on the results of organoleptic tests, the treatment that gives the highest value of sensory is biscuit C (200g WF: 37.5 g PF: 62.5g CBIP). Biscuit C has levels of protein, fat, crude fiber, and ash that meet the SNI standard, but not for carbohydrate. Biscuits C contains beta carotene at 2731.226 (µg/100g) and amino acids as to improve the nutritional value of proteins both quantitatively and qualitatively.

Keywords— baby biscuit, cowpeas bean protein isolates, pumpkin flour, characteristics, nutritional value.

INTRODUCTION

Protein Energy Malnutrition (PEM) especially among babies and young children are always found in developing countries. The effect is to delay growth in the presence of nutritional deficiency syndromes such as skinny, edema, dermatis, apathetic and lethargic. Protein is an important compound for baby during the period of growth and development, malnutrition in this period will lead to the formation of nerve and impaired neural nodes.

Cowpeas is a plant that has expectations as a good source of vegetable protein due to the high protein content (30-37%) [5]. Cowpeas bean has a high quality protein because it contains a

Complete amino acid with high levels, constituent essential amino acid content equivalent to soy, and even amino acids lysine and cysteine higher than soybeans [10].

Protein isolate is the most pure protein extracted, as a minimum protein content of 90% (based on dry weight). Protein isolate is virtually free of carbohydrates, fiber and fat and has so much better functional properties than the cowpeas flour and protein concentrate so utilizing protein isolate on baby food products better than concentrates nor cowpeas flour [7]. Compared with other forms of protein, protein isolate is the best form for a food product because of a high purity level and sensory characteristics are best because it does not produce unpleasant odours.

Indonesia is a country that has the highest prevalence KVA (Vitamin A deficiency) among the developing countries [1]. Vitamin A deficiency increases the risk of the child against infectious diseases such as respiratory diseases and diarrhoea, increased mortality due to measles and causes growth delay [1].

Procurement source of vitamin A and beta - carotene in foods for babies and toddlers with a relatively cheap price is pretty hard to do, when babies and toddlers are especially in need of vitamin A and other balanced nutrition for growth. Pumpkin contains a number of beta-carotene at 1569µg, so the pumpkin can be used as an alternative source of beta-carotene and vitamin A which can be used for supplementary food for babies and toddlers [8].

METHODS

A. Place of research

This research conducted in Agricultural Technology Laboratory of Andalas University in Padang, Kopertis Laboratory area X, Central Laboratory for Post-Harvest Ministry of Agriculture and Food and Nutrition Laboratory of PAU UGM.

B. Materials and Equipment

The main material used in this study is fresh pumpkin, no defects, no bruises, not too old and not too young from Solok district and cowpeas bean obtained from Pasar Raya Padang. Other materials used include materials used in the manufacture of biscuits include: margarine, powdered sugar, full cream milk, eggs, baking soda, pumpkin flour and cowpeas protein isolate. The chemicals used to manufacture protein isolate (hexane, 2N NaOH, 2N HCl, and distilled water) and materials for chemical analysis.

The equipment used in this study among container mixing dough, molds, rolling pin, pan, electric oven, filter apparatus, pH meters, heating plate, magnetic stirrer, thermometer, centrifugation and glass tools, scales, knives, tool grinder, dryers, and other equipment for analysis.

RESEARCH DESIGN

This study designed using a completely randomized design (CRD) with 5 treatments and 3 replications for each treatment. The treatment is the ratio of raw material wheat flour (WF): pumpkin flour (PF): cowpeas beans protein isolates powder (CBPI) as follows:

A = 300 g of WF (control),
B = 200 g of WF + 100 g of PF,
C = 200 g of WF + 100 g of mixture of PF and CBPI
(37.5 g: 62.5 g),
D = 200 g of WF + 100 g of mixture of PF and CBPI
(25 g: 75 g),
E = 200 g of WF + 100 g of mixture of PF and CBPI
(12.5 g: 82.5 g)

Observational data analysed with the F test and if it significantly different test followed by Duncan New Multiple Range Test (DNMRT) at the level of 5%.

