BUKTI KORESPONDENSI

Judul Artikel	Effect of Kappa-Carrageenan Concentration on Physical Properties of Carrot Pineapple Velva
Jurnal/Prosiding	**International Food Conference (IFC 2021)** **E3S Web of Conferences** Vol. 344, 04006 (2022) (Prosiding Internasional, Terindex Scopus, SJR(2020): 0,24, H-Index: 28)
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Penulis korespondesi	Adrianus Rulianto Utomo
Alamat email koresponden	rulianto@ukwms.ac.id

No.	Perihal	Tanggal
1.	Bukti email penerimaan abstrak	9 Oktober 2021
2.	Bukti email undangan kehadiran	2 November 2021
3.	Bukti email pengiriman full paper	17 November 2021
4.	Bukti email review internal	26 November 2021
5.	Bukti email review external	20 Februari 2022
6.	Bukti email link prosiding	27 September 2022

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1.	Bukti email penerimaan abstrak	9 Oktober 2021

Gmail

Ir. T. Dwi Wibawa Budianta , MT. <tdwiwibawabudianta@ukwms.ac.id>

Fwd: Abstract Acceptance

1 pesan

Ir. A. Rulianto Utomo , MP. <rulianto@ukwms.ac.id> 11 Oktober 2022 14.27
Kepada: "Ir. T. Dwi Wibawa Budianta , MT." <tdwiwibawabudianta@ukwms.ac.id>

Yth. Pak Bowo

Bagian Per Bagian saya kirimkan penerimaan paper di E3S - terima kasih.

Salam,
Adrianus Rulianto Utomo
Fakultas Teknologi Pertanian - Universitas Katolik Widya Mandala Surabaya
Jalan Dinoyo 42-44 - Surabaya - 60265

---------- Forwarded message ---------
From: **International Food Conference 2021** <ifc@ukwms.ac.id>
Date: Sat, Oct 9, 2021 at 4:56 PM
Subject: Abstract Acceptance
To: <rulianto@ukwms.ac.id>

Dear Mr. Adrianus Rulianto
First of all, congratulations! Your abstract is accepted! Through this email, we would like to inform important information for the next step. in this email we also attach the letter of acceptance along with the guidelines books below and hopefully, these can help you. Lastly, we would like to inform you that October 13 is the due date for confirming your publication type (E3S, Food research, or IJFNPH)
Thank you and once again, congratulations!

Warm Regards,
IFC Organizing Committee
Widya Mandala Surabaya Catholic University

Whatsapp: +6281313187071
Website: http://ocs.wima.ac.id

2 lampiran

Guidelines IFC 2021 .pdf
6132K

Acceptance Letter IFC 2021_Adrianus Rulianto Utomo.pdf
374K

INTERNATIONAL FOOD CONFERENCE 2021
AGRICULTURAL TECHNOLOGY FACULTY
WIDYA MANDALA SURABAYA CATHOLIC UNIVERSITY
Jl. Dinoyo 42 – 44 Surabaya 60265

Surabaya, October 9th 2021

No. : 40/FTP-IFC/10/2021

Subject : 3rd Circular Abstract Acceptance

Adrianus Rulianto Utomo

Widya Mandala Surabaya Catholic University

Dear Adrianus Rulianto Utomo,

On behalf of the INTERNATIONAL FOOD CONFERENCE (IFC) 2021 Organizing Committee, we are pleased to inform you that your abstract entitled **Effect of Concentration and Type of Stabilizer on Physical Properties of Carrot Pineapple Velva** with **RDP-121** has been selected for the **POSTER** presentation at the IFC 2021, which will be held on November 3rd, 2021, as an online conference. Congratulations!
Please prepare your full paper with an appropriate template according to the type of publication you choose. Templates are available on link below:

- https://www.myfoodresearch.com/author-guidelines.html (Food Research Journal)
- https://wasd.org.uk/publications/journals/author/ (International Journal of Food, Nutrition, and Public Health)
- https://www.e3s-conferences.org/for-authors (E3S Proceeding, one column format)

If you choose to not publish your paper on those options, you don't have to submit your full paper.

We're kindly remind that there will be additional charge for your publication.

No.	Publication	Additional charge
1.	Food Research (Q3 Scopus-Indexed Journal)	USD 350
2.	International Journal of Food, Nutrition, and Public Health (Proquest-Indexed Journal)	USD 25
3.	E3S (Scopus-Indexed Proceeding)	IDR 1.800.000/ USD 125

Please submit the full paper online through website http://ocs.wima.ac.id/index.php/IFC2021/home by October 18th 2021 through your account (see attached IFC Guidelines page 25). Should there be any other information needed, feel free to reach out to us.

We are looking forward to meeting you at the conference.

Best regards,

Anita Maya Sutedja, PhD
Chair Person of Organizing Committee

Ir. Ignatius Srianta
Dean of Agriculture Technology
Widya Mandala Surabaya Catholic University
Surabaya, Indonesia

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2.	Bukti email undangan kehadiran	2 November 2021

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Gmail

Ir. T. Dwi Wibawa Budianta , MT. <tdwiwibawabudianta@ukwms.ac.id>

Fwd: IFC 2021 Invitation

1 pesan

Ir. A. Rulianto Utomo , MP. <rulianto@ukwms.ac.id> 11 Oktober 2022 14.29
Kepada: "Ir. T. Dwi Wibawa Budianta , MT." <tdwiwibawabudianta@ukwms.ac.id>

Yth. Pak Bowo

Bagian Per Bagian saya kirimkan penerimaan paper di E3S - terima kasih.

