INTEREST: Jurnal Ilmu Kesehatan
Vol. 10, No. 2, November 2021
https://doi.org/10.37341/interest.v9i2.396

Original Research

Development Of Carrots (*Daucus Carota* L.) Flour Steamed Brownies

Arum Dwi Agustin[1*], Ratih Purwasih[2], Pelangi Pagi Kalimasadha[3]

[1,2,3] Department of Pharmaceutical and Food Analysis, Poltekkes Kemenkes Surakarta, Indonesia

ABSTRACT

Background: *Carrots production in Indonesia is quite abundant but has not been used optimally. How to process carrots is very necessary so that they become foods that have a high selling value while maintaining the content of antioxidant compounds contained therein One way to optimize is to make carrot flour that can reprocess into food products, steamed brownies. This research was conducted to increase the selling value of carrots, to determine the quality and antioxidant activity of carrot flour steamed brownies.*

Methods: *The research type is quantitative with a design of descriptive research. Determination of the quality of carrots flour and carrots flour steamed brownies included water and ash content assays. A qualitative assay using color reaction assays, quantitative analysis, and antioxidant activity using UV-Visible Spectrophotometry.*

Results: *The quality assay result content of water and ash in carrots flour was 4.1% and 0.5% and in carrots flour steamed brownies was 26.8% and 1.8%. A qualitative assay using a color reaction assay with antimony trichloride showed positive results, both for carrot flour and carrot flour steamed brownies. The result of antioxidant activity with* IC_{50} *values of 241.4822 ± 2,1294 ppm*

Conclusion: *The quality assay results in carrots flour and carrots flour steamed brownies in accordance with the flour parameters of SNI 3751: 2009 and SNI 01-3840-1995 for steamed brownies. The result of antioxidant activity for carrots flour steamed brownies including a medium level. It is necessary to carry out proximate tests such as fat, protein, carbohydrate, and microbiological tests on carrot flour and carrots flour steamed brownies.*

ARTICLE HISTORY
Received: January 04th, 2022
Accepted: January 31th, 2022

KEYWORDS
β-carotene, carrots, steamed brownies, quality assay, uv-visible spectrophotometry;

CONTACT
Arum Dwi Agustin
✉
arum272586@gmail.com
Jurusan Anafarma Poltekkes Kemenkes Surakarta, Jln. Letjen Sutoyo, Mojosongo, Surakarta, Indonesia.

Cite this as: Agustin, A., Purwasih, R., & Kalimasadha, P. (2022). Development Of Carrots (Daucus Carota L.) Flour Steamed Brownies. *Interest : Jurnal Ilmu Kesehatan*, 275-287. https://doi.org/10.37341/interest.v0i0.396

INTRODUCTION

In Indonesia, carrots production is abundant. Every year the production of carrots continues to increase. According to Statistics Indonesia, carrots production in Central Java from 2015 reached 142.248 tons, 2016 increased to 145.362, 2017 decreased to 144.619 tons, 2018 increased to 153.058 tons, and 2019 increased again to 160.278 tons (Statistics, 2020). Most of the Indonesian people so far have not used carrots optimally

(Astarina, 2010), besides that carrot bulbs harvested should be 100-120 days of planting will not be good.

The quality of carrots is low and may not sell in the market (Lubis, 2019). According to Sutanti & Mutiara (2017), special handling to extend the shelf life needs to be done by applying appropriate technology in processing carrots. Based on nutritional content, carrots are a type of vegetable that contains a lot of β-carotene. The body converts β-carotene into vitamin A. The content of β-carotene in carrots the needs of vitamins A as an antioxidant in reducing the effects of free radicals (Agustina *et al.*, 2019).

How to process carrots is very necessary so that they become foods that have a high selling value while maintaining the content of antioxidant compounds contained in there. The content of β-carotene in carrots is quite high can be used as food ingredients such as carrots flour. Carrots flour can also into various forms and other types of food, into food products that and easy to make as brownies (Tjahjadi, 2013).

Brownies are cakes that have a thick chocolate taste and have a cake-like texture or have a fudge texture, which is dry on the surface but still wet and solid on the inside. Brownies are that snacks liked by children, currently a trend, and a favorite of many people. Brownies can last two to three days without preservatives (Rahmatiah, 2018). The levels of β -carotene during the process of making brownies will decrease so special treatment is needed so that the antioxidant compounds contained are maintained. (Nurani & Yuwono, 2014).

