

## **BAB V**

### **KESIMPULAN DAN SARAN**

#### **A. Kesimpulan**

Berdasarkan dari hasil penelitian yang telah dilakukan dapat diperoleh kesimpulan bahwa :

Pertama, fisetin dapat dibuat menjadi nanofitosom dengan menggunakan metode hidrasi lapis tipis-sonikasi.

Kedua, formula dengan menggunakan variasi konsentrasi fosfatidilkolin paling banyak yaitu dengan perbandingan bahan antara fisetin, fosfatidilkolin dan kolesterol yaitu 1:5:0,2 memiliki ukuran yang paling kecil dan nilai efisiensi penjerapan paling besar.

Ketiga, karakterisasi nanofitosom fisetin menghasilkan ukuran partikel rata rata berukuran nano pada F1, F2, F3, F4 dan F5 berturut-turut dengan nilai yaitu 8811; 231,50; 152,67; 147,20; dan 136,87 nm. Efisiensi penjerapan diukur dari formula ketiga, keempat dan kelima dengan hasil berturut-turut yaitu 83,72%; 87,29% dan 88,42%.

Keempat, nanofitosom fisetin tidak stabil selama proses penyimpanan.

#### **B. Saran**

Penelitian ini masih banyak kekurangan, maka perlu dilakukan penelitian lebih lanjut mengenai :

Pertama, perlu dilakukan pembuatan nanofitosom dengan menggunakan metode lain sehingga lebih bisa memberikan ukuran partikel dan zeta potensial yang lebih bagus.

Kedua, perlu dilakukan modifikasi komponen bahan serta perbandingan komponen yang digunakan agar diperoleh hasil ukuran partikel dan zeta potensial yang lebih stabil.

Ketiga, perlu dilakukan uji TEM untuk mengetahui morfologi ukuran partikel.

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## Lampiran 1. Analisis Fisetin

**TOCRIS**  
a biotechne brand

Print Date: Jan 14<sup>th</sup> 2016

## Certificate of Analysis

www.tocris.com

Product Name: Fisetin

Catalog No.: 5016

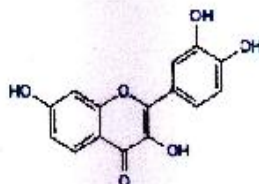
Batch No.: 1

CAS Number: 528-48-3

IUPAC Name: 2-(3,4-Dihydroxyphenyl)-3,7-dihydroxy-4H-1-benzopyran-4-one

## 1. PHYSICAL AND CHEMICAL PROPERTIES

**Batch Molecular Formula:** C<sub>15</sub>H<sub>10</sub>O<sub>8</sub>  
**Batch Molecular Weight:** 286.24  
**Physical Appearance:** Yellow solid  
**Solubility:** DMSO to 100 mM  
ethanol to 10 mM  
**Storage:** Store at -20°C  
**Batch Molecular Structure:**



## 2. ANALYTICAL DATA

**HPLC:** Shows 98.1% purity  
**<sup>1</sup>H NMR:** Consistent with structure  
**Mass Spectrum:** Consistent with structure  
**Microanalysis:**

	Carbon	Hydrogen	Nitrogen
Theoretical	62.94	3.62	
Found	62.81	3.58	

Caution - Not Fully Tested - Research Use Only - Not For Human or Veterinary Use

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Tel: +1 612 378 2858

## Lampiran 2. Sertifikat Analisis Lipoid

<b>Lipoid</b>					
PHOSPHOLIPID GmbH - Member of the Lipoid Group					
ANALYTICAL DATA					
 AN30183645 - 1 -					
PHOSPHOLIPON 93 G					
Batch	228154-3180044	Recommended storage	n.m.l. 18 °C		
		Date of production	07/2018		
Sample for laboratory use only					
Parameter	Result	Specification		Unit	Method
		min	max		
Phosphatidylcholine	96.1	94.0	102.0	% (m/m)	05.P07.867
Identity (TLC)	conform to reference	conform to reference			05.P08.309
Lyo-phosphatidylcholine	1.4		4.0	% (m/m)	05.P07.867
Nonpolar lipids	1.0		3.0	% (m/m)	05.P03.006
Tocopherol	0.21		0.30	% (m/m)	05.P07.142
Acid value	0.2		0.5		05.P03.002
Peroxide value	1.8		5.0		05.P05.120
Water	0.2		1.5	% (m/m)	05.P10.013
Toluene insolubles	0.00		0.05	% (m/m)	05.P08.001
Ethanol	0.1		0.2	% (m/m)	05.P05.049
Heavy metals	< 10		10	mg/kg	USP <231> method II
Arsenic	< 0.015		0.15	mg/kg	USP <232>/ USP <233>
Lead	< 0.015		0.10	mg/kg	USP <232>/ USP <233>
Appearance	yellowish, waxy	yellowish, waxy			05.P06.166

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PHOSPHOLIPID GmbH - Nottemmeraustr. 1 - D-50829 Köln - Tel.: 0221-93746-0 - Fax: 0221-98746-218

**Safety data sheet**  
according to 1907/2006/EC, Article 32

Printing date 04.05.2016

Revision: 04.05.2016

**SECTION 1: Identification of the substance/mixture and of the company undertaking**

**1.1 Product identifier**

Trade name: PHOSPHOLIPON® 90 G

Article number: 228154, 368202, 368247

**1.2 Relevant identified uses of the substance or mixture and uses advised against**  
No further relevant information available.

**Application of the substance / the mixture**

Additive for cosmetic or pharmaceutical preparations  
Food additives

**1.3 Details of the supplier of the safety data sheet**

**Manufacturer/Supplier:**

PHOSP-HOLIPID GmbH  
Nattermannallee 1  
D-50829 Köln  
Tel.: +49 (0) 221 - 987 46 0  
Fax.: +49 (0) 221 - 987 46 216  
e-mail: info@phospholipid.de

**Informing department:** Product Safety Department

**1.4 Emergency telephone number:**

Mu-F: 8.00-16.30  
Tel.: +49 (0) 221 - 98746-444

**SECTION 2: Hazards identification**

**2.1 Classification of the substance or mixture**

**Classification according to Regulation (EC) No 1272/2008**  
The product is not classified according to the CLP regulation.

**2.2 Label elements**

**Labelling according to Regulation (EC) No 1272/2008** Void

**Hazard pictograms** Void

**Signal word** Void

**Hazard statements** Void

**Additional information:**

Contains 3,4-dihydro-2,5,7,8-tetramethyl-2-(4,8,12-trimethyltridecyl)-2H-benzopyran-6-ol. May produce an allergic reaction.

**2.3 Other hazards**

**Results of PBT and vPvB assessment**

PBT: Not applicable.

vPvB: Not applicable.

**SECTION 3: Composition information on ingredients**

**3.1 Chemical characterisation: Substances**

**CAS No. Designation:**

97281-47-5 + \*0191-41-0 + 137-86-6

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# Lipoid

PHOSPHOLIPID GmbH Member of the Lipoid Group

## ANALYTICAL DATA

AN30199640

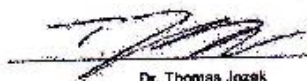
- 2 -

PHOSPHOLIPON 90 G

Batch 228154-3180044

Sample for laboratory use only

Köln, September 26, 2018



Dr. Thomas Jozek  
Head of Quality Control



Myrtil Tengereck  
Quality Assurance

**Safety data sheet**  
according to 1907/2006/EC, Article 32

Printing date 04.05.2016

Revision: 04.05.2016

Trade name: PHOSPHOLIPON® 90 G

(Contd. of page 1)

- **Identification number(s):**
- **EC number:** 306-547-4 - 233-466-0 + 205-305-4
- **3.2 Chemical characterisation: Mixtures**
- **Description:** Purified phosphatidylcholine from soybean lecithin

- **Dangerous components:**

CAS: 10191-41-3	3,4-dihydro-2,5,7,8-tetramethyl-2-(4,8,12-trimethyltridocyl)-2H-1-benzopyran-6-ol	max. 0,3%
EINECS: 233 466 0	benzopyran-6-ol	
	⚠ Skin Sens. 1, H317	

**SECTION 4: First aid measures**

- **4.1 Description of first aid measures**
- **After inhalation** Supply fresh air; consult doctor in case of symptoms.
- **After skin contact** Instantly wash with water and soap and rinse thoroughly.
- **After eye contact** Rinse opened eye for several minutes under running water.
- **After swallowing** In case of persistent symptoms consult doctor.
- **4.2 Most important symptoms and effects, both acute and delayed**  
No further relevant information available.
- **4.3 Indication of any immediate medical attention and special treatment needed**  
No further relevant information available.

**SECTION 5: Firefighting measures**

- **5.1 Extinguishing media**
- **Suitable extinguishing agents** CO<sub>2</sub>, sand, extinguishing powder. Do not use water.
- **For safety reasons unsuitable extinguishing agents** Water.
- **5.2 Special hazards arising from the substance or mixture**  
No further relevant information available.
- **5.3 Advice for firefighters**
- **Protective equipment:** Wear full protective suit.

**SECTION 6: Accidental release measures**

- **6.1 Personal precautions, protective equipment and emergency procedures**  
Product forms slippery surface when combined with water.  
Keep away from ignition sources.
- **6.2 Environmental precautions:** Do not allow to enter drainage system, surface or ground water.
- **6.3 Methods and material for containment and cleaning up:** Collect mechanically.
- **6.4 Reference to other sections**  
See Section 7 for information on safe handling  
See Section 8 for information on personal protection equipment.  
See Section 13 for information on disposal.

**SECTION 7: Handling and storage**

- **7.1 Precautions for safe handling** No special precautions necessary if used correctly.
- **Information about protection against explosions and fires:** No special measures required.
- **7.2 Conditions for safe storage, including any incompatibilities**
- **Storage**
- **Requirements to be met by storerooms and containers:** No special requirements.
- **Information about storage** In one common storage facility: Not required.
- **Further information about storage conditions:** < 5 °C

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**Safety data sheet**  
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Trade name: PHOSPHOLIPON® 90 G

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7.3 Specific end use(s) No further relevant information available.

**SECTION 8: Exposure controls/personal protection**

Additional information about design of technical systems: No further data: see item 7.

**8.1 Control parameters****Components with limit values that require monitoring at the workplace:**

The product does not contain any relevant quantities of materials with critical values that have to be monitored at the workplace.

