NUTRITIONAL ANALYSIS NATA DE CITRULLUS AFKIR SEMANGKA FROM

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Abstract

Watermelon (Citrullus Vulgaris) is a fruit that is almost in every region in Indonesia. Watermelon has many health benefits. The yields of watermelons sold are usually of medium size (± 2 kg) and large (≥2 kg), while those of small size (≤ 2 kg) are underutilized and are sold at relatively cheap prices. Watermelon in this small size can be categorized into watermelon afkir, which is a watermelon whose harvest age and maturity level is sufficient but its size is small, so it is underutilized and has a low selling price or farmers also often refer to it as the Ampera group. One alternative treatment that can be done to increase the sale value and extend the shelf life of watermelon is by making Nata de Citrullus. Nata is a type of component drink cellulose compound (dietary fiber) which is fermented by the bacterium Acetobacter Xylinum. The purpose of this study is to increase the selling price and extend the shelf life of rejected watermelons, and to find out the nutritional value of nata de citrullus. This study used an experimental method with a completely randomized design method with 4 treatments and 3 replications. In this research, an analysis is carried out, namely the analysis of nutrient analysis of nata watermelon. The results of this study indicate that the nata of the watermelon rejects contains 62.3% protein, 99.03% water, 0.26% ash, 0.27% fat and 29.1% carbohydrate. As for the antioxidant content after testing there are 18.28% antioxidant content in Nata de Citrullus.

Keywords: *Organoleptic, Nata de citrullus, Watermelon Afkir*

INTRODUCTION

Watermelon (*Citrullus Vulgaris*) is a fruit that is almost in every region in Indonesia. Watermelon has many health benefits. The yields of watermelons sold are usually of medium size (± 2 kg) and large (≥2 kg), while those of small size (≤ 2 kg) are underutilized and are sold at relatively cheap prices. Watermelon in this small size can be categorized into watermelon afkir, which is a watermelon whose harvest age and maturity level is sufficient but its size is small, so it is underutilized and has a low selling price or farmers also often refer to it as the Ampera group. These watermelons are often sold in low-cost cases, not sold per piece anymore. One alternative treatment that can be done to increase the selling price and extend the shelf life of the watermelon is by making *Nata de Citrullus.*

Nata is the result of fermentation from the bacterium Acetobacter xylinum which is grown on glucose-containing media. According to Pambayun (2002) the bacteria Acetobacter xylinum can form nata if grown in media that has been enriched with carbon (C) and nitrogen (N) through a controlled process. In such conditions, the bacteria will produce extracellular enzymes that can arrange sugars (in this case glucose)

into thousands of chains (homopolymers) or cellulose. Nata consists of millions of microorganisms which grow in the media used, will produce sheets of cellulose threads which eventually will appear solid white to transparent, that is what is called nata.

Nata is very good if it is processed into several food or drink refreshes, because it contains fiber (dietary fiber). Like natural cellulose, nata plays an important role in the process of digestion of food that occurs in the small intestine and absorption of water in the large intestine, so it is very beneficial in the digestion of food and indirectly is very good for health. In addition to cellulose, there are also proteins in nata mainly from Acetobacter xylinum which are found in the cellulose threads.

The type of nata that circulates in the community is nata de coco, which is nata made from coconut water. But there are also some other raw materials in making nata, for example from fruit juice, leri water (rice washing water). According to Res, 2009) along with the development of technology, the material makes nata more diverse, it can be made from tofu pulp, pseudo cashew fruit, aloe vera or pineapple skin. Components that play a role in forming nata from these raw materials are sugar, organic acids and minerals that are converted into synthetic cellulose by Acetobacter xylinum.

In accordance with studies that have been done, the possibility of nata from watermelon can also be done. Therefore, the authors take the title of this study which is adapted to existing studies, but uses a specific material that is processing nata from watermelon afkir. From the description above, the writer is interested in researching about "Nutrition Analysis of Nata De Citrullus From Watermelon Afkir"

RESEARCH METHOD

Materials needed in making nata de citrullus are watermelon apples, Acetobacter xylinum bacteria, sugar, essence, NaOH, H_2SO_4, acetic acid and bean sprouts. The equipment needed in making nata de citrullus is plastic pan, plastic cup, plastic basin, scales, plastic spoon, knife, filter cloth, sticker paper. The Nata de Citrullus research activity was carried out in several stages, namely:

Sterilization of Tools and Equipment

The equipment needed in making nata de citrullus is plastic trays, plastic cups, plastic basins, scales, plastic spoons, knives, filter cloths, sticker paper. The ingredients needed in making nata de citrullus are watermelon, Acetobacter xylinum bacteria, sugar, essence, NaOH, H_2SO_4, acetic acid and bean sprouts.

