

Chemical And Organoleptic Quality Of Suction Pudding With Variations In The Type And Concentration Of Carrot Extract (*Daucus carota* L.)

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Abstract. Carrots are one type of vegetable that is rich in vitamin A. In order to increase carrot consumption, it is necessary to diversify carrot-based preparations, among others, by adding carrots to the pudding suction. This study aims to determine the effect of the interaction of the type and concentration of wotel extract on the chemical and organoleptic quality of lipo pudding as functional food. The research method used is experimental laboratory with Complete Random Design (RAL) research design which is arranged factorially with 2 (two) factors. The first factor is the type of carrot extract, namely boiled carrot extract and fresh carrot extract. The second factor is the difference in carrot extract concentration, which is 7%, 10% and 13% carrot extract. Each treatment factor was repeated 3 (three) times resulting in 18 trials. Observational variables include β -carotene tests, crude fiber tests, reduction sugar tests, and organoleptic tests. Based on the results of the study showed that the interaction between different types and carrot extracts had no real effect on β -carotene levels, crude fiber levels, sugar reduction levels. The best treatment in this study was the F2B treatment, namely suction pudding with the addition of fresh carrot extract with a concentration of 10% with the highest Yield Value (NH) of 0.87. The criteria for the parameters of the study were β -carotene content = 983.0 ppm, crude fiber content = 2.1%, reduced sugar content = 14.37%, color = 5.05 (somewhat like), taste = 5.07 (somewhat like), aroma = 4.67 (somewhat like), and chewiness = 4.71 (somewhat like).

Keywords: Carrot, Functional Food, Suck Pudding

1 Introduction

Carrots have been known to the public as vegetables that are rich in vitamin A, so it has been widely used for processed raw materials such as soup, capcay, stir-fry and others. However, some people, especially children, do not like vegetables. This is in accordance with the results of Basic Health Research (Riskesmas) of the Ministry of Health of the Republic of Indonesia in 2013 which found that on average 93.5% of the Indonesian population consumes less fruits and vegetables. Therefore, efforts to diversify preparations are needed with the addition of vegetables, including carrots. Some studies on processed carrots include carrot nuggets [1], carrot candy [2], carrot crackers [3], adding carrots to sausage [4], snakehead fish sausages with the addition of carrots [5], carrot jelly candy [6] etc. Based on the above, to increase the amount of diversification of carrot-based processed foods, including suction pudding.

Pudding is one type of dessert that is favored by people of various ages. According to [7], [3] lipo pudding is a pudding product that has a soft texture like silk and is known since early 2013 along with the trend of dessert pudding *and can be* accepted by the tongue of Indonesians and can be processed into interesting products with a variety of interesting flavors. The raw materials of pudding are UHT milk, granulated sugar, agar agar, and *jelly*. Suck pudding with a soft, sweet texture and favored by children is suitable for use as complementary food to gain weight for malnourished toddlers or healthy children in general [8]. Suck pudding with the addition of modified carrot juice aims to improve the taste, nutritional value, and acceptability of the product so that it is beneficial for health beyond the nutrients and nutrients available so it is very beneficial for children who do not like vegetables.

Based on the description above, it is necessary to conduct research aimed at determining the right type and concentration of carrot extract in order to obtain the best chemical and organoleptic pudding suction quality.

2 Method

This research design uses a Complete Randomized Design (RAL) research design which is arranged factorially with two factors. Factor 1 is the type of carrot extract / F, which consists of two levels, namely F1: boiled carrot extract and F2: fresh carrot extract. Factor 2 is the concentration of carrot extract, which consists of 3 levels, namely A: 7%, B: 10% and C: 13%. So there are 6 treatment combinations and each treatment is repeated 3 times.

