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**Program Studi Teknologi Pangan**

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**SURAT TUGAS**

Nomor : 00706/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: *Microencapsulation of Andrographis paniculata extract using crystallizer at a different agitation speed.*
- 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

061/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.

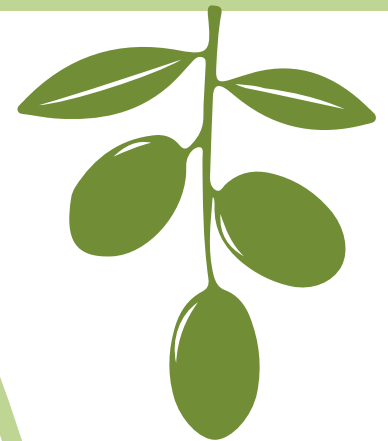
# Microencapsulation of Sambiloto (*Andrographis paniculate*) extract using crystallizer at a different agitation speed.



Victoria Kristina Ananingsih,  
Cynthia Andriani, Paulus Advent  
Satya Nugraha

Food Technology Department,  
Soegijapranata Catholic  
University

ICFSE, 11-12 October 2022



# Background

**Sambiloto contain high antioxidant : functional drink**

**Sambiloto contributes a bitter taste**

**Increasing trend of functional food**

**Consumption of high antioxidant food to enhance immunity**







# BACKGROUND

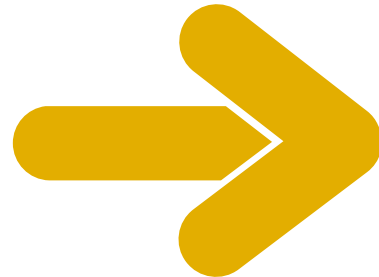
## Sambiloto (*Andrographis paniculata*) Leave



reduce the risk of viral infections by enhance the body's immune system response.



Contains *andrografolide* and *flavonoid*



act as an antioxidant, immunostimulant, anti diabetes



known as "*the king of bitters*" (*andrografolide*)



# CRYSTALLIZATION

- Microencapsulation is conducted using crystallization method
- The process of forming particles of solid substances (crystals) in a saturated solution using crystallizer
- Processed through heating the extract with the addition of granulated sugar until thickened and crystals form
- Granulated sugar as a filler, gives a sweet taste, accelerates crystallization, and is a preservative



To determine the effect of :

- agitation speed of crystallizer
  - addition of Sambiloto (*Andrographis paniculate*) extract
- on the physicochemical characteristics of microencapsulated powder