Additional information: The lists that were valid during the compilation were used as basis.

**8.2 Exposure controls****Personal protective equipment****General protective and hygienic measures**Take off immediately all contaminated clothing  
Wash hands during breaks and at the end of the work.

Breathing equipment: Not required.

**Protection of hands:**

Protective gloves.

The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.

Due to missing tests no recommendation to the glove material can be given for the product/ the preparation/ the chemical mixture.

Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation

**Material of gloves**

The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.

**Penetration time of glove material**

The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.

Eye protection: Safety glasses

Body protection: Protective work clothing.

**SECTION 9: Physical and chemical properties****9.1 Information on basic physical and chemical properties****General information****Appearance:**

Form: Solid.

Colour: yellowish

Odour: Characteristic

Odour threshold: Not determined.

pH-value (10 g/l) at 20 °C: 5 - 7

**Change in condition**

Melting point/Melting range: Not determined

Boiling point/Boiling range: Not determined

Flash point: Not applicable

Inflammability (solid, gaseous) Not determined.

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Trade name: PHOSPHOLIPON® 90 G

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• Ignition temperature:	
• Decomposition temperature:	Not determined.
• Self-inflammability:	Product is not selfigniting.
• Danger of explosion:	Product is not explosive.
• Critical values for explosion:	
Lower:	Not determined.
Upper:	Not determined.
• Vapour pressure:	Not applicable.
• Density	Not determined.
• Relative density	Not determined.
• Vapour density	Not applicable.
• Evaporation rate	Not applicable.
• Solubility in / Miscibility with	
Water:	Dispersible
• Partition coefficient (n-octanol/water):	Not determined.
• Viscosity:	
dynamic:	Not applicable.
kinematic:	Not applicable.
• 9.2 Other information	No further relevant information available.

**SECTION 10: Stability and reactivity**

- 10.1 Reactivity No further relevant information available.
- 10.2 Chemical stability
- Thermal decomposition / conditions to be avoided:  
To avoid thermal decomposition do not overheat.
- 10.3 Possibility of hazardous reactions No dangerous reactions known
- 10.4 Conditions to avoid No further relevant information available.
- 10.5 Incompatible materials: No further relevant information available.
- 10.6 Hazardous decomposition products:  
Carbon dioxide  
Carbon monoxide

**SECTION 11: Toxicological information**

- 11.1 Information on toxicological effects
- Acute toxicity Based on available data, the classification criteria are not met.
- Primary irritant effect:
- Skin corrosion/irritation Based on available data, the classification criteria are not met.
- Serious eye damage/irritation Based on available data, the classification criteria are not met.
- Respiratory or skin sensitisation Based on available data, the classification criteria are not met.
- CMR effects (carcinogenicity, mutagenicity and toxicity for reproduction)
- Germ cell mutagenicity Based on available data, the classification criteria are not met.
- Carcinogenicity Based on available data, the classification criteria are not met.
- Reproductive toxicity Based on available data, the classification criteria are not met.
- STOT-single exposure Based on available data, the classification criteria are not met.
- STOT-repeated exposure Based on available data, the classification criteria are not met.
- Aspiration hazard Based on available data, the classification criteria are not met.

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Revision: 04.05.2016

Trade name: PHOSPHOLIPON® 90 G

(Cont'd. of page 4)

**SECTION 12: Ecological information**

- **12.1 Toxicity**
- **Aquatic toxicity:** No further relevant information available.
- **12.2 Persistence and degradability** biodegradable
- **12.3 Bioaccumulative potential** No further relevant information available.
- **12.4 Mobility in soil** No further relevant information available.
- **Additional ecological information:**
- **General notes:**  
Water hazard class 1 (German Regulation) (Self-assessment): slightly hazardous for water.  
Do not allow undiluted product or large quantities of it to reach ground water, water bodies or sewage system.
- **12.5 Results of PBT and vPvB assessment**
- **PBT:** Not applicable.
- **vPvB:** Not applicable.
- **12.6 Other adverse effects** No further relevant information available.

**SECTION 13: Disposal considerations**

- **13.1 Waste treatment methods**
- **Recommendation:**  
Must not be disposed of together with household garbage. Do not allow product to reach sewage system.
- **Waste disposal key number:** 07 05 14
- **Uncleaned packagings:**
- **Recommendation:**  
Empty contaminated packagings thoroughly. They can be recycled after thorough and proper cleaning.

**SECTION 14: Transport information**

• <b>14.1 UN-Number</b>	
• <b>ADR, ADN, IMDG, IATA</b>	Void
• <b>14.2 UN proper shipping name</b>	
• <b>ADR, ADN, IMDG, IATA</b>	Void
• <b>14.3 Transport hazard class(es)</b>	
• <b>ADR, ADN, IMDG, IATA</b>	
• <b>Class</b>	Void
• <b>14.4 Packing group</b>	
• <b>IMDG, IATA</b>	Void
• <b>14.5 Environmental hazards:</b>	
• <b>Marine pollutant:</b>	No
• <b>14.5 Special precautions for user</b>	Not applicable.
• <b>14.7 Transport in bulk according to Annex II of Marpol and the IBC Code</b>	Not applicable.
• <b>UN "Model Regulation":</b>	Void

(Cont'd. on page 2)



**Safety data sheet**  
according to 1907/2006/EC, Article 32

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**SECTION 15: Regulatory information**

- 15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

Directive 2012/18/EU

Named dangerous substances - ANNEX I None of the ingredients is listed.

National regulations

Technical instructions (air):

Class	Share in %
NK	0,1 - 1

- Water hazard class: Water hazard class 1 (Self-assessment): slightly hazardous for water.
- 15.2 Chemical safety assessment: A Chemical Safety Assessment has not been carried out.

**SECTION 16: Other information**

These data are based on our present knowledge. However, they shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

Relevant phrases

H317 May cause an allergic skin reaction.

Department issuing data specification sheet: Environment protection department.

Contact: -

Abbreviations and acronyms:

ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)

IMDG: International Maritime Code for Dangerous Goods

IATA: International Air Transport Association

GHS: Globally Harmonized System of Classification and Labeling of Chemicals

EINECS: European Inventory of Existing Commercial Chemical Substances

ELINCS: European List of Notified Chemical Substances

CAS: Chemical Abstracts Service (division of the American Chemical Society)

PBT: Persistent, Bioaccumulative and Toxic

vPvB: very Persistent and very Bioaccumulative

Skin Sens. 1: Sensitizer - Skin, Hazard Category 1

3E

**Lampiran 3. Penetapan Ukuran Partikel dan Zeta Potensial Sebelum Penyimpanan**

<b>Formula</b>	<b>Ukuran partikel</b>	<b>Rata-rata <math>\pm</math>SD</b>	<b>Indeks polidispersitas</b>	<b>Rata-rata <math>\pm</math>SD</b>
<b>1</b>	7803	8811,00 $\pm$ 1400,383	1	0,971 $\pm$ 0,050
	8220		1	
	10.410		0,914	
<b>2</b>	244,1	231,50 $\pm$ 32,111	0,588	0,549 $\pm$ 0,034
	255,4		0,537	
	195		0,523	
<b>3</b>	151,6	152,67 $\pm$ 7,656	0,420	0,394 $\pm$ 0,024
	160,8		0,374	
	145,6		0,387	
<b>4</b>	149,4	147,20 $\pm$ 2,066	0,324	0,336 $\pm$ 0,022
	146,9		0,323	
	145,3		0,361	
<b>5</b>	137,7	136,87 $\pm$ 0,971	0,226	0,225 $\pm$ 0,004
	135,8		0,220	
	137,1		0,228	

## Hasil PSA Formula 1

### Size Distribution Report by Intensity

v2.2



#### Sample Details

Sample Name: Nanofitosom Fisetin F1 1

SOP Name: mansettings.nano

General Notes:

File Name: NanofitosomMyricetin\_2...      Dispersant Name: Water  
 Record Number: 49      Dispersant RI: 1,330  
 Material RI: 1,52      Viscosity (cP): 0,8872  
 Material Absorbtion: 0,100      Measurement Date and Time: Jumat, 26 April 2019 12.59....

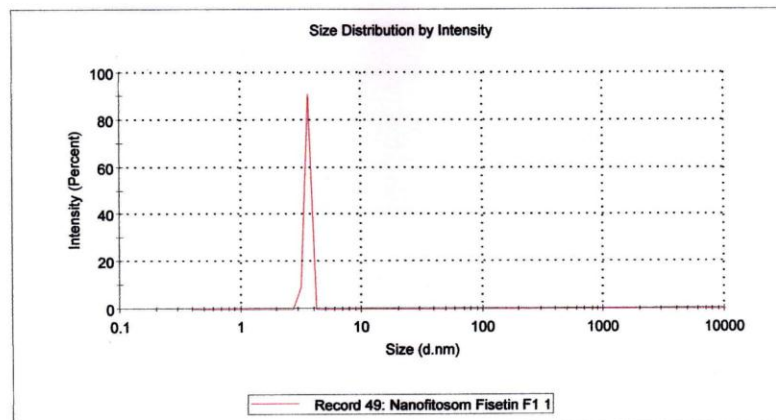
#### System

Temperature (°C): 25,0      Duration Used (s): 60  
 Count Rate (kcps): 276,0      Measurement Position (mm): 4,65  
 Cell Description: Disposable sizing cuvette      Attenuator: 7

#### Results

	Size (d.n...	% Intensity:	St Dev (d.n...
<b>Z-Average (d.nm):</b> 7803	<b>Peak 1:</b> 3,569	100,0	0,1439
<b>PdI:</b> 1,000	<b>Peak 2:</b> 0,000	0,0	0,000
<b>Intercept:</b> 0,847	<b>Peak 3:</b> 0,000	0,0	0,000

Result quality **Refer to quality report**



## Hasil PSA Formula 2

### Size Distribution Report by Intensity

v2.2



#### Sample Details

Sample Name: Nanofitosom Fisetin F2 1

SOP Name: mansettings.nano

General Notes:

File Name: NanofitosomMyricetin\_2...      Dispersant Name: Water  
 Record Number: 52      Dispersant RI: 1,330  
 Material RI: 1,52      Viscosity (cP): 0,8872  
 Material Absorbtion: 0,100      Measurement Date and Time: Jumat, 26 April 2019 13.09....

