BAB V
KESIMPULAN DAN SARAN

A. KESIMPULAN

Berdasarkan hasil studi deskriptif yang telah dilakukan maka dapat disimpulkan bahwa:

1. Resveratrol dapat dibuat dalam sediaan SLN dan NLC dengan karakteristik yang baik.
2. NLC resveratrol dapat memberikan karakteristik yang lebih baik dibanding pada SLN.

B. SARAN

Berdasarkan hasil studi deskriptif yang telah dilakukan maka penulis menyarankan perlu adanya penelitian lebih lanjut agar hasil yang didapatkan lebih maksimal, yaitu:

1. Perlu dilakukan uji karakteristik SLN dan NLC resveratrol lebih lanjut.
2. Perlu dilakuakn uji pelepasan obat pada sistem SLN dan NLC resveratrol secara *in vivo* maupun *in vitro.*

DAFTAR PUSTAKA

[USP]. 2009. *The United State Pharmacopeia.* Ed ke-32. Rockville : The United State Pharmacopeial Convention Inc.

Aisiyah, S., Harjanti, R., Nopiyanti, V. 2019. Pengaruh Panjang Rantai Karbon Lipid Padat terhadap Karakteristik *Nanostructured Lipid Carrier* Resveratrol. Program Studi S1 Fakultas Farmasi, Fakultas Farmasi, Universitas Setia Budi. JPSCR: *Journal of Pharmaceutical Science and Clinical Research*.2:69-81 DOI: 10.20961/jpscr.v4i2.34408

Annisa, R., Hendradi, E., Melani, D. 2016. Pengembangan sistem *nanostructured lipid carriers* (NLC) meloxicam dengan lipid monostearin dan miglyol 808 menggunakanmetode emulsifikasi. *J. Trop. Pharm. Chem.* 2016. Vol 3. No. 3.

Ansel, H.C. 2008. *Pengantar Bentuk Sediaan Farmasi.* ed IV. Alih bahasa Ibrahim, F. Jakarta : UI Press.

Atun, S., Arianingrum, R., Yoshiaki, T., And Masatake, N. 2010. *Phenolic content and cytotoxic ptoperties of fermented black soybeans (glycine soja) extract on human HeLa-S3 and raji cell lines*. Proceeding *PACOON*. 689-691. Thailand: Ubon Ratchatani.

Badarinath, A., RAo, K.M., Chetty, C.S., Ramkanth, S., Rajan, T., & Gnanaprakash, K. 2010. A Riview on in-vitro Antioksidant Methods : Comparisions, Correlation and Considerations. *International Journal of PharmTech Research.* Vol.2. No.2. pp 1276-1285. April-June 2010.

Barbosa, P.J., Neves, A.R., Silva, A.M., Barbosa, M.A., Reis, M.S., Santos, S.G. 2016. Nanostructured lipid carriers loaded with resveratrol modulate human dendritic cells. *International Journal of Nanomedicine*. 2016:11.

Carlotti, M. E., Sapino, S., Segundo, S., Ugazro, E., Gallrate, M., Morel, S. 2012. Resveratrol in solid lipid nanoparticles. *Journal of dispersion science and technology.* 33.

Chen, C.C., Tsai T. H., Huang, Z. R., & Fang, J. Y. 2010. Effects of Lipophilic Emulsifiers on The Oral Administration of Lovastatin from Nanostructured Lipid Carriers : Physicochemical Characterization and Pharmacokinetics. *Eurpean Journal of Pharmaceutics and Biopharmaceutics vol. 74*, p. 472-482.

Chen, J., Wei, N., Garcia, M. L., Ambrosw, D., Lee, J., Annelin, C., Peterson, T., 2017. Development and evaluation of resveratrol, Vitamin E, and

epigallocatechin gallate loaded lipid nanoparticles for skin care applications. *Eurpean Journal of Pharmaceutics and Biopharmaceutics.* 117, p. 286-291.

Couvreur, P., Kante, B., Lenaerts, V., Scailteur, V., Roland, M., and Speiser P. 2002. Tissue Distribution of Antitumor Drugs Associated with Polyalkylcyanoacrylate Nanoparticles. *J. Pharm. Sci*. 69: 199-202.