**Research Aims**





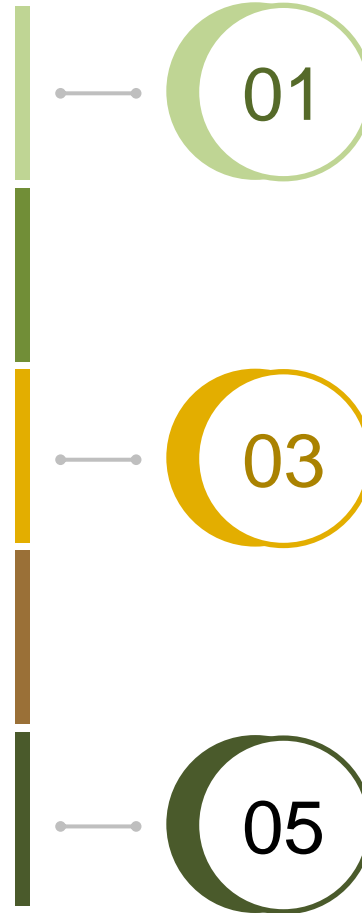
# Methods



**Crystallization for  
making instant  
powder drink**



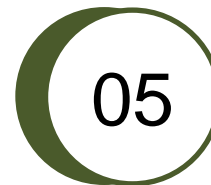
**Physicochemical  
analyses**



**Extraction: ginger,  
sambiloto**



**Sieving the powder**

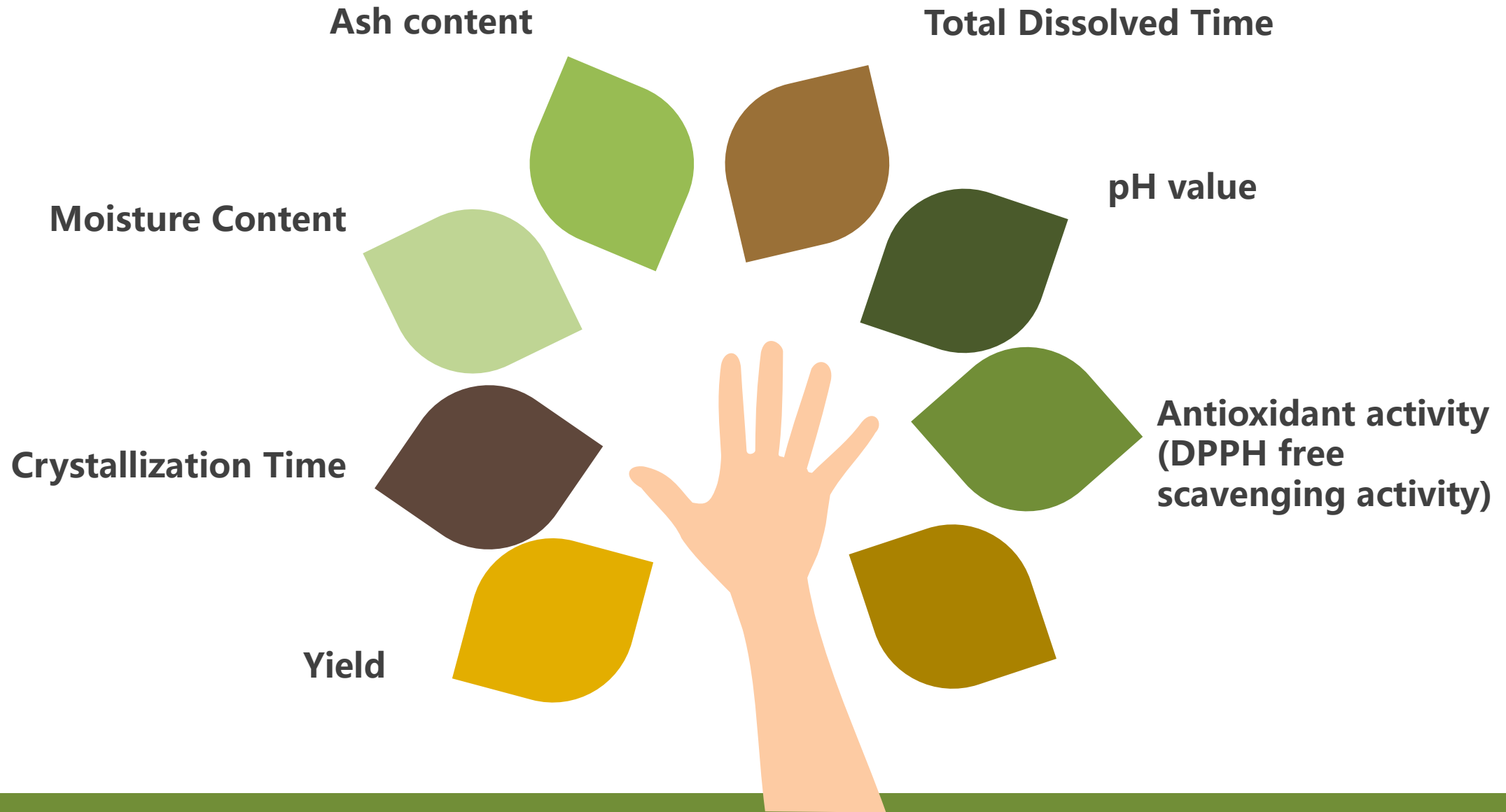


**Data analyses**





# Physicochemical Analysis



# SAMBILOLO