

Ash, Protein And Salinity Analysis Of Integrated Formulation Of Herbs And Spices In Typical Simalungun "Tinuktuk" North Sumatera-Indonesia

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Abstract.

Tinuknuk is a special sauce from Simalungun Regency, North Sumatra Province, tinuktuk warms the body and is believed to be able to cure various internal diseases, especially to help post-natal recovery. This study aims to determine the optimal nutritional value of the main components, namely red ginger with black pepper in the ratio composition: 70:30%, 60:40%, 50:50%, 40:60%, and 30:70% using the method oven at a temperature of 105°C. Then the ash content, protein content, and salt content were tested. The results showed that the ash content was 6.98%, respectively; 6.91%; 6.90%; 6.84%, and 6.73%. The salt content is 0.57%, respectively; 0.57%; 0.57%; 0.57%, and 0.57%. The protein content was 10.43%, respectively; 10.93%; 12.43%; 11.81%, and 10.62%.

Keywords: Tinuktuk, black pepper, red ginger, Ash, Protein and salt Content.

I. INTRODUCTION

Indonesia is one of the countries that produce spices and herbs in the world. The use of spices is widely used in the field of industry and health. One of the uses of spices and herbs as spices, from Simalungun Regency, North Sumatra province. Since the days of the Simalungun Batak ancestors, Tinuktuk is a spice and herbal condiment that is nutritious for the body. Tinuktuk is now getting hard to find and the taste is not liked by the younger generation . [1]Tinuktuk itself comes from the word "ti" which means "which", while the word "nuktuk" means "mashed", so the meaning of the word Tinuktuk is mashed [2]. Tinuktuk has a good impact on health and has been believed to be used as medicine. This is because tinuktuk contains chemicals, as well as a number of proteins and minerals that have the potential and properties in curing various diseases, especially post-partum recovery. Processing food ingredients are changing the original form into a form that can be eaten immediately.

One method of food processing is using heating or drying. Drying with the oven method in making tinuktuk is an alternative drying because the oven heat given to the food can be passed from the oven wall, as well as convection and hot air circulation through the container where the food is placed [3]. According to [4] states that black pepper is effective at an optimum temperature of 105°C. The process of heating and drying foodstuffs is beneficial for the availability of several nutritional components contained therein. The quality of the tinuktuk was already tested, which were the pH, moisture, and fat content. The oven method showed that the pH values from the ratio of 70:30, 60:40, 50:50, 40:60, and 30:70 were 6.15, 6.25, 6.25, 6.25, 6.3, respectively. Besides, the water content was 56.61%, 54.68%, 54.065%, 49.395%, and 45.265%, and fat content was 15.52%, 18.35%, 15.46%, 19.39%, 16.50% [5] To continue the previous research, it is necessary to carry out additional analysis of the quality of tinuktuk. Further research was conducted with 5 treatments with variations in the ratio of red ginger and black pepper: 70:30%, 60:40%, 50:50%, 40:60%, and 30:70% using the oven method. With the difference in concentration, the ratio of the main ingredients for making chili sauce can be produced nutritional values that it is safe, and healthy for consumption.

II. METHODS

This research uses equipment, namely: blender, knife, scissors, cutting board, basin, sieve, spoon, mortar, and pestle. The equipment used to perform the tinuktuk test is an analytical balance, measuring cup,

filter paper, oven, desiccator, hot plate, Kjeldahl flask, stative, measuring flask, beaker glass, stirring rod, dropper pipette, burette, Erlenmeyer, refrigerator, tongs, watch glass, Petri dish, furnace, bath. The ingredients used in the study included red ginger, black pepper, onion, garlic, tamarind, candlenut, aromatic ginger, andaliman, and Himalayan salt. Chemicals: aquadest, H_2SO_4 (pa), NaOH, n-Hexane (pa), AgNO_3 0.1N, $\text{K}_2\text{Cr}_2\text{O}_4$ indicator 5%, Boric acid 40%, HCl (pa), NaCl, selenium, Conway indicator.

Sample Preparation

Making tinuktuk through several stages requires the material to be dry by roasting at a temperature of 105°C for 20 minutes. (Sutamihardja et al., 2018) For the roasted ingredients are black pepper, andaliman, and candlenut. Red ginger, aromatic ginger, shallots, garlic are peeled, washed with water and drained, and then sliced. For tamarind, it is washed and then drained. The procedure was repeated for each treatment variation. The making of tinuktuk begins by grinding all the ingredients that have been roasted separately according to their respective groups. Cekala acid is ground and squeezed, and the juice is used to grind onions and garlic. Red ginger and aromatic ginger are ground using water from the juice of the onion and garlic and then squeezed. Black pepper that has been mashed is put into a bowl, followed by all the other ingredients and the squeezed water, and stirred again until well mixed. Tinuktuk has been mixed and pounded back together. This study was conducted to determine the correct formulation of tinuktuk by using the ratio between red ginger and black pepper with a percentage (70:30%; 60:40%; 50:50%; 40:60%; 30:70%).