Eid, A. M. M., Elmarzugi, N. A., & El-Enshasy, H.A. 2013. Preparation and evaluation of olive oil nanoemulsion using sucrose monoester. *International Journal of Pharmacy Pharmaceuticals Science.* 5, 434-440.

Gambini J *et al*. 2015. Properties of Resveratrol: *In Vitro* and *In Vivo* Studies about Metabolism, Bioavailability, and Biological Effects in Animal Models and Humans. *Oxidative Medicine and Cellular Longevity*.

Gandjar, I.G., Rohman, A. 2007. *Kimia Farmasi Analisis.* Yogyakarta : Pustaka Pelajar. hlm 456-474.

Gandjar, I.G., Rohman, A. 2012. *Analisis Obat Secara Kromatografi dan Spektroskopi.* Yogyakarta : Pustaka Pelajar. hlm 466-497.

Gerszon, J., Aleksandra, R., Mieczysław, P. 2014. Antioxidant properties of resveratrol and its protective effects in neurodegenerative diseases. *Department of Radiobiology, Faculty of Biology and Environmental Protection, University ofŁódz advances in cell biology*. Vol.4. Hlm. (97–117).

Gokce, H.E., Korkmaz, E., Dellera, E., Sandri, G., Bonferoni, M.C., and Ozer O. 2012. Resveratrol-loaded Solid Lipid Nanoparticles versus Nanostructured lipid Carriers: evaluation of antioxidant potential for dermal applications. *International Journal of Nanomedicine.* Vol. 7. Hlm. 1941-1850.

Hanani, E., Mun'im, A., Sekarini, R., dan Wiryowidagdo, S. 2006. Uji aktivitas antioksidant beberapa spons laut dari kepulauan Seribu. *Jurnal Bahan Alam Indonesi.* vol 5. no.1 (*in Press*).

Hao, J., Gao, Y., Zhao, J., Li, Z., Zhao, Z., and Liu, J. 2014. Preparation and Optimization of Resveratrol Nanosuspensions by Antisolvent Precipitation Using Box-Behnken Design. *AAPS PharmaSciTech*. Vol. 16, No. 1.

Harmita. 2014. Petunjuk Pelaksanaan Validasi Metode dan Cara Perhitungannya.*Majalah Ilmu Kefarmasian*. 1(3): 117-135.

Hernani., dan Raharjo, M. 2005. *Tanaman Berkhasiat Antioksidan*. Cetakan I. Jakarta : Penebar Swadaya. Hal: 3, 9, 11, 16-17.

Hidayah, R., Rosita, N., 2018. Development Nanostructured Lipid Carriers (NLC) Loaded Resveratrol with Different Combination of Soybean Oil and Oleic Acid. *International Journal of Advances in Scientific Research and Engineering (ijasre).* 4(11): 64-70. doi: 10.31695/IJASRE.2018.32935

Hung, C., Yin, L., Zih, H., Jia, F. 2008. Delivery of Resveratrol, a Red Wine Polyphenol, from Solutions andHydrogels *via* the Skin.*Biol Pharm Bull.* 31(5): 955-962.

Jones, D. 2008. *FASTTrack: Pharmaceutics – Dosage Form and Design*.

Kitchenham B, Charters S. 2007. Guidelines for Performing Systematic Literature Reviews in Software Engineering. Technical Report EBSE 2007-001. Keele University and Durham University Joint Report.

Komaiko, J.S.,& McClements, D.J. 2016. Formation of Food-Grade Nanoemulsions Using Low-Energy Preparation Methods: A Review of Available Methods. *Institute of Food Technologists*. Vol.15,2016.

Li, B., & Ge, Z. Q. 2012. Nanostructure Lipid Carrier Improve Skin Permeation and Chemical Stability of Idebenone. *AAPS PharmSci Tech*. Vol.13 No. 1. p. 276-283.

Mader, K. 2006. Solid Lipid Nanoparticles as Drug Carriers. In V. P. Torchilin, *Nanoparticulate as Drug Carrier* (pp. 187-205). London: Imperial Colllege Press.

Mulhaquddin. 2014. *Validation Method*. Dipresentasikan pada Diklat Validasi Metode, Baristand Industri Ambon 10 - 13 Juni 2014.