Salam,
Adrianus Rulianto Utomo
Fakultas Teknologi Pertanian - Universitas Katolik Widya Mandala Surabaya
Jalan Dinoyo 42-44 - Surabaya - 60265

---------- Forwarded message ---------
From: <ifc@ukwms.ac.id>
Date: Tue, Nov 2, 2021 at 4:45 PM
Subject: IFC 2021 Invitation
To: <rulianto@ukwms.ac.id>

Dear Adrianus Rulianto Utomo ,

As for the IFC 2021 event held on Wednesday, 3 November 2021, we would like to send you invitation letter and supporting file regarding conference.

The zoom link for the conference is
https://us02web.zoom.us/j/3684751482?pwd=Q1M3VnNuMURab1ZnWnpMRWkzVW5qUT09

The virtual background, IFC 2021 schedule, seminar guidelines, and conference program book can be accessed with this link:
https://drive.google.com/drive/folders/1aDB8viGkn6itlgqBOAkJMlHF-Iw3gIp1?usp=sharing
Please follow the seminar guidelines for the smoothly run event

For the certificate purpose, please fill in this link below before the 3rd of November 2021 at 1 p.m.
https://forms.gle/GipVQWLG7MLAbQrQ8

Thank you in advance for your consideration, we are looking forward to meeting you virtually at the upcoming conference.

Best regards,

IFC Organizing Committee

P-13_Invitation Letter For IFC 2021 Poster Participant.pdf
278K

INTERNATIONAL FOOD CONFERENCE 2021
AGRICULTURAL TECHNOLOGY FACULTY
WIDYA MANDALA SURABAYA CATHOLIC UNIVERSITY
Jl. Dinoyo 42 – 44 Surabaya 60265

Surabaya, 1 November 2021

No. : 81/FTP-IFC/10/2021

Subject : Invitation for attending IFC 2021

Dear Adrianus Rulianto Utomo,
Widya Mandala Surabaya Catholic University

On behalf of the INTERNATIONAL FOOD CONFERENCE (IFC) 2021 Organizing Committee, we formally invite you to attend the IFC 2021 event. The conference will take place on the 3rd of November 2021, **from 8 a.m. until 5 p.m. (Western Time of Indonesia, UTC+7).**

Please kindly click the link below to join Zoom of the conference:
https://us02web.zoom.us/j/3684751482?pwd=Q1M3VnNuMURab1ZnWnpMRWkzVW5qUT09
Meeting ID: 368 475 1482
Passcode: IFC2021

The virtual background, IFC 2021 schedule, seminar guidelines, and conference program book can be accessed with this link:
https://drive.google.com/drive/folders/1aDB8viGkn6itlgqBOAkJMlHF-Iw3gIp1?usp=sharing
Please follow the seminar guidelines for the smoothly run event

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https://forms.gle/GipVQWLG7MLAbQrQ8

Thanks for your consideration. We are looking forward to meeting you virtually at the conference.

Best regards,

Anita Maya Sutedja, PhD
Chair Person of Organizing Committee

Dr. Ignatius Srianta
Dean of Agriculture Technology
Widya Mandala Surabaya Catholic University
Surabaya, Indonesia

3.	Bukti email pengiriman full paper	17 November 2021

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Gmail

Ir. T. Dwi Wibawa Budianta , MT. <tdwiwibawabudianta@ukwms.ac.id>

Fwd: Full Paper IFC A Rulianto

1 pesan

Ir. A. Rulianto Utomo , MP. <rulianto@ukwms.ac.id> 11 Oktober 2022 14.31
Kepada: "Ir. T. Dwi Wibawa Budianta , MT." <tdwiwibawabudianta@ukwms.ac.id>

Yth. Pak Bowo

Bagian Per Bagian saya kirimkan penerimaan paper di E3S - terima kasih.

Salam,

Adrianus Rulianto Utomo
Fakultas Teknologi Pertanian - Universitas Katolik Widya Mandala Surabaya
Jalan Dinoyo 42-44 - Surabaya - 60265

---------- Forwarded message ---------
From: **Ir. A. Rulianto Utomo , MP.** <rulianto@ukwms.ac.id>
Date: Wed, Nov 17, 2021 at 12:40 PM
Subject: Full Paper IFC A Rulianto
To: International Food Conference 2021 <ifc@ukwms.ac.id>

Yth. Panitia IFC

Saya kirimkan Full Paper untuk publikasi di E3S

Terima Kasih,
Adrianus Rulianto Utomo
Fakultas Teknologi Pertanian - Universitas Katolik Widya Mandala Surabaya
Jalan Dinoyo 42-44 - Surabaya - 60265

Full Paper IFC_Adrianus Rulianto Utomo_17112021.docx
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Effect of Kappa-Carrageenan Concentration on Physical Properties of Carrot Pineapple Velva

Adrianus Rulianto Utomo[1*], *Tarsisius* Dwi Budianta[1], *Elisabeth* Fionna Evania Harianto[1], Gabriel Anastasia[1], Gracella Christian Widayu[1], Richard Alexander Wiradinata[2]

[1]Food Technology Study Program, Faculty of Agricultural Technology, Widya Mandala Surabaya Catholic University
[2]Master Program of Nutrition, Chung Shan Medical University, Taichung, Taiwan

Abstract Velva is a frozen food product similar to ice cream, but velva has lower fat content because it is not added fat from other ingredients. The advantages of velva are its high crude fiber and vitamin contents that come from fruits and vegetables. Pineapples, whose color is yellow, are chosen to produce velva. Yellow color is not considered because it is less attractive in making velva, so orange carrots are added to make it more attractive. A stabilizer is needed to produce velva products with appropriate characteristics such as smooth texture and hard-melted. One of the stabilizers that is often used is kappa-carrageenan. The research aimed to examine the effect of the various kappa-carrageenan concentration on the physicochemical properties (first drip, flow rate, color, and pH) of the carrot pineapple velva produced. Based on the results of the study, it was found that by using kappa-carrageenan with a concentration of 0.25%, 0.50%, 0.75% and 1% (w/w) produced the first drip at 132.67-420.83 seconds with flow rate 1.41-0.55 cm/seconds, color with parameters lightness 47.45-47.50, redness +9.97 - +10.52, yellowness +17.50 - +18.33, chroma 20.79-21.57, and °hue 58.39 – 60.73, and pH 4.53-4.59.