- Prepared 5 plastic trays and beaker
- Then the plastic tray was pasteurized at water bath at 80 c
- Chemical beakers and newsprint then sterilized in the oven at 170 c for 2 hours
- Then stored for use

Making Watermelon Nata

Making Toge Sari Sprouts

- Sprout sprouts are prepared, washed thoroughly then weighed
- Then sprout sprouts are blended with a comparison (:) with water
- The results of the blender / smoothing then filtered with a filter cloth
- Obtained juice/ extract of sprouts toge Sprouts

Making Watermelon Sari - Watermelon

as much as 3 pieces are prepared, then washed thoroughly -
Watermelon then peeled with a knife and cut into small pieces -
Then blender until smooth

- The results of the blender are filtered using a sieve cloth -
- Obtained watermelon juice

Making Nata Watermelon

- Urea, sprout juice extract, watermelon juice, sugar and acetic glacial acid are prepared
- Nata is made with two treatments, namely the addition of urea and the addition of kecambah juice h toge
- Sari watermelon prepared each-masing 1 liter for every treatment, sugar 30 Gr each treatment
- Urea is added (5 gr / liter) and 200 ml of juice sprouts sprouts sprouts for treatment of a nitrogen source, pH was measured using a pH meter and plus Glacial Acetic Acid to Ph 4
- Then heated on a Hot Plate until it boils, then the sample is cooled (which has been pasteurized)
- Nata starter is prepared and added to each sample of 200 ml
- Then stirred and covered with a sterile spatula
- The tray is then covered with paper newspaper and given rubber
- Then stored at room temperature for 10 days.

Harvest nata

- Nata after 10 days old were harvested
- Measured thickness of nata and yield with calipers and analytical balance
- Air residual fermentation discarded, then nata washed thoroughly with running water
- Nata then cut the size of the dice (1x1 cm)
- Nata then be redeemed for turn off acetobacter xylinum
- Boiling water nata is discarded and nata is then soaked for 3 days
- Nata is replaced with clean water
- Then stored in the showcase
- Water replacement is carried out for 3 days.

Boiling

- Nata that has been replaced with water and then washed again clean
- Nata then added coloring from marjan syrupConduct
- -boiling for 15 minutes
- Nata is then packed with plastic and then sealed
- Nata is then stored in the showcase

Figure 1: Process of Making Nata

RESULTS THAT ARE ACHIEVED

This research is an experimental research. The main ingredient in making Nata de citrullus is watermelon afkir or also known as ampera watermelon with size <2 kg. This study uses 2 repetitions, namely to form the plate desired. The variables measured were nutrient content and antioxidant test content of nata de citrullus. The making of nata is carried out in several stages, namely:

1. Preparation of tools and materials.
2. Making starter nata de citrullus from Acetobacter xylinum.
3. Nata fermentation process
4. Harvesting and washing
5. Packaging

Materials needed in making nata de citrullus are watermelon, Acetobacter xylinum bacteria, sugar, essence, NaOH, H2SO4, acetic acid.

Nutrition test for nata de citrullus (Proximate test)

Nata water content (AOAC 2006)

Aluminum cup that will be used to measure the weight of samples that have been in the oven, then weighed with an analytical balance and recorded values (c). The cup is stored in a desiccator before use so as not to absorb moisture from the air which causes it to gain weight. 1-2 grams of sample are weighed in a prepared cup. The sample weights read on the analytical balance are recorded and then called the sample wet weight (a). The sample and the cup were dried in an oven for 3 hours at 105°C, then cooled in a desiccator and weighed. The weight obtained is then called the sample dry weight + cup (b). Calculation of water content can be done using the equation:

$$\text{Moisture content (\% bb)} = a - (b - c) \times 100$$
$$(a)$$

$$\text{Moisture content (\% bk)} = a - (b - c) \times 100$$
$$a. \qquad (b - c)$$

After testing was carried out 99.03% of the water content in nata de citrullus.

Nata ash content (AOAC 2006)

Porcelain cups are preheated in the furnace, then cooled in a desiccator and weighed. A total of 3-5 grams of sample in a porcelain cup is burned to the point of no-smoking and ash in a furnace at 600°C until it is white. Then cooled in a desiccator and weighed.

Calculation of ash content can be calculated by the equation:

$$\text{Ash content (\% bb)} = W1 - W2 \times 100\%$$
$$1. \quad W$$

Note:

% bb = ash content per wet material (%)

W = weight of initial material before ash (gr)

W1 = sample weight + empty cup after grading (gr)

W2 = empty cup weight (gr)

After testing there is 0, 26% ash content in nata de citrullus.