MATERIALS AND METHOD

Fresh carrots from Yogyakarta, wheat flour, dark cooking chocolate, cocoa powder, butter, eggs, low-calorie sugar, baking powder, emulsifiers were obtained from local supermarkets. 1,1-Diphenyl-2-Picrylhydrazyl (DPPH), β-carotene, were obtained from Sigma (Sigma Aldrich GmbH, Sternheim, Germany). Ethanol p.a., methanol, n-hexane p.a., antimony trichloride, were obtained from Merck, Darmstadt, Germany, distilled water, and Whatman 41 filter paper. Analytical balance, oven, 80 mesh sieve, blender, mixer, stove, steamer, baking sheet, stemper, mortar, porcelain dish, exchange rate, brazier, magnetic stirrer, glass funnel, assay tube, measuring pipette, dropper pipette, Bunsen flame, measuring flask, cuvette, UV-Vis spectrophotometer.

This research was conducted in June-September 2021 at the Integrated Laboratory of Campus 3 Health Polytechnic of Surakarta Ministry. This research is a descriptive type with a quantitative descriptive design because it describes a sample objectively with data in the form of numbers or data shaken, and the variables used in this study are single variables. This research includes the flouring process for making steamed brownies, nutrient content analysis, including the content assay of water and ash, hedonic, qualitative and quantitative of β-carotene, and antioxidant activity of carrots flour and carrots flour steamed brownies.

Carrots (*Daucus carota* L.) Flour Steamed Brownies

Determination of carrots (*Daucus carota* L.)

Determination of Carrots (*Daucus carota* L.) was carried out in Pharmacy Biology Laboratory, Islamic University of Indonesia.

Steamed brownies making

Steamed brownies making begin with flour milling of carrots. Carrots are peeled, washed, and then sorted. Carrots were cut using a knife and then dried in an oven at a temperature of 40-55 ^{o}C for 30 hours, then mashed or ground and sifted using an 80 mesh flour sieve. The remaining sifting is then ground again (Sianturi *et al*., 2018 with modification). Carrots flour is ready to use to make steamed brownies. Formula of steamed brownies is shown in Table 1.

Table 1. Steamed Brownies Formula

Material	Formula (%)
Dark cooking chocolate	25
Cocoa powder	5
Carrot flour	24
Wheat flour	9
Margarine	4
Egg	16
Baking powder	1
Sugar	15
Emulsifier	1

Eggs, sugar, and emulsifier have beaten a mixer at high speed until they are perfectly fluffy, thick, white, and trail. Wheat flour, carrot flour, cocoa powder, and baking powder are sifted first before being added to the egg, sugar, and emulsifier mixture, then stirred briefly using a low-speed mixer and continued using a spatula until well blended. The melted dark cooking chocolate and butter have been added to the mixture, stirred again with a back-stirring technique until a good blend. The brownies dough is poured into a brownies pan that has been lined with parchment paper and then steamed in a pot for 30 minutes (Wulandari *et al.*, 2019).

Quality Assay

Water content assay

The first step to analyze the water content was to dry the porcelain dish in an oven at 105 °C for 1 hour. The porcelain dish is placed in a desiccator for approximately 15 minutes and allowed to cool then weighed to a constant weight (AOAC, 2005). The next step is to weigh the carrots flour and the crushed steamed brownies each as much as 3 g, then place them in different cups. Furthermore, drying is carried out in an oven at a temperature of 100-105 °C for 3-5 hours, after which the porcelain dish is cooled in a desiccator and reweighed (Ismanto *et al.*, 2016). This treatment was repeated until it reached a constant weight with a tolerance level of 5% or 0.05 (Apriyani, 2014).

Ash content assay

The crucible was heated in an oven at 105 °C for 15 minutes, then cooled in a desiccator (AOAC, 2005). A total of 3 g of carrots flour and steamed brownies was put into a crucible. The sample was ignited to ashes at 600 °C temperature, then the crucible was cooled in a desiccator and reweighed (Marpaung *et al*., 2017). This treatment was repeated until it reached a constant weight with a tolerance level of 5% (Apriyani, 2014).

Assay of β-carotene

Sample preparation

Samples of flour and carrot flour steamed brownies were mashed are weighed as much as 5 grams each, put into an Erlenmeyer, and added 10 ml of n-hexane pa, shaken for 25 minutes with a magnetic stirrer, and filtered using Whatman 41 filter paper. The filtrate is separated and repeated. The filtrated was put into a 25 ml volumetric flask, added n-hexane p.a to the mark (Syafitri *et al.*, 2020).