Observational variables in this study include determination of chemical quality (β -carotene content, crude fiber content and reduced sugar content) and organoleptic tests (color, taste, aroma and *mouthfeel*). Determination of β -carotene levels using the spectrophotometer method (Oza *et al.*, 2008), *determination of crude fiber content using gravimetric methods* [9], determination of reduced sugar levels using the refractometry method with brix digital refractometer equipment [10], [11]. While the organoleptic test uses a favorability test / hedonic test including color, taste, aroma and *mouthfeel* [12]. This test used 25 panelists using 7 scales of favorability levels, namely 1 = very dislike, 2 = dislike, 3 = somewhat dislike, 4 = neutral, 5 = somewhat like, 6 = like and 7 = very like [13].

Parametric data obtained namely β -carotene content, crude fiber content, and reduced sugar content were tested based on parametric statistics using *one way anova*. Anova analysis using the SPSS program version 26. If the results of the analysis have a significant difference between treatments, then further tests are carried out using the BNT / BNJ / Duncan test at a confidence level of $\alpha = 95\%$ depending on the size of the diversity coefficient. The diversity coefficient $\leq 5\%$ uses the Smallest Real Difference Test (BNT), if the value is 5 – 10% using the Honest Real Difference Test (BNJ) and if $\geq 10\%$ using the Duncan Test.

Non-parametric data which include organoleptic tests consisting of color, taste, aroma and chewiness (*mouthfeel*) are tested based on the level of liking using the Kruskall Wallis test method. Determination of the best treatment is carried out using the Effectiveness test [14].

3 Results and Discussion

3.1 β -carotene Rate

The results of observations on the treatment of carrot extract types with different concentrations of carrot extract on the levels of beta-carotene of suction pudding are presented in the table below.

Table 1. Average Levels of Beta-Carotene (PPM) Pudding Suck with Carrot Extract Type Treatment with Different Carrot Extract Concentrations

Code Treatment	Treatment	Average Levels Beta-carotene (ppm)
F1A	Boiled carrot extract 7%	822.67
F1B	Boiled carrot extract 10%	872.67
F1C	Boiled carrot extract 13%	943.33
F2A	Fresh carrot extract 7%	956.67
F2B	Fresh carrot extract 10%	983.00
F2C	Fresh carrot extract 13%	1000.33

Lipo pudding with the addition of different types and concentrations of carrot extract contains β -carotene levels ranging from 822.67 to 1000.33 ppm. The lowest β -carotene levels were found in the F1A treatment, namely the treatment of adding boiled carrot extract at 7% concentration, while the highest β -carotene levels were found in the F2C treatment, which was the treatment of adding fresh carrot extract at 13% concentration. Table 4.3 shows that the more added boiled carrot extract, the higher the β -carotene content of suction pudding, as well as the addition of fresh carrot extract. At the same concentration of carrot extract, the suck pudding with the addition of fresh carrot extract contains higher levels of β -carotene. This is because when the process of blanching carotene is unstable at high temperatures which causes a decrease in β -carotene levels. According to [15][16], the higher the temperature, the increase in reaction rate will cause the total carotene produced to also be greater, but after reaching a certain point, the increase in temperature will actually damage the pigment itself and will reduce total carotene due to decomposition.

3.2 Crude Fiber Rate

The results of observations on the treatment of carrot extract types with different concentrations of carrot extract on the crude fiber content of suction pudding are presented in the table below.

Table 2. Average crude fiber content (%) in carrot extract lipo pudding

Treatment Code	Treatment	Rerata Kadar Serat Kasar (%)
F1A	Boiled carrot extract 7%	1.8900
F1B	Boiled carrot extract 10%	2.0133
F1C	Boiled carrot extract 13%	2.0667
F2A	Fresh carrot extract 7%	1.9467
F2B	Fresh carrot extract 10%	2.1000
F2C	Fresh carrot extract 13%	2.1400

Table 2 shows that suction pudding with the addition of different types and concentrations of carrot extract contains crude fiber content ranging from 1.89 to 2.14%. The lowest crude fiber content is found in F1A treatment, namely in the treatment of boiled carrot extract with 7% concentration, while the highest crude fiber content is found in F2C treatment, namely in the treatment of fresh carrot extract type with 13% concentration. Table 2 also illustrates that the same concentration of carrot extract, sucked pudding with the addition of fresh carrot extract contains higher crude fiber content but the crude fiber content produced is not significantly different from boiled carrot extract. At the concentration of carrot extract, the more the addition of boiled carrot extract, the crude fiber content of suction pudding is also higher, as well as the addition of fresh carrot extract. The results of this study are in accordance with the research of [5][17], namely the greater the addition of carrots, the greater the crude fiber content produced on carrot sticks.