Muller, R. H., K., Mader, K., & Gohla, S. 2000. Solid Lipid Nanoparticles (SLN) for Controlled Drug Delivery-A Review of The State of The Art. *European journal of Pharmaceutics and Biopharmaceutics*, p. 161-177.

Mukerjee A, dan Vishwanathan JK. 2009. Formulation, Characterization And Evaluation Of Curcumin-Loaded PLGA Nanospheres For Cancer Therapy. *Anticancer Res*. Vol 29 : 3867-3875.

Naibaho, D.H., Yamkan, V.Y., Weni, Wiyono. 2013. Pengaruh Basis Salep Terhadap Formulasi Sediaan Salep Ekstrak Daun Kemangi (Ocinum sanchum L.) pada Kulit Punggung Kelinci yang dibuat Infeksi Staphylococcus aureus. *Jurnal ilmiah Farmasi – UNSRAT*. 2(2).

Neves, A. R., Martins, S., Segundo, M. A., Reis, S. 2016. Nanoscale Delivery of Resveratrol towards Enhancement of Supplements and Nutraceuticals. *Nutrients.* 8, (131). doi:10.3390/nu8030131

Nidhin,M. Indumathy, R. Sreeram, K.J. and Nair., B.U. 2008. Synthesis of Iron Oxide Nnaoparticles of Narrow Size Distribution on Polysaccharide Templates. *Buletin Materaial Scence.* 31 (1). 93-96.

Padusitrada. 2019. Formulasi *Nanostructured Lipid Carrier* (NLC) Resveratrol dengan Variasi Lipid Cair dan Surfaktan Menggunakan Metode Emulsifikasi-Sonikasi [Skripsi]. Surakarta: Fakultas Farmasi, Universitas Setia Budi.

Paulus, E, M., Djoko, S. 2012. Uji Aktivitas Antioksidan Tumbuhan Cynara scolimus L., Arthemisia china L., Borreria Rrpens DC., Polygala paniculata L., Hasil Koleksi dari Taman Nasional Gunung Merapi Dengan Metode Penagkapan Radikal DPPH (2,2-Difenil-1-Pikrilhidrazil). *Majalah Obat Tradisional* : 17(3), 53-60.

Pokorny, J. N., Yanishleva, and Gordon, M. 2001. *Antioxidant in Food*. Woodhead Publishing Ltd. England.

Prakash, A. 2001. Antioxidant Activity. *Medallion Laboratories-Analytical Progress.* Volume 19. Nomor 2. Hal 1-4.

Prayoga G. 2013. *Fraksinasi,* Uji Aktivitas Antioksidan dengan Metode DPPH danIdentifikasi Golongan Senyawa Kimia dari Ekstrak Teraktif Daun SambangDarah (*Excoecaria cochinchinensis Lour*). Fakultas Farmasi Program Studi Sarjana Ekstensi Universitas Indonesia. Jakarta

Rigon, R. B., Fachinetti, N., Saverino, P., Santana, M. H. A., Chorilli, M. 2015. Skin Delivery and in Vitro Biological Evaluation of Trans-Resveratrol-Loaded Solid Lipid Nanoparticles for Skin Disorder Therapies. *Molecules* 2016, 21, 116.

Robinson, K., Charlotta, M., and Liang, D. 2014. Pre-formulation studies of resveratrol. *Drug Development and Industrial Pharmacy.* Texas Southem University, Houston, TX, USA. online 1-6.

Rohdiana, D. 2001. Aktivitas Daya Tangkap Radikal Polifenol dalam Daun Teh. *Majalah Jurnal Indonesia :* 53-58.

Rohman, A., & Riyanto, S. (2005). Aktivitas Antioksidan Ekstrak Buah Mengkudu (Morinda citrifolia,L). *Agritech.*Vol 25 No. 3 hlm 131-136.

Ropita. 2019. Pengaruh Konsentrasi Asam Oleat dan Panjang Rantai Lipid Padat Terhadap Karakterisasi Fisik *Nanostructured Lipid Carriers* (NLC) Resveratrol dengan Metode Emulsifikasi-Sonikasi[Skripsi]. Surakarta: Fakultas Farmasi, Universitas Setia Budi.

Rowe, R.C., Sheskey, P.J., Uiqnn, M.E. 2009. *Handbook of Pharmaceutical Excipient, 6th edition*. Washington DC: Pharmaceutical Press and American Pharmacits Association.