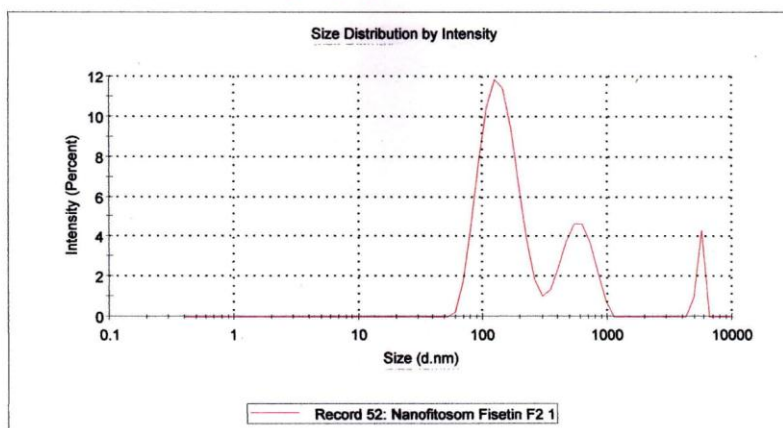
#### System

Temperature (°C): 25,0      Duration Used (s): 60  
 Count Rate (kcps): 404,1      Measurement Position (mm): 1,05  
 Cell Description: Disposable sizing cuvette      Attenuator: 4

#### Results

	Size (d.n...	% Intensity:	St Dev (d.n...
<b>Z-Average (d.nm): 244,1</b>	<b>Peak 1: 138,6</b>	70,4	47,38
<b>Pdl: 0,588</b>	<b>Peak 2: 568,5</b>	24,3	158,4
<b>Intercept: 0,885</b>	<b>Peak 3: 5422</b>	5,3	292,7

Result quality **Refer to quality report**



## Hasil PSA Formula 3

### Size Distribution Report by Intensity

v2.2



#### Sample Details

Sample Name: Nanofitosom Fisetin F3 1

SOP Name: mansettings.nano

General Notes:

File Name: NanofitosomMyricetin\_2... Dispersant Name: Water

Record Number: 55 Dispersant RI: 1,330

Material RI: 1,52 Viscosity (cP): 0,8872

Material Absorbtion: 0,100 Measurement Date and Time: Jumat, 26 April 2019 13.19....

#### System

Temperature (°C): 25,0 Duration Used (s): 70

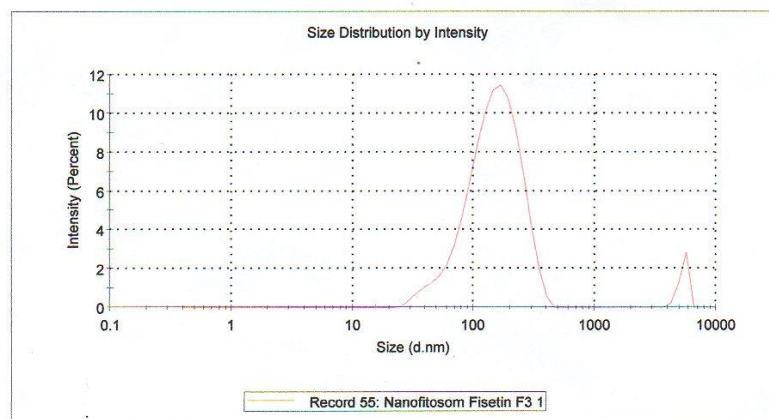
Count Rate (kcps): 174,2 Measurement Position (mm): 1,05

Cell Description: Disposable sizing cuvette Attenuator: 3

#### Results

	Size (d.n...	% Intensity:	St Dev (d.n...
<b>Z-Average (d.nm):</b> 151,6	<b>Peak 1:</b> 156,3	95,7	72,06
<b>PdI:</b> 0,420	<b>Peak 2:</b> 5263	4,3	432,9
<b>Intercept:</b> 0,918	<b>Peak 3:</b> 0,000	0,0	0,000

Result quality **Good**



## Hasil PSA Formula 4

### Size Distribution Report by Intensity

v2.2



#### Sample Details

Sample Name: Nanofitosom Fisetin F4 1

SOP Name: mansettings.nano

General Notes:

File Name: NanofitosomMyricetin\_2...      Dispersant Name: Water  
 Record Number: 58      Dispersant RI: 1,330  
 Material RI: 1,52      Viscosity (cP): 0,8872  
 Material Absorbtion: 0,100      Measurement Date and Time: Jumat, 26 April 2019 13.30....

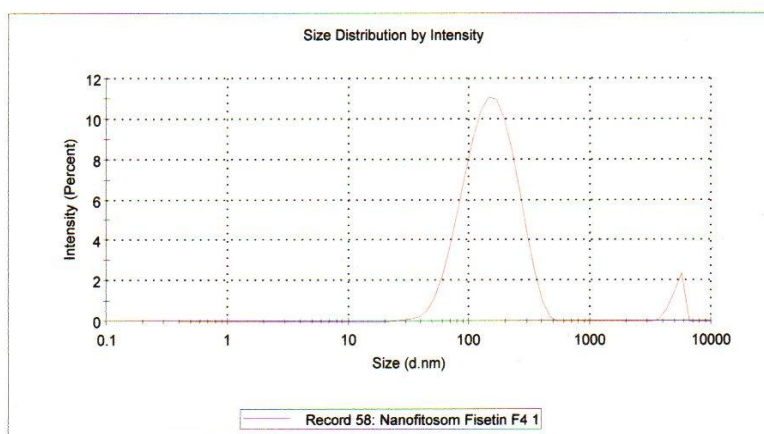
#### System

Temperature (°C): 25,0      Duration Used (s): 60  
 Count Rate (kcps): 340,9      Measurement Position (mm): 4,65  
 Cell Description: Disposable sizing cuvette      Attenuator: 5

#### Results

	Size (d.n...	% Intensity:	St Dev (d.n...
<b>Z-Average (d.nm):</b> 149,4	<b>Peak 1:</b> 159,5	95,5	74,86
<b>Pdl:</b> 0,324	<b>Peak 2:</b> 5092	4,5	554,4
<b>Intercept:</b> 0,925	<b>Peak 3:</b> 0,000	0,0	0,000

Result quality **Good**



## Hasil PSA Formula 5

### Size Distribution Report by Intensity

v2.2



#### Sample Details

**Sample Name:** Nanofotosom Fisetin F5 2

**SOP Name:** mansettings.nano

**General Notes:**

**File Name:** NanofotosomMyricetin\_2... **Dispersant Name:** Water  
**Record Number:** 62 **Dispersant RI:** 1,330  
**Material RI:** 1,52 **Viscosity (cP):** 0,8872  
**Material Absorbtion:** 0,100 **Measurement Date and Time:** Jumat, 26 April 2019 13.43....

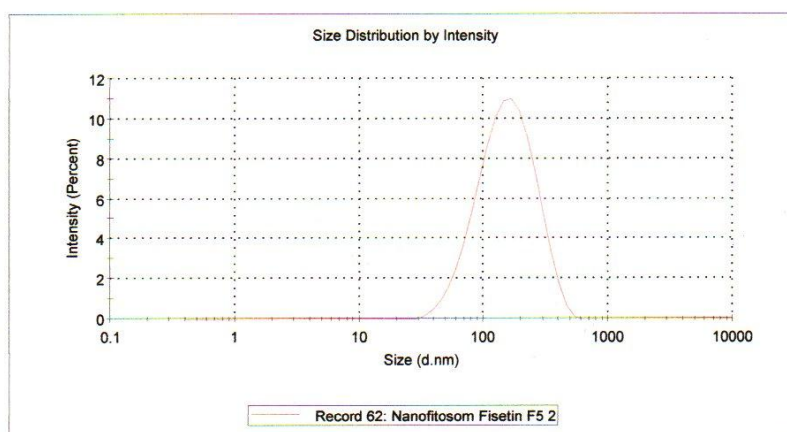
#### System

**Temperature (°C):** 25,0 **Duration Used (s):** 70  
**Count Rate (kcps):** 203,2 **Measurement Position (mm):** 1,05  
**Cell Description:** Disposable sizing cuvette **Attenuator:** 3

#### Results

	Size (d.n...	% Intensity:	St Dev (d.n...
<b>Z-Average (d.nm):</b> 135,8	<b>Peak 1:</b> 167,0	100,0	83,27
<b>PdI:</b> 0,220	<b>Peak 2:</b> 0,000	0,0	0,000
<b>Intercept:</b> 0,926	<b>Peak 3:</b> 0,000	0,0	0,000

**Result quality** Good



#### Lampiran 4. Uji Stabilitas Selama 3 Minggu

##### UJI STABILITAS (3 MINGGU)

###### a. Pengamatan Fisik (Ada Tidaknya Endapan)

Formula	Minggu 1	Minggu 2	Minggu 3
1	Tidak ada endapan	Ada endapan	Ada endapan
2	Tidak ada endapan	Ada endapan	Ada endapan
3	Tidak ada endapan	Ada endapan	Ada endapan
4	Tidak ada endapan	Tidak ada endapan	Ada endapan
5	Tidak ada endapan	Tidak ada endapan	Tidak ada endapan

###### b. Pengukuran Ukuran Partikel dan Zeta Potensial

Formula	Ukuran Partikel (nm)		Indeks Polidispersitas		Zeta Potensial (mV)	
	Sebelum	Sesudah	Sebelum	Sesudah	Sebelum	Sesudah
5	136,87	776,9	0,225	0,378	-4,37	-10,0



## Hasil Ukuran Partikel F5 Setelah Penyimpanan

### Size Distribution Report by Number v2.2



#### Sample Details

**Sample Name:** F5 Fisetin 1  
**SOP Name:** mansettings.nano  
**General Notes:**

**File Name:** Vilza Dwiki 2019.dts      **Dispersant Name:** Water  
**Record Number:** 1      **Dispersant RI:** 1.330  
**Material RI:** 1.52      **Viscosity (cP):** 0.8872  
**Material Absorbtion:** 0.100      **Measurement Date and Time:** Tuesday, May 21, 2019 9:...