Keywords: Velva, Pineapples, Carrot, Kappa-Carrageenan

1. Introduction

Velva is a frozen food product similar to ice cream, but velva has lower fat content because it is not added fat from other ingredients. The advantages of Velva are its high crude fiber and vitamin contents that come from fruits and vegetables. Pineapples, whose color is yellow, are chosen to produce velva. However, yellow color is not considered because it is less attractive in making velva, so orange carrots are added to make it more appealing. A stabilizer is needed to produce velva products with appropriate characteristics such as smooth texture and hard-melted. One of the stabilizers that is often used is kappa-carrageenan.

The advantage of kappa-carrageenan is that it has the characteristics of affecting viscosity and uniformity, making it more stable, and it can bind and control moisture during the freezing process [1]. Kappa-carrageenan also has properties that do not affect the product's taste, are effective at low pH, and can be well dispersed [2].

The research aimed to examine the effect of kappa-carrageenan concentration on the physicochemical properties (flow rate, first drip, color, and pH) of the carrot pineapple velva produced. The concentration variations used were 0%, 0.25%, 0.50%, 0.75%, 1% (w/w).

[*]Corresponding author: rulianto@ukwms.ac.id

2. Methods

The experiment were conducted on September – November 2020 in Food Processing Technology Laboratory, Widya Mandala Surabaya Catholic University.

2.1 Raw Material

The ingredients used in the study consisted of honey pineapple, carrots, kappa carrageenan, sucrose sugar, and mineral water.

2.2 The Research Design

The research design used was a randomized block design (RBD) and four-factor levels, with six replications. The parameters tested are physicochemical test (first drip, melting power, flow rate, pH, and color). The data obtained were tested by ANOVA (Analysis of Variance) with $\alpha = 5\%$, the ANOVA results showed a significant effect between each treatment and continued with Duncan's Multiple Range Test (DMRT) with $\alpha = 5\%$ to determine which treatments were significantly different.

2.3 The Research Design

Table 1. Product Formulation

Material (g)	Treatment			
	C1	C2	C3	C4
Pineapple Juice	80	80	80	80
Carrot Juice	80	80	80	80
Water	40	40	40	40
Sugar	40	40	40	40
Kappa-Carrageenan	0,5	1.0	1.5	2.0

2.4 First Drip Analysis [3]

The first drip is the time at which the sample begins to melt or melt. The first drop test is carried out by recording the time of the first drop of the sample melt. A good sample is expected not to melt easily at room temperature.

2.5 Flow Rate Analysis [4]

The flow rate value is obtained from a distance traveled by the Velva dough to flow on a sloping glass plate per second with a sample weight of 15 grams and a glass plate tilt degree of 11.54 °

2.6 Color Analysis With Color Grab Application

Color testing is done using a color reader. The sample in the form of carrot pineapple Velva was placed in a plastic cup. The sample was placed on a black mat with the lid open, and color measurements were taken under a lamp. In this test, values were obtained in the form of L (lightness), a* (redness), b*(yellowness), C (chroma), H (degree of hue).

2.7 pH Analysis

pH testing is done using a portable pH meter.

3. Results And Discusscion

3.1 First Drip

The first drip is the time of the first drip in melting ice cream (frozen dessert). The constituent composition influences the first drip, the amount of air introduced, the nature of the ice crystals [5]. Based on the study results, the value of the first drip of carrot pineapple velva produced was in the range of 132.67-420.83 seconds. Based on the results of the ANOVA test (α=5%), it can be shown that there is a significant difference in the concentration of kappa-carrageenan used against the first drip on the carrot pineapple velva. Furthermore, the follow-up test results with DMRT (α =5%) showed that there was a significant difference between treatments.

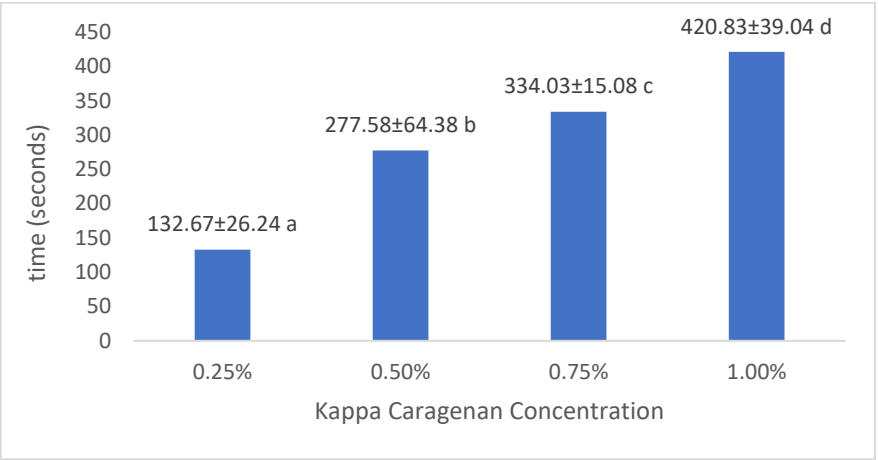

Fig.1 First Drip Analysis

The average of the first drips on the carrot pineapple velva showed an increase. At 0.25% kappa-carrageenan concentration, the lowest value of the first drip was 132.67 seconds. The low first drip time indicates that velva needs a faster time to melt at room temperature. While the concentration of kappa-carrageenan 1% has the highest value of the first drip of 420.83 seconds. This is because the higher concentration of stabilizer is used, the longer the time for the first drip on the valve. The first drip is affected by the size of the ice crystals formed during freezing associated with the recrystallization of ice. Kappa carrageenan works as a stabilizer that can control water by binding water during freezing. The increase in the first drip is caused by a decrease in the free water content bound by the stabilizer, which causes the size of the ice crystals formed during storage to be smaller so that it takes a longer time to melt [6].