Sethuraman, N.,*et al*. 2018. Design, Development and Characterization of Nano Structured Lipid Carrier for Topical Delivery of Aceclofenac.

Shimojo, A. M. M., Fernandes, A.R.V., Ferreira, N. R. E. 2019. Evaluation of the Influence of Process Parameters on the Properties of Resveratrol-Loaded NLC Using 2^2 Full Factorial Design. *MDPI*. 8(272).

Shrotriya, S. N., Ranpise, N. S., Vidhate, B. V. 2016. Skin targeting of resveratrol utilizing solid lipid nanoparticle-engrossed gel for chemically induced irritant contact dermatitis. *Drug Deliv. and Transl. Res.*

Simon, P. 2012. *Formulasi Dan Uji Penetrasi Mikroemulsi Natrium Diklofenak DenganMetode Sel Difusi Franz Dan Metode Tape Stripping*. Prodi Farmasi FMIPAUniversitas Indonesia. Depok.

Singhal, G. B., Patel, R. P., Prajapati, B., & Patel, N. A. 2011. Solid Lipid Nanoparticles and Nano lipid Carriers : as novel Solid Lipid based drug Carriers. *Journal of pharmacy*.2011. 40-52.

Sinko, P. J. 2011.*Martin Farmasi Fisika dan Ilmu Farmasetika edisi 5*.diterjemahkan oleh Tim Alih Bahasa Sekolah Farmasi ITB. 706.Jakarta : PenerbitBuku Kedokteran EGC.

Soeratri, W., Hidayah, R., Rosita, N. 2019. Effect of combination soy bean oil and oleic acid to characteristic, penetration, physical stability or nanostructured lipid carrier resveratrol. *Fol Med Indones*. Vol. 55. No. 3: 213-222.

Soldati, P.P., Polonini, H. C., Paes, C. Q., Retrepo, J. A. S. 2018. Controlled release of resveratrol from lipid nanoparticles improves antioxidant effect. *IFAC (International Federation of Automatic Control).* Vol. 51. No. 27. p. 16-21.

Sonia Losada-Barreiro, Marlene Costa, Carlos Bravo-Díaz and Fátima Paiva-Martins. 2014. Distribution and Antioxidant Efficiency of Resveratrol in Stripped Corn Oil Emulsions Spain:University of Vigo, *Vigo*. 36-200.

Souto EB, Muller RH. 2007. *Lipid Nanoparticles (Solid Lipid Nanopartocles and Nanostructured Lipid Carriers) for cosmetic, Dermal, and Transdermal Aplication. In D.* Thassu, M. Deleers, & Y. Payhak, *Nanoparticulate Drug Delivery System.* pp. 213-229. New York: Informa Healthcare USA. Inc.

Sriarumtias, F.F., Sasanti, T., Sophi, D. 2017. Formulasi dan uji potensi antioksidan nanostructured lipid carriers (NLC) retinil palmitat.*Acta Pharmaceutica Indonesia.* 2017. Vol. 42. No. 1. hlm. 25-31.

Tamjidi, F., Shahedi, M., Varshosaz, J., Nasirpour, A. 2013. Nanostructured Lipid Carriers (NLC): A potential delivery System for Bioactive Food Molecules. *Innovative Food Science and Emerging Thecnologies.* Vol.19. p.29-43.

Tavakoli, N. Mohsen, M., Mojtaba, H.,Ruholla, M. 2015. Transdermal Iontophoretic Delivery of Celecoxib from Gel Formulation. *Research in Pharmaceutical Sciences*. 10(5): 419-428.

Tofani, R.P. 2016.*Pengembangan Sediaan TopikalNanostructured Lipid Carrier (NLC) Deoksiarbutindan Uji Efikasi Depigmentasiny*, Disertasi ProgramDoktor, Institut Teknologi Bandung. 13-17.

Uner, M. & Yener, G. 2007. Importance of *Solid lipid* Naniparticles (SLN) Various Administration Routes and Future Prespective. *International Journal of Nanomedicine.*2: 289-300.

Wan S, Zhang L, Quan Y, Wei K. 2018 Resveratrol-loaded PLGA nanoparticles: enhanced stability, solubility and bioactivity of resveratrol for non-alcoholic fatty liver disease therapy. R. Soc. open sci. 5: 181457.