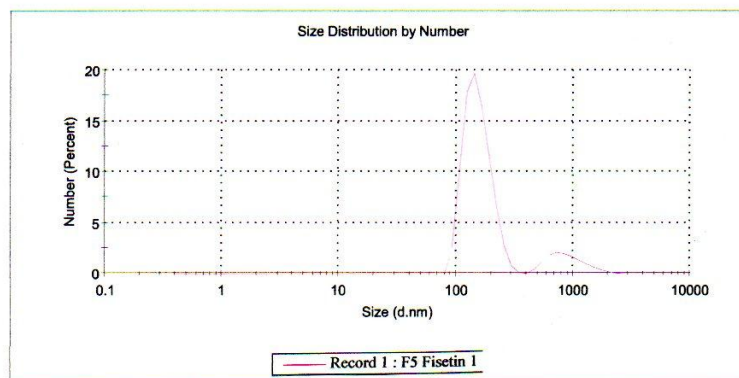
#### System

**Temperature (°C):** 25.0      **Duration Used (s):** 80  
**Count Rate (kcps):** 145.9      **Measurement Position (mm):** 4.65  
**Cell Description:** Disposable sizing cuvette      **Attenuator:** 7

#### Results

	Size (d.n...	% Number:	St Dev (d.n...
<b>Z-Average (d.nm):</b> 776.9	<b>Peak 1:</b> 905.6	12.6	351.3
<b>Pdl:</b> 0.378	<b>Peak 2:</b> 153.6	87.4	41.14
<b>Intercept:</b> 0.948	<b>Peak 3:</b> 0.000	0.0	0.000

**Result quality** Refer to quality report



## Hasil Zeta Potensial F5 Setelah Penyimpanan

### Zeta Potential Report v2.3



Malvern Instruments Ltd - © Copyright 2008

#### Sample Details

**Sample Name:** F5 Fisetin 1  
**SOP Name:** mansettings.nano  
**General Notes:**

**File Name:** Vilza Dwiki 2019.dts      **Dispersant Name:** Water  
**Record Number:** 6      **Dispersant RI:** 1.330  
**Date and Time:** Tuesday, May 21, 2019 9:50:1...      **Viscosity (cP):** 0.8872  
**Dispersant Dielectric Constant:** 78.5

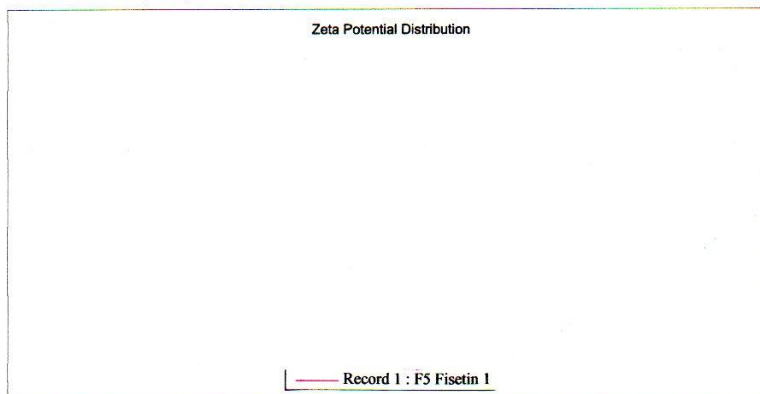
#### System

**Temperature (°C):** 25.0      **Zeta Runs:** 31  
**Count Rate (kcps):** 318.9      **Measurement Position (mm):** 4.50  
**Cell Description:** Zeta dip cell      **Attenuator:** 7

#### Results

	Mean (mV)	Area (%)	St Dev (mV)
<b>Zeta Potential (mV):</b> -10.0	<b>Peak 1:</b> 0.00	0.0	0.00
<b>Zeta Deviation (mV):</b> 0.00	<b>Peak 2:</b> 0.00	0.0	0.00
<b>Conductivity (mS/cm):</b> 10.6	<b>Peak 3:</b> 0.00	0.0	0.00

**Result quality** Good

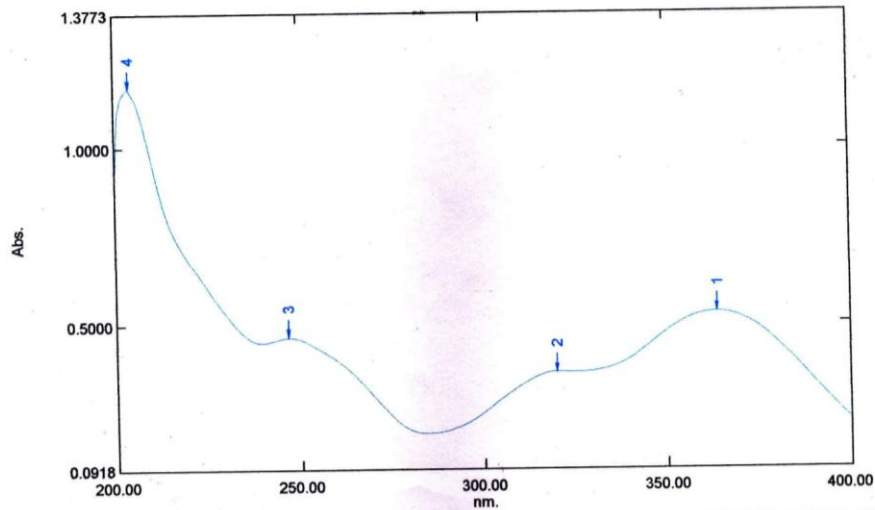


## Lampiran 5. Penentuan Panjang Gelombang Maksimum Fisetin

### Spectrum Peak Pick Report

04/02/2019 01:35:05 PM

Data Set: File\_190402\_133302 - RawData



[Measurement Properties]  
 Wavelength Range (nm.): 200.00 to 400.00  
 Scan Speed: Medium  
 Sampling Interval: 1.0  
 Auto Sampling Interval: Disabled  
 Scan Mode: Single

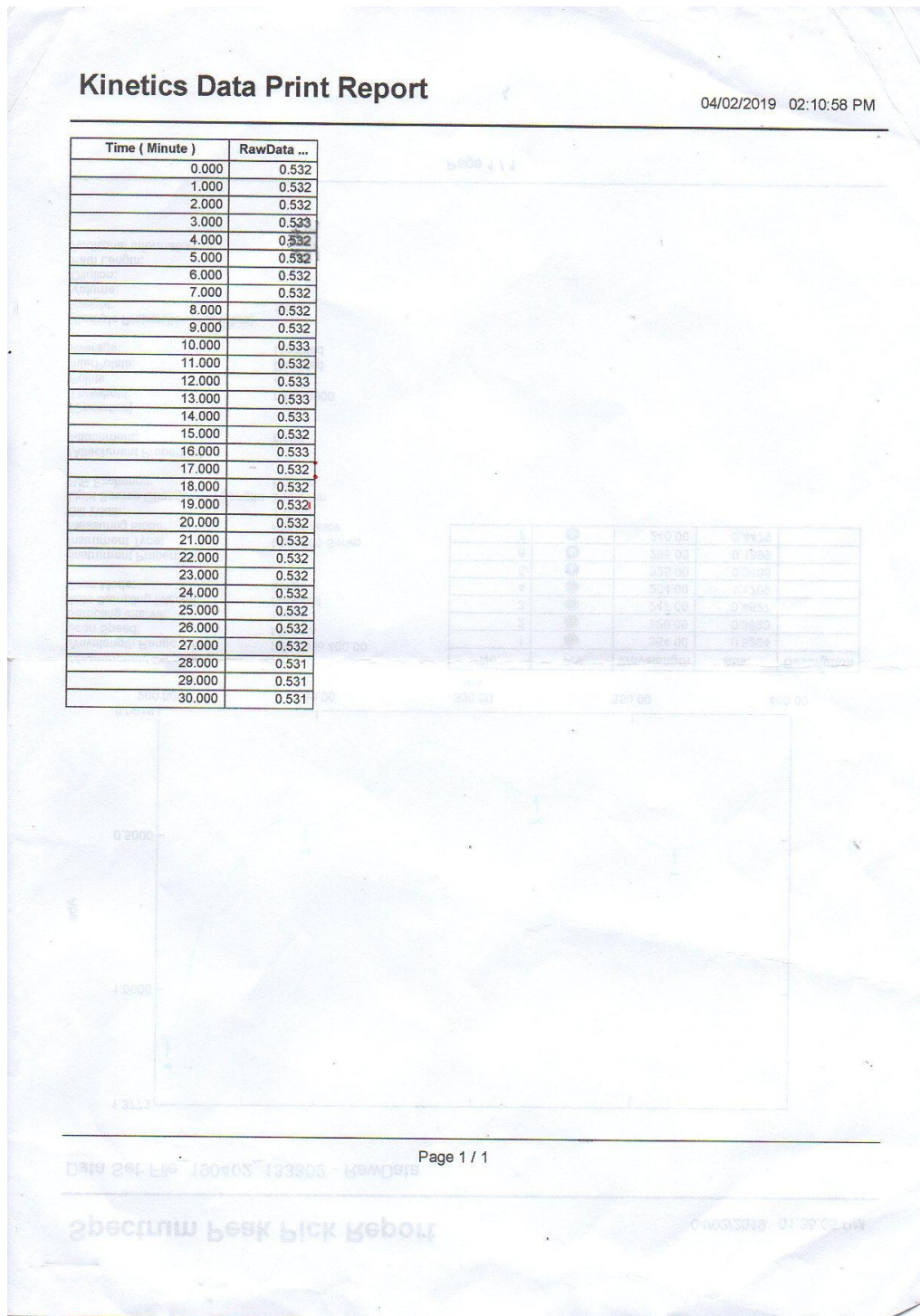
[Instrument Properties]  
 Instrument Type: UV-1800 Series  
 Measuring Mode: Absorbance  
 Slit Width: 1.0 nm  
 Light Source Change Wavelength: 340.0 nm  
 S/R Exchange: Normal

[Attachment Properties]  
 Attachment: None

[Operation]  
 Threshold: 0.0010000  
 Points: 4  
 InterPolate: Disabled  
 Average: Disabled

[Sample Preparation Properties]  
 Weight: 359  
 Volume:  
 Dilution:  
 Path Length:  
 Additional Information:

No.	P/V	Wavelength	Abs.	Description
1	●	364.00	0.5294	
2	●	320.00	0.3623	
3	●	247.00	0.4627	
4	●	204.00	1.1709	
5	⬇	325.00	0.3608	
6	⬇	285.00	0.1899	
7	⬇	240.00	0.4479	