3.3 Reduced Sugar Levels

The results of observations on the treatment of carrot extract types with different concentrations of carrot extract on the sugar content of lipo pudding reduction are presented in the table below.

Table 3. Average reduced sugar content (%) in carrot extract lipo pudding

Treatment Code	Treatment	Average Levels Sugar Reduction (%)
F1A	Boiled carrot extract 7%	13.43
F1B	Boiled carrot extract 10%	13.77
F1C	Boiled carrot extract 13%	14.57
F2A	Fresh carrot extract 7%	13.47
F2B	Fresh carrot extract 10%	14.37
F2C	Fresh carrot extract 13%	14.57

Lipo pudding with the addition of different types and concentrations of carrot extract contains reduced sugar levels ranging from 13.37% to 14.57%. The lowest reduction sugar content was found in the F1A treatment, which was the treatment of adding boiled carrot extract as much as 7%, while the highest reduction sugar content was found in the F1C and F2C treatment, which was the treatment of adding boiled and fresh carrot extract as much as 13%. Table 4.4 shows that the more added boiled carrot extract, the higher the sugar content of lipo pudding reduction, as well as the addition of fresh carrot extract. This is because carrots are one of the vegetables that have a sweet taste. According to [18][19], carrots have a total sugar content of 4.74 g / 100 g of ingredients so that the more added carrot extract, the higher the value of sugar content in pudding. This is in accordance with [20][21] research statement, (2018) that the addition of the highest carrots produces apple vinegar with the highest sugar content.

3.4 Organoleptic Test

3.4.1 Color

The average results of the favorability test for the color of the suction pudding with the addition of different types of carrot extract showed that different types and concentrations of carrot extract gave a favorability value for the color of the suction pudding ranging from 4.47-5.11 which means that the color of the suction pudding was considered neutral to somewhat liked by the panelists. The average histogram of the color color of the suction pudding with the addition of carrot extract types with different concentrations can be seen in Figure 1.

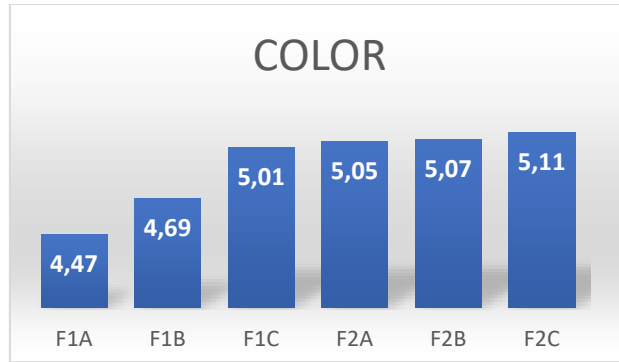


Figure 1. Histogram of Pudding Color Straw Carrot Extract

The histogram above shows that the FIA treatment (boiled carrot extract with a concentration of 7%) gives a value of 4.47 which means a neutral value by the panelists. The FIB treatment (boiled carrot extract with a concentration of 10%) gave a value of 4.69 which means a somewhat favored value by the panelists. The FIC treatment (boiled carrot extract with a concentration of 13%) gave a value of 5.01 which means a neutral value by the panelists. F2A (fresh carrot extract with a concentration of 7%) gave a value of 5.05 which means a neutral value by the panelists. The F2B treatment (fresh carrot extract with a concentration of 10%) gave a value of 5.07 which means a neutral value by the panelists. The F2C treatment (fresh carrot extract with a concentration of 13%) gave a value of 5.11 which means a neutral value by the panelists [22].

3.4.2 Flavor

The average results of the favorability test for the taste of suction pudding with the addition of different types of carrot extract showed that different types and concentrations of carrot extract gave a favorability value for the taste of suction pudding ranging from 4.63-5.09 which means that the color of the suck pudding was considered somewhat like by the panelists. The average histogram of the color color of the suction pudding with the addition of carrot extract types with different concentrations can be seen in Figure 2.

