

**Fakultas Teknologi Pertanian**  
**Program Studi Teknologi Pangan**

Gedung Fransiskus Asisi - Kampus 2 BSB  
Jl. Rm. Hadisoebeno Sosro Wardoyo, Jatibarang,  
Kec. Mijen, Kota Semarang, Jawa Tengah 50212  
Email : tu.ftp@unika.ac.id http://www.unika.ac.id



**SURAT TUGAS**

Nomor : 00705/B.7.7/ST.FTP/02/2023

Dekan Fakultas Teknologi Pertanian Universitas Katolik Soegijapranata, Semarang dengan ini memberikan tugas kepada:

- Nama : **Dr. Victoria Kristina Ananingsih, S.T., M.Sc.**
- Status : Dosen Universitas Katolik Soegijapranata
- Tugas : Penyaji makalah dalam 4th International Conference on Food Science and Engineering, berjudul: Formulation of Low-Calorie Roselle Syrup Using Sorbitol and Carboxymethyl Cellulose
- Waktu : 11 – 12 Oktober 2022
- Tempat : Universitas Negeri Sebelas Maret (online)
- Lain-lain : -

Harap melaksanakan tugas dengan sebaik-baiknya dan penuh tanggung jawab, serta memberikan laporan setelah selesai melaksanakan tugas.

Semarang, 27 Februari 2023

Dekan Fakultas Teknologi Pertanian,



**Dr. Dra. Laksmi Hartajanie, MP.**  
NPP 058.1.2012.281





# CERTIFICATE

079/Pre/UNS/ICFSE/10/2022

THIS CERTIFICATE IS PRESENTED TO:

**Victoria Kristina Ananingsih**

FOR PARTICIPATING AS

**ORAL PRESENTER**

IN THE 4<sup>th</sup> INTERNATIONAL CONFERENCE ON FOOD SCIENCE AND ENGINEERING (ICFSE) 2022  
ORGANIZED BY DEPARTMENT OF FOOD SCIENCE AND TECHNOLOGY,  
FACULTY OF AGRICULTURE, UNIVERSITAS SEBELAS MARET  
OCTOBER 11-12, 2022  
SURAKARTA, CENTRAL JAVA, INDONESIA



Faculty of Agriculture  
Dean

Prof. Dr. Ir. Samanhudi, S.P., M.Si., IPM, ASEAN Eng.

Chairman



Dr. Dimas Rahadian A. M., S.T.P., M.Sc.



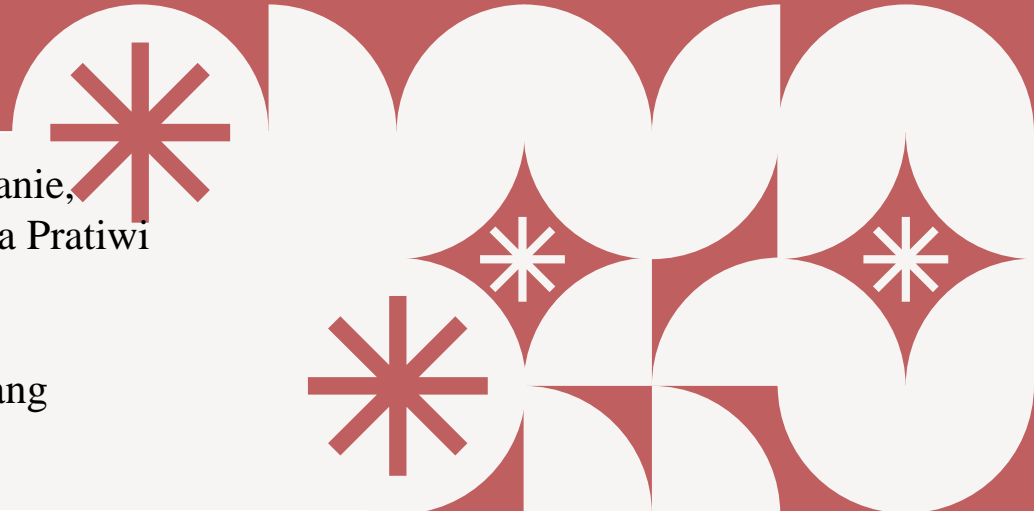
# Formulation of Low-Calorie Roselle Syrup (*Hibiscus sabdariffa* L.) Using Sorbitol and Carboxymethyl Cellulose