3.2 Flow Rate Analysis

The flow rate is the distance traveled by a fluid divided by its time to travel that distance in cm/second [7]. Factors that can affect the flow rate are the viscosity of the solution, the degree of slope of the glass plate, the frictional force between the glass plate and the solution. The flow rate test was carried out using an inclined glass plate with a slope of 11.50°. Flow power has an inverse relationship with viscosity—the greater the flow rate, the lower the viscosity of the material. Based on the study results, the flow rate range was 1.41-0.55 (cm/second). Based on the results of the ANOVA test (α=5%), it can be shown that there

is a significant difference in the concentration of carrageenan to the flow rate in the carrot pineapple veins. Furthermore, the results of the follow-up test with DMRT (α=5%) show a significant difference between treatments.

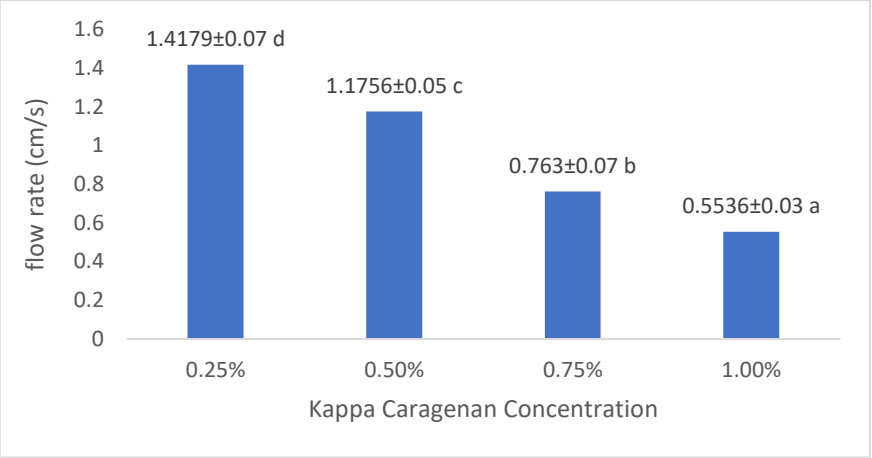

Fig. 2 Flow Rate Analysis

The average flow rate on the carrot pineapple valve showed that at a concentration of 0.25% kappa-carrageenan, the highest flow rate value was 1.4179 cm/second. While at a concentration of 1% kappa-carrageenan, the lowest flow rate was 0.5536 cm/second. The higher the concentration of kappa-carrageenan used, the lower the flow rate (slower). This is due to the nature of carrageenan which can form a gel and make the liquid thick. The thickening of the valve makes the valve take longer to flow across the glass surface of the inclined plate. The viscosity of the carrageenan solution is mainly due to the nature of carrageenan as a polyelectrolyte. The repulsion between the negative charges along the polymer chain, namely the sulfate groups, causes the molecular chain to stiffen. Due to its hydrophilic nature, the polymer is surrounded by water molecules that are mobilized, causing the carrageenan solution to become viscous [8]. Hydrocolloids can bind water and increase viscosity so that they can affect the quality of flowability [9]. This is also in line with the research conducted by Basito et al. [10] with the use of CMC and carrageenan stabilizer, the viscosity of the super red dragon fruit velva increased.

3.3 Color Analysis

Table 2. Color Analysis with Color Grab Application

Kappa Caragenan Concentration	Lightness	Redness (a^*)	Yellowness (b^*)	Chroma	^{o}Hue	Color
0.25 %	47.49±0.4	10.49±0.9	17.87±0.45	20.79±0.61	60.73±1.74	
0.50 %	47.5±1.24	10.51±0.59	18.33±0.23	21.2±0.2	60.65±1.03	
0.75 %	47.48±0.5	9.97±0.95	17.5±1.76	21.38±4.23	58.39±3.65	
1.00 %	47.45±1.06	10.52±0.69	18.23±1.26	21.57±0.91	60.08±3.21	

Color is used as an indicator in determining the quality of a product. The data from the ANOVA test (α=5%) showed that there was no significant difference between carrageenan concentration and carrot pineapple velva color.

3.3.1 Lightness

The brightness value states the level of brightness or brightness of a color. The value of the brightness range of the carrot pineapple velva is 47.45-47.50. Kappa-Carrageenan can bind water which causes the water content in the veins to decrease. With the decrease in the water content, the matrix molecules that make up the valve will be more tightly packed [11].

3.3.2 Redness (a^*)

The value of redness (a*) indicates the intensity or presence of red color in a product. The value of the redness velva of the pineapple carrot is 9.97-10.52. Redness in Velva products comes from the raw material used, namely carrots. Carrots have carotenoid pigments, which are a group of pigments that give orange, red and yellow colors [12]

3.3.3 Yellowness (b^*)

Yellowness value (b*) indicates the intensity or presence of yellow color in a product. The value of yellowness velva pineapple carrot is 17.50-18.33. The yellow color in Velva products comes from the raw material used, namely pineapple. Pineapple has carotenoid and xanthophyll pigments [13]. Carotenoid and xanthophyll pigments are orange-yellow pigments [12].

3.3.4 Chroma

The chroma value shows the intensity or color saturation of a product [7]. The greater the chroma value, the brighter the product will be, while the lower the chroma value, the color will fade. The value of the carrot pineapple chroma velva range is 20.79-21.57. The large concentration of carrageenan used causes a lot of kappa-carrageenan to immobilize the water so that the color of the veins becomes pale [14].