Qualitative assay

A qualitative assay was carried out by tube assay using 25% antimony trichloride solution in chloroform. The result extraction is a solution, taken as much as 2 mL, then added a solution of antimony trichloride. Positive results if a blue color is formed in the sample (Octaviani *et al.*, 2014).

Quantitative assay

a. Preparation of β-carotene standard solution

A solution 0.01% w/v made with the solvent n-hexane p.a (Stankovic, 2011).

b. Determination of maximum

A 0.005% w/v solution made diluted from a standard solution of 0.01% w/v then A was measured at 350-550 nm (Stankovic, 2011).

c. Calibration curve creation

Take 0.1; 0.2; 0.3; 0.4; and 0.5 mL of a standard solution of 0.005% w/v then put into a 5 mL volumetric flask, volume made up after absorption was measured with a UV-Vis spectrophotometer at the maximum wavelength (Octaviani *et.al.*, 2014).

d. Determination of β-carotene levels

25 ml of brownies extract pipetted with 0.02 ml and the volume was made up with n-hexane in a 5 ml volumetric flask, absorption measured by UV-vis spectrophotometry at the maximum wavelength with n-hexane as blank (Stankovic, 2011).

Antioxidant Activity Assay

a. Determination of DPPH maximum wavelength

A solution of DPPH in ethanol p.a 50 ppm was made. The solution is then placed into a dark bottle. Samples were incubated in a dark room for 30 minutes. The DPPH solution was determined for its maximum absorption wavelength using a UV-Vis spectrophotometer at a wavelength (λ) of 400-600 nm (Tahir *et al.*, 2020).

b. Determination of Antioxidant Activity

Determination of antioxidant activity refers to Maulani (2017), the brownies were ground and weighed 5, 10, 15, 20, and 25 mg and added 10 mL of ethanol p.a to obtain solutions of 500, 1000, 1500, 2000, and 2500 ppm. The sample was then vortexed for 10 minutes, 1 mL of the pipette sample put into a assay tube, 2 mL of 50 ppm DPPH solution, 2 mL of methanol p.a, added. The controlled making with 1 mL of methanol p.a and 2 mL of 50 ppm DPPH solution. The assay tubes were closed, the sample was incubated at room temperature in the dark for 30 minutes. Absorbance solution measured at maximum wavelength (Tahir *et al.*, 2020)

$$\%\ \text{inhibition} = \frac{(\text{control} - \text{sample})\ \text{absorbance}}{\text{control absorbance}}\ \text{x}\ 100\%$$

The IC_{50} value is determined by making a linear curve between the concentration of the assay solution (x-axis) and % inhibition (y-axis) so that the equation y = bx + a is obtained. Where y is the % inhibition and x is the IC_{50} value (Handayani *et.al.*, 2018).

$$IC_{50} = \frac{50 - a}{b}$$

RESULTS

Steamed Brownies Carrots (*Daucus carota* L.) Flour

Determination of carrots (*Daucus carota* L.)

The result of the determination is obtained by the formula:
1b-2b-3b-4b-6b-7b-9b-10a-(class 7)
92b-100b-103b-105b-106b-107b-108b-(Umbelliferae)
1a-2b-13b-15a-16b (*Daucus carota* Linn.)

Steamed brownies making

Make flour from fresh carrots (*Daucus carota* L.) until it becomes powder through several processes. The results of making flour from carrots (*Daucus carota* L.) are shown in Table 3.

Table 3. Result of the carrot (*Daucus carota* L.) flour making

Sample	Wet mass (g)	Dried mass (g)	Carrots flour mass (g)
Carrots Flour	1760	180	115

Figure 1. Carrots flour and steamed brownies carrots flour

Quality Assay

Assay content of water and ash of the carrots (*Daucus carota* L.) flour

This assay was conducted to measure the content of the water and ash in the carrots (*Daucus carota* L.) flour. The results of water and ash content assay for carrots (*Daucus carota* L.) flour:

Table 4. The quality assay result of the carrots (*Daucus carota* L.) flour

Parameter (%)	Replication			Mean± SD
	1	2	3	
Water content	4	4	4.3	4.1±0.31
Ash content	0.6	0.3	0.3	0.5±0.15

Assay content of water and ash of the carrots (*Daucus carota* L.) flour steamed brownies