Victoria Kristina Ananingsih, Laksmi Hartajanie,  
Felicia Connie, Bernadeta Soedarini, Alberta Rika Pratiwi

Food Technology Department,  
Soegijapranata Catholic University, Semarang

ICFSE, 11-12 October 2022





**.1** Introduction \_\_\_\_\_

**.2** Methods \_\_\_\_\_

**.3** Results and Discussion \_\_\_\_\_

**.4** Conclusions \_\_\_\_\_

# Background

Sugar



Dental caries  
Obesity  
**Diabetic  
diseases**



Syrup

**Diabetes can be triggered due to:**

→ a lack of physical activity

→ an unattended diet, such consuming sugary foods & drinks



### **Rosella petals**

→ antidiabetic

→ contains a lot of antioxidants


### **Sodium Carboxymethyl Cellulose**

Thickeners & stabilizer ←





# Purposes

- To determine the effect of thickener concentration levels on physical, chemical, and sensory characteristics of rosella syrup
  - To determine the best formulation of rosella syrup based on sensory characteristics
- 

# Formulation of Rosella Syrup



Ingredients	F1	F2	F3	F4
Water (g)	125	125	125	125
Sorbitol (g)	125	125	125	125
<b>CMC (%)</b>	<b>0</b>	<b>0,5</b>	<b>1</b>	<b>1,5</b>
Salt (g )	0,125	0,125	0,125	0,125
Rosella flower (g)	50	50	50	50





# Syrup making process



Fresh rosella petals are obtained



Heated to a temperature 100°C



Stirred for 15 minutes



Filtering



Rosella syrup



Put in the bottles

# Physicochemical Analyses



**Total Dissolved Solid**



**Digital refractometer**

**Colour intensity**



**Chromameter**

**Viscosity**



**Viscometer brookfield**

# Physicochemical Analyses



**pH value**



**pH meter**

**Antioxidant Activity**

**DPPH Method**

**Glucose Level**

**Phenol-sulfuric acid  
method**

# Sensorical Analyss

---

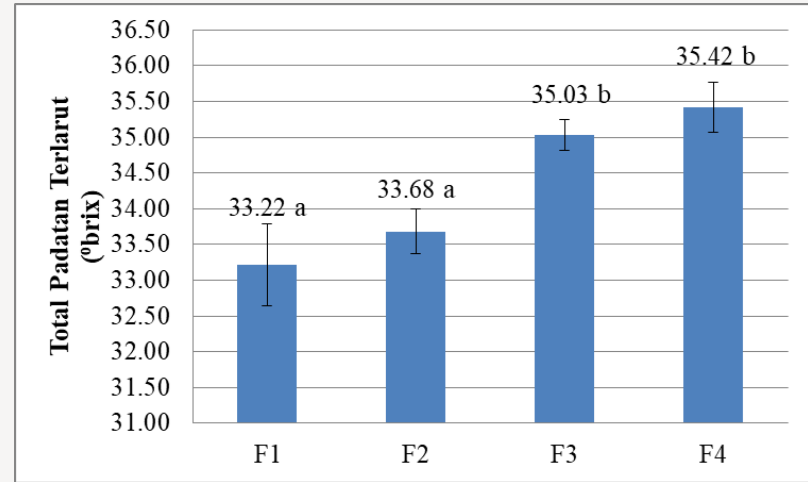
- Panelists : 30 people
- **Descriptive Test**
  - Attribut: color, aroma, sweetness, sour taste, and bitter aftertaste
  - *5-point rating scale*
- **Hedonic Test**
  - *overall score*
  - *4-point rating scale*



# Total Dissolved \* Solid

The caused of the increase in TDS:

- CMC is a polysaccharide with a hydroxyl group (OH), so it can bind to components more strongly and cause the syrup to stabilize. It increases the total dissolved solids in the syrup and the concentration of thickeners (Fahrul *et al.*, 2020)
- Rosella flowers contain several organic acids, such as citric acid and malic acid, which can dissolve, thus increasing the total dissolved solids (Yuniati *et al.*, 2021).