3.3.5 ^{o}Hue

The value of °hue indicates the dominant wavelength that determines the color of a material [15]. The value of ^{o}hue the carrot pineapple velva range is 58.39-60.73. If it is included in the color indication based on the ^{o}hue value, the carrot pineapple Velva product is included in the orange color category. The orange color comes from the raw materials used, namely carrots and pineapple. Each of these ingredients has carotenoid and xanthophyll pigments that can produce color so that when combined, they form an orange color.

3.4 pH Analysis

In Velva products, pH affects optimizing the ability of hydrocolloids to work, because each hydrocolloid has a certain pH condition to be able to work optimally. Based on the data from the ANOVA test (α=5%) it showed that there was no significant difference between kappa-carrageenan concentration and the pH of the carrot pineapple velva. These results indicate that there is no increase in pH as the concentration of kappa-carrageenan increases. This is because the hydrocolloid used has one of the properties that it does not affect the pH of the product. The optimal ability of kappa-carrageenan as a stabilizer is at pH > 4.3. Kappa-carrageenan solution will lose it is gelling and stabilizing properties at pH below 4.3. The cause is the occurrence of an autohydrolysis process that forms 3,6-Anhydro-D-galactose bonds [16] The results of the pH of the valve in the test obtained pH in acidic conditions caused by the velva-forming material in the form of pineapple which has a pH of about 4-5 [17].

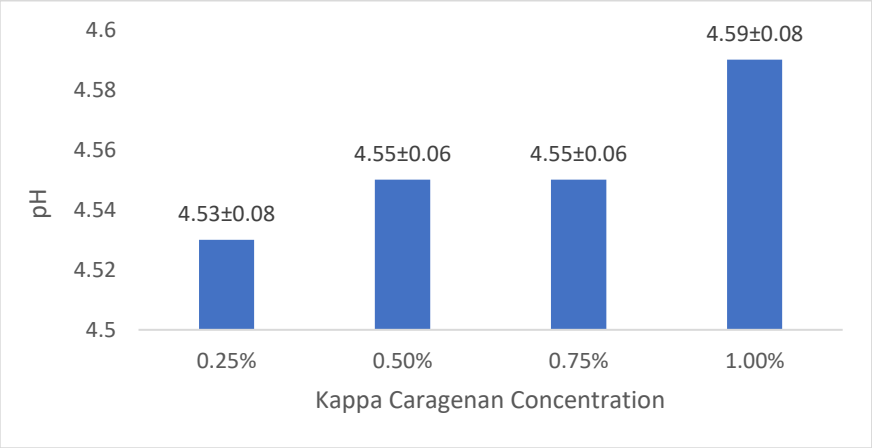

Fig. 3 pH Analysis

4. Conclusion

The difference in concentration of kappa-carrageenan has a significant effect on the physicochemical properties, including the first drip and flow rate. However, it does not have a substantial impact on color and pH. The increase in the concentration of kappa-carrageenan causes an increase in the first drip with a value range of 132.67-420.83 seconds but decreases the flow rate with a value range of 1.41-0.55 (cm/second). The color of the carrot pineapple velva includes lightness (L) of 47.45-47.50. Redness (*a) is 9.97-10.52. Yellowness (*b) is 17.50-18.3. Chroma (*c) is 20.79-21.57, and hue is 58.39-60.73. The pH produced by carrot pineapple velva ranged from 4.53-4.59.

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4.	Bukti email review internal	26 November 2021

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Ir. T. Dwi Wibawa Budianta , MT. <tdwiwibawabudianta@ukwms.ac.id>

Fwd: Review from external reviewer

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Ir. A. Rulianto Utomo , MP. <rulianto@ukwms.ac.id> 11 Oktober 2022 14.39
Kepada: "Ir. T. Dwi Wibawa Budianta , MT." <tdwiwibawabudianta@ukwms.ac.id>

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Salam,
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Jalan Dinoyo 42-44 - Surabaya - 60265

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From: **International Food Conference 2021** <ifc@ukwms.ac.id>
Date: Sun, Feb 20, 2022 at 9:58 PM
Subject: Review from external reviewer
To: Ir. A. Rulianto Utomo , MP. <rulianto@ukwms.ac.id>

Dear A. Rulianto Utomo,

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Thank you for your attention. We are looking forward to your response.

Warm regards,
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Author:	Adrianus Rulianto Utomo1*, Tarsisius Dwi Budianta1, Elisabeth Fionna Evania Harianto1, Gabriel Anastasia1, Gracella Christian Widayu1, Richard Alexander Wiradinata2
Title of manuscript:	Effect of Kappa-Carrageenan Concentration on Physical Properties of Carrot Pineapple Velva

No	**Section**	☑☒
1	Title	☑
2	Authors and affiliations	☑
3	Corresponding author's email	☑
4	Abstract (equal to or less than 200 words)	190
5	Keywords	☑
6	Introduction	☑
7	Materials and methods	☑
8	Results and discussion	☑
9	Conclusions	☑
10	References	☑
Remarks for section: All included		
No	**Formatting**	☑☒
1	Paper size 170x250 mm	☑
2	Margin (TBLR = 24-16-20-20 mm)	☑
3	One column format	☑
4	Font size according to the regulations for each section	☑
5	Font types (Arial for sections' title and TNR for body text)	☑
6	Spacing (single line spacing)	☑
7	Paragraphs (justified)	☑
8	Numbering of section, subsection, and subsubsection	☑
9	Figures and tables (captions and numbering, positioning)	☑
10	Equations and mathematics *(if any)*	N/A
11	Citations (sequential numbers in brackets)	☑
12	References' elements and style	☑
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Abstract:

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Results and Discussion [correct word '<u>discussion</u>' in manuscript]:

You need to highlight under this section: Any ‘scientific significance’ of your results. What impact these findings have. Who could benefits these reported results and what their utility.

Please include underneath this section a subheading in which you can outline any limitations [if any] or any strengths [if any] of your study. Perhaps you may need to reflect on nutritional values associated to consumption of velva as food product general.