This assay was conducted to measure the content of the water and ash in the carrots (*Daucus carota* L.) flour steamed brownies. The results of water and ash content assay for carrots (*Daucus carota* L.) flour steamed brownies:

Table 5. The quality assay result of the carrot (*Daucus carota* L.) flour steamed brownies

Parameter (%)	Replication			Mean ± SD
	1	2	3	
Water content	25.2	25.6	29.5	26.8±2.4
Ash content	1.9	1.8	1.8	1.8±0.1

Assay of β-carotene

Qualitative assay of β-carotene

This assay was carried out to identified content of β-carotene in the carrots (*Daucus carota* L.) flour and steamed brownies. The result of β-carotene content in the carrots (*Daucus carota* L.) flour and carrots (*Daucus carota* L.) flour steamed brownies:

Table 6. Result of qualitative assay β-carotene

Sample	Color
β-carotene standard	Blue
Carrots Flour	Blue
Carrots flour steamed brownies	Blue

Quantitative assay of β-carotene

This assay was carried out to determine content of β-carotene in the carrots (*Daucus carota* L.) flour steamed brownies. The result of β-carotene content in the carrots (*Daucus carota* L.) flour steamed brownies:

Table 7. The absorbance of β-carotene

Concentration (ppm)	Absorbance
1	0.262
2	0.327
3	0.428
4	0.547
5	0.610

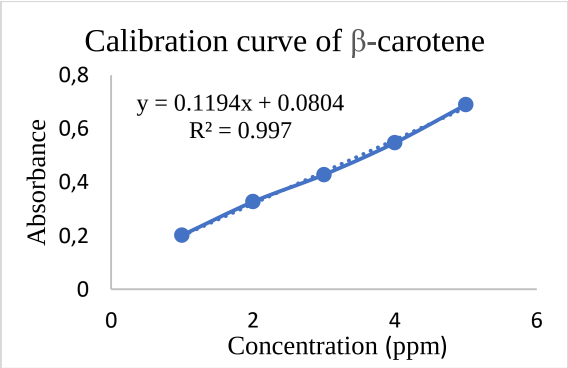

Figure 2. Calibration curve of β-carotene

Table 8. The result of β-carotene levels

Type	Replication	Absorbance	Concentration (ppm)	β-carotene levels (mg/g)
Carrot flour	1	0.630	4.387	0.1096
	2	0.630	4.387	0.1096
	3	0.629	4.379	0.1094
Mean± SD		**0.6296**	**4.384**	**0.1095±0.000115**
Steamed brownies carrots flour	1	0.348	2.290	0.00687
	2	0.348	2.290	0.00687
	3	0.348	2.290	0.00687
Mean± SD		**0.348**	**2.290**	**0.0343**

Antioxidant Activity Assay of the Carrots (*Daucus carota* L.) Flour Steamed Brownies

This assay is to determine the level of antioxidant activity of the carrots (*Daucus carota* L.) flour steamed brownies. The following is the data on the %inhibition and antioxidant activity assay results of the carrots (*Daucus carota* L.) flour steamed brownies:

Table 9. Percent inhibition of the carrots (*Daucus carota* L.) flour steamed brownies

Concentration (ppm)	IC_{50} average ± SD (ppm)
500	
1000	
1500	241.4822 ± 2.1294
2000	
2500	

DISCUSSION

Carrots (*Daucus carota* L.) Flour Steamed Brownies

Determination of carrots (*Daucus carota* L.)

The first step in this research is to do the determination of the plant used is the carrot (*Daucus* carota L.), determination carried out macroscopically at the Pharmacy Biology Laboratory of the Islamic University Indonesia. Determination aims to ensure and prove that the identity of the correct plant used in this research is the carrots (*Daucus carota* L.). Determination is done by adjusting the morphological state of the plant using the key of determination found in the Flora of Java (Backer and Bakhuizen, 1965) From the results of the determination formula, it can be confirmed that the plant is *Daucus carota* L. commonly known as carrots.

Steamed brownies

Make flour from fresh carrots (*Daucus carota* L.) until it becomes powder through several processes. The results of making flour from carrots (*Daucus carota* L.) are shown in Table 3 and Figure 1. Color of carrots flour is orange, have distinctive carrots aroma, tasteless and fine powder. The result of carrots flour steamed brownies are shown in Figure 1. The steamed brownies are dark brown in color, have distinctive chocolate and carrots aroma, and sweet taste.