Nata fat content (AOAC 2006)

A sample of 5 grams in extract form wrapped in filter paper and then the filter paper is put into an extractor tool soxhl*et. The*condenser is placed above it and the fat pumpkin is placed underneath it. The hexane solvent is put into the Soxhlet extractor until the sample is submerged. Then reflux is performed for a minimum of 6 hours until the solvent drops back into the clear fat pumpkin. The solvent in the fat flask is distilled and the solvent is recovered. Then the fat flask containing extracted fat is heated in an

oven at 150^{o}C until it reaches a constant weight, then cooled in a desiccator. Then the pumpkin and the fat in it are weighed and the weight of the fat can be known. Calculation of fat content can be seen in the following equation:

$$\text{Fat content (\% bb)} = \frac{W1 - W2}{W} \times 100\%$$

Specification:

% bb = fat content per wet material (%)
W = sample weight (gr)
W1 = fat pumpkin weight + extracted fat (gr)
W2 = empty fat pumpkin weight (gr)

After testing there is 0.27% fat content in nata de citrullus.

Nata protein levels (AOAC 2006)

Samples weighing as much as 0.2 gr were put into the flask Kjeldahl, then added 1.9 ± 0.1 gr K_2SO_4, 40 ± 10 mg HgO, and 2.0 ± 0.1 ml H_2SO_4. Then the sample is destructed until the liquid is clear (about 1 hour). This clear solution is then transferred to the distillation apparatus.flask is Kjeldahl washed with distilled water and the water is washed into the distillation apparatus added with 8-10 ml of NaOH-Nasolution$_2S_2O_3$. Under the condenser is placed an erlenmeyer containing 5 ml of solution H_3BO_3 and 2-4 drops indicator (mixture of 2 parts red metal 0.2% in alcohol and 1 part blue metal 0.2% in alcohol). The end of the condenser tube must be submerged in solution H_3BO_3. Then the contents of the erlenmeyer are diluted to 50 ml then titrated with 0.02 N HCl until the color changes to gray. The same procedure is also carried out on blanks.

Calculation of% N and protein content of the sample can be done using the following equation:

$$\text{\% N} = \frac{(\text{ml HCl} - \text{ml HCl blank}) \times \text{N HCl} \times 14.007 \times 100\%}{\text{mg sample}}$$

Protein content (% bb) =% N x conversion factor (6.38)

Note:

% bb = protein content per wet material (%)
% N = nitrogen content in the sample (%)

After testing there is 62.3% protein content in nata de citrullus.

Antioxidant capacity using the DPPH method (Permana et al. 2012)

An acetate buffer of 4 ml was added with 7.5 ml of methanol, 400 µl of DPPH solution, homogenized and 100 ml added and then incubated for 20 minutes at 20°C. Samples were measured for absorbance with spectrophotometer at a wavelength of 517 nm. The antioxidant capacity of the sample is based on comparing the absorbance of the sample with a standard curve. Standards using ascorbic acid and capacity are expressed in mg / g AEAC (*Ascorbic Acid Equivalent Antioxidant Capacity*).

Antioxidant capacity is calculated using the equation:

Antioxidant capacity (mg AEAC / g) = (C x F P) / (M x FK)

Note:

C = antioxidant capacity of the standard curve (mg / L)

FP = dilution factor

M = sample weight dry (gram)

FK = conversion factor

After testing there are 18.28% antioxidants content in nata de citrullus.

CONCLUSIONS AND SUGGESTIONS

Based on the results of research development learning modules that have been carried out, the following conclusions are obtained:

1. Watermelon (Citrullus Vulgaris) is a fruit that is almost there in every region in Indonesia. Watermelon has many health benefits. The yields of watermelons sold are usually of medium size (± 2 kg) and large (≥2 kg), while those of small size (≤ 2 kg) are underutilized and are sold at relatively cheap prices.
2. One alternative treatment that can be done to increase the sale value and extend the shelf life of watermelon is by making Nata de Citrullus.
3. After testing there is 99.03% water content in Nata de Citrullus.
4. After testing there are 0, 26% ash content in Nata de Citrullus.
5. After testing there is 0.27% fat content in Nata de Citrullus.
6. After testing there was 62.3% protein content in Nata de Citrullus.
7. After testing there were 18.28% of the antioxidant content in Nata de Citrullus.

Based on the research conducted, it is suggested the following things:

1. It is recommended to further researchers to develop nata from several other rejected fruits so that fruits that are still good but do not have high selling prices can be raised for selling prices and more efficiently.
2. It is recommended to further researchers that this nata can make more variations of this nata de citrullus so that it is more competitive.
3. The author hopes that this research can be used as literature for future nata de citrullus development research.

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