Widodo F. M., Maria I. R., Tri W. A. 2014. Pengaruh ekstrak kasar buah mahkota dewa (*Phaleria macrocarpa*)sebagai antioksidan dan fillet ikan bandeng (*Chanos chanos* Forsk) segar. *Jurnal Pengolahan dan Bioteknologi Hasil Perikanan*. 2014. Vol. 3. No. 2. Hlm. 34-43.

Yulia, A., Esti, H, & Tutiek P. 2012. Karakteristik Sediaan dan Pelepasan Natrium Diklofenak dalam Sisten Niosom dengan Basis Gel Carbomer 940. *PharmaScientia*.1 (1):2.

Yuyun, Y. 2011. Uji Antioksidan dan Antiradikal bebas dari ekstrak kulit buah Rambutan (Nephelium lappaceum L) var. Binjai. *Media Eksakta*.7 (1) : 005-009. januari 2011 .

Zhuang, C. Y., Li, N., Wang, M., Zhang, M. N., Pan, W. S., Peng, J. J., *et al.* 2010. Preparation and Characterization of Vinopacetine Loaded Nanostructured Lipid Carriers (NLC) for Improved Oral Bioavailability. *International Journal Of Pharmacy* Vol. 394. p. 179-185.

Zulkifli, M., dan Estiasih, T. 2014. Sabun dari Distilat Asam Lemak Minyak Sawit. *Jurnal Pangan dan Agroindustri*. No. 4. Vol. 2.

L A M P I R A N

Lampiran 1. Sertifikat analisis resveratrol

泽世化学 THANEN CHEMICALS
THANEN CHEMICALS(CHANGZHOU)CO.,LTD
ADDRESS: RM2705, BLDG 5, CHANGFA, 101-1# TAIHU ROAD, 213022, P.R.CHINA
TEL: +86 519 89880626 FAX: +86-519-89880629

Certificate Of Analysis

Product name: Resveratrol

Batch NO.: 200101H — Producing date: 2019.12.29

CAS NO.:501-36-0 — Analysis date: 2020.01.08

Quantity: 10G — Retest date : 2020.12.28

Item	Specification	Result
Description	White or almost white	Passed
Clarity of Solution	The solution should be	Passed
Identification	IR	Passed
LOD	NMT0.3%	0.15%
ROI	NMT0.1%	0.04%
Melting point	252-262℃	257.3-259.2℃
Single impurity	NMT0.1%	0.07%
Purity	99.0%up	99.88%

Conclusion: It is up to the enterprise standard.

For and on behalf of 常州泽世化学有限公司 THANEN CHEMICALS(CHANGZHOU)CO.,LTD
Authorized Signature(s)

Lampiran 2. Efisiensi penjerapan

Perhitungan:

Replikasi 1:

y = a + bx

y = 0.0138 + 0.1354x

0.336 = 0.0138 + 0.1354x

x = 2.3796*ppm* x 10 (FP)

x = 23.796 mg/1000 mL

%EP = $\frac{Wa-Ws}{Wa} x\ 100\%$

%EP = $\frac{50-0.023796}{50} x\ 100\%$

%EP = 99.953%

Lampiran 3. Kurva kalibrasi dan verifikasi metode analisis

1. Hasil kurva kalibrasi resveratrol pelarut metanol

a. Hasil kurva kalibrasi resveratrol

Penimbangan dan pembuatan larutan induk resveratrol $\frac{49mg}{10mL}\ x\ 1000mL = 4900\ ppm$

Pembuatan larutan stok resveratrol 98 ppm

$V1.\mathrm{C1} = \mathrm{V2}.\mathrm{C2}$

$200\mu\mathrm{L}\ \times\ 4900\ \mathrm{ppm} = 10000\ \mu\mathrm{L} \times\ \mathrm{C2}$

$C2 = 200\mu\mathrm{L}\ \times 4900\ \mathrm{ppm}/10000\mu\mathrm{L}$

$C2 = 98\ ppm$

Hasil penentuan panjang gelombang maksimum 98 ppm

Perhitungan pembuatan larutan panjang gelombang maksimum:

$V1 \times 4900\ \mathrm{ppm} =\ 10000\mu\mathrm{L}\ \times 98\ \mathrm{ppm}$

$V1 = 200\ \mu\mathrm{L}$

Wavelength	Abs.
306.00	0.6628

b. Hasil verifikasi metode analisis

1) Linearitas

Larutan stok resveratrol 98 ppm dibuat 5 seri konsentrasi yaitu: 1,96 ppm; 2,94 ppm; 3,92 ppm; 4,9 ppm dan 5,88 ppm.