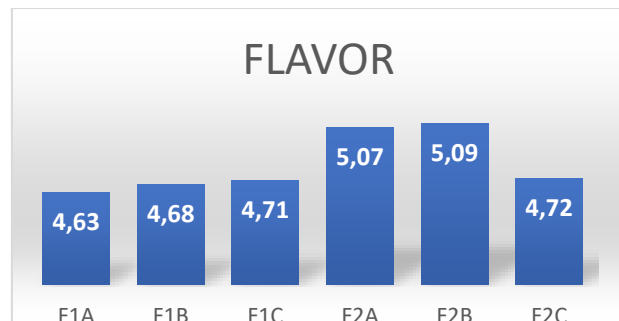


Figure 2. Histogram of pudding taste straw carrot extract

The histogram above shows that the FIA treatment (boiled carrot extract with a concentration of 7%) gives a value of 4.63 which means a neutral value by the panelists. The FIB treatment (boiled carrot extract with a concentration of 10%) gave a value of 4.68 which means a somewhat liked value by the panelists. The FIC treatment (boiled carrot extract with a concentration of 13%) gave a value of 4.71 which means a somewhat liked value by the panelists. F2A (fresh carrot extract with a concentration of 7%) gave a value of 5.07 which means a neutral value by the panelists. The F2B treatment (fresh carrot extract with a concentration of 10%) gave a value of 5.09 which means a somewhat liked value by the panelists. The F2C treatment (fresh carrot extract with a concentration of 13%) gave a value of 4.72 which means a somewhat liked value by the panelists.

3.4.3 Scents

The average results of the favorability test for the aroma of suction pudding with the addition of different types of carrot extract showed that different types and concentrations of carrot extract gave a favorability value for the aroma of suction pudding ranging from 4.48-4.71 which means that the aroma of suction pudding was considered neutral to somewhat like by the panelists. The average histogram of the aroma of suck pudding with the addition of carrot extract types with different concentrations can be seen in Figure 3.

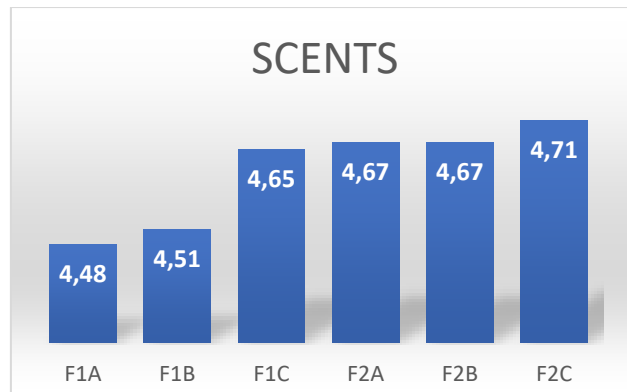


Figure 3. Histogram of the Aroma of Pudding Straw Extract of Carrot Cider

The histogram above shows that the F1A treatment (boiled carrot extract with a concentration of 7%) gave a value of 4.48 which means a neutral value by the panelists. The F1B treatment (boiled carrot extract with a concentration of 10%) gave a value of 4.51 which means a somewhat liked value by the panelists. The F1C treatment (boiled carrot extract with a concentration of 13%) gave a value of 4.65 which means a somewhat liked value by the panelists. F2A (fresh carrot extract with a concentration of 7%) gave a rating of 4.67 which means a somewhat liked value by the panelists. The F2B treatment (fresh carrot extract with a concentration of 10%) gave a value of 4.67 which means a somewhat liked value by the panelists. The F2C treatment (fresh carrot extract with a concentration of 13%) gave a value of 4.71 which means a somewhat liked value by the panelists

3.4.4 Mouthfeel

The average results of the favorability test for the chewiness of suction pudding with the addition of different types of carrot extract showed that different types and concentrations of carrot extract gave a favorability value for the chewiness of suction pudding ranging from 4.67-4.72 which means that the aroma of suction pudding was considered somewhat like by the panelists. The average histogram of the chewiness of suction pudding with the addition of different types of carrot extract can be seen in Figure 4.