INSTANT POWDER DRINK

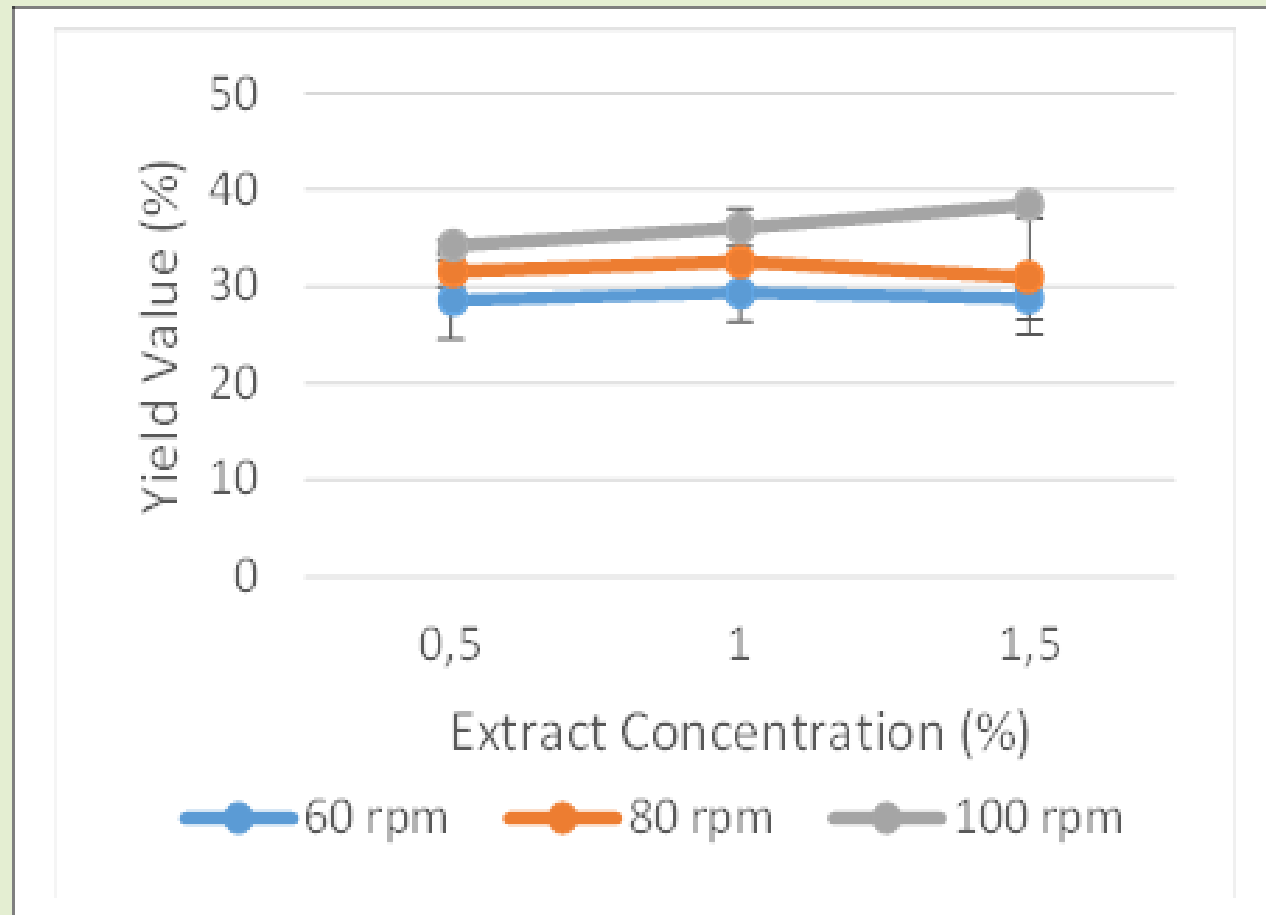


**60 rpm**

**80 rpm**

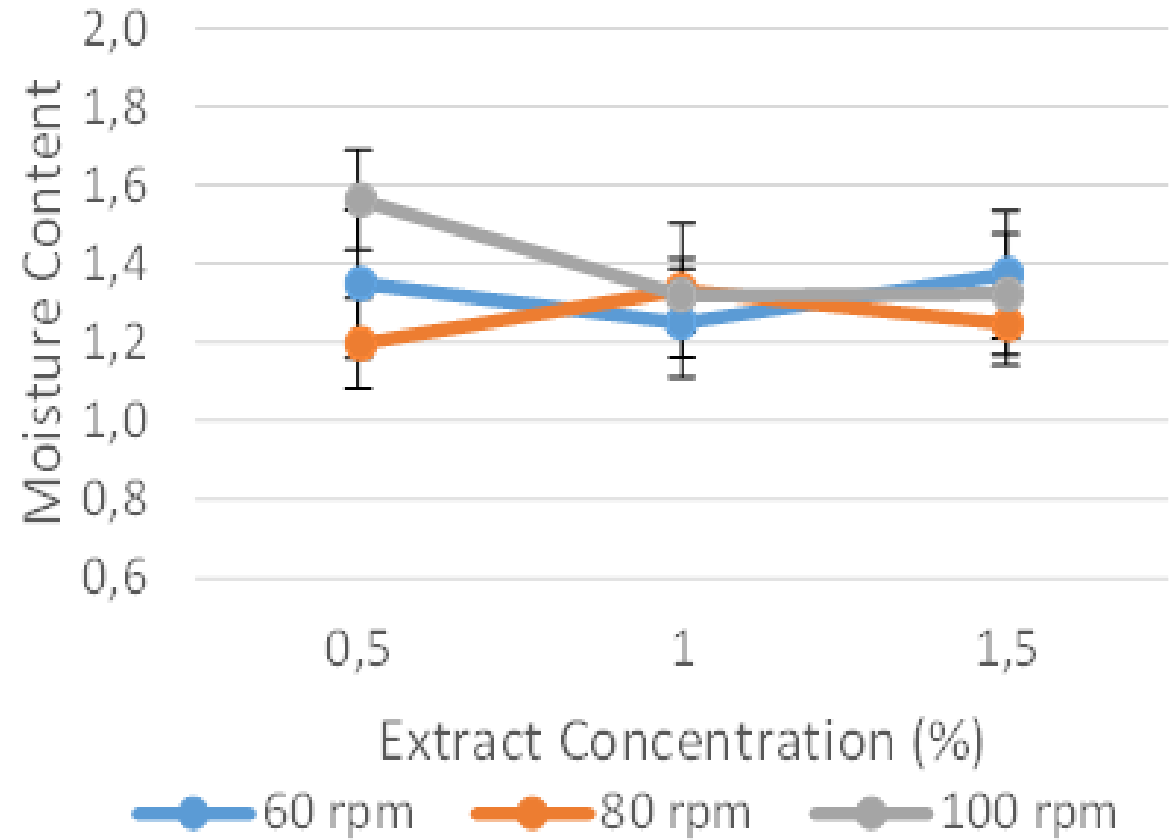
**100 rpm**

# YIELD VALUE



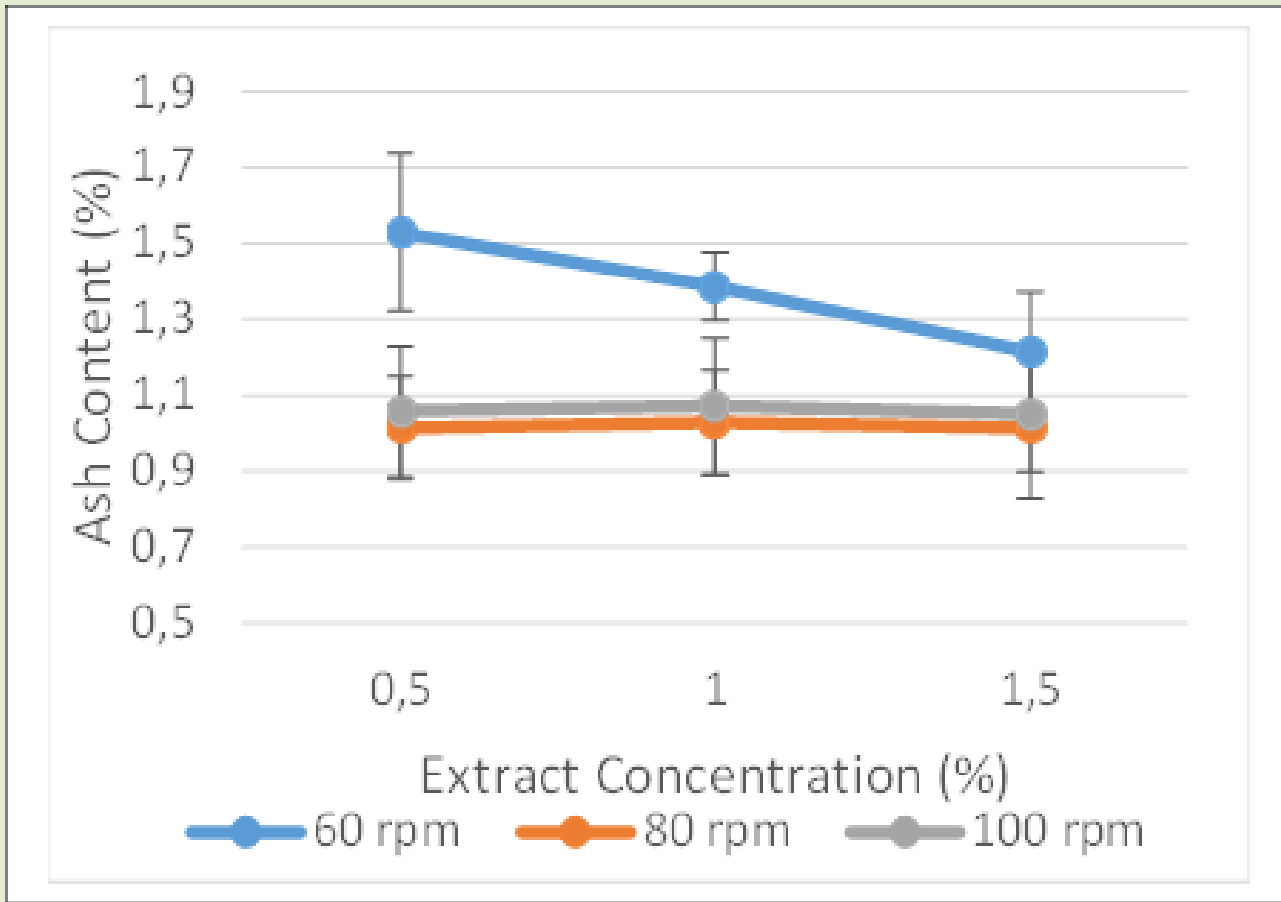
The faster the speed of agitation used, the greater the resulting yield.

# MOISTURE CONTENTS



- Indonesian National Standard instant herbal powder drink (SNI. 01-4320-1996), max moisture content 3%.

# ASH CONTENTS



- Indonesian National Standard instant herbal powder drink (SNI 01-4320-1996), max ash content 1,5%.



# CRYSTALLIZATION TIME

Crystallization Time (minutes)

Agitation speed (rpm)	<i>A paniculate</i> extract		
	0,5%	1%	1.5%
60	129.00±9.20 <sup>a,NS</sup>	128.00±9.19 <sup>a,NS</sup>	126.00±9.19 <sup>a,NS</sup>
80	111.00±2.83 <sup>b,NS</sup>	111.00±2.12 <sup>b,NS</sup>	111.00±4.95 <sup>b,NS</sup>
100	109.00±7.78 <sup>b,NS</sup>	108.00±7.78 <sup>b,NS</sup>	110.00±2.12 <sup>b,NS</sup>

- There was a significant decrease when the crystallizer agitation speed increased from 60 rpm to 80 rpm.
- Meanwhile, when the speed of the crystallizer agitation increased from 80 rpm to 100 rpm, crystallization time was not significant