IMPLEMENTATION

A. Making of Pumpkin Flour [8]

1. Pumpkin washed and cut lengthwise into 8 pieces
2. Discarded seeds and fibers, then peel.
3. Slice thin yellow squash.
4. Drying for 2-4 days.
5. Puree with a blender.
6. Sift with 60 mesh sieve.
7. Packed with plastic bags and alumunium foil.

B. Making of Cowpeas Protein Isolates

1. Cowpeas bean soaked in water for (12-24 hours), and then manually peeled and dried, then ground and sieved with a 60 mesh sieve.
2. Cowpeas bean flour extracted with hexane at a temperature of 60° C for 30 minutes to obtain a fat-free flour
3. Fat-free flour is mixed with water (1:20), pH is set to be 9.5 to 10 with NaOH 2N, stirred for 30 minutes at room temperature and centrifuged at 2500 rpm for 30 minutes. The supernatant protein extract was filtered through a nylon filter and the pH was adjusted to the isoelectric point of 4.2 by the addition of HCl 2N. Protein precipitates were separated by centrifugation and washed with distilled water acidified to pH 4.2. This precipitate was suspended with a little volume of distilled water; pH is set to 6.5 and oven-dried at a temperature of 50° C to reduce the water content of less than 12%.

C. Making of Baby Biscuits

1. Mix wheat flour, pumpkin flour, and protein isolates base on formula.
2. Sugars, margarine, full cream milk, and whipped egg yolks are mixed until blended, then add the mixed flour, salt and baking powder little by little until the dough flat.
3. Dough wrapped in plastic and leave for 2 hours in refrigerator.
4. Make the dough in roll and sheet with the thickness of 2 mm, then molded and baked at a temperature of 195 ° C for 15 minutes.

OBSERVATION

1. Observations on pumpkin flour: ash content, protein content, crude fiber content, fat content, carbohydrate content and levels of beta carotene.
2. Observations on Cowpeas Bean Protein Isolates: moisture content, protein content and ash content.
3. Observations on baby biscuit: chemical analysis of moisture content, ash content, crude fiber content, protein content, carbohydrate content, fat content, amino acid levels and levels of beta carotene. While the biscuits organoleptic test such as color, aroma, texture, and the most preferred product.

RESULTS AND DISCUSSION

A. *Pumpkin Flour Chemical Analysis*

TABLE I
ANALYSIS RESULTS AND CHARACTERISTICS OF PUMPKIN FLOUR

Chemical Compound	Pumpkin Flour
Color	Yellowish white
Aroma	Typical aroma of pumpkin
Flavor	Bittersweet
Water (%)	11,78
Carbohydrate (%)	79.49
Crude Fiber (%)	3.15
Protein (%)	1,899
Fat (%)	0,938
Ash (%)	5.89
Beta Carotene (µg/100g)	12706.5

Pumpkin has fairly high carbohydrate content, so it's potential to be processed into flour. Pumpkin that used in this study has a carbohydrate content of 79.49%. Therefore, pumpkin flour can be used as an alternative food fulfilling energy needs.

The protein content in pumpkin flour is 1,899%. This value is very low when compared to the protein content of Segitiga Biru wheat flour about 11%. So in the manufacture of biscuits pumpkin flour should be fortification with flour that has a high protein value. Ash content in pumpkin flour is 5.89. The ash content of pumpkin flour was caused by high mineral content in the pumpkin. The level of fat and crude fiber content in pumpkin flour is 0.938 and 3.15. This value is higher than the fat content of wheat flour that is at 0.8.

Pumpkin flour is a flour with finely granular, 60 mesh sieve, yellowish white with a typical odour and ± 12% moisture content. The physical characteristic of pumpkin flour was affected by condition of main material and the drying temperature [8]. Chemical analysis of cowpeas bean isolate can be seen in Table 2.

TABLE 2
CHEMICAL ANALYSIS RESULT OF COWPEAS BEAN PROTEIN ISOLATES

Chemical Compound	Cowpeas Bean Isolate Protein Powder
Water (%)	9,09
Protein (%)	83,84
Ash (%)	3.3
Yeild (%)	25

Protein isolate is a product processed nuts obtained from low-fat nuts. Increased concentrations of these proteins caused by the removal of other components, which does not have the same solubility as proteins. Protein isolate must contain more than 90% protein on dry weight [13].