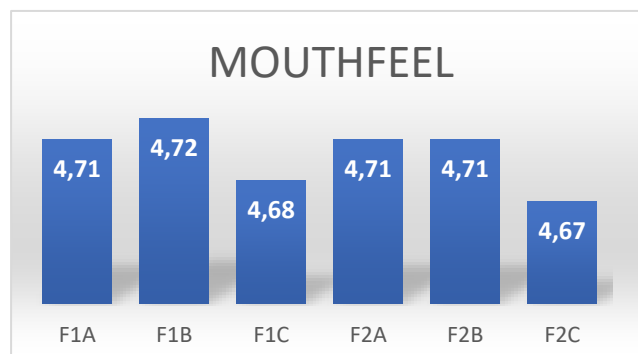


Figure 4. Histogram of Pudding's Pudding-Sucking Swortel Extract

The histogram above shows that the F1A treatment (boiled carrot extract with a concentration of 7%) gives a value of 4.71 which means a somewhat favored value by the panelists. The F1B treatment (boiled carrot extract with a concentration of 10%) gave a value of 4.72 which means a somewhat liked value by the panelists. The F1C treatment (boiled carrot extract with a concentration of 13%) gave a value of 4.68 which means a somewhat liked value by the panelists. F2A (fresh carrot extract with a concentration of 7%) gave a rating of 4.71 which means a somewhat liked value by the panelists. The F2B treatment (fresh carrot extract with a concentration of 10%) gave a value of 4.71 which means a somewhat liked value by the panelists. The F2C treatment (fresh carrot extract with a concentration of 13%) gave a value of 4.67 which means a somewhat liked value by the panelists[15][16].

3.5 Effectiveness Test

Based on the determination of effectiveness tests on all research parameters, it shows that F2B treatment (fresh carrot extract with a concentration of 10%) is the best treatment with a Yield Value (NH) of 0.87. The average value of the research parameter results can be seen in Table 4.

Table 4. Average Test of Effectiveness of Research Parameters

VARIABLE	TREATMENT					
	F1A	F1B	F1C	F2A	F2B	F2C
Up to β -carotene	0.00	0.06	0.13	0.15	0.18	0.20
Taste	0.00	0.02	0.03	0.16	0.17	0.03
Resilience	0.11	0.15	0.04	0.11	0.11	0.00
Fiber content	0.00	0.06	0.09	0.03	0.11	0.13
Up to gula	0.00	0.04	0.13	0.00	0.11	0.13
Color	0.00	0.04	0.10	0.11	0.11	0.12
Scents	0.00	0.01	0.08	0.09	0.09	0.11
TOTAL	0.11	0.38	0.61	0.65	0.87	0.72

The table above shows that the F2B treatment, namely suction pudding with the addition of fresh carrot extract with a concentration of 10%, is the best treatment with the highest Yield Value (NH) of 0.87. The criteria for the study parameters were β -carotene content = 983.0 ppm, crude fiber content = 2.1%, reduced sugar content = 14.37%, color = 5.05 (somewhat like), taste = 5.07 (somewhat like), aroma = 4.67 (somewhat like), and chewiness = 4.71 (somewhat like)

4 Conclusion

The results of research on different types and concentrations of carrot extracts on the chemical and organoleptic quality of pudding can be concluded that the interaction between carrot extract types and different carrot extract concentrations has no real effect on β -carotene levels, crude fiber levels and reduced sugar levels.

F2B treatment, namely suction pudding with the addition of fresh carrot extract concentration of 10%, is the best treatment with the highest Yield Value (NH) of 0.87, with research parameter criteria of β -carotene content = 983.0 ppm, crude fiber content = 2.1%, reduction sugar content = 14.37%, color = 5.05 (somewhat like), taste = 5.07 (somewhat like), aroma = 4.67 (somewhat like), chewiness = 4.71 (somewhat like).

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