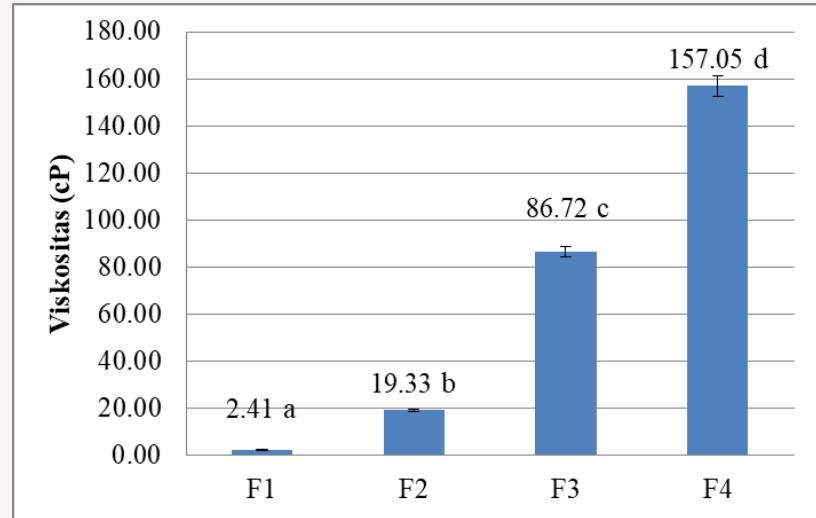
CMC ↑ ↑ Total Dissolved Solid

- In addition, sorbitol can also increase the concentration of soluble material, it is because sorbitol is hydrophilic and contains a hydroxyl group (OH) that can bind free water so that the soluble components increase the viscosity of a solution (Suryadri *et al.*, 2020)

# Viscosity\*

The caused of the increase in Viscosity:

- CMC is hydrophilic and can form crosslinks with solvent molecules to form a structure that is increasingly viscous to rigid (Kamal, 2010).
- There is an interaction between CMC and water, where sodium ( $\text{Na}^+$ ) in water will be released and replaced by hydrogen ( $\text{H}^+$ ), thus forming HCMC and resulting in increased viscosity (Bochek et al., 2002).

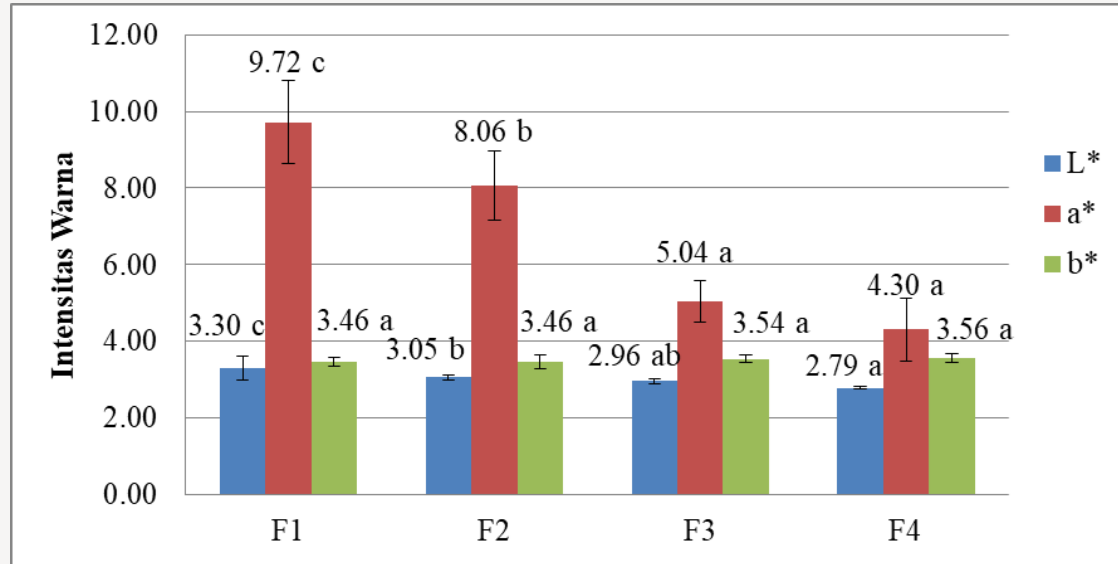


CMC



Viscosity

# Colour Intensity\*



CMC



L\*  
a\* value

# Colour Intensity\*

The caused of the decrease in colour intensity:

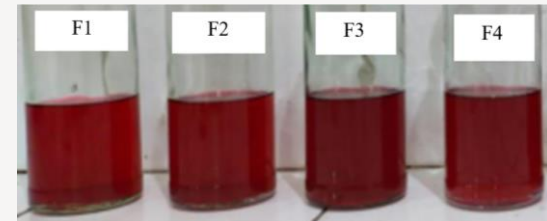
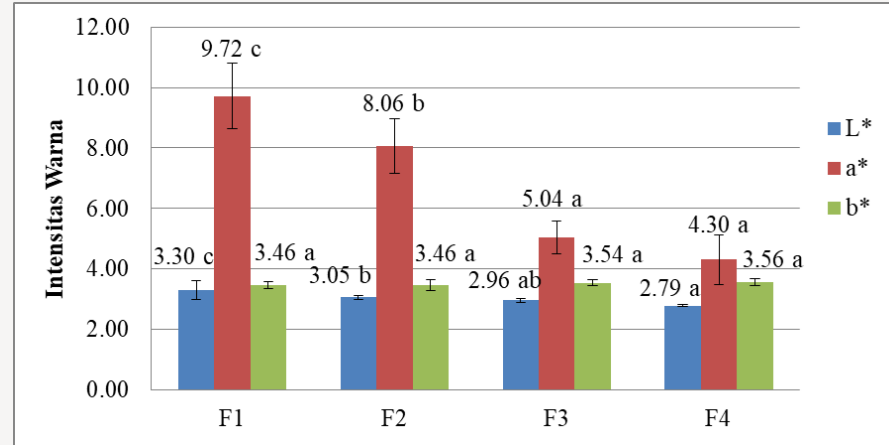
- L\* (*lightness*)

→ sugar (glucose) content contained in CMC when there is heating, then caramelization will occur, causing the color of the sample to get darker or cloudier. (Deviarni dan Warastuti, 2017)

- a\* value (*redness*)

→ The red color in rosella syrup is caused by anthocyanins in roselle, which are water-soluble pigments (Amperawati *et al.*, 2019)

→ In addition, CMC works as a thickener that can bind various components, one of which is anthocyanins (Fahrul *et al.*, 2020)

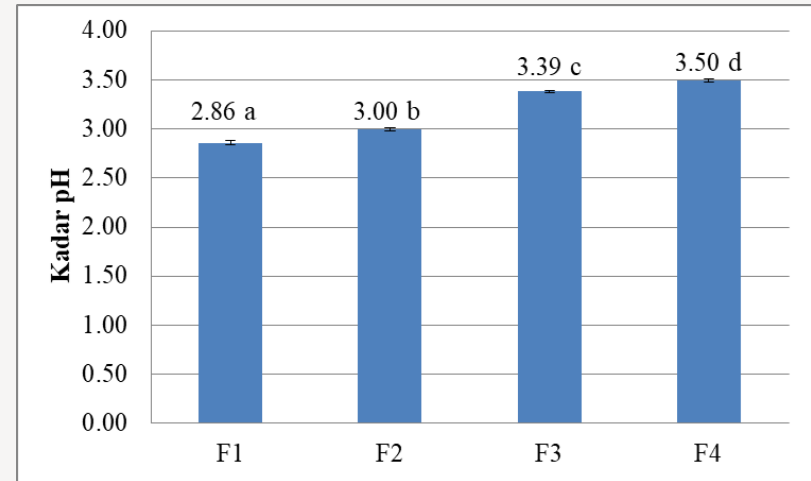




# pH value\*

The caused of the increase in pH value:

- The increase in pH is due to CMC thickeners, where CMC processing is made through the alkalization and esterification stages, so it is alkaline (Latif et al., 2007).
- In addition, CMC also contains hydrocolloids that have a carboxyl group that is easily hydrolyzed to cause an increase in the pH value (Manoi, 2006).