5.	Bukti email review external	20 Februari 2022

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Fwd: Review from external reviewer

1 pesan

Ir. A. Rulianto Utomo , MP. <rulianto@ukwms.ac.id> 11 Oktober 2022 14.39
Kepada: "Ir. T. Dwi Wibawa Budianta , MT." <tdwiwibawabudianta@ukwms.ac.id>

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Jalan Dinoyo 42-44 - Surabaya - 60265

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Remarks for section: All included		
No	**Formatting**	☑☒
1	Paper size 170x250 mm	☑
2	Margin (TBLR = 24-16-20-20 mm)	☑
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4	Font size according to the regulations for each section	☑
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6	Spacing (single line spacing)	☑
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8	Numbering of section, subsection, and subsubsection	☑
9	Figures and tables (captions and numbering, positioning)	☑
10	Equations and mathematics *(if any)*	N/A
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Remarks for content:

Abstract:

Perhaps towards the end you may need to highlight the conclusion with few words on your own critical views.

Results and Discussion [correct word '<u>discussion</u>' in manuscript]:

You need to highlight under this section: Any ‘scientific significance’ of your results. What impact these findings have. Who could benefits these reported results and what their utility.

Please include underneath this section a subheading in which you can outline any limitations [if any] or any strengths [if any] of your study. Perhaps you may need to reflect on nutritional values associated to consumption of velva as food product general.

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6.	Bukti email link prosiding	27 September 2022

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Date: Wed, Sep 7, 2022 at 5:44 PM
Subject: E3S Proceeding Information
To: Ir. A. Rulianto Utomo , MP. <rulianto@ukwms.ac.id>

Dear, Ir. A. Rulianto Utomo, MP.

We are the committee of the International Food Conference (IFC) 2021, would like to inform you that your article has already published at E3S proceeding. You can access due this link:

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Congratulations.

Effect of Kappa-Carrageenan Concentration on Physical Properties of Carrot Pineapple Velva

Adrianus Rulianto Utomo[1*], *Tarsisius* Dwi Budianta[1], *Elisabeth* Fionna Evania Harianto[1], *Gabriel* Anastasia[1], *Gracella* Christian Widayu[1], *Richard* Alexander Wiradinata[2]

[1]Food Technology Study Program, Faculty of Agricultural Technology, Widya Mandala Surabaya Catholic University
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Abstract Velva is a frozen food product similar to ice cream, but velva has lower fat content. Velva contains high crude fiber and vitamin contents that come from fruits and vegetables. Pineapples and carrots were chosen as the main ingredients to produce velva. Yellow color from pineapple was found to be less attractive, so that the addition of orange color from carrots 77 make it more attractive. A stabilizer is needed to produce velva with appropriate characteristics such as smooth texture and hard-melted. The stabilizers used in this study was kappa-carrageenan. The research aimed to examine the effect of the various kappa-carrageenan concentration on the physicochemical properties (first drip, flow rate, color, and pH) of the carrot-pineapple velva. Based on the results of the study, it was found that by using kappa-carrageenan with a concentration of 0.25%, 0.50%, 0.75% and 1% (w/w) produced the first drip at 132.67 - 420.83 seconds with flow rate 1.41-0.55 cm/seconds, color with parameters lightness 47.45-47.50, redness +9.97 - +10.52, yellowness +17.50 - +18.33, chroma 20.79-21.57, and °hue 58.39 – 60.73, and pH 4.53-4.59. An increase in the concentration of kappa-carrageenan produces a thicker velva, so it is necessary to examine its organoleptic properties further.

Keywords: Velva, Pineapples, Carrot, Kappa-Carrageenan

1. Introduction

Velva is a frozen food product similar to ice cream, but velva has lower fat content. Velva contains high crude fiber and vitamin contents that come from fruits and vegetables. Pineapples and carrots were chosen as the main ingredients to produce velva. Yellow color from pineapple was found to be less attractive, so that the addition of orange color from carrots was proven to make it more attractive. A stabilizer is needed to produce velva with appropriate characteristics such as smooth texture and hard-melted. The stabilizers used in this study was kappa-carrageenan.

The addition of kappa-carrageenan affects viscosity and uniformity of velva, by making it more stable, can bind and control moisture during the freezing process [1]. Kappa-carrageenan also do not affect the product's taste, are effective at low pH, and can be well dispersed [2].

The research aimed to examine the effect of kappa-carrageenan concentration on the physicochemical properties (flow rate, first drip, color, and pH) of the carrot-pineapple velva produced. The concentration variations used were 0%, 0.25%, 0.50%, 0.75%, 1% (w/w).

*Corresponding author: rulianto@ukwms.ac.id

2. Methods

The experiment were conducted on September – November 2020 in Food Processing Technology Laboratory, Widya Mandala Surabaya Catholic University.

2.1 Raw Material

The ingredients used in the study were honey pineapple, carrots, kappa carrageenan, sugar, and mineral water.

2.2 The Research Design

A randomized block design (RBD) was used as the research design and four-factor levels, with six replications. The parameters tested were first drip, melting power, flow rate, pH, and color. The data obtained were tested by ANOVA (Analysis of Variance) with $\alpha = 5\%$, the ANOVA results showed a significant effect between each treatment and continued with Duncan's Multiple Range Test (DMRT) with $\alpha = 5\%$ to determine which treatments were significantly different.

2.3 The Research Design

Table 1. Product Formulation

Material (g)	Treatment			
	C1	C2	C3	C4
Pineapple Juice	80	80	80	80
Carrot Juice	80	80	80	80
Water	40	40	40	40
Sugar	40	40	40	40
Kappa-Carrageenan	0,5	1.0	1.5	2.0

2.4 First Drip Analysis [3]

The first drip is the time at which the sample begins to melt. The first drop test is carried out by recording the time of the first drop of the sample melt. A good sample is expected not to melt easily at room temperature.