**Lampiran 6. Penentuan Operating Time Fisetin**

### Lampiran 7. Perhitungan Bobot Bahan yang Ditimbang untuk Pembuatan Nanofitosom

Diketahui :

Kadar fisetin : >98 % → 98 %

BM Fisetin : 286,24 gram/mol

BM Fosfatidilkolin : 768 gram/mol

BM Kolesterol : 386,67 gram/mol

#### Kandungan fisetin dalam 10 mg serbuk

$$\text{Fisetin (mg)} = 10 \text{ mg} \times \frac{98}{100} = 9,8 \text{ mg}$$

$$\begin{aligned} \text{Mol Fisetin dalam 10mg serbuk} &\rightarrow \frac{9,8 \text{ mg}}{286.240 \times 10^{-6} \mu\text{mol}} \\ &\rightarrow 34,265 \mu\text{mol} \end{aligned}$$

#### Perhitungan Berat Fosfatidilkolin yang Ditimbang

- **F1** (1:1:0,2) →  $34,265 \mu\text{mol} \times \frac{768.000 \text{ mg}}{10^6 \mu\text{mol}}$   
→ 26,315 mg
- **F2** (1:2:0,2) →  $68,53 \mu\text{mol} \times \frac{768.000 \text{ mg}}{10^6 \mu\text{mol}}$   
→ 52,631 mg
- **F3** (1:3:0,2) →  $102,793 \mu\text{mol} \times \frac{768.000 \text{ mg}}{10^6 \mu\text{mol}}$   
→ 78,946 mg
- **F4** (1:4:0,2) →  $137,06 \mu\text{mol} \times \frac{768.000 \text{ mg}}{10^6 \mu\text{mol}}$   
→ 105,262 mg
- **F5** (1:5:0,2) →  $171,325 \mu\text{mol} \times \frac{768.000 \text{ mg}}{10^6 \mu\text{mol}}$   
→ 131,577 mg

#### Perhitungan Berat Kolesterol yang Ditimbang

$$\begin{aligned} \text{Kolesterol} &= 0,2 \times 34,265 \mu\text{mol} \\ &= 6,853 \mu\text{mol} \end{aligned}$$

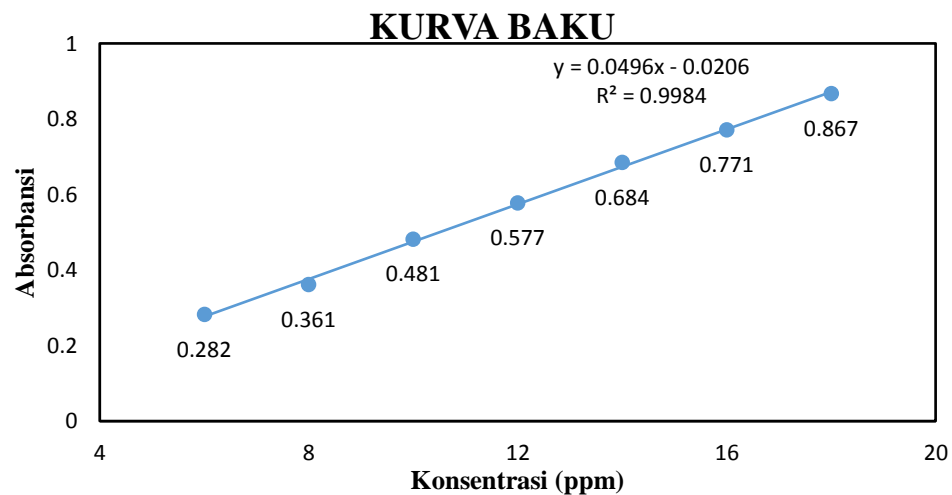
$$\begin{aligned} \text{Berat kolesterol yang ditimbang} &= 6,853 \mu\text{mol} \times \frac{386.670 \text{ mg}}{10^6 \mu\text{mol}} \\ &= 2,649 \text{ mg} \end{aligned}$$

## Lampiran 8. Verifikasi Metode

### A. LINIERITAS

Pembuatan kurva baku dengan konsentrasi larutan induk 100 ppm, dari 10 mg fisetin ditambahkan 10 ml etanol 96% untuk melarutkan kemudian ditambah larutan dapar *phospat* ph 7,4 ad 100 ml.

Konsentrasi (ppm)	Absorbansi
6	0,282
8	0,361
10	0,481
12	0,577
14	0,684
16	0,771
18	0,867



Keterangan :

a : -0,02057

b : 0,04961

r : 0,99922

Persamaan Regresi Linier :

$y = a+bx$

$y = 0,04961x - 0,02057$

Hasil linieritas diperoleh ( $r$ ) = 0,99922, sehingga dapat disimpulkan bahwa data yang diperoleh linier.

### B. LOD dan LOQ

Konsentrasi (x)	Absorbansi (y)	y'	y-y'	(y-y') <sup>2</sup>
6	0,282	0,277071	0,004929	0,000024
8	0,361	0,376286	-0,015286	0,000234
10	0,481	0,475500	0,005500	0,000030
12	0,577	0,574714	0,002286	0,000005
14	0,684	0,673929	0,010071	0,000101
16	0,771	0,773143	-0,002143	0,000005
18	0,867	0,872357	-0,005357	0,000029
<b>JUMLAH TOTAL (<math>\sum  y-y' </math>)<sup>2</sup></b>				<b>= 0,000428</b>

Nilai y' diperoleh dari substitusi konsentrasi dalam persamaan  $y = 0,04961x - 0,02057$  dengan x adalah konsentrasi (ppm) dan y adalah serapan (y').

1. Konsentrasi 6 ppm

$$y = 0,04961x - 0,02057$$

$$y = 0,04961 (6) - 0,02057$$

$$= 0,277071$$

2. Konsentrasi 8 ppm

$$y = 0,04961x - 0,02057$$

$$y = 0,04961 (8) - 0,02057$$

$$= 0,376286$$

3. Konsentrasi 10 ppm

$$y = 0,04961x - 0,02057$$

$$y = 0,04961 (10) - 0,02057$$

$$= 0,475500$$

4. Konsentrasi 12 ppm

$$y = 0,04961x - 0,02057$$

$$y = 0,04961 (12) - 0,02057$$

$$= 0,574714$$

## 5. Konsentrasi 14 ppm

$$y = 0,04961x - 0,02057$$

$$y = 0,04961 (14) - 0,02057$$

$$= 0,673929$$

## 6. Konsentrasi 16 ppm

$$y = 0,04961x - 0,02057$$

$$y = 0,04961 (16) - 0,02057$$

$$= 0,773143$$

## 7. Konsentrasi 18 ppm

$$y = 0,04961x - 0,02057$$

$$y = 0,04961 (18) - 0,02057$$

$$= 0,872357$$

$$\bullet \quad S_{x/y} = \sqrt{\frac{\sum |y - y'|^2}{N - 2}}$$

Keterangan :

$S_{x/y}$  = simpangan baku residual

$N$  = jumlah data

$(\sum |y - y'|)^2$  = jumlah kuadrat total residual

$$S_{x/y} = \sqrt{\frac{0,000428}{7-2}} = 0,009254$$

$$\bullet \quad \text{LOD} = 3,3 \times \frac{S_x}{b}$$

$$\text{LOD} = 3,3 \times \frac{0,009254}{0,04961}$$

$$\text{LOD} = 0,615572 \text{ ppm}$$

$$Y = 0,04961x - 0,02057$$

$$Y = 0,04961 (0,615572) - 0,02057$$

$$Y = 0,03053 - 0,02057$$

$$\text{Serapan LOD} = 0,00996$$



- $LOQ = 10 \times \frac{S_x}{b}$   
 $LOQ = 10 \times \frac{0,009254}{0,04961}$   
 $LOQ = 1,865371 \text{ ppm}$   
 $Y = 0,04961x - 0,02057$   
 $Y = 0,04961 (1,865371) - 0,02057$   
 $Y = 0,09254 - 0,02057$   
Serapan LOQ = 0,07197

### Lampiran 9. Perhitungan Efisiensi Penjerapan

Data efisiensi penjerapan

Formula	Replikasi	Absorbansi	Rata rata Absorbansi	% EP
3	1	0,785	0,787	83,72%
	2	0,788		
	3	0,787		
4	1	0,548	0,554	88,42%
	2	0,556		
	3	0,558		
5	1	0,606	0,610	87,29%
	2	0,612		
	3	0,614		

Regresi linier :

a : - 0,0205

b : 0,0496

r : 0,999224

Rumus Efisiensi Penjerapan :

$$\% EE = \frac{TD-FD}{TD} \times 100\%$$

Keterangan :

TD : total jumlah fenolat yang terdapat pada formula

FD : total senyawa fenolat yang terdeteksi pada supernatant (tidak terjerap)

#### PERHITUNGAN :

##### 1. FORMULA 3

- $y = a + bx$

$$0,787 = -0,0205 + 0,0496x$$

$$x = \frac{0,787+0,0205}{0,0496}$$

$$x = 16,280 \text{ ppm}$$

- Jumlah Fisetin yang tidak terjerap =  $\frac{16,280 \text{ ppm}}{100 \text{ ppm}} \times 10 \text{ mg}$   
= 1,628 mg

- $\% EE = \frac{10mg - 1,628mg}{10mg} \times 100 \%$   
 $= 83,72 \%$

## 2. FORMULA 4

- $y = a + bx$   
 $0,610 = -0,0205 + 0,0496x$   
 $x = \frac{0,610 + 0,0205}{0,0496}$   
 $x = 12,711 \text{ ppm}$
- Jumlah Fisetin yang tidak terjerap =  $\frac{12,711 \text{ ppm}}{100 \text{ ppm}} \times 10 \text{ mg}$   
 $= 1,27 \text{ mg}$
- $\% EE = \frac{10mg - 1,27mg}{10mg} \times 100 \%$   
 $= 87,29 \%$

