

# PRODUCTION AND ANALYSIS PROTEIN AND POSPHOR MINERAL OF A HIGH NUTRITION CHIPS

## Abstract

### By

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It has been conducted a research about production and analysis protein and phosphor mineral of a high nutrition chips. High nutrition chips were produced by fortification of an ill (*Monopterus albus Zuiew*) and tiny sea fish (*Stolephorus* Sp) flour in a chips batter. It have been produced three kinds of chips with variation in ratio of tapioca and ill fortified flour, were KB1 (90:10), KB2 (80:20) and KB3 (70:30). In addition, it have been produced three kinds of chips with variation in ratio of tapioca and tiny sea fish fortified flour, were KT1 (90:10), KT2 (80:20) and KT3 (70:30). Ill and tiny sea fish flour has been known as a rich of protein and phosphor mineral nutrients. The results showed that protein and phosphor contains of KB3>KB2>KB1 and KT3>KT2>KT1. KB3 have 19.74 g proteins and 560 mg phosphor minerals per 100 g chips, while KT3 have 19.22 g proteins and 550 mg phosphor minerals per 100 g chips. Physic characteristics showed that color, taste and crispy of chips are fine, but needed organoleptic test.

Key words: *Chips, Fortification, an ill, tiny sea fish.*

## Introduction

Indonesia is a country, rich with nature product from marine, fishery and agriculture sector. As a country was growing, so Indonesia used that nature product for completed on food sector. One of those foods is cassava. Cassava is rich of carbohydrate, are used in some of food as like as chips and alcoholic beverage. Benefit of cassava is increasing by processing of it until materials, as like as tapioca flour (Radiyah, 1990). In Indonesia we can meet some food with tapioca flour as major material, one of it is chips.. Chip is a food was made from material starches with carbohydrate as major component. Be based on it, so to increase of a chips nutrition quality, we must add other nutrition to a chips by fortification process (Poedjiadi, 2005). An aim of fortification is to find taste, form and nutrition of food are better.

This research has been conducted by fortification with ill (*Monopterus albus Zuiew*) and tiny sea fish (*Stolephorus* Sp) flour was adding in chips batter. An effort of it is to nutrition increase and diversification of product. An ill constitute of fishery product, rich of protein and phosphor, similar with tiny sea fish. We know that protein and phosphor nutrition are necessary of our bodies. Protein contains in an ill is 18.4 g per 100 g material, similar with protein

contains in a cow meat (12.8 g per 100 g material). An ill protein contains is very easy to digest, so very compatible for all of old, from baby until oldest people (Rukmana, 2003). An ill have many good amino acids, as like as leusin, lisin, aspartic acid, and glutamic acid. Non essential amino acid be founded in an ill is arginine. Arginine contains in an ill influence people growth hormone production (HGH). HGH helped on muscle healthy increase and decrease of body lipids contains (Almatsier, 2004). Other nutrition contains in an ill is phosphor. Phosphor have benefit very much, because phosphor very important in the bond forming. The amount of phosphor and calcium must be balanced, because that both can made starchy and strong of bond, and free of osteoporoses.

The problems of this research are how many influence of ill flour and tiny sea fish flour are concerning to nutrition contain, especially protein and phosphor minerals contains from chips are produced. Be based on these problems, so the aim of that research is to understand of nutrition contains especially protein and phosphor minerals of fortified chips with ill and tiny sea fish flour.

## Materials and Methods

### Materials

Tapioca flour, an ill, tiny sea fish and food additive as like as salt, sugar, white onion and pepper, HCl, n-heksana, NaOH, KI, H<sub>2</sub>SO<sub>4</sub>, Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub>.5 H<sub>2</sub>O, CH<sub>3</sub>COOH, KIO<sub>3</sub>, K<sub>2</sub>SO<sub>4</sub>, Na<sub>2</sub>SO<sub>4</sub>, H<sub>3</sub>BO<sub>3</sub>, selen, Luff-Schorll reagent (Na<sub>2</sub>CO<sub>3</sub>, citric acid, and CuSO<sub>4</sub>.5 H<sub>2</sub>O), Indicator metilen red and brom cresol green.

### Methods

#### a. Chips Production

The first step of chips production is made of ill and tiny sea fish flour. Amount of 3 kg an ill, was branded, was steamed around of one hour, drying in oven with 50 – 55 °C, temperature during 6 hour. Tiny sea fish was made by drying of it in the oven on 55 °C, during 24 hour, and than was crushed and was sieved until tiny sea fish flour produced. Production conducted by increment of ill flour to tapioca flour on ratio of ill flour: tapioca flour are 10 : 90 ; 20 : 80 ; 30 : 70. The mixture was added with salt, sugar, white onion, red onion and pepper. That mixture was steamed until two hours, was cooled in a freezer, are formed, and than drying in the oven on 50°C, temperature during 15 – 18 hours. There are three kinds of ill fortified chips, with name KB1 (10: 90), KB2 (20:80), and KB3 (30:70). By same method are made three kinds of chips with tiny sea fish fortified, there are KT1 (10:90), KT2 (20:80), and KT3 (30: 70).

#### b. Chemical Analysis

Chemical contains analysis are focused on protein and phosphor minerals analysis from six chips are produced. Protein analysis conducted by Kjeldahl method.