Protein content in isolate protein produced in this study is 83.84%. This value is lower than protein content in protein isolate generally that is 90%. This can be caused by several factors, such as the size of flour particles, flour age, previous heat treatment and pH of the dissolution ratio. Besides the process is less effective, the length of extraction, temperature and the ratio of flour and water affect the levels of the protein isolates. In the manufacturing of soy protein isolate, the extraction time can reach one hour. The content of the protein increases if temperature can be increased gradually until it reaches 80°C [13].

Cowpeas bean flour used in the making of this protein isolates was sift by 60 mesh sieve. This size of flour particles could have been still bigger than flour that used in the manufacture of protein isolate that has been done by [10] the protein content of cowpeas isolate protein that obtained was 89.8%.

In addition, the size of the flour used, the pH of extraction process of making protein isolates also affect the final protein content, the pH of the extraction that used in this study is pH 4.2. According [6] in her study of functional properties of low-fat flour and protein isolates from cowpeas bean mentioned that the change in pH from 4 to 2 on the extraction of proteins in the protein isolate manufacturing phase will result in greater solubility protein.

B. *Analysis of Baby Biscuits Characteristics*

Organoleptic Test

1) Organoleptic test of baby biscuit was done on 20 mothers who have had babies as panellist. In this test panellists asked to reveal their own responses on color, flavor, aroma, and texture of baby biscuit that produce.

TABLE 3.
REPLICATIONS AVERAGE VALUE AGAINST THE PANELISTS PREFERENCE LEVEL PARAMETER BISCUITS

Formula	Parameter			
	Color	Flavor	Texture	Aroma
D. A	1.6 d	3.05 a	2.9 a	3.1 a
E. B	2.9 a	1.6 c	1.5 b	3.25 a
F. C	2.65 a b	2.95 a	2.75 a	2.45 b
G. D	2.4 b c	2.6 b	2.6 a	2.35 b
H. E	2.15 c	2.4 b	1.75 b	2.25 b

The numbers in the same column followed by the same lowercase letter are not significantly different according to DNMRT at 5% significance level
Note: 1 = dislike , 2 = slightly dislike, 3 = like , 4 = slightly like , 5 = like

1. *Color.*

The results of the organoleptic test by the panellists on baby biscuit shows that generally baby biscuits have color value range is between 1.6 until 2.9. The highest value given by the panellists is baby biscuits with treatment B (addition of 100 g pumpkin flour) of 2.9 which is at level like and the lowest value level was given on biscuits with treatment A of 1.6 which is at a level slightly like. The more pumpkin flour is added, the brighter

color so that preferred by the panellists. This is because the base color of pumpkin flour itself is yellowish white.

The more addition of protein isolate, the preference of colors of product reduces. This is because the more addition of pumpkin flour, the color of biscuit that produce becomes browner. This browning process was increased at high temperature and high protein. The low value of panellists whose like the color of biscuits A because biscuit has slightly pale color.

2. Flavor

The results of the organoleptic test by the panellists on baby biscuit shows that generally baby biscuits have flavor value ranged between 1.6 until 3.05. The highest value given by the panellists is baby biscuits with treatment A of 3.05 which is at level like and the lowest value level was given on biscuits with treatment B of 1.6 which is at a level slightly like.

A high value on biscuits with treatment A caused of it has a flavor similar to the flavor of the biscuits in the market are usually given to the baby. The acceptance of biscuit flavor by panellists was decrease with the increasing amount of pumpkin flour that was added. This is because pumpkin flour gives a bitter taste to the product, because basically pumpkin flour has a bittersweet flavor.

Amount of protein isolates were added to the product does not give effect to the preference level of biscuits flavor by the panellist. This is because protein isolate which has a neutral flavor due to the loss of the unpleasant flavor of the beans during the process of making protein isolate, so the product flavor more influenced by the addition of pumpkin flour on the dough.