Fresh carrots were peeled, washed, and cut using a knife and then dried in an oven at 40-55 ^{o}C for 30 hours. After drying, the carrots were mashed with a blender and sieved with a size of 80 mesh. The aim of drying is to reduce the levels of water, to ensure storage, prevent mold growth, and prevent enzymatic processes or reactions that can reduce quality (Rahmatiah, 2018). Steamed brownies are made by melting dark cooking chocolate and butter and then beating the eggs, sugar, and emulsifier using a high-speed mixer until the dough is fluffy, white, and trails.

Wheat flour, carrots flour, cocoa powder, and baking powder are sifted first before being added to the egg, sugar, and emulsifier mixture then stirred using a mixer on low speed for a moment and continued using a spatula until well blended. Dark cooking chocolate and melted butter are added to the mixture, then stirred again with the stirring technique until well blended. The brownies dough is then poured into a baking sheet that has been lined with parchment paper and then steamed in a pan for 30 minutes. The addition of baking powder serves to expand the brownie dough and the addition of an emulsifier to soften the texture of the brownies (Wulandari *et al.*, 2019).

Quality Test

The results of carrots (*Daucus carota* L.) flour analysis (Table 4) showed the water and ash content were 4.1 ± 0.31 % and 0.5 ± 0.15 % respectively. This result is considered on SNI 3751:2009, which is a maximum content of 14.5% for water and 0.7% for ash (Badan Standarisasi Nasional, 2009). The water content in beverage means determines the freshness and shelf life of the foodstuffs. The high water content results in the ease of carn, bacteria, and kamir to multiply so that there will be changes in foodstuff (Sandjaja & Amarita, 2009). Determination of ash content aims to measure the nutritional value of foodstuff, especially total minerals.

High ash content indicated that the mineral content of foodstuff is high (Fathoni *et al.*, 2016). This is in line with Hendrasetyawati (2017) research, which states that the standard water content in flour is a maximum of 14%. The results of this study are also in accordance with previous research conducted by Tjahjadi (2013), on the physical and chemical characteristics of carrot flour which obtained a water content of 5.6%.

The results content of the water and ash of the carrots (*Daucus carota* L.) flour steamed brownies (Table 5) were 26.8 ± 2.4 % and 1.8 ± 0.1 % respectively. This result corresponds to the parameter SNI 01-3840-199, which is no more than 40% for water content and no more than 3% for ash content (Badan Standarisasi Nasional, 1995). The results of this study are higher than previous studies conducted by Wulandari *et al.* (2019), on the effect of adding pumpkin flour to the nutritional value of steamed brownies as a high β-carotene snack which resulted in a water content of 18.04% and the nutritional value of steamed brownies as a high β-carotene snack which resulted in an ash content of 1.95%.

Assay of β-carotene

Qualitative assay of β-carotene

Qualitative assay carried out to find out the presence of β-carotene content in samples of flour and the carrots (*Daucus carota* L.) flour steamed brownies (Table 6). Qualitative assay results of β-carotene compounds were proven by the formation of bluish-green color in the sample assayed. It can be said that the sample showed positive results containing β-carotene according to the study Octaviani *et al.* (2014), which stated positive results indicated by the formation of blue color in the sample solution assayed.

This qualitative assay was conducted by the Carr-Price method, with the principle of blue formation as a result of a reaction between provitamin A and antimony chloride with chloroform formed blue color. Carotenoid compounds that react with antimony chloride through the anhydroretinil pathway (anhydrovitamine A) to form the geometric trigonal bipyramid complex compound that surrounds antimony atoms (Synnove & Geir, 2008). This complex results in discoloration from orange-yellow to unstable blue (lasting approximately 10 seconds). The intensity of the blue color formed is proportional to the amount of β-carotene in the sample (Octaviani *et al.*, 2014).

Quantitative assay of β-carotene

Determination of β-carotene levels is done by the method of UV-Vis Spectrophotometry due to the presence of aromatic compounds conjugated in β-carotene thus showing strong absorption bands in aromatic areas of ultraviolet light and visible light (Harborne, 1987). The first step is the creation of a concentrations series of raw solutions because the method used in measuring levels uses raw curve equations, so to calculate levels can be used linear equations. The next step is the determination of maximum wavelength (λ max) conducted in the range of 400-500 nm, which based on the running results obtained λ max 454 nm, which will later be used to measure the absorbance (A) in the series of concentrations of raw solutions and samples.