#### Protein analysis

An around 0.5 gram of protein was added to Kjeldahl salt (CuSO<sub>4</sub>.5 H<sub>2</sub>O and K<sub>2</sub>SO<sub>4</sub> ratio 1: 3) add 10 mL of H<sub>2</sub>SO<sub>4</sub>, were heated until clear solution. This step was called as sample destruction. Continued step is a clear solution are moved to measure flask size 50 mL, added some water until limit of a line on flask. An around 5 mL of solution were pick up and put on measure flask size 50 mL, are added some water until limit of a line on flask. An around 5 mL of it moved to distillation flask, added with 10 mL of NaOH 30% and were heated. The distillate are collected on 10 mL of H<sub>3</sub>BO<sub>3</sub> 3%, contains of Tashiro indicator. Titration of distillate with HCl 0.1 N until green color of solution moved to purple color. The calculation of protein contains conducted use formula:

$$\text{Protein contains} = \frac{V_{\text{HCl}} \times N_{\text{HCl}} \times 14 \times \text{fk}}{w \times \text{fp}} \times 100\%$$

Information:

w = sample mass on gram

V HCl = HCl volume are used for titration of filtrate (mL)

N HCl = HCl normality

fk = conversion factor for protein from food (6.25)

fp = dilution factor

### Phosphor Mineral Analysis

Phosphor mineral contains were mired by camouflage technique. The method is , sample are moved to measure flask size 25 mL, add with 2.5 mL molibdat 2.5 % solution and 1 mL hidrazin sulfat 0.3 % solution, add some water until limit a line in the flask. The mixture was heated on the water bath 90 °C temperatures, until 10 minute and than cooling down. The next step is measuring using UV-VIS spectrophotometer wave length 840 nm.

## Results and Discussion

### a. Chips Production

It have been produced three kinds of chips with variation in ratio of tapioca and ill fortified flour, were KB1 (90:10), KB2 (80:20) and KB3 (70:30) as like as figure 1.



KB1 (90:10)



KB2 (80:20)



KB3 (70:30)

**Figure 1:** An ill fortified Chips

In addition, It have been produced three kinds of chips with variation in ratio of tapioca and tiny sea fish flour, were KT1 (90:10), KT2 (80:20) and KT3 (70:30), as like as figure 2.



KT1 (90:10)



KT2 (80:20)



KT3 (70:30)

**Figure 2:** Tiny Sea Fish fortified Chips

Physic characteristic result about color, aroma, taste and crispy of KB1, KB2 and KB3 showed that color of chips is yellow, have nice of aroma and taste. All of characteristic increased with ill flour and tiny sea fish are more added, and all of chips are crispy. Tiny sea fish fortified chips has same characteristic with ill fortified Chips.

## b.Nutrition Contains Analysis Result

Nutrition contains analysis, especially on protein and phosphor mineral contains of chips showed on table 1.

Table 1: Protein and Phosphor mineral contains per 100 gram chip.

| Nutrition     | Ill fortified Chip |       |       | Tiny sea fish fortified Chip |       |       |
|---------------|--------------------|-------|-------|------------------------------|-------|-------|
|               | KB1                | KB2   | KB3   | KT1                          | KT2   | KT3   |
| Protein (g)   | 8.37               | 14.82 | 19.74 | 11.87                        | 14.77 | 19.22 |
| Phosphor (mg) | 200                | 380   | 560   | 300                          | 310   | 550   |

The data off protein and phosphor mineral contains of chips increased with fortified flour increased. If its data was compared to tapioca chips (protein 0.5 g and phosphor 0 mg) (Poedjadi.2005), showed that nutrition contains of fortified chips are more than tapioca chips. In addition, if that results are compared to Prawns Chips or tiny sea fish chips at the market, with nutrition contains as like as table 2, KB3 (protein 19.74 g and phosphor 560 mg) is more than prawns and fish chips nutrition contains. Nutrition contains of prawn chips have protein and phosphor minerals more than fish chips contains. Unfortunately, we can't know how many ratio of tapioca: prawn in the prawn chips or tapioca: fish in the fish chips.

Table 2: Protein and Phosphor Mineral contains per 100 gram of Prawn Chips and Fish Chips.

| Nutrition     | Prawn Chips | Fish Chips |
|---------------|-------------|------------|
| Protein (g)   | 17.2        | 16.0       |
| Phosphor (mg) | 337         | 20         |

Reference: Poedjadi, 2005.

As like as KB3, the KT3 (protein 19.22 g and phosphor 550 mg) fortified chips with tiny sea fish 30%, have protein and phosphor minerals more than protein and phosphor mineral contains of prawn and fish chips. Unfortunately, we don't get conducted of organoleptic test of chips are produced. We know that all of adult needed 400 mg until 500 mg phosphor per day. Its can were found from fortified chips, because tapioca chips didn't have of phosphor minerals and smaal of protein contains.

Tiny sea fish with small size and almost people not like, but we can eat with its bond, so from the bond we found of protein and phosphor minerals. Phosphor minerals are needed of our body for growth,

many reactions in the body, transfer energy, and reproduction cell as like as ATP and DNA. Phosphor was benefit very much, because phosphor very important in the bond forming. The amount of phosphor and calcium must be balanced, because that both can made starchy and strong of bond, and free of osteoporoses. Unfortunately, a lot of people no like tiny sea fish, so we must remove it become to other product, as like as a chips. In the harvest season, production of it is overflow and endurance of it just 24 hours, so processing of it is needed very much. Be based on tiny sea fish as food material are rich of phosphor mineral, so people can use an ill as food material rich of protein.

## Conclusion

Be based on the research result could summarized, it have been produced of chips with high of protein and phosphor minerals nutrition. Production by fortified flour from an ill resulted three kinds of chips were KB1 (10%), KB2 (20%) and KB3 (30%). In addition, from tiny sea fish flour resulted three kinds of chips, were KT1 (10%), KT2 (20%) and KT3 (30%). Analysis of nutrition contains, especially protein and phosphor mineral contains showed KB3 have 19.74 g protein and phosphor 560 mg and KT3 have protein 19.22 g and phosphor 550 mg. All of it are bigger than protein and phosphor mineral contains of prawn and fish chips at the market.

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