3. Aroma.

The results of the organoleptic test by the panellists on baby biscuit shows that generally baby biscuits have aroma value ranged between 2.25 to 3.25. The highest value given by the panellists is baby biscuits with treatment B of 3.25 which is at level like and the lowest value level was given on biscuits with treatment E of 2.25 which is at a level like.

Treatment B with the highest addition of pumpkin flour levels has the highest level of preference. This is because the strong scent of pumpkin in product B. Pumpkin flour that added to the dough has a distinctive smell pumpkin that increase the preference value of panellist on the aroma of the product.

Biscuit A keeps the second highest level after biscuit B. This indicated that the panellists are still affected by the aroma of biscuits that generally found in the market that has the aroma is almost like a biscuit with milk and egg aroma dominant.

4. Texture.

The results of the organoleptic test by the panellists on baby biscuit shows that generally baby biscuits have texture value ranged between 1.5 until 2.9. The highest value given by the panellists is baby biscuits with treatment A of 2.9 which is at level like and the lowest value level was given on biscuits with treatment B of 1.5 which is at a level slightly like.

A high-level panel on biscuit A caused the level of hardness and texture of biscuit is similar to a baby biscuits generally in the market, which is fragile and easily broken. While the baby biscuit made with the addition of protein isolate powder and pumpkin flour has a harder texture compared to the control biscuits. This is because the more protein contained in the food, the more water is bound to food, this is what causes the product to become harder. Fortification of flour with the addition of protein to the amount of more than 12% will be able to damage the rheological properties of wheat flour such as biscuits small volumes these will cause disturbance gluten matrix, thus increasing the hardness of biscuits [2].

The increasing number of addition of protein isolate was added into the dough, will lead to the reduction in the amount of fat in product that will produce a product with the crispness of diminishing returns. Addition of fat will improve the texture of the material. According to [3] fat has a structure such as a solid plastic, a plastic property of this fat causes fat to function as an softening ingredient in foodstuffs.

The addition of pumpkin flour into biscuits will give effect to the texture of the biscuits produced. The more pumpkin flour used in the manufacture of biscuits will produce biscuits with smaller pores and and smaller levels of swell. This is because the amount of pumpkin flour used in the dough, then the more the amount of pectin and the smaller the percentage of gluten, so the ability of gluten to hold the CO_2 trapping starch granules and thus diminishing the level of development of biscuits produced diminishing returns. The addition of pumpkin flour starch contributes, but amylopectin getting smaller. According Muchtadi to [9] products are made with high amylose will produce a product with properties of hard, solid as the process of development occurs on a limited basis.

Analysis of Chemical and Physical Characteristics of Baby Biscuits Protein levels

TABLE 4
PROTEIN LEVELS OF BABY BISCUITS

Treatments	Average level of protein (%)
E (200 g WF : 12.5 g PF : 82.5 g CBPI)	31.60 a
D (200 g WF : 25 g PF: 75 g CBPI)	29.61 b
C (200g WF : 37.5 g PF : 62.5 g CBPI)	28.55 c
A (300 g WF)	13.18 d
B (200 g WF : 100 g PF)	6.69 e
KK = 2.98%	

WF (wheat flour): PF (pumpkin flour): CBPI (cowpeas beans protein isolates powder).The numbers in the same column followed by the different lowercase letter are significantly different according to DNMRT at 5% significance level.

The protein content of baby biscuits was highest in treatment E and the lowest is the treatment B. Low levels of protein biscuits B due to the protein content of the flour is added to the pumpkin is 1.899% smaller than the protein content of the flour is replaced by 9%. While on treatment E has the highest protein content among the 5 treatments. This is because the addition of cowpeas protein isolate on biscuits is the highest among the other treatment that is equal to 82.5 grams. The protein content of cowpeas protein isolate is much more than wheat protein levels were replaced about 83.84%. Thus when compared to the quality specifications according to *SNI* of baby biscuits and Toddlers, the protein content of the biscuit is above the minimum standard of quality requirement limits the biscuits are allowed [11].