Konsentrasi (ppm)	Volume yang diambil (µL)	Volume yang dibuat (µL)
1.96	200	10000
2.94	300	10000
3.92	400	10000
4.9	500	10000
5.88	600	10000

Perhitungan kurva baku resveratrol pelarut metanol

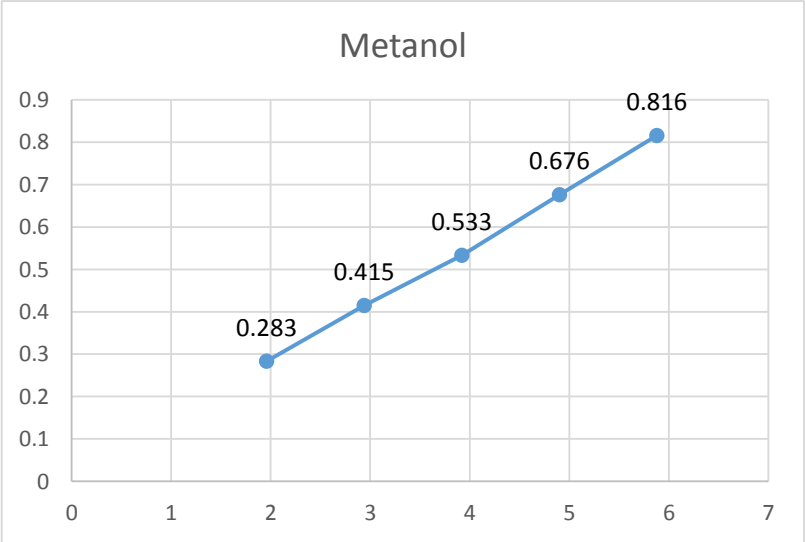
1,96 ppm : V1 = $10000\mu L \times 1{,}966ppm/98ppm = 200\mu L$

2,94 ppm : V1 = $10000\mu L \times 2{,}94ppm/98ppm = 300\mu L$

3,92 ppm : V1 = $10000\mu L \times 3{,}92ppm/98ppm = 400\mu L$

4,9 ppm : V1 = $10000\mu L \times 4{,}9ppm/98ppm = 500\mu L$

5,88 ppm : V1 = $10000\mu L \times 5{,}88ppm/98ppm = 600\mu L$



Nilai linearitas pada kurva kalibrasi metanol yaitu:

Intercept (a) = 0,0256

Slope (b) = 0,101939

Koefisien korelasi (r) = 0,999666

2) LOD dan LOQ

X	Y	y'	y-y'	$(y-y')^2$
1.96	0.283	0.2792	0.0038	1.4449E-05
2.94	0.415	0.4119	0.0031	9.61E-06
3.92	0.533	0.5446	-0.0116	0.00013456
4.9	0.676	0.6773	-0.0013	1.69E-06
5.88	0.816	0.81	0.006	3.6E-05

Jumlah = 0.0001963

Sy/x = 0.007005355

LOD $= 3\frac{\frac{Sy}{x}}{b}$ LOQ $= 10\frac{\frac{Sy}{x}}{b}$

LOD $= \frac{3.3x0.007005355}{0.135408} = 0.170725836$

LOQ $= \frac{10x0.007005355}{0.135408} = 0.517351017$

y' = a + b.x

y-y' = absorbansi – kadar yang didapatkan

3) Presisi

Konsentrasi	ABS	Konsentrasi
3.92	0.526	4.0485
3.92	0.544	3.9156
3.92	0.552	3.9746
3.92	0.503	3.6128
3.92	0.532	3.8269
3.92	0.506	3.6349
3.92	0.512	3.6792
3.92	0.532	3.8269
3.92	0.508	3.6497
	Rata-rata	3.7966
	SD	0.160634
	CV	0.04231