CMC



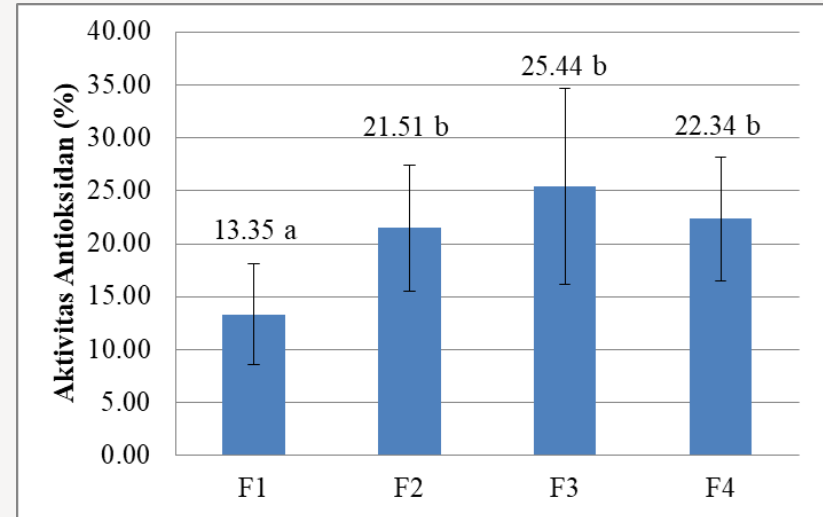
pH value

# Antioxidant\* Activity

The test results showed increasing of antioxidant

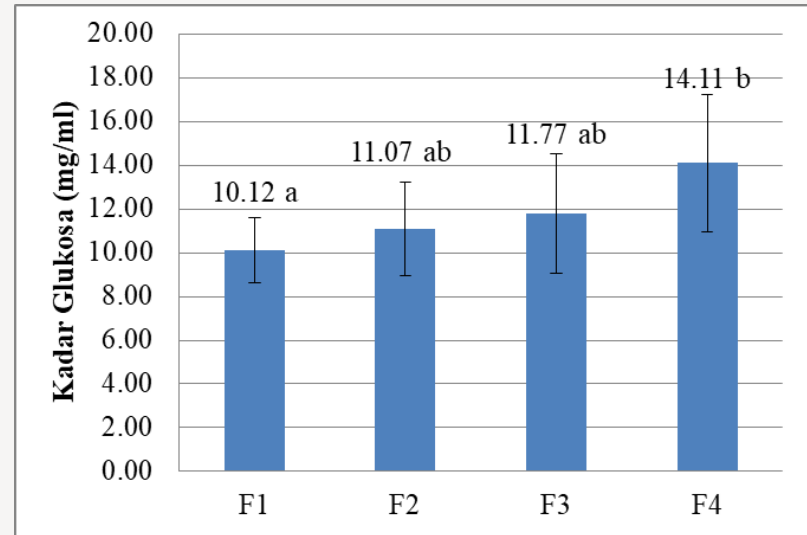
→ This indicates that using CMC thickeners can bind antioxidant compounds because CMC has a hydroxyl group, so the addition of CMC can bind components more strongly (Fahrul et al., 2020).

→ The stability of anthocyanins is related to several double bonds on their chemical structure that can be degraded through extraction, processing, and storage processes (Fernandes *et al.*, 2014)