Levels of Fat

TABLE 5
FAT LEVELS OF BABY BISCUITS

Treatments	Average level of fat(%)
B (200 g WF : 100 g PF)	11.49 a
A (300 g WF)	10.23 b
C (200 g WF : 37.5 g PF : 62.5 g CBPI)	7.18 c
D (200 g WF : 25 g PF : 75 g CBPI)	7.10 c
E (200 g WF : 12.5 g PF : 82.5 g CBPI)	6.91 c d
KK = 4.43%	

WF (wheat flour): PF (pumpkin flour): CBPI (cowpeas beans protein isolates powder).The numbers in the same column followed by the same lowercase letter are not significantly different according to DNMRT at 5% significance level.

Based on Table 5 it can be seen that the highest fat content was obtained on product B and the lowest fat content found in product E. High levels of fat in the product with treatment B due to the high fat content in pumpkin flour that is 0.938 more higher than the fat content of wheat flour which is substituted by it. The lowest fat level found in product with treatment E. This is due to the low fat content of protein isolates cowpeas that were added to the biscuits. The low fat content of cowpeas protein isolate caused by chemical processes carried out in obtaining this protein isolate, wherein the protein isolate is made from fat-free cowpeas flour that has been extracted using hexane solvent.

Fat level in baby biscuits A, C, D and E are already eligible for baby and toddlers quality biscuits Department of Industry Indonesia recommended that a maximum of 11% [11].

Ash Level

TABLE.6
ASH LEVELS OF BABY BISCUITS

Treatments	Average level of ash (%)
B (200 g WF : 100 g PF)	2,75 a
C (200 g WF : 37.5 g PF : 62.5 g CBPI)	2.28 b
D (200 g WF : 25 g PF : 75 g CBPI)	2.05 c
E (200 g WF : 12.5 g PF : 82.5 g CBPI)	1.72 d
A (300 g WF)	1,17 c
KK = 2.10%	

WF (wheat flour): PF (pumpkin flour): CBPI (cowpeas beans protein isolates powder).The numbers in the same column followed by the same lowercase letter are not significantly different according to DNMRT at 5% significance level.

The results shows that the ash content was highest in biscuits with treatment B with the addition of 100 grams of pumpkin flour and lowest ash content contained on treatment A. High levels of ash contained in the treatment of B due to the high mineral contained by pumpkin flour.

The lowest ash content is found in biscuit A that uses 100% wheat flour. Ash content of the biscuit is affected by the ash content of flour used. The high ash content in the biscuits with the addition of cowpeas protein isolates caused of cowpeas protein isolate contains 3.3% ash. Ash content in cowpeas protein isolate is higher than the ash content of flour.

Ash content of biscuits B, D and E, are not eligible ash content determined by SNI 01-4445-1998 is a maximum of 2%. While the ash content contained in the treatment of E and A is compliant with the ash content is determined by [11].

Moisture Content

TABLE 7
MOISTURE CONTENT OF BABY BISCUITS

Treatments	Average level of water content (%)
B (200 g WF : 100 g PF)	5,90 a
A (300 g WF)	3,71 b
C (200 g WF : 37.5 g PF : 62.5 g CBPI)	2.59 c
D (200 g WF: 25 g PF: 75 g CBPI)	2.47 c d
E (200 g WF : 12.5 g PF: 82.5 g CBPI)	2.31 d
KK = 3.33%	

WF (wheat flour): PF (pumpkin flour): CBPI (cowpeas beans protein isolates powder).The numbers in the same column followed by the same lowercase letter are not significantly different according to DNMRT at 5% significance level.

Biscuit B has the highest moisture content due to the large percentage of pumpkin flour that is added.

Pumpkins contains of high a enough water bound. Besides pumpkin flour moisture content is higher than the water content of the flour, resulting in higher levels of water biscuits.

The low water content in biscuits C, D and E with the addition of protein isolate due to the high levels of protein in these 3 treatments resulting amount of free water, causing the lower the moisture content of biscuits. Protein isolate has the properties of water can absorb. These properties mainly due to the polar side chains of proteins are still free and tend to bind water.