## 3. FORMULA 5

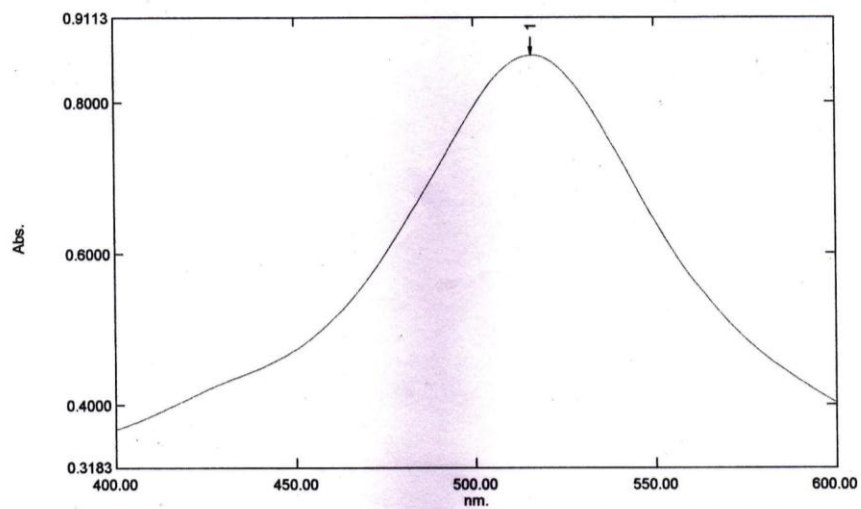
- $y = a + bx$   
 $0,554 = -0,0205 + 0,0496x$   
 $x = \frac{0,554 + 0,0205}{0,0496}$   
 $x = 11,582 \text{ ppm}$
- Jumlah Fisetin yang tidak terjerap =  $\frac{11,582 \text{ ppm}}{100 \text{ ppm}} \times 10 \text{ mg}$   
 $= 1,158 \text{ mg}$
- $\% EE = \frac{10mg - 1,158mg}{10mg} \times 100 \%$   
 $= 88,42 \%$

## Lampiran 10. Penentuan Panjang Gelombang DPPH

### Spectrum Peak Pick Report

03/13/2019 09:19:56 AM

Data Set: DPPH\_091227 - RawData



[Measurement Properties]  
 Wavelength Range (nm.): 400.00 to 600.00  
 Scan Speed: Medium  
 Sampling Interval: 1.0  
 Auto Sampling Interval: Disabled  
 Scan Mode: Auto

No.	P/V	Wavelength	Abs.	Description
1	●	516.00	0.8619	

[Instrument Properties]  
 Instrument Type: UV-1800 Series  
 Measuring Mode: Absorbance  
 Slit Width: 1.0 nm  
 Light Source Change Wavelength: 340.0 nm  
 S/R Exchange: Normal

[Attachment Properties]  
 Attachment: None

[Operation]  
 Threshold: 0.0010000  
 Points: 4  
 InterPolate: Disabled  
 Average: Disabled

[Sample Preparation Properties]  
 Weight:  
 Volume:  
 Dilution:  
 Path Length:  
 Additional Information:

## Lampiran 11. Penentuan Operating Time DPPH

## Kinetics Data Print Report

03/13/2019 05:15:51 PM

---

Time ( Minute )	RawData ...
0.000	0.688
1.000	0.662
2.000	0.643
3.000	0.628
4.000	0.615
5.000	0.606
6.000	0.598
7.000	0.591
8.000	0.586
9.000	0.580
10.000	0.576
11.000	0.572
12.000	0.569
13.000	0.566
14.000	0.563
15.000	0.560
16.000	0.558
17.000	0.556
18.000	0.554
19.000	0.552
20.000	0.550
21.000	0.549
22.000	0.547
23.000	0.546
24.000	0.544
25.000	0.543
26.000	0.542
27.000	0.541
28.000	0.540
29.000	0.539
30.000	0.538
31.000	0.537
32.000	0.536
33.000	0.535
34.000	0.534
35.000	0.533
36.000	0.533
37.000	0.532
38.000	0.531
39.000	0.530
40.000	0.530
41.000	0.529
42.000	0.528
43.000	0.528
44.000	0.527
45.000	0.527
46.000	0.526
47.000	0.525
48.000	0.525
49.000	0.524
50.000	0.524

---

**Kinetics Data Print Report**

03/13/2019 05:15:51 PM

Time ( Minute )	RawData ...
51.000	0.523
52.000	0.523
53.000	0.522
54.000	0.522
55.000	0.521
56.000	0.521
57.000	0.521
58.000	0.520
59.000	0.520
60.000	0.519

**Lampiran 12. Data penimbangan DPPH dan pembuatan larutan stok****Penimbangan DPPH**

Serbuk DPPH untuk uji antioksidan ditimbang sesuai hasil perhitungan berikut :

$$\begin{aligned}\text{Penimbangan DPPH} &= \text{BM DPPH} \times \text{Volume larutan} \times \text{Molaritas DPPH} \\ &= 394,32 \text{ g/mol} \times 0,1 \text{ liter} \times 0,0004 \text{ M} \\ &= 0,015772 \text{ g} \approx 15,78 \text{ mg} \approx 15,8 \text{ mg}\end{aligned}$$

**Pembuatan larutan stok DPPH**

Serbuk DPPH ditimbang sebanyak 15,8 mg, kemudian dilarutkan dengan etanol pro analisa hingga tanda batas labu takar 100,0 mL, labu takar yang digunakan terlebih dahulu dilapisi dengan aluminium foil.

**Lampiran 13. Data perhitungan dan pembuatan seri konsentrasi dari larutan stok fisetin, sediaan nanofitosom fisetin dan basis nanofitosom**

**Pembuatan Larutan Stok Fisetin**

Penimbangan serbuk fisetin untuk pembuatan larutan stok yaitu sebanyak 10 mg kemudian dilarutkan menggunakan etanol pro analisa dalam labu ukur 100 ml hingga tanda batas, sehingga diperoleh konsentrasi larutan fisetin yaitu 100 ppm.

Penimbangan fisetin :

Kertas kosong	= 0,2432 mg
Kertas + zat	= 10,3021 mg
Kertas + sisa	= 0,2911 mg
Berat zat	= 10,011 mg

$$\begin{aligned} \text{Konsentrasi fisetin} &= 10 \text{ mg}/100 \text{ mL} \\ &= 100 \text{ mg}/1000 \text{ mL} \\ &= 100 \text{ ppm} \\ &= 100 \mu\text{g}/\text{ml} \end{aligned}$$

Larutan fisetin konsentrasi 100 ppm diencerkan menjadi 6 seri konsentrasi yaitu : 10 ppm, 20 ppm, 30 ppm, 40 ppm, 50 ppm, dan 60 ppm.

**Pembuatan Seri Konsentrasi :**

➤ Konsentrasi 10 ppm

$$\begin{aligned} V_1 \times V_1 &= V_2 \times V_2 \\ V_1 \times 100 \text{ ppm} &= 10 \text{ ml} \times 10 \text{ ppm} \\ V_1 &= \frac{10 \text{ ml} \times 10 \text{ ppm}}{100 \text{ ppm}} \\ &= 1 \text{ ml} \end{aligned}$$

Dipipet larutan stok fisetin konsentrasi 100 ppm sebanyak 1 ml dimasukkan kedalam labu ukur 10 ml, kemudian ditambahkan etanol pro analisa hingga tanda batas.

➤ Konsentrasi 20 ppm



$$\begin{aligned}
 V_1 \times V_1 &= V_2 \times V_2 \\
 V_1 \times 100 \text{ ppm} &= 10 \text{ ml} \times 20 \text{ ppm} \\
 V_1 &= \frac{10 \text{ ml} \times 20 \text{ ppm}}{100 \text{ ppm}} \\
 &= 2 \text{ ml}
 \end{aligned}$$

Dipipet larutan stok fisetin konsentrasi 100 ppm sebanyak 2 ml dimasukkan kedalam labu ukur 10 ml, kemudian ditambahkan etanol pro analisa hingga tanda batas.

➤ Konsentrasi 30 ppm

$$\begin{aligned}
 V_1 \times V_1 &= V_2 \times V_2 \\
 V_1 \times 100 \text{ ppm} &= 10 \text{ ml} \times 30 \text{ ppm} \\
 V_1 &= \frac{10 \text{ ml} \times 30 \text{ ppm}}{100 \text{ ppm}} \\
 &= 3 \text{ ml}
 \end{aligned}$$

Dipipet larutan stok fisetin konsentrasi 100 ppm sebanyak 3 ml dimasukkan kedalam labu ukur 10 ml, kemudian ditambahkan etanol pro analisa hingga tanda batas.

➤ Konsentrasi 40 ppm

$$\begin{aligned}
 V_1 \times V_1 &= V_2 \times V_2 \\
 V_1 \times 100 \text{ ppm} &= 10 \text{ ml} \times 40 \text{ ppm} \\
 V_1 &= \frac{10 \text{ ml} \times 40 \text{ ppm}}{100 \text{ ppm}} \\
 &= 4 \text{ ml}
 \end{aligned}$$

Dipipet larutan stok fisetin konsentrasi 100 ppm sebanyak 4 ml dimasukkan kedalam labu ukur 10 ml, kemudian ditambahkan etanol pro analisa hingga tanda batas.

➤ Konsentrasi 50 ppm

$$\begin{aligned}
 V_1 \times V_1 &= V_2 \times V_2 \\
 V_1 \times 100 \text{ ppm} &= 10 \text{ ml} \times 50 \text{ ppm}
 \end{aligned}$$

$$\begin{aligned}
 V_1 &= \frac{10 \text{ ml} \times 50 \text{ ppm}}{100 \text{ ppm}} \\
 &= 5 \text{ ml}
 \end{aligned}$$

Dipipet larutan stok fisetin konsentrasi 100 ppm sebanyak 5 ml dimasukkan kedalam labu ukur 10 ml, kemudian ditambahkan etanol pro analisa hingga tanda batas.

➤ **Konsentrasi 60 ppm**

$$\begin{aligned}
 V_1 \times V_1 &= V_2 \times V_2 \\
 V_1 \times 100 \text{ ppm} &= 10 \text{ ml} \times 60 \text{ ppm} \\
 V_1 &= \frac{10 \text{ ml} \times 60 \text{ ppm}}{100 \text{ ppm}} \\
 &= 6 \text{ ml}
 \end{aligned}$$

Dipipet larutan stok fisetin konsentrasi 100 ppm sebanyak 6 ml dimasukkan kedalam labu ukur 10 ml, kemudian ditambahkan etanol pro analisa hingga tanda batas.

### **Pembuatan larutan stok nanofitosom fisetin**

Pembuatan sediaan nanofitosom fisetin menggunakan serbuk fisetin sebanyak 10 mg yang dibuat dalam sediaan 20 ml.