The results of determination A for the raw solution can be seen in Table 8 and the calibration curve image of the raw solution of β-carotene can be seen in Figure 1. Based on the results of these measurements, the higher the concentration, the higher the absorbance. The linear regression equation obtained, which is $y = 0.1194x + 0.0804$. The calibration curve equation is what will be used determination of β-carotene levels is done by measuring the absorption of the sample with UV-Visible Spectrophotometry at a maximum wavelength of 454 nm with n-hexane as a blank. According to Basset *et al.* (1994), determination of levels using UV-Vis spectrophotometry is used blank solution as a control that serves as several compounds that do not need to be analyzed.

The results of determining the levels of β-carotene in carrots (*Daucus carota* L.) flour amounted to 0.1095±0.000115 mg / g sample while the carrots (*Daucus carota* L.) flour steamed brownies, amounted to 0.0343 mg / g sample. The results of this study showed that the levels of β-carotene in carrots (*Daucus carota* L.) flour was greater than the carrots (*Daucus carota* L.) flour steamed brownies. This can be due to the steaming process performed on carrot (*Daucus carota* L.) flour steamed brownies. The levels of β-carotene will decrease in the processing process by cooking, roasting, and drying.

The decrease in the β-carotene content is due to mechanical physical processes during the processing process, such as friction, heating, and chemical processes that occur in the mixed materials and the properties of β-carotene compounds that are sensitive especially to oxygen and light (Fathoni *et al.*, 2016). Steamed brownies from carrots (*Daucus carota* L.) flour have higher levels of β-carotene than the steamed brownies without the addition of carrot (*Daucus carota* L.) flour which has a β-carotene content of 0.00598 mg/g sample.

The results of this study are also close to the results of the research of Wulandari *et al.* (2019), on the effect of adding pumpkin flour to the organoleptic test and the nutritional value of steamed brownies as a high β-carotene snack which resulted in

0.00567 mg/g sample of β-carotene content. The addition of carrots flour (*Daucus carota* L.) can affect the levels of β-carotene because carrot flour contains β-carotene.

This indicates that the addition or use of carrots flour in steamed brownies increases the levels of β-carotene in steamed brownies so that the more addition of carrot flour also increases the levels of β-carotene in the steamed brownies.

Antioxidant Activity Assay of the Steamed Brownies Carrots (*Daucus carota* L.) Flour

The antioxidant activity of the carrot (*Daucus carota* L.) flour steamed brownies was assayed by reacting a sample extract of carrots (*Daucus carota* L.) flour steamed brownies in ethanol with DPPH. The carrot flour steamed brownies were made series of sample solutions with concentrations of 500, 1000, 1500, 2000, and 2500 ppm. Each concentration is picked 1 ml and added with 2 ml of DPPH 50 ppm, incubated 30 minutes.

The sample measured its absorbance at a wavelength of 518 nm which is the maximum wavelength of DPPH. This is by research conducted by Sagar & Singh (2011), that DPPH has a maximum absorbance at wavelengths of 515-520 nm. The absorbance measurement data is shown in Table 10. The absorbance obtained is then used to calculate the % of free radical inhibition. The value of % of the acquired and then made a curve between the % of the interest and the concentration of the sample obtained linear regression equation as in Table 10.

Based on Table 10 IC_{50} of carrots (*Daucus carota* L.) flour steamed brownies was 241.4822 ± 2,1294 ppm. It showed that the antioxidant activity of the carrot flour steamed brownies include a medium level based on antioxidant activity level classification, it is in the 101-250 ppm range (Sari, 2019). This is because β-carotene in carrot (*Daucus carota* L.) flour steamed brownies have a relatively moderate inhibitory ability when reacting with DPPH radicals or oxygen radicals. This inhibitory ability is affected by the processing process, where the antioxidant β-carotene is easily oxidized and degraded by air and heat so that it will damage the composition of its chemical compounds so that it will affect antioxidant activity (Ismanto *et al*., 2016).

CONCLUSION

Based on research showed that the carrots (*Daucus carota* L.) flour has an orange color, distinctive carrots aroma, tasteless, and fine powder. The water content and ash content of carrots (*Daucus carota* L.) flour were 4.1% and 0.5% respectively. The β-carotene of carrots (*Daucus carota* L.) flour was 0.1095 mg/g. The carrots (*Daucus carota* L.) flour steamed brownies have a dark brown color, chocolate distinctive aroma, carrots taste, and solid shape.