Perhitungan % RSD $\frac{s}{y}x\ 100\%$

% RSD $= \frac{0.179469}{3.8356}x\ 100\% = 0{,}046791\%$

4) Akurasi

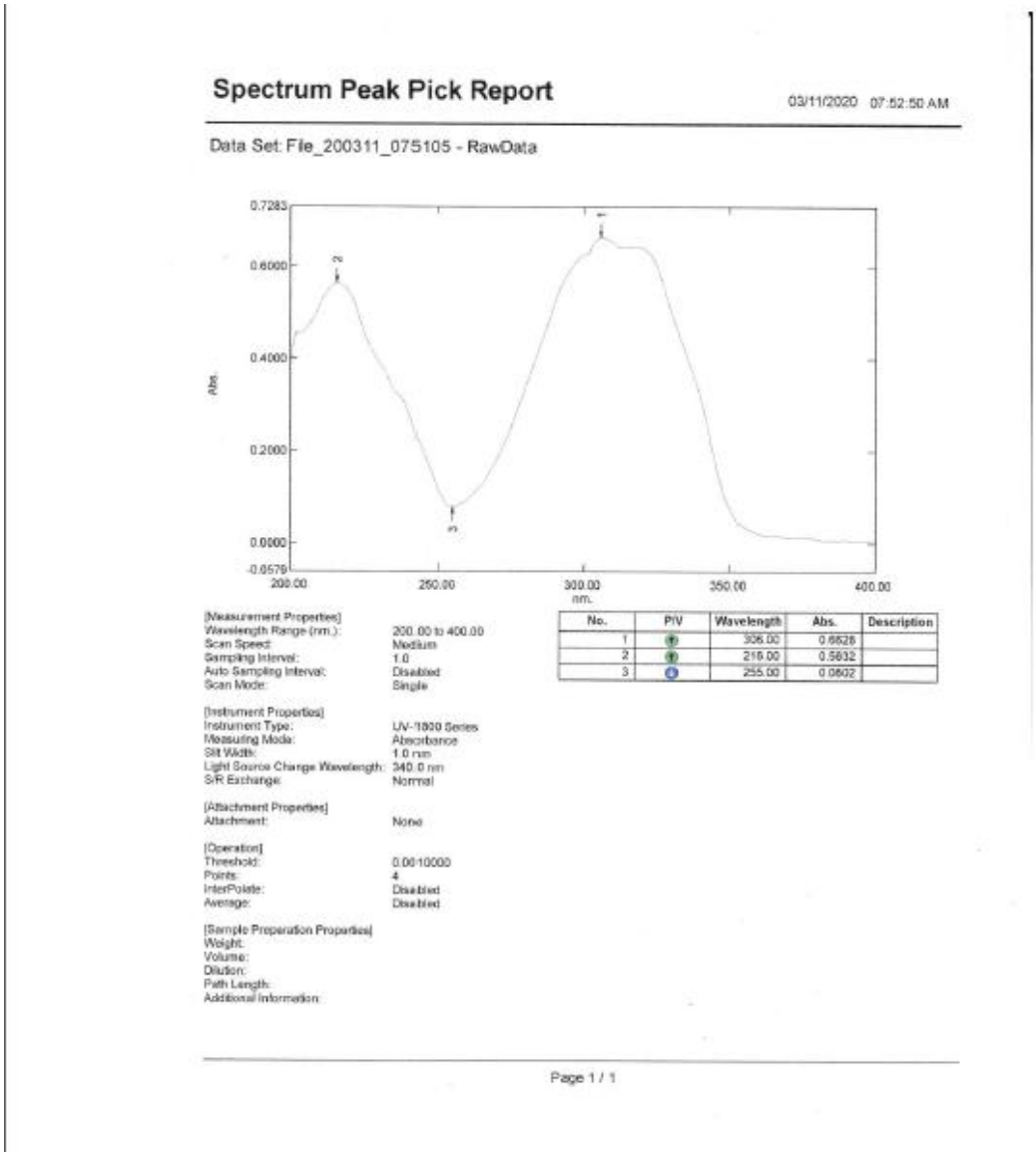
Replikasi	ABS	Konsentrasi	Sebenarnya	%	
1	0.411	2.933353429	2.94	99.77%	
2	0.411	2.933353429	2.94	99.77%	99.94%
3	0.413	2.948123587	2.94	100.28%	
1	0.503	3.612780708	3.92	92.16%	
2	0.574	4.137121326	3.92	105.54%	101.33%
3	0.578	4.166661643	3.92	106.29%	
1	0.655	4.735312735	4.9	96.64%	
2	0.682	4.934709872	4.9	100.71%	99.75%
3	0.69	4.993790505	4.9	101.9%	