Konsentrasi larutan stok Nanofitosom Fisetin :

$$= 10 \text{ mg} / 20 \text{ ml}$$

$$= 500 \text{ mg} / 1000 \text{ ml}$$

$$= 500 \text{ ppm}$$

Larutan nanofitosom fisetin 500 ppm diencerkan setengahnya untuk pembuatan 6 seri konsentrasi yaitu : 250 ppm; 125 ppm; 62,5 ppm; 31,25 ppm; 15,625 ppm dan 7,812 ppm.

**Pembuatan Seri Konsentrasi :**

➤ Konsentrasi 250 ppm

$$V_1 \times V_1 = V_2 \times V_2$$

$$V_1 \times 500 \text{ ppm} = 10 \text{ ml} \times 250 \text{ ppm}$$

$$V_1 = \frac{10 \text{ ml} \times 250 \text{ ppm}}{500 \text{ ppm}}$$

$$= 5 \text{ ml}$$

Dipipet larutan stok nanofitosom fisetin konsentrasi 500 ppm sebanyak 5 ml dimasukkan kedalam labu ukur 10 ml, kemudian ditambahkan etanol pro analisa hingga tanda batas.

➤ Konsentrasi 125 ppm

$$V_1 \times V_1 = V_2 \times V_2$$

$$V_1 \times 500 \text{ ppm} = 10 \text{ ml} \times 125 \text{ ppm}$$

$$V_1 = \frac{10 \text{ ml} \times 125 \text{ ppm}}{500 \text{ ppm}}$$

$$= 2,5 \text{ ml}$$

Dipipet larutan stok nanofitosom fisetin konsentrasi 500 ppm sebanyak 2,5 ml dimasukkan kedalam labu ukur 10 ml, kemudian ditambahkan etanol pro analisa hingga tanda batas.

➤ Konsentrasi 62,5 ppm

$$V_1 \times V_1 = V_2 \times V_2$$

$$V_1 \times 500 \text{ ppm} = 10 \text{ ml} \times 62,5 \text{ ppm}$$

$$V_1 = \frac{10 \text{ ml} \times 62,5 \text{ ppm}}{500 \text{ ppm}}$$

$$= 1,25 \text{ ml}$$

Dipipet larutan stok nanofitosom fisetin konsentrasi 500 ppm sebanyak 1,25 ml dimasukkan kedalam labu ukur 10 ml, kemudian ditambahkan etanol pro analisa hingga tanda batas.

➤ Konsentrasi 31,25 ppm

$$V_1 \times V_1 = V_2 \times V_2$$

$$V_1 \times 500 \text{ ppm} = 10 \text{ ml} \times 31,25 \text{ ppm}$$

$$\begin{aligned}
 V_1 &= \frac{10 \text{ ml} \times 31,25 \text{ ppm}}{500 \text{ ppm}} \\
 &= 0,625 \text{ ml}
 \end{aligned}$$

Dipipet larutan stok nanofitosom fisetin konsentrasi 500 ppm sebanyak 0,625 ml dimasukkan kedalam labu ukur 10 ml, kemudian ditambahkan etanol pro analisa hingga tanda batas.

➤ Konsentrasi 15,625 ppm

$$\begin{aligned}
 V_1 \times V_1 &= V_2 \times V_2 \\
 V_1 \times 500 \text{ ppm} &= 10 \text{ ml} \times 15,625 \text{ ppm} \\
 V_1 &= \frac{10 \text{ ml} \times 15,625 \text{ ppm}}{500 \text{ ppm}} \\
 &= 0,312 \text{ ml}
 \end{aligned}$$

Dipipet larutan stok nanofitosom fisetin konsentrasi 500 ppm sebanyak 0,312 ml dimasukkan kedalam labu ukur 10 ml, kemudian ditambahkan etanol pro analisa hingga tanda batas.

➤ Konsentrasi 7,812 ppm

$$\begin{aligned}
 V_1 \times V_1 &= V_2 \times V_2 \\
 V_1 \times 500 \text{ ppm} &= 10 \text{ ml} \times 7,812 \text{ ppm} \\
 V_1 &= \frac{10 \text{ ml} \times 7,812 \text{ ppm}}{500 \text{ ppm}} \\
 &= 0,156 \text{ ml}
 \end{aligned}$$

Dipipet larutan stok nanofitosom fisetin konsentrasi 500 ppm sebanyak 0,156 ml dimasukkan kedalam labu ukur 10 ml, kemudian ditambahkan etanol pro analisa hingga tanda batas.

### **Pembuatan Larutan Pembawa Nanofitosom Fisetin**

Pengujian larutan pembawa nanofitosom fisetin perlakuannya seperti pada pembuatan sediaan nanofitosom fisetin dan dengan seri konsentrasi yang sama. Pembacaan dilihat dari 3 seri konsentrasi terlebih dahulu jika stabil (memiliki nilai absorbansi yang sama berturut turut) berarti basis tidak beraktivitas antioksidan.

**Pembuatan Seri Konsentrasi :**

- Konsentrasi 250 ppm

$$V_1 \times V_1 = V_2 \times V_2$$

$$V_1 \times 500 \text{ ppm} = 10 \text{ ml} \times 250 \text{ ppm}$$

$$V_1 = \frac{10 \text{ ml} \times 250 \text{ ppm}}{500 \text{ ppm}}$$

$$= 5 \text{ ml}$$

Dipipet larutan stok nanofitosom fisetin konsentrasi 500 ppm sebanyak 5 ml dimasukkan kedalam labu ukur 10 ml, kemudian ditambahkan etanol pro analisa hingga tanda batas.

- Konsentrasi 125 ppm

$$V_1 \times V_1 = V_2 \times V_2$$

$$V_1 \times 500 \text{ ppm} = 10 \text{ ml} \times 125 \text{ ppm}$$

$$V_1 = \frac{10 \text{ ml} \times 125 \text{ ppm}}{500 \text{ ppm}}$$

$$= 2,5 \text{ ml}$$

Dipipet larutan stok nanofitosom fisetin konsentrasi 500 ppm sebanyak 2,5 ml dimasukkan kedalam labu ukur 10 ml, kemudian ditambahkan etanol pro analisa hingga tanda batas.

- Konsentrasi 62,5 ppm

$$V_1 \times V_1 = V_2 \times V_2$$

$$V_1 \times 500 \text{ ppm} = 10 \text{ ml} \times 62,5 \text{ ppm}$$

$$V_1 = \frac{10 \text{ ml} \times 62,5 \text{ ppm}}{500 \text{ ppm}}$$

$$= 1,25 \text{ ml}$$

Dipipet larutan stok nanofitosom fisetin konsentrasi 500 ppm sebanyak 1,25 ml dimasukkan kedalam labu ukur 10 ml, kemudian ditambahkan etanol pro analisa hingga tanda batas.

## Lampiran 14. Perhitungan IC<sub>50</sub> Fisetin

### Pembacaan Absorbansi Senyawa Tunggal Fisetin

Aktivitas antioksidan				
	Konsentrasi (ppm)	Replikasi	Absorbansi Kontrol	Absorbansi Sampel
Fisetin	10	Replikasi I	0,862	0,615
	20			0,508
	30			0,420
	40			0,310
	50			0,205
	60			0,189
	10	Replikasi II		0,587
	20			0,502
	30			0,397
	40			0,307
	50			0,200
	60			0,197
	10	Replikasi III		0,620
	20			0,532
	30			0,425
	40			0,334
	50			0,217
	60			0,212

### Perhitungan Prosen Peredaman dan IC<sub>50</sub> Fisetin

Perhitungan prosentase peredaman menggunakan rumus :

$$\text{Peredaman (\%)} = \frac{\text{absorbansi kontrol} - \text{absorbansi sampel}}{\text{absorbansi kontrol}} \times 100 \%$$

	Konsentrasi (ppm)	% Peredaman	Hasil Regresi Linier	IC <sub>50</sub>	Rata-rata ± SD
Replikasi I	10	28,654	a= 20,023 b= 1,044 r= 0,9883	28,713	28,735 ± 1,575
	20	41,067			
	30	51,276			
	40	64,037			
	50	76,218			
	60	78,074			
Replikasi II	10	31,902	a= 23,481 b= 0,976 r= 0,9846	27,171	
	20	41,763			
	30	53,944			
	40	64,385			
	50	76,789			
	60	77,146			
Replikasi III	10	28,074	a= 19,072 b= 1,020 r= 0,9860	30,321	
	20	38,283			
	30	50,696			
	40	61,252			
	50	74,826			
	60	75,406			

### Perhitungan % Peredaman Fisetin :

#### 1. Replikasi I :

- Konsentrasi 10 ppm

$$\begin{aligned} \% \text{Peredaman} &= \frac{0,862 - 0,615}{0,862} \times 100\% \\ &= 28,654 \% \end{aligned}$$

- Konsentrasi 20 ppm

$$\begin{aligned} \% \text{Peredaman} &= \frac{0,862 - 0,508}{0,862} \times 100\% \\ &= 41,067 \% \end{aligned}$$

- Konsentrasi 30 ppm

$$\begin{aligned} \% \text{Peredaman} &= \frac{0,862 - 0,420}{0,862} \times 100\% \\ &= 51,276 \% \end{aligned}$$

- Konsentrasi 40 ppm

$$\begin{aligned} \% \text{Peredaman} &= \frac{0,862 - 0,310}{0,862} \times 100\% \\ &= 64,037 \% \end{aligned}$$

- Konsentrasi 50 ppm

$$\begin{aligned} \% \text{Peredaman} &= \frac{0,862 - 0,205}{0,862} \times 100\% \\ &= 76,218 \% \end{aligned}$$

- Konsentrasi 60 ppm

$$\begin{aligned} \% \text{Peredaman} &= \frac{0,862 - 0,189}{0,862} \times 100\% \\ &= 78,074 \% \end{aligned}$$

#### 2. Replikasi II

- Konsentrasi 10 ppm

$$\begin{aligned} \% \text{Peredaman} &= \frac{0,862 - 0,587}{0,862} \times 100\% \\ &= 31,902 \% \end{aligned}$$

- Konsentrasi 20 ppm

$$\begin{aligned} \% \text{Peredaman} &= \frac{0,862 - 0,502}{0,862} \times 100\% \\ &= 41,763 \% \end{aligned}$$