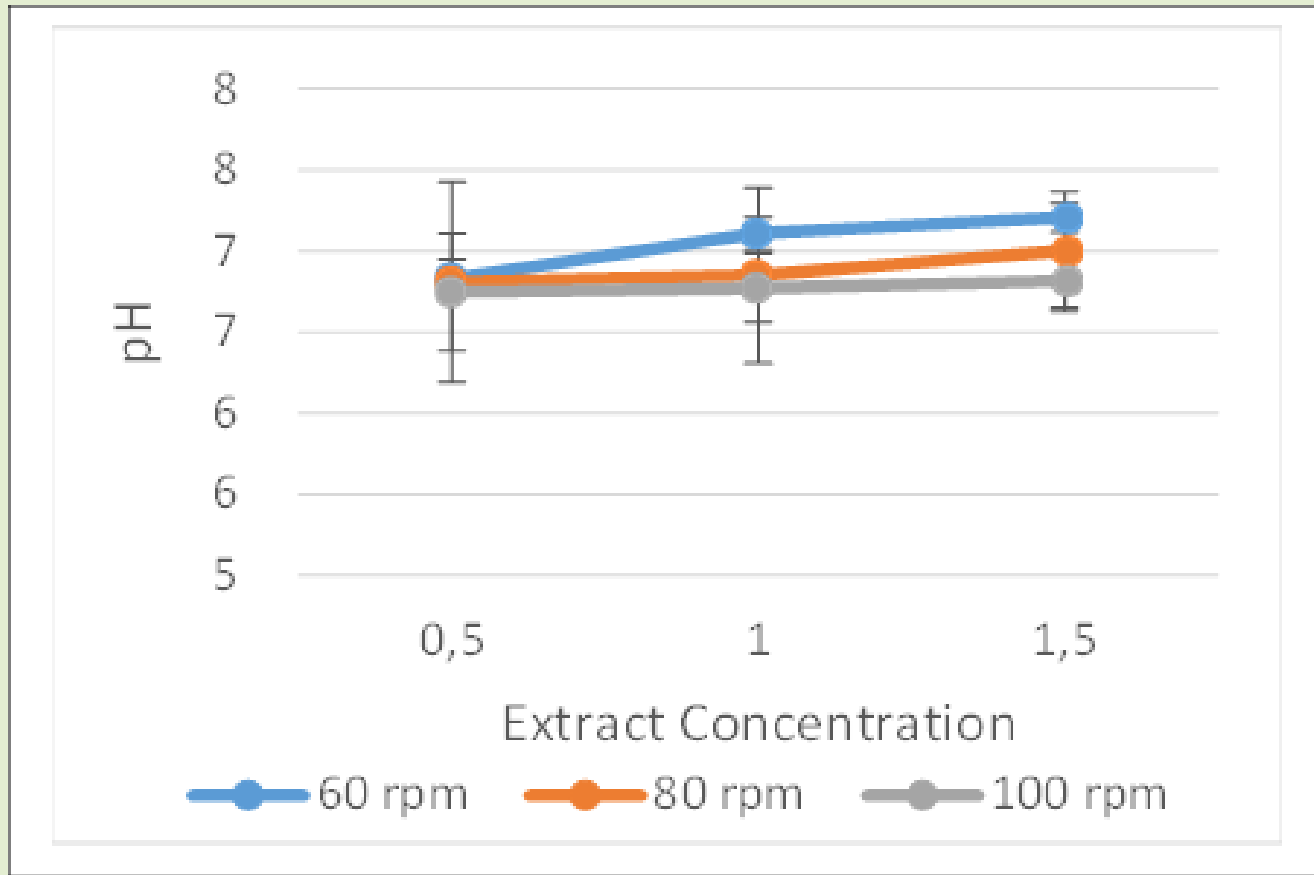
# DISSOLVING TIME

Dissolving Time (second)

Agitation speed (rpm)	A paniculate extract concentration		
	0,5%	1%	1.5%
60	107.00± 3.83 <sup>c,NS</sup>	104.00±3.25 <sup>c,NS</sup>	100.00±2.35 <sup>c,NS</sup>
80	84.00±4.22 <sup>b,NS</sup>	87.00±3.93 <sup>b,NS</sup>	84.00±3.31 <sup>b,NS</sup>
100	70.00±3.67 <sup>a,NS</sup>	71.00±2.79 <sup>a,NS</sup>	70.00±2.58 <sup>a,NS</sup>