Qualitative assay using color reaction assay with antimony trichloride showed positive results, both for carrots (*Daucus carota* L.) flour and the carrots (*Daucus carota* L.) flour steamed brownies. The results of the assay of water content and ash content in steamed brownies carrots (*Daucus carota* L.) flour were 26.8% and 1.8%. Carrots (*Daucus carota* L.) flour steamed brownies contained positive β-carotene compounds with β-carotene levels of 0.0343 mg/g and moderate antioxidant activity with IC_{50} values of 241.4822 ± 2.1294 ppm. It is necessary to carry out proximate tests such as fat, protein, carbohydrate and microbiological tests on carrot flour and steamed brownies from carrot flour to get more complete test results.

ACKNOWLEDGEMENT

Acknowledgments are conveyed to appropriate parties, especially to the institution or person who is assisting the research, for example: to the donor, facilities, materials, or advice. Do not give thanks to one of the authors.

REFERENCES

Agustina, A., Hidayati, N., & Susanti, P. (2019). Penetapan Kadar β-karoten pada Wortel (*Daucus carota* L.) Mentah dan Wortel Rebus dengan Spektrofotometri Visibel. *Jurnal Farmasi Sains Dan Praktis*, *5*(1), 7–13.

AOAC. (2005). *Official Methods of Analysis of the Association of Analytical Chemistry*. Virginia USA: Association of Official Analytical Chemistry Inc.

Apriyani, S. (2014). *Pengembangan Metode Uji Kadar Air Bening Pala (Myristica Spp.)*. Skripsi. Institut Pertanian Bogor. Bogor.

Astarina, L. D. (2010). *Wortel pada Pembuatan Biskuit Ditinjau dari Kadar Beta Karoten, Sifat Organoleptik dan Daya Terima*. Skripsi. Fakultas Ilmu Kesehatan Universitas Muhammadiyah Surakarta. Surakarta.

Backer, C.A., and Bakhuizen van den Brink, R. C. (1965). *Flora of Java*. Netherlands: N.V.P. Noordhoff

Badan Standarisasi Nasional, (BSN). (1995). *SNI 01-3840-1995: Roti*. Jakarta: Badan Standarisasi Nasional.

Badan Standarisasi Nasional, (BSN). (2009). *SNI 3751:2009 : Tepung Terigu sebagai Bahan Makanan*. Jakarta: Badan Standarisasi Nasional.

Basset, J., Denney, R. C., Jeffery, G. & Mendham, J. (1994). *Buku Ajar Vogel Kimia Analisis Kuantitatif Anorganik* (EGC (ed.)). Yogyakarta: EGC

Fathoni, A., Hartati, N.S., & Mayasti, N. K. I. (2016). Minimalisasi Penurunan Kadar Beta-Karoten dan Protein dalam Proses Produksi Tepung Ubi Kayu. *Jurnal Pangan*, *25*(2), 113–124.

Handayani, S., Najib, A., & Wati, N. P. (2018). Uji Aktivitas Antioksidan Ekstrak Daun Daruju (Acanthus Ilicifolius L.) dengan Metode Peredaman Radikal Bebas 1,1-Diphenyil-2-Picrylhidrazil (DPPH). *Jurnal Fitofarmaka Indonesia*, *5*(2), 299–308.

Harborne, J. B. (1987). *Metode Fitokimia; Penuntun Cara Modern Menganalisa Tumbuhan* (K. Padmawinata & I. Soediro (eds.); Kedua). Bandung: ITB.

Hendrasetyawati, T. D. (2017). *Pengawasan Mutu Berdasarkan Uji Fisik dan Kimia Tepung Terigu pada Bahan Baku Pembuatan Mie Instan di PT Indofood CBP Sukses Makmur Tbk. Divisi Noodle Cabang Semarang*. Laporan Kerja Praktik. Universitas Katolik Soegijapranata. Semarang.

Ismanto, D. S., Novelina, & Fauziah, A. (2016). Pengaruh Penambahan Daun Cincau Hijau (Premna oblongifoli M.) terhadap Aktivitas Antioksidan dan Karakteristik Crackers yang Dihasilkan. *Conference: Seminar Nasional Perhimpunan Ahli Teknologi Pangan Indonesia (PATPI) 2016 Di Makassar 18-20 Agustus 2016*, 1–11.

Lubis, E., R. (2019). *Panduan Praktis Budi Daya dan Manfaat Wortel*. Jakarta: Bhuana Ilmu Populer.