2.5 Flow Rate Analysis [4]

The flow rate value was obtained from a distance traveled by the Velva dough to flow on a sloping glass plate per second with a sample weight of 15 grams and a glass plate tilt degree of 11.54 °

2.6 Color Analysis with Color Grab Application

Color testing was done using a color reader. The carrot-pineapple velva was placed in a plastic cup. The sample was placed on a black mat with the lid open, and color measurements were taken under a lamp. In this test, values were obtained in the form of L (lightness), a* (redness), b*(yellowness), C (chroma), H (degree of hue).

2.7 pH Analysis

pH testing is done using a portable pH meter.

3. Results and Discusscion

3.1 First Drip

The first drip is the time of the first drip in melting ice cream (frozen dessert). The constituent composition influences the first drip, the amount of air introduced, the nature of the ice crystals [5]. Based on the study results, the value of the first drip of carrot-pineapple velva produced was 132.67-420.83 seconds. Based on the results of the ANOVA test (α=5%), it can be shown that there was a significant difference in the concentration of kappa-carrageenan used against the first drip of carrot-pineapple velva. Furthermore, the DMRT (α =5%) test showed that there was a significant difference between treatments.

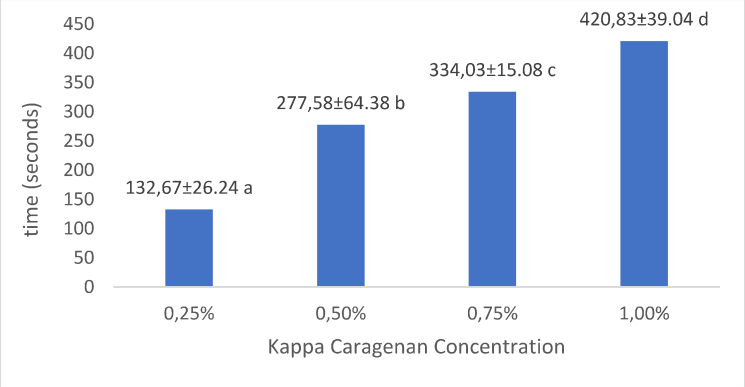

Fig.1 First Drip Analysis

The average of the first drips on the carrot-pineapple velva showed a significant increase. At 0.25% kappa-carrageenan concentration, the lowest value of the first drip was 132.67 seconds. The low first drip time indicates that the velva was easier to melt at room temperature. While the concentration of kappa-carrageenan 1% has the highest value of the first drip of 420.83 seconds. This results indicates the higher concentration of stabilizer used, the longer the time for the first drip on the velva. The first drip is affected by the size of the ice crystals formed during freezing associated with the recrystallization of ice. Kappa carrageenan works as a stabilizer that can control water by binding water during freezing. The increase in the first drip is caused by a decrease in the free water content bound by the stabilizer, which causes the size of the ice crystals formed during storage to be smaller so that it takes a longer time to melt [6].

3.2 Flow Rate Analysis

The flow rate is the distance traveled by a fluid divided by its time to travel the distance in cm/second [7]. Factors that can affect the flow rate are the viscosity of the solution, the degree of slope of the glass plate, the frictional force between the glass plate and the solution. The flow rate test was carried out using an inclined glass plate with a slope of 11.50°. Flow power has an inverse relationship with viscosity—the greater the flow rate, the lower the viscosity of the material. Based on the study results, the flow rate of carrot-pineapple velva was range from 1.41 to 0.55 (cm/second). Based on the results of the ANOVA test (α=5%), it can be shown that there is a significant difference in the

concentration of carrageenan to the flow rate in the carrot pineapple veins. Furthermore, the results of the DMRT (α=5%) test showed a significant difference between treatments.

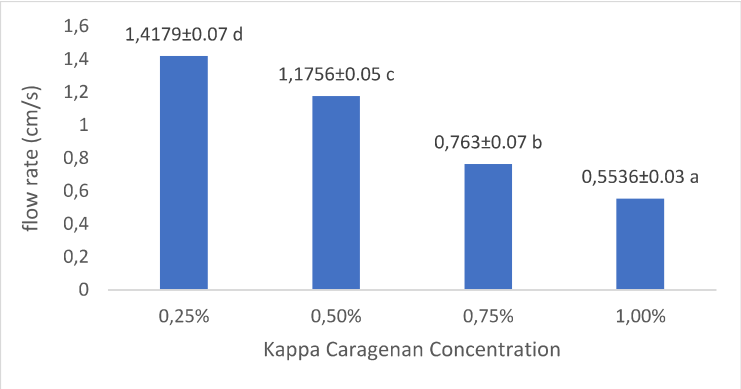

Fig. 2 Flow Rate Analysis

The average flow rate on the carrot pineapple valve showed that at a concentration of 0.25% kappa-carrageenan, the highest flow rate value was 1.4179 cm/second. While at a concentration of 1% kappa-carrageenan, the lowest flow rate was 0.5536 cm/second. The higher the concentration of kappa-carrageenan used, the lower the flow rate (slower). This results were caused by the characteristic of carrageenan which can form a gel and increase the thickness of liquid. The thickening of the valve makes the valve take longer to flow across the glass surface of the inclined plate. The viscosity of the carrageenan solution is mainly due to the characteristic of carrageenan as a polyelectrolyte. The repulsion between the negative charges along the polymer chain, namely the sulfate groups, causes the molecular chain to stiffen. Due to its hydrophilic nature, the polymer is surrounded by water molecules that are mobilized, causing the carrageenan solution to be more viscous [8]. Hydrocolloids can bind water and increase viscosity so that they can affect the quality of flowability [9]. Our results was also in line with the research conducted by Basito et al. [10] with the use of CMC and carrageenan stabilizer that increased the viscosity of the super red dragon fruit velva.