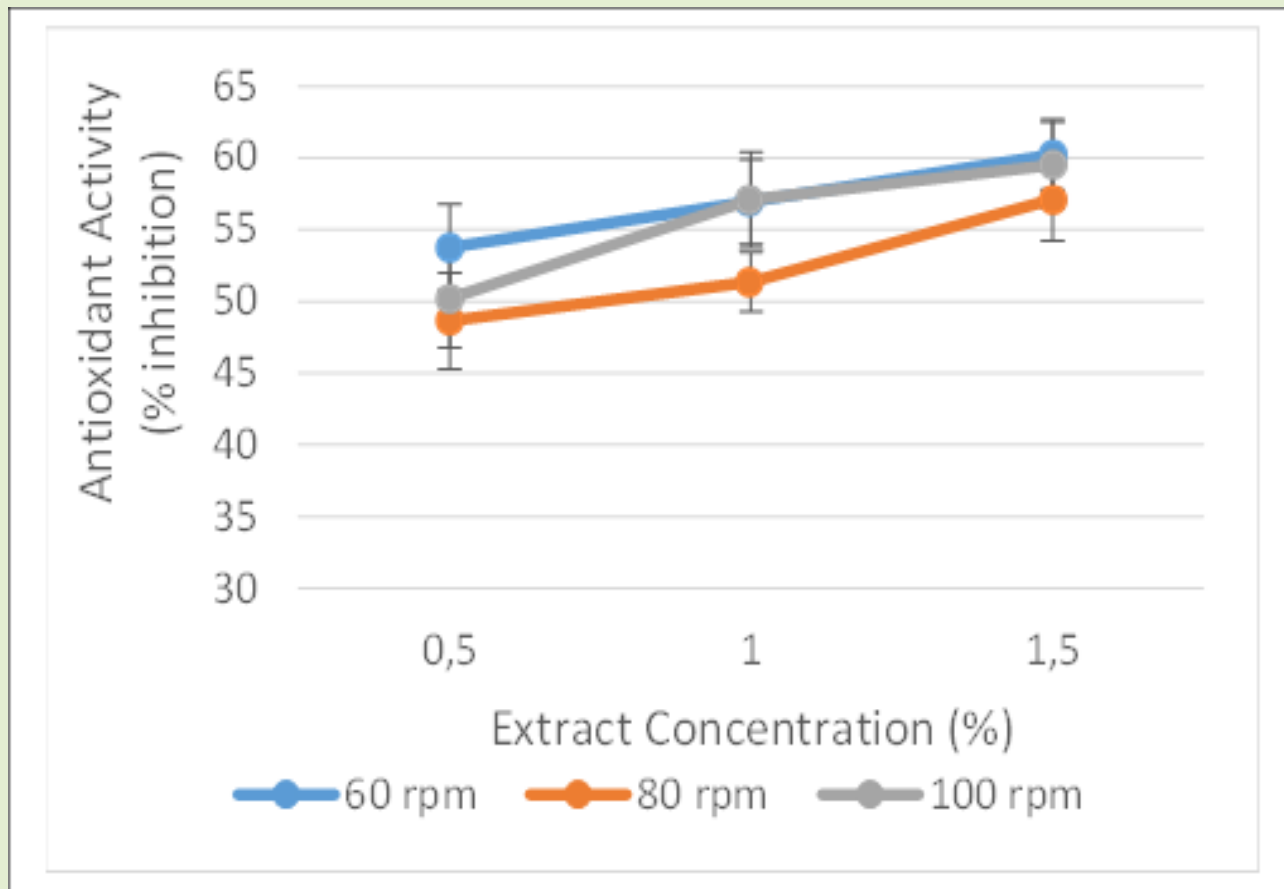
- Higher speed of agitation, shorter dissolving time of sambiloto instant powder drink.