Biscuits A, C, D and E have a level of moisture content that must be found a baby biscuits according to SNI 01-4445-1998 for a maximum of 5%. While biscuits B reached its maximum limit set by the water content of [11].

The water content in food can cause a decrease in the quality of food. In addition, the water content in food also determines the shelf life of the food. According to [16], 3-7% moisture content reaches optimum stability and may reduce microbial growth and chemical destructive reactions such as hydrolysis and oxidation of fat.

Levels of Crude Fiber

TABLE 8
CRUDE FIBER LEVEL OF BABY BISCUITS

Treatments	Average level of crude fiber (%)
B (200 g WF : 100 g PF)	1.23 a
A (300 g WF)	0.63 b
C (200 g WF : 37.5 g PF : 62.5 g CBPI)	0.44 c
D (200 g WF: 25 g PF : 75 g CBPI)	0.36 d
E (200 g WF: 12.5 g : 82.5 g)	0.28 e
KK = 1.05 %	

WF (wheat flour): PF (pumpkin flour): CBPI (cowpeas beans protein isolates powder).The numbers in the same column followed by the same lowercase letter are not significantly different according to DNMRT at 5% significance level.

Complementary food for babies should be nutrient dense and contain crude fiber and other materials which are difficult to digest a minimum, because too much crude fiber numbers will interfere with digestion of babies [9].

Based on Table 8, it can be seen that crude fiber content was highest in the treatment of B of 1.23%, and the lowest crude fiber content of 0.28% in the treatment E. There are no specific recommendations about the maximum amount of crude fiber which may be found in baby food, but according to [9] the best baby foods containing coarse fibers to a minimum. The high crude fiber content in biscuits B is caused due to high crude fiber content by pumpkin flour of 3.15% thereby affecting the amount of crude fiber contained in the baby biscuit with the highest addition of pumpkin flour.

The amount of crude fiber contained in the treatment E is 0.28. This number is much lower when compared to the amount of crude fiber contained in the treatment B. This is because in addition of pumpkin flour into dough with treatment E is lower than the treatment B, also due to the use of an addition of cowpeas protein isolate in treatment E that does not contain of crude fiber. This is due to a chemical process that has been done when making of protein isolate which is the addition of NaOH, after the centrifuge sediment discarded. This precipitate containing carbohydrate and crude fiber, so that the manufacture of protein isolates, crude fiber and carbohydrates have been wasted.

Based on the analysis, biscuit E is the most well used as complementary foods because they contain roughage action of the lowest among the treatments above.

Carbohydrate Level

TABLE 9
CARBOHYDRATE LEVELS OF BABY BISCUITS

Treatments (Wheat : Pumpkin flour : protein isolate)	Average level of protein (%)
B (200 g WF : 100 g PF)	73.17 a
A (300 g WF)	71.10 b
C (200 g WF : 37.5 g PF : 62.5 g CBPI)	59.7 c
D (200 g WF : 25 g PF : 75 g CBPI)	58.78 d
E (200 g WF : 12.5 g PF : 82.5 g CBPI)	42.54 e
KK = 11.87%	

WF (wheat flour): PF (pumpkin flour): CBPI (cowpeas beans protein isolates powder).The numbers in the same column followed by the same lowercase letter are not significantly different according to DNMRT at 5% significance level.

Carbohydrates level of baby biscuits obtained ranged from 42.54% to 73.17%. The highest values is in treatment B and the lowest value found in the treatment of E. Carbohydrate values contained in baby biscuit affected by carbohydrate levels in the composition of the baby biscuits. Biscuit B has the highest carbohydrate value; this is because the pumpkin flour as one of the components of the product has a carbohydrate content of 78.56%. While on treatment E produces biscuits with carbohydrate content is much lower in the amount of 42.54%. This is because the composition of protein isolates in biscuit dough more than the pumpkin flour composition, thus affecting the carbohydrate content of the end product.