80% = 99.94%

100% = 101.33% Rata-rata = 100.34%

120% = 99.75%

Lampiran 4. Panjang gelombang resveratrol dengan pelarut metanol



Spectrum Peak Pick Report

03/11/2020 07:52:50 AM

Data Set: File_200311_075105 - RawData

No.	P/V	Wavelength	Abs.	Description
1	P	306.00	0.6626	
2	P	216.00	0.5632	
3	V	255.00	0.0602	

[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: 0.00100000
Points: 4
InterPolate: Disabled
Average: Disabled

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

Page 1 / 1

Lampiran 5. Ukuran partikel dan indeks polidispersitas NLC resveratrol

Size Distribution Report by Number

v2.2

Malvern

Sample Details

Sample Name:	Formula 2 5
SOP Name:	mansettings.nano
General Notes:	

File Name:	Siti 2020.dts	**Dispersant Name:**	Water
Record Number:	5	**Dispersant RI:**	1.330
Material RI:	1.33	**Viscosity (mPa.s):**	0.8872
Material Absorption:	0.500	**Measurement Date and Time:**	Friday, February 14, 2020 ...

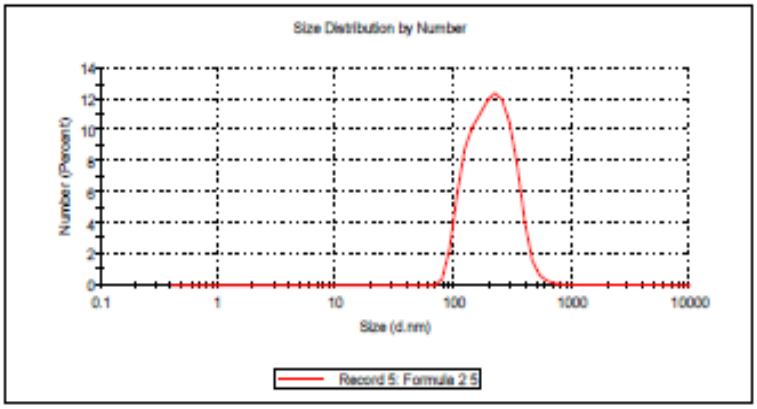
System

Temperature (°C):	25.0	**Duration Used (s):**	60
Count Rate (kcps):	293.9	**Measurement Position (mm):**	1.25
Cell Description:	Disposable sizing cuvette	**Attenuator:**	4

Results

			Size (d.n...	% Number:	St Dev (d.n...
Z-Average (d.nm):	388.2	**Peak 1:**	220.4	99.7	95.70
PdI:	0.520	**Peak 2:**	2526	0.3	1191
Intercept:	0.761	**Peak 3:**	0.000	0.0	0.000

Result quality Refer to quality report



Lampiran 6. Zeta potensial NLC resveratrol

Zeta Potential Report

v2.3

Sample Details

Sample Name: Formula 2 3
SOP Name: mansettings.nano
General Notes:

File Name: Siti 2020.dts
Record Number: 8
Date and Time: Friday, February 14, 2020 11:0...
Dispersant Name: Water
Dispersant RI: 1.330
Viscosity (cP): 0.8872
Dispersant Dielectric Constant: 78.5

System

Temperature (°C): 25.0
Count Rate (kcps): 0.9
Cell Description: Zeta dip cell
Zeta Runs: 100
Measurement Position (mm): 4.50
Attenuator: 11

Results

			Mean (mV)	Area (%)	St Dev (mV)
Zeta Potential (mV):	0.685	**Peak 1:**	28.1	14.5	13.9
Zeta Deviation (mV):	164	**Peak 2:**	-86.3	11.2	10.5
Conductivity (mS/cm):	0.0481	**Peak 3:**	-9.02	9.5	9.26

Result quality See result quality report