# ACIDITY LEVEL (pH VALUE)



- The higher the concentration of sambiloto extract added, the higher the acidity (pH) of the powdered drink

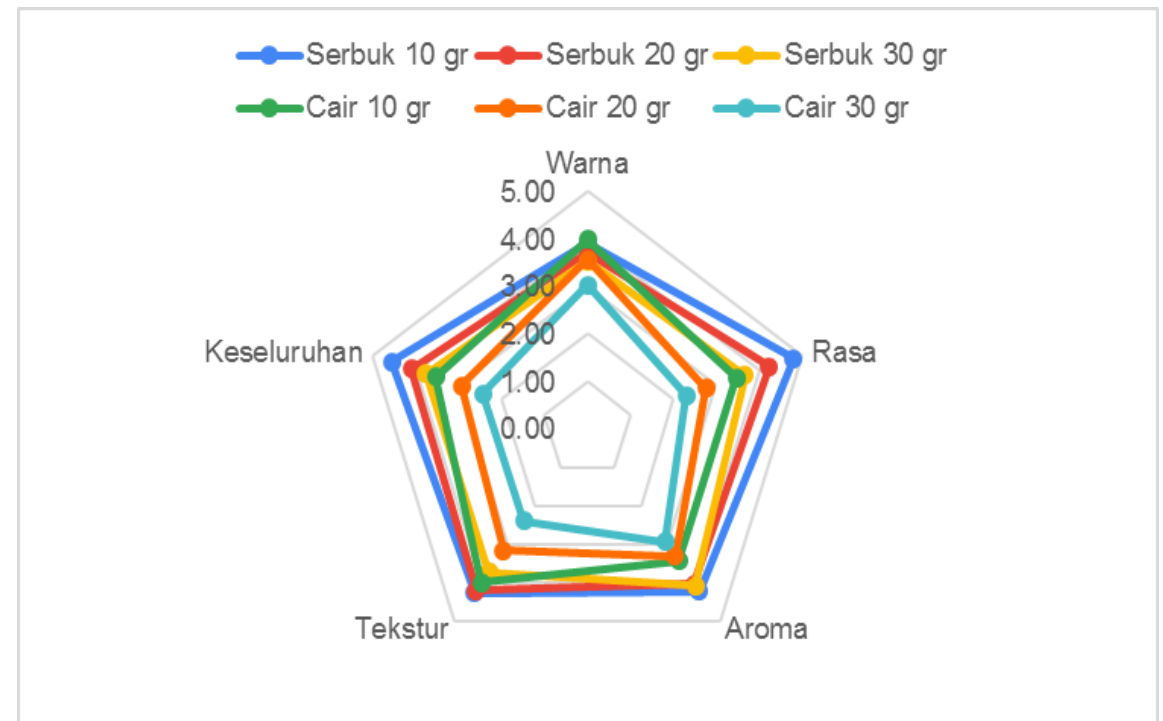
# ANTIOXIDANT ACTIVITY



- The increase in agitation speed affects the decrease in the antioxidant activity of the product
- Accelerating agitation speed causing the material to react faster due to contact with an increasingly intense heat source.

# APPLICATION IN THE HARD ICE CREAM

Powder	Colour	Taste	Aroma	Texture	Overall
10 g	3.93±0.87 <sup>a</sup>	4.80±1.13 <sup>a</sup>	4.23±0.94 <sup>a</sup>	4.27±1.08 <sup>a</sup>	4.57±0.94 <sup>a</sup>
20 g	3.70±0.79 <sup>a</sup>	4.23±1.10 <sup>b</sup>	4.03±1.03 <sup>a</sup>	4.20±0.89 <sup>a</sup>	4.10±0.88 <sup>bc</sup>
30 g	3.53±0.86 <sup>a</sup>	3.67±0.99 <sup>cd</sup>	4.07±0.87 <sup>a</sup>	3.73±1.05 <sup>a</sup>	3.77±0.73 <sup>cd</sup>








The optimum process condition was achieved at 100 rpm with a concentration of 1,5%, which resulted on crystallization time (110 minutes), moisture content (1.32 %), ash content (1,05 %).  
dissolving time (70 second), and antioxidant activity (59.50%).



**CONCLUSION**



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


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