Parameters in Test

Ash Content Analysis [6]

Measurement of ash content was carried out by dry ashing method using a furnace. The porcelain cup was dried in a furnace at a temperature of 600°C for one hour, then cooled in a desiccator and weighed. About 2 g of the tinuktuk sample was weighed in a porcelain dish. In the furnace again for 2 hours at a temperature of 600°C to form white ash, cooled in a desiccator, weighed until a constant weight of the cup and sample is obtained. Calculation of ash content (%) using the formula:

$$\text{Ash content} = \frac{(w_2 - w_0)}{(w_1 - w_0)} \times 100\%$$

Information:

W0 = weight of empty cup (g)

W1 = weight and sample before ash (g)

W2 = weight of the cup and sample after ashing (g)

Protein Level Analysis [7]

A total of 1 g of tinuktuk was put into a 100 mL Kjeldahl flask, added 1 g of selenium and added 25 mL of concentrated H_2SO_4 . After that, the material was destroyed for 1 hour until a clear liquid was formed, then cooled, and diluted in a 100 mL volumetric flask. 25 mL of the sample solution was put into a boiling flask in a distillation apparatus and 50 mL of NaOH solution (40%). Distillation was carried out and the distillate was accommodated in an Erlenmeyer containing 25 mL of 40% boric acid and 1-2 drops of Conway's solution. The distillate was then titrated with standardized 0.1 N HCl until the color changed from green to pink. Calculation of protein content (%) using the formula:

$$\text{Protein content} = \frac{(v_1 - v_2) \times N \times 0.014 \times f.k \times fp}{w} \times 100\%$$

Information:

W = snippet weight (grams)

V1 = volume of 0.1N HCl used in titrating the sample

V2 = volume of HCl used titration blank

N = normality of HCl

FK = conversion factor for protein from food in general: 6.25. Milk & processed products: 6.38. Peanut butter: 5.46.

fp = dilution factor

Salt Level Analysis [8]

The mashed sample was weighed exactly about 2 grams and added hot water was so that the salt dissolved. The salt extract was diluted to 100 mL. Take 10 mL and titrate with 0.1 N AgNO₃ using a 5% K₂Cr₂O₄ solution indicator. The salt content is calculated by the following formula:

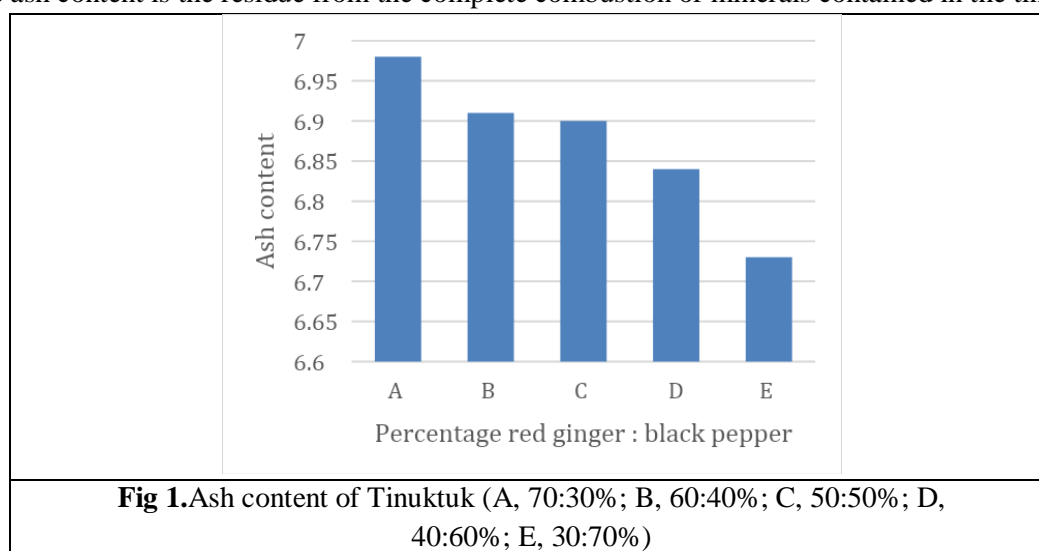
$$\text{Salt content} = \frac{\text{mL sampel} \times N \text{ AgNO}_3 \times 0.05844 \times fp \times 100\%}{\text{berat sampel (gram)}}$$

III. RESULT AND DISCUSSION

On the quality inspection of the tinuktuk based on the percentage comparison show the results as shown in the following table:

Ash Level

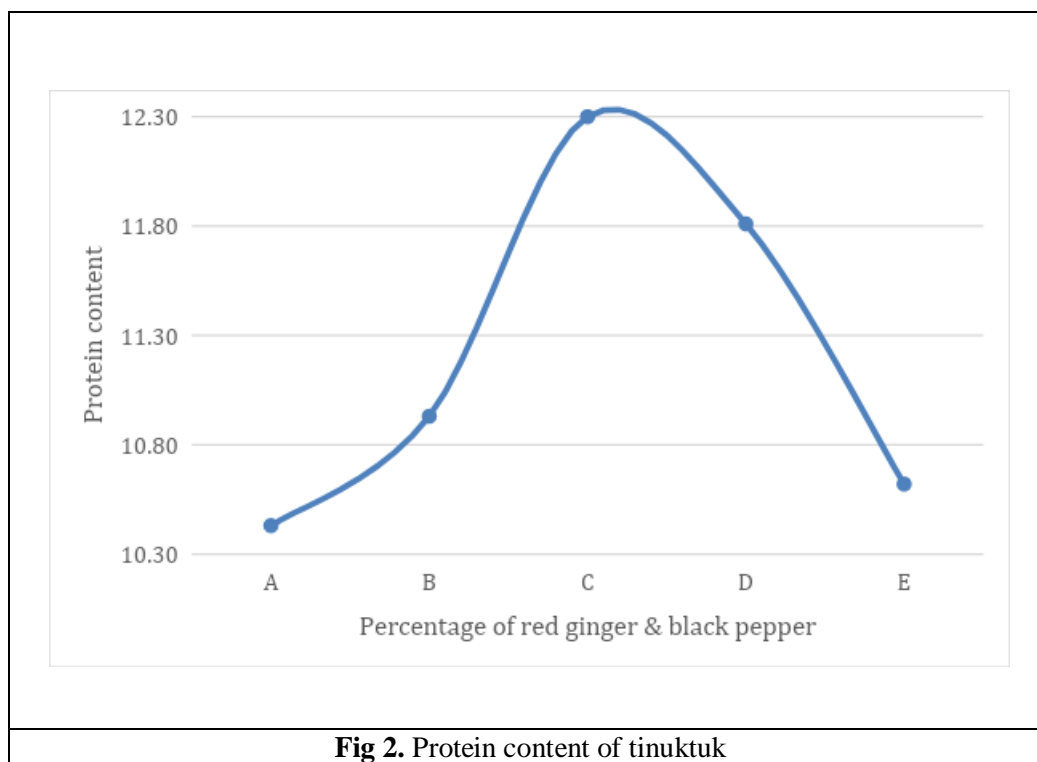
Ash is an inorganic material left over from complete combustion at a temperature of 600°C for some time. The amount of ash content in food products depends on the amount of mineral content of the ingredients used. As many as 96% of food ingredients come from organic materials and water. The rest consists of mineral elements or ash content (Winarno, 2004). Determination of ash content was carried out to control the concentration of inorganic salts such as sodium (Na), carbonate (K), potassium (Ca), and phosphate (P). Ash content is related to the mineral content of a material. If the ash content is high, then the mineral content in the food is also high. This ash content states the number of minerals present in foodstuffs where the ash content is the residue from the complete combustion of minerals contained in the tinuktuk.



From Figure 1 the ash content of tinuktuk is 6.98%-6.73%. Ash content tends to decrease along with differences in the concentration of the main components of red ginger and black pepper. This is due to the more red ginger is added, the higher the ash content, while the more black pepper is added, the lower the ash content. Red ginger contains minerals that are higher than black pepper. Red ginger has an ash content of 8.76% [9] while according to the Indonesian Ministry of Health 2017 black pepper has an ash content of around 6.1% [10].

Protein Level

Protein is an important food substance for the body that functions to regulate body substances and body-building substances. Protein is an amino acid that contains hydrogen, nitrogen, and oxygen. The results of the analysis of the protein content of tinuktuk can be seen in figure 2. The results of the analysis show that the protein content of tinuktuk in the treatment ranged from 10.42% to 12.43%. Where 70:30 is (10.43%), 60:40 is (10.93%), 50:50 is (12.43%), 40:60 is (11, 81%), and 30:70 is (10, 62%). The protein value in red ginger was 3.57 g/100 g and in black pepper was 10.39 g/100 g protein based on the [11]



Salinity

The salt content test was carried out using the Argentometry method. The final result of the titration is indicated by a change in the color of the solution from yellow to brick red and a precipitate is formed. This happens because the NaCl solution will react with AgNO₃ until the solution's NaCl solution runs out. Then, AgNO₃ will react with the K₂CrO₄ indicator so that the color of the solution is brick red and a precipitate is formed [12]. In addition to providing a salty taste, reducing oxygen solubility, and affecting the Aw of a food ingredient, salt addition is carried out to prevent food spoilage.

Table 1. The salt content of Tambar tinuktuk

Sample	Salinity (%)
A	0,57
B	0,57
C	0,57
D	0,57
E	0,57

The salt content shown in the 5 variations of the ratio between red ginger and black pepper tinuktuk is not different. This is due to the addition of Himalaya salt in each treatment of tinuktuk is the same.

IV. CONCLUSION

The conclusion from the results of research and discussion that has been carried out on the percentage comparison between 70:30%;60:40%;50:50%;40:60% and, 30:70% using the oven method which has good analytical results on the ash content at 30:70% treatment is 6.73%, the analysis of the best protein content in 50:50% treatment is 12, 43% and the value of salt content is the same in each treatment.

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