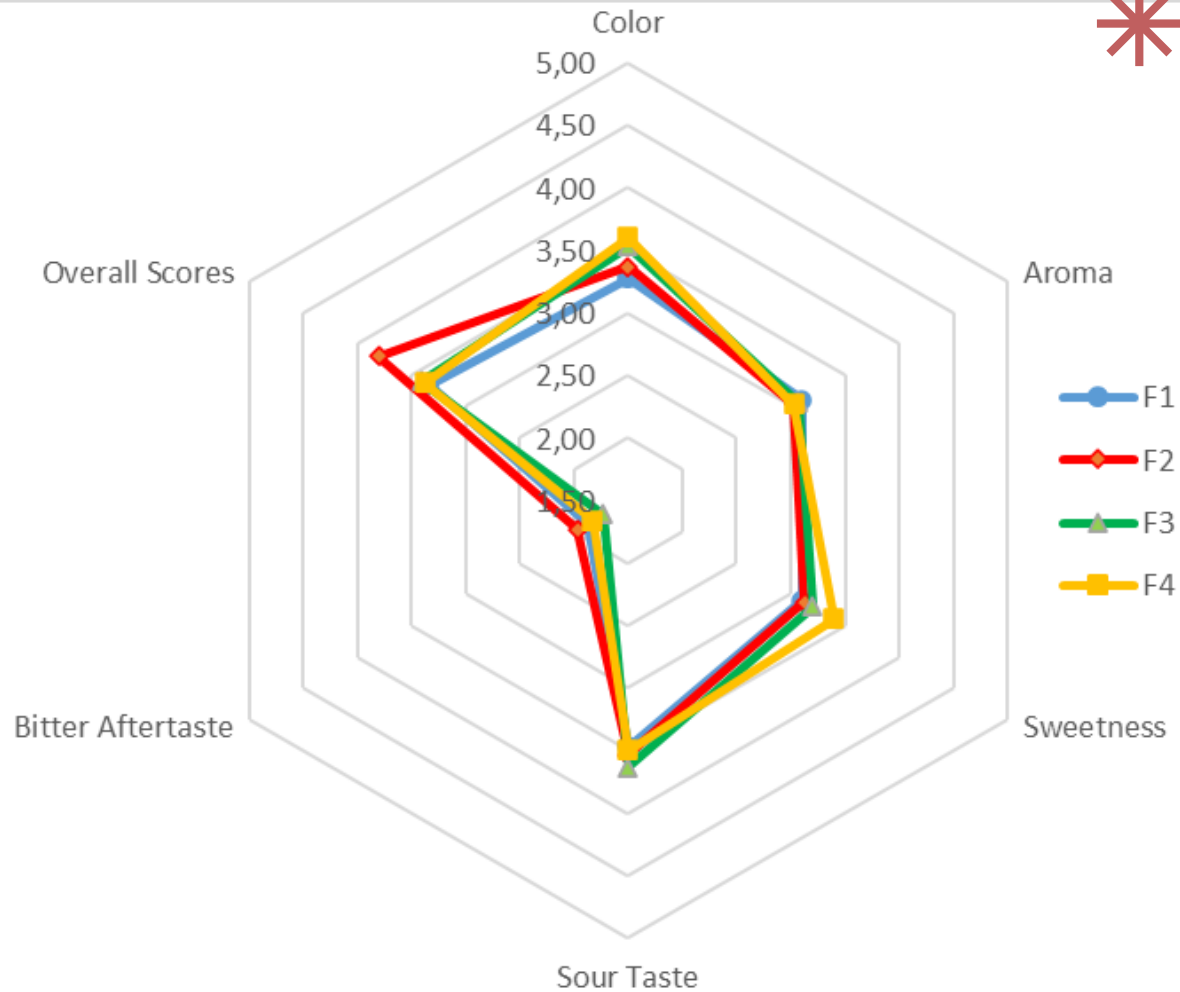
# Glucose Level \*

- The glucose levels of all samples showed no significant difference
- However there was an increase in glucose levels along with the addition of CMC
  - CMC which has a polymer chain structure consisting of cellulose molecular units and has many glucose components, so that it can increase glucose levels in rosella syrup (Rahmaningtyas et al., 2016).
  - In addition, the presence of sorbitol as a sweetener does not contribute glucose in syrup (Suseno *et al.*, 2008)





# Sensorical Analysis



# \* Sensorical Analysis

## Overall Scores

	Overall Scores
F1	<b>3,34 ± 1,20<sup>a</sup></b>
F2	<b>3,80 ± 0,80<sup>ab</sup></b>
F3	<b>3,41 ± 0,80<sup>a</sup></b>
F4	<b>3,38 ± 1,19<sup>a</sup></b>

- Overall, the panelist assesses the overall attributes
- In the results obtained, it is known that the F2 sample, namely rosella syrup with the addition of a CMC thickener of 0.5%, produced the highest average value