➤ Konsentrasi 30 ppm

$$\begin{aligned}\% \text{Peredaman} &= \frac{0,862 - 0,397}{0,862} \times 100\% \\ &= 53,944 \%\end{aligned}$$

➤ Konsentrasi 40 ppm

$$\begin{aligned}\% \text{Peredaman} &= \frac{0,862 - 0,307}{0,862} \times 100\% \\ &= 64,385 \%\end{aligned}$$

➤ Konsentrasi 50 ppm

$$\begin{aligned}\% \text{Peredaman} &= \frac{0,862 - 0,200}{0,862} \times 100\% \\ &= 76,789 \%\end{aligned}$$

➤ Konsentrasi 60 ppm

$$\begin{aligned}\% \text{Peredaman} &= \frac{0,862 - 0,197}{0,862} \times 100\% \\ &= 77,146 \%\end{aligned}$$

### 3. Replikasi III

➤ Konsentrasi 10 ppm

$$\begin{aligned}\% \text{Peredaman} &= \frac{0,862 - 0,620}{0,862} \times 100\% \\ &= 28,074 \%\end{aligned}$$

➤ Konsentrasi 20 ppm

$$\begin{aligned}\% \text{Peredaman} &= \frac{0,862 - 0,532}{0,862} \times 100\% \\ &= 38,283 \%\end{aligned}$$

➤ Konsentrasi 30 ppm

$$\begin{aligned}\% \text{Peredaman} &= \frac{0,862 - 0,425}{0,862} \times 100\% \\ &= 50,696 \%\end{aligned}$$

➤ Konsentrasi 40 ppm

$$\begin{aligned}\% \text{Peredaman} &= \frac{0,862 - 0,334}{0,862} \times 100\% \\ &= 61,252 \%\end{aligned}$$

➤ Konsentrasi 50 ppm

$$\begin{aligned}\% \text{Peredaman} &= \frac{0,862 - 0,217}{0,862} \times 100\% \\ &= 74,826 \%\end{aligned}$$



➤ Konsentrasi 60 ppm

$$\begin{aligned}\% \text{Peredaman} &= \frac{0,862 - 0,212}{0,862} \times 100\% \\ &= 75,406 \%\end{aligned}$$

### Perhitungan IC<sub>50</sub> Fisetin :

1. Replikasi I

$$\text{IC}_{50} \rightarrow y = a + bx$$

$$\rightarrow 50 = 20,023 + 1,044x$$

$$\rightarrow x = \frac{50 - 20,023}{1,044}$$

$$\rightarrow 28,713 \text{ ppm}$$

2. Replikasi II

$$\text{IC}_{50} \rightarrow y = a + bx$$

$$\rightarrow 50 = 23,481 + 0,976x$$

$$\rightarrow x = \frac{50 - 23,481}{0,976}$$

$$\rightarrow 27,171 \text{ ppm}$$

3. Replikasi III

$$\text{IC}_{50} \rightarrow y = a + bx$$

$$\rightarrow 50 = 19,072 + 1,020x$$

$$\rightarrow x = \frac{50 - 19,072}{1,020}$$

$$\rightarrow 30,321 \text{ ppm}$$

### Lampiran 15. Perhitungan IC<sub>50</sub> Nanofitosom Fisetin

#### Pembacaan Absorbansi Sediaan Nanofitosom Fisetin

Aktivitas antioksidan				
Nanofitosom Fisetin	Konsentrasi (ppm)	Replikasi	Absorbansi Kontrol	Absorbansi Sampel
	250	Replikasi I	0,862	0,203
	125			0,269
	62,5			0,345
	31,2			0,403
	15,625			0,527
	7,812			0,676
	250	Replikasi II		0,212
	125			0,269
	62,5			0,347
	31,2			0,408
	15,625			0,546
	7,812			0,711
	250	Replikasi III		0,212
	125			0,287
	62,5			0,316
	31,2			0,421
	15,625			0,535
	7,812			0,681

#### Perhitungan Prosen Peredaman dan IC<sub>50</sub> Nanofitosom Fisetin

Perhitungan prosentase peredaman menggunakan rumus :

$$\text{Peredaman (\%)} = \frac{\text{absorbansi kontrol} - \text{absorbansi sampel}}{\text{absorbansi kontrol}} \times 100 \%$$

	Konsentrasi (ppm)	% Peredaman	Hasil Regresi Linier	IC <sub>50</sub>	Rata-rata ± SD
Replikasi I	250	76,45	a= 38,369 b= 0,180 r= 0,828	64,617	68,257 ± 4,017
	125	68,793			
	62,5	59,977			
	31,2	53,248			
	15,625	38,863			
	7,812	21,578			
Replikasi II	250	75,406	a=36,430 b= 0,187 r= 0,807	72,567	
	125	68,793			
	62,5	59,744			
	31,2	52,668			
	15,625	36,659			
	7,812	17,517			
Replikasi III	250	75,406	a= 38,037 b= 0,177 r= 0,812	67,588	
	125	66,705			
	62,5	63,341			
	31,2	51,160			
	15,625	37,935			
	7,812	20,998			

### Perhitungan % Peredaman Nanofitosom Fisetin :

#### 1. Replikasi I

- Konsentrasi 250 ppm

$$\begin{aligned} \% \text{Peredaman} &= \frac{0,862 - 0,203}{0,862} \times 100\% \\ &= 76,45\% \end{aligned}$$

- Konsentrasi 125 ppm

$$\begin{aligned} \% \text{Peredaman} &= \frac{0,862 - 0,269}{0,862} \times 100\% \\ &= 68,793\% \end{aligned}$$

- Konsentrasi 62,5 ppm

$$\begin{aligned} \% \text{Peredaman} &= \frac{0,862 - 0,345}{0,862} \times 100\% \\ &= 59,977\% \end{aligned}$$

- Konsentrasi 31,2 ppm

$$\begin{aligned} \% \text{Peredaman} &= \frac{0,862 - 0,403}{0,862} \times 100\% \\ &= 53,248\% \end{aligned}$$

- Konsentrasi 15,625 ppm

$$\begin{aligned} \% \text{Peredaman} &= \frac{0,862 - 0,527}{0,862} \times 100\% \\ &= 38,863\% \end{aligned}$$

- Konsentrasi 7,812 ppm

$$\begin{aligned} \% \text{Peredaman} &= \frac{0,862 - 0,676}{0,862} \times 100\% \\ &= 21,578\% \end{aligned}$$

#### 2. Replikasi II

- Konsentrasi 250 ppm

$$\begin{aligned} \% \text{Peredaman} &= \frac{0,862 - 0,212}{0,862} \times 100\% \\ &= 75,406\% \end{aligned}$$

- Konsentrasi 125 ppm

$$\begin{aligned} \% \text{Peredaman} &= \frac{0,862 - 0,269}{0,862} \times 100\% \\ &= 68,793\% \end{aligned}$$

- Konsentrasi 62,5 ppm  

$$\% \text{Peredaman} = \frac{0,862 - 0,347}{0,862} \times 100\%$$

$$= 59,744 \%$$
- Konsentrasi 31,2 ppm  

$$\% \text{Peredaman} = \frac{0,862 - 0,408}{0,862} \times 100\%$$

$$= 52,668 \%$$
- Konsentrasi 15,625 ppm  

$$\% \text{Peredaman} = \frac{0,862 - 0,546}{0,862} \times 100\%$$

$$= 36,659 \%$$
- Konsentrasi 7,812 ppm  

$$\% \text{Peredaman} = \frac{0,862 - 0,711}{0,862} \times 100\%$$

$$= 17,517 \%$$

### 3. Replikasi III

- Konsentrasi 250 ppm  

$$\% \text{Peredaman} = \frac{0,862 - 0,212}{0,862} \times 100\%$$

$$= 75,406 \%$$
- Konsentrasi 125 ppm  

$$\% \text{Peredaman} = \frac{0,862 - 0,287}{0,862} \times 100\%$$

$$= 66,705 \%$$
- Konsentrasi 62,5 ppm  

$$\% \text{Peredaman} = \frac{0,862 - 0,316}{0,862} \times 100\%$$

$$= 63,341 \%$$
- Konsentrasi 31,2 ppm  

$$\% \text{Peredaman} = \frac{0,862 - 0,421}{0,862} \times 100\%$$

$$= 51,160 \%$$
- Konsentrasi 15,625 ppm  

$$\% \text{Peredaman} = \frac{0,862 - 0,535}{0,862} \times 100\%$$

$$= 37,935 \%$$

➤ Konsentrasi 7,812 ppm

$$\begin{aligned}\% \text{Peredaman} &= \frac{0,862 - 0,681}{0,862} \times 100\% \\ &= 20,998 \%\end{aligned}$$

### Perhitungan IC<sub>50</sub> Nanofitosom Fisetin :

#### 1. Replikasi I

$$\text{IC}_{50} \rightarrow y = a + bx$$

$$\rightarrow 50 = 38,369 + 0,180x$$

$$\rightarrow x = \frac{50 - 38,369}{0,180}$$

$$\rightarrow 64,617 \text{ ppm}$$

#### 2. Replikasi II

$$\text{IC}_{50} \rightarrow y = a + bx$$

$$\rightarrow 50 = 36,430 + 0,187x$$

$$\rightarrow x = \frac{50 - 36,430}{0,187}$$

$$\rightarrow 72,567 \text{ ppm}$$

#### 3. Replikasi III

$$\text{IC}_{50} \rightarrow y = a + bx$$

$$\rightarrow 50 = 38,037 + 0,177x$$

$$\rightarrow x = \frac{50 - 38,037}{0,177}$$

$$\rightarrow 67,588 \text{ ppm}$$

### Lampiran 16. Pengujian Aktivitas Antioksidan Zat Pembawa NanoFitosom

Pengujian aktivitas antioksidan zat pembawa nanofitosom dilakukan pembacaan pada 3 seri konsentrasi dan diamati kestabilan absorbansi yang diperoleh.

Konsentrasi	Replikasi	Absorbansi	Rata rata	Kesimpulan
250 ppm	1	1,051	1,051	Stabil, maka tidak memiliki daya antioksidan
	2	1,052		
	3	1,052		
125 ppm	1	1,050	1,051	
	2	1,051		
	3	1,052		
62,5 ppm	1	1,051	1,051	
	2	1,052		
	3	1,051		