Marpaung, M., Ahwizar, A., & Wulandari, W. (2017). Karakterisasi dan Skrinning Fitokimia Ekstrak Akar Kuning (*Fibraurea chloroleuca* Miers). *Prosiding Seminar Nasional Kimia 14 Oktober*. Universitas Negeri Yogyakarta. Yogyakarta

Maulani, S. (2017). *Pengaruh Rasio Daging dan Kulit Buah Naga Merah (Hylocereus costaricensis) dan Penambahan Jenis Gula Terhadap Mutu Selai*. Fakultas Pertanian Peternakan. Skripsi. Universitas Muhammadiyah Malang. Malang.

Nurani, S., & Yuwono, S. S. (2014). Pemanfaatan Tepung Kimpul (Xanthosoma sagittifolium) sebagai Bahan Baku Cookies (Kajian Proporsi Tepung dan Penambahan Margarin). *Jurnal Pangan Dan Agroindustri*, *2*(2), 50–58.

Octaviani, T., Guntarti, A., & Susanti, H. (2014). Penetapan Kadar β-karoten Pada Beberapa Jenis Cabe (*Genus capsicum*) dengan Metode Spektrofotometri Tampak. *Pharmaciana*, *4*(2), 101–109.

Rahmatiah. (2018). *Studi Pembuatan Brownies Kukus dengan Substitusi Tepung Daun Singkong (Mannihot utilissima)*. Skripsi. Fakultas Pertanian Universitas Hasanuddin. Makassar.

Sagar, B. K., & Singh, R. P. (2011). Genesis And Development of DPPH Method of Antioxidant Assay. *J Food Sci Technol*, *48*(4), 412–422.

Sandjaja, & Amarita. (2009). *Kamus Gizi Pelengkap Kesehatan Keluarga*. Jakarta: PT. Kompas Media Nusantara.

Sari, D. K. (2019). *Uji Kapasitas dan Aktivitas Antioksidan Air Rebusan Kulit Bawang Merah (Allium cepa L) dalam Berbagai Konsentrasi*. Skripsi. Jurusan Analis Kesehatan Politeknik Kesehatan Kementerian Kesehatan Denpasar. Denpasar.

Sianturi, P. R., Aritonang, S. N., & Juliyarsi, I. (2018). Potency of Carrot (*Daucus carrota* L.) Powder to Improving Antioxidant and Physicochemical Properties of Sweet Cream Butter. *Jurnal Ilmu Dan Teknologi Hasil Ternak*, *13*(1), 63–71.

Stankovic, M. S. (2011). Total Phenolic Content, Flavonoid Concentration and Antioxidant Activity of Marrubium peregrinum L. Extracts. *Kragujevac J Sci, 33*(2011), 63–72.

Statistics, I. (2020). *Produksi Tanaman Sayuran Tahun 2015-2019 di Provinsi Jawa*

Tengah. Semarang: Badan Pusat Statistik.

Sutanti, S., & Mutiara, E. (2017). Industri Rumah Tangga Stick Wortel di Deli Serdang. *Jurnal Pengabdian Kepada Masyarakat*, *23*(2), 256–260.

Syafitri, E. U., Yulianis, Andriani, L. (2020). Validasi Metoda Penetapan Kadar β-karoten Ekstrak n-Heksana Kulit Jeruk Manis (Citrus sinensis L.) dengan KLT-Densitometri. *Journal of Healthcare Technology and Medicine*, *6*(1), 192–203.

Synnove, L. J., & Geir, K. A. (2008). Blue Carotenoid. *ARKIVOC*, *7491*(6), 5–25.

Tahir, M., Suhaenah, A., & Rahim, R. (2020). Potensi Aktivitas Antioksidan Ekstrak Etanol Dan Fraksi n-Heksan Buah Jeruk Pamelo (*Citrus maxima* (Burm) Merr) Asal Kabupaten Pangkep. *Jurnal Fitofarmaka Indonesia*, *7920*, 18–22.

Tjahjadi, S. F. (2013). *Karakteristik Fisika Kimia Tepung Wortel*. Skripsi. Fakultas Teknologi Industri Universitas Katolik Parahyangan. Bandung.

Wulandari, Asyik, N., Sadimantara, M. S. (2019). Pengaruh Penambahan Tepung Labu Kuning (*Cucurbita moschata* L.) Terhadap Uji Organoleptik dan Nilai Gizi Brownies Kukus sebagai Makanan Selingan Tinggi β-Karoten. *Jurnal Sains Dan Teknologi Pangan*, *4*(3), 2188–2203.