The low carbohydrate content in the protein isolate is because carbohydrates have been removed during the chemical process of making the protein isolate, leaving only the protein alone. Carbohydrate is needed as the cheapest source of energy, which will produce 1 gram of carbohydrate 4 cal. In energy-sufficient, it is recommended that 60-70% of the total energy needed by toddlers comes from carbohydrates [9]. Thus the overall value of carbohydrates baby biscuits produced

under quality standards according to SNI 01-4445-1998 biscuit baby is at least 75%.

Beta Carotene Level

Levels of beta carotene performed on a biscuit with the highest value on organoleptic test, biscuit C can be seen in Table 10.

TABLE 10
LEVELS OF BETA-CAROTENE ON THE C BABY BISCUITS AND PUMPKIN FLOUR

Sample Code	Average value of ß Carotene level (µg/100g)
Biscuit C (200 g WF : 37.5 g PF : 62.5 g CBPI)	2731.226
Pumpkin Flour	12706.5

WF (wheat flour): PF (pumpkin flour): CBPI (cowpeas beans protein isolates powder).

Pumpkin has a high provitamin A content that is 767 mg / g of fresh fruit. Pumpkin flour is one form of preserved products that are not too difficult to make. Besides being easily made, easily stored form or flour will be packed and marketed. Pumpkin flour can be used as a vegetable source of vitamin A.

Based on the results in Table 10 can be seen decreased levels of beta-carotene which is very far from the basic ingredients of flour pumpkin is equal to 12706.5 µg/100g compared with the levels of beta-carotene which in the pumpkin flour has been incorporated into a biscuit dough in the amount of 2731,226 mg / 100g. This is because the amount of pumpkin flour added in treatment C only 37.5 grams, so that the levels of beta carotene in biscuits C is also low when compared with the levels of beta carotene pumpkin flour. A low levels of beta-carotene in biscuits C also caused of during the making of biscuit dough is knead, making it sheets and the process of molding in which the oxidation of beta-carotene. Additionally the baking process with high temperatures does increase the loss of beta carotene. This is because the high temperature allows the termination of the double bond so that the higher it happens, the destruction of beta carotenes also become higher.

Decreased levels of beta carotene caused by damage overall. Such damage can be oxidative, non-oxidative and non-enzymatic. [3], oxygen can result in carotenoid oxidation reaction. This is caused by the presence of a number of double bonds in its molecular structure.

Amino Acid Levels

Amino acid levels in biscuits performed on biscuit C can be seen in Table 11.

TABEL 11
RESULT OF AMINO ACID LEVEL OF BABY BISCUIT

No	Types of Amino Acid	Level (%)	Mg/g protein	FAO/WHO/ UNU Scoring Patterns 1987	Presence of Amino Acids in biscuit C (%)
1	Aspartic Acid	0.307	10.77	-	-
2	Glutamic Acid	0.432	15.15	-	-
3	Serine	0.180	6.31	-	-
4	Glycine	0.087	3.052	-	-
5	Histidine	0.159	5.57	16	34.81
6	Arginine	0.284	9.96	-	-
7	Threonine	1.011	35.47	50	70.94
8	Alanine	0.115	3.32	-	-
9	Proline	0.259	9.08	-	-
10	Tyrosine +	0.202+0.734	32.84	72	45.61
11	Phenilalanin	1.315	23.8	54	83.57
12	Valine	0.097+0.051	5.19	33	15.72
13	Methionin + Cysteine	0.771	27.05	40	67.63
14	Isoleucine	0.301	10.56	93	11.35
15	Leucine	0.203	7.12	66	10.79
	Lysine				

Protein contains a high nutritional value if it contains of the essential amino acids as well as its complete arrangement and the composition according to the needs of the body, as well as amino acids that can be used by the body. Thus, the nutritional value of a protein is determined by level of digestivity, which determines the availability of amino acids in biological [9].

In products with treatment C, there are amino acids needed by the baby so that the addition of cowpeas protein isolate on biscuits besides improving the nutritional value of proteins quantitatively but also qualitatively. Protein in baby foods must meet the baby's needs essential amino acids, namely histidine, isoleucine, leucine, lysine, methionine + cysteine, phenilalanin + tyrosine, threonine, tryptophan and valine. The amino acid