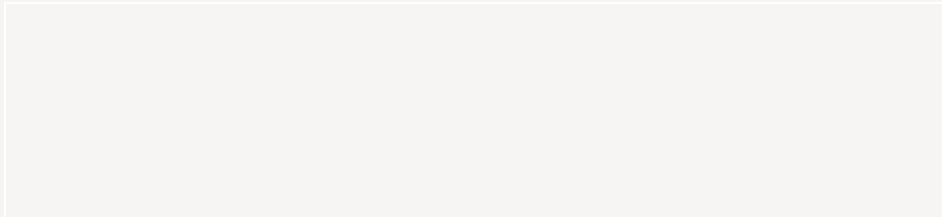
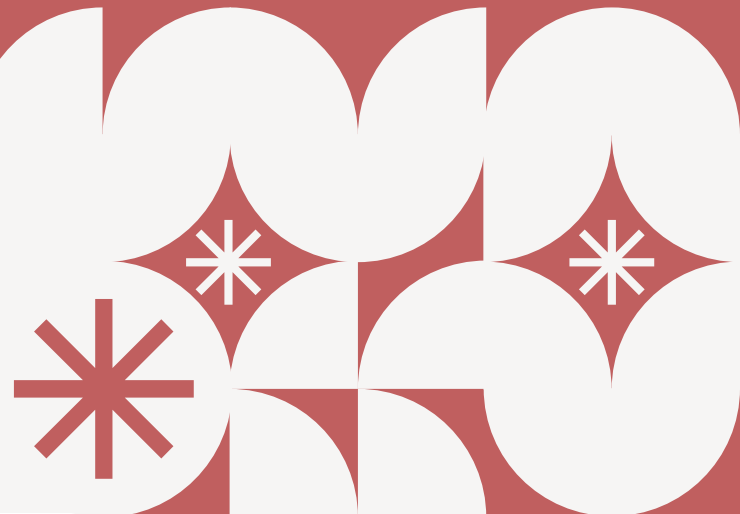


# Conclusions


- The effect of CMC thickeners on the physical and chemical characteristics of rosella syrup is an increase in total dissolved solids, viscosity, pH value and glucose levels. Still, it lowers the brightness and redness levels of rosella syrup.
- Descriptive sensory tests show that rosella syrup has a slightly red color, a slightly smelled rosella aroma, a slightly sweet, slightly sour taste, and no bitter taste.
- Rosella syrup with the addition of a CMC thickener of 0.5% is the best formulation based on sensory tests (overalls) with an average value of  $3.07 \pm 0.64$  (likes) and antioxidant activity of  $21.51 \pm 5.95\%$ .

Thank you\*

---



<https://icfse.uns.ac.id/fourth-conference>




HOME CALL FOR PAPERS SUBMISSION DETAILS **COMMITTEES** CONTACT PAST CONFERENCE

# STEERING COMMITTEE

*Committee of ICFSE*

## STEERING COMMITTEE

1. Prof. Dr. Ir. Samanhuri, S.P., M.P.
2. Dinar Praseptianga, S.T.P., M.Sc., Ph.D.
3. M. Zhukhuruf Zaman, S.P., M.Sc., Ph.D



HOME CALL FOR PAPERS SUBMISSION DETAILS **COMMITTEES** CONTACT PAST CONFERENCE

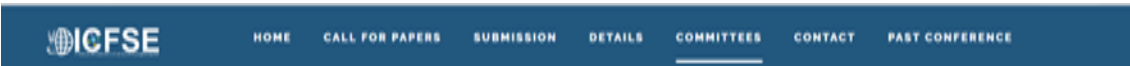
# ORGANIZING COMMITTEE

*Committee of ICFSE*

## ORGANIZING COMMITTEE

### Chairman

- Dr. Ir. Dimas Rahadian Aji Muhammad, S.T.P., M.Sc.



HOME CALL FOR PAPERS SUBMISSION DETAILS **COMMITTEES** CONTACT PAST CONFERENCE

### Co-Chairman

- Dr. Ir. Achmad Ridwan Ariyantoro, S.T.P., M.Sc.

### Secretary

- Siswanti, S.T.P., M.Sc.
- Rahmania Nur Arifah, S.Pi., M.Sc.

### Treasurer

- Ardhea Mustika Sari, S.T.P., M.Sc.
- Dewi Ambarsari, S.H.

### Scientific Division

- Anastriyani Yulviatun S.T.P., M.Sc.
- Prakoso Adi, S.T.P., M.Sc.
- Rizky Brisha Nuary, S.T.P., M.Sc.

### IT and Logistic Division

- Adhitya Pitara Sanjaya, S.T.P., M.Sc.



# ADVISORY BOARD

*Committee of ICFSE 2020*

## ADVISORY BOARD

---

1. Prof. Dr. Jamal Wiwoho, S.H., M.Hum. – Universitas Sebelas Maret (UNS), Indonesia
2. Prof. Dr. Ir. Ahmad Yunus, M.S. – Universitas Sebelas Maret (UNS), Indonesia
3. Prof. Dr. Okid Parama Astirin – Universitas Sebelas Maret (UNS), Indonesia
4. Prof. Dr. Syamsul Hadi – Universitas Sebelas Maret (UNS), Indonesia