The best Velva qualities are its smooth texture and hard-melting character, so a stabilizer added to its manufacture. Increasing the concentration of kappa-carrageenan in the manufacture of carrot pineapple Velva has resulted in a product with a smooth texture and good durability in the melting process (the first drip is longer while the flow rate is slower). The results of this study can continue to obtain the best concentration to produce products that have organoleptic properties that are acceptable for consumers.

3.3 Color Analysis

Color is used as an indicator to determine the quality of a product. The data from the ANOVA test (α=5%) showed that there was no significant difference between carrageenan concentration and carrot-pineapple velva color. Pineapples and carrots were chosen as the main ingredients to produce velva. Yellow color from pineapple was found to be less attractive, so that the addition of orange color from carrots was proven to make it more attractive.

Table 2. Color Analysis with Color Grab Application

Kappa Caragenan Concentration	Lightness	Redness (a^*)	Yellowness (b^*)	Chroma	°Hue	Color
0.25 %	47.49±0.4	10.49±0.9	17.87±0.45	20.79±0.61	60.73±1.74	
0.50 %	47.5±1.24	10.51±0.59	18.33±0.23	21.2±0.2	60.65±1.03	
0.75 %	47.48±0.5	9.97±0.95	17.5±1.76	21.38±4.23	58.39±3.65	
1.00 %	47.45±1.06	10.52±0.69	18.23±1.26	21.57±0.91	60.08±3.21	

3.3.1 Lightness

The lightness value indicates the brightness level of carrot-pineapple velva. The value of the lightness range of the carrot pineapple velva was 47.45-47.50. Kappa-Carrageenan can bind water which causes the water content in the veins to decrease. With the decrease in the water content, the matrix molecules that make up the valve will be more tightly packed [11].

3.3.2 Redness (a^*)

The value of redness (a*) indicates the intensity or presence of red color in the product. The redness of carrot-pineapple velva was 9.97-10.52. Redness in Velva products comes from the raw material used, mainly carrots. Carrots have carotenoid pigments, which are a group of pigments that give orange, red and yellow colors [12]

3.3.3 Yellowness (b^*)

Yellowness value (b*) indicates the intensity or presence of yellow color in the product. The yellowness of carrot-pineapple velva was 17.50-18.33. The yellow color in Velva products comes from the raw material used, mainly pineapple. Pineapple has carotenoid and xanthophyll pigments [13]. Carotenoid and xanthophyll pigments are orange-yellow pigments [12].

3.3.4 Chroma

The chroma value shows the intensity or color saturation of the product [7]. The greater the chroma value, the brighter the product will be, while the lower the chroma value, the color will fade. The chroma of carrot-pineapple velva was ranged from 20.79 to 21.57. The large concentration of carrageenan used causes a lot of kappa-carrageenan to immobilize the water so that the color of the veins becomes pale [14].

3.3.5 °Hue

The value of °hue indicates the dominant wavelength that determines the color of a material [15]. The °hue of carrot-pineapple velva was ranged from 58.39 to 60.73. If it is included in the color indication based on the °hue value, the carrot pineapple Velva product is included in the orange color category. The orange color was caused by the carrots and pineapple. Each of these ingredients has carotenoid and xanthophyll pigments that can produce orange color.

3.4 pH Analysis

In Velva products, pH affects the ability of hydrocolloids to work, because each hydrocolloid has a certain pH condition to work optimally. Based on the data from the ANOVA test (α=5%) it showed that there was no significant difference between kappa-

carrageenan concentration and the pH of the carrot-pineapple velva. These results indicate that there is no increase in pH as the concentration of kappa-carrageenan increases. This is because the hydrocolloid used has one of the properties that did not affect the pH of the product. The optimal ability of kappa-carrageenan as a stabilizer is at pH lower than 4.3. Kappa-carrageenan solution might lose its gelling and stabilizing properties at pH below 4.3. The cause is the occurrence of an autohydrolysis process that forms 3,6-Anhydro-D-galactose bonds [16]. The results of the pH of the velva in the test obtained pH in acidic conditions caused by the velva-forming material in the form of pineapple which has a pH of about 4-5 [17].

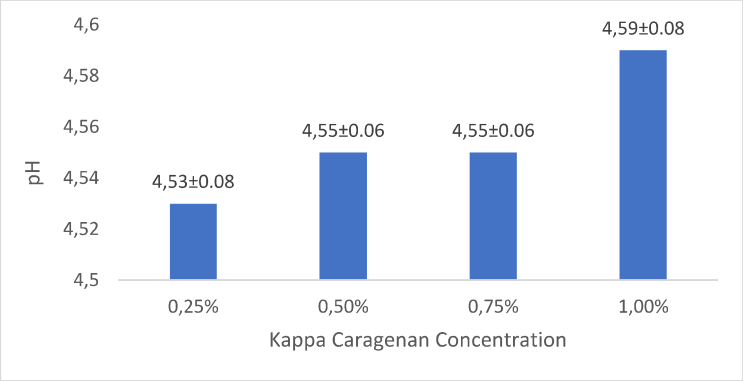

Fig. 3 pH Analysis

4. Conclusion

The difference in concentration of kappa-carrageenan has a significant effect on the physicochemical properties, including the first drip and flow rate. However, it did not have a substantial impact on color and pH. The increase in the concentration of kappa-carrageenan caused an increase in the first drip with a value range of 132.67-420.83 seconds but decreases the flow rate with a value range of 1.41-0.55 (cm/second). The color of the carrot-pineapple velva includes lightness (L) of 47.45-47.50. Redness (*a) is 9.97-10.52. Yellowness (*b) is 17.50-18.3. Chroma (*c) is 20.79-21.57, and hue is 58.39-60.73. The pH produced by carrot-pineapple velva ranged from 4.53-4.59.

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