

LAMPIRAN

Lampiran 1 CoA Vitamin E Asetat



DL-A-TOCOPHERYL ACETATE



CERTIFICATE OF ANALYSIS

Productcode : 0420085
 Lot No. : UT18080219
 Analysis No. : 03D07192

Test	Result	Limits / Specifications	Dimension / Units
Appearance visual	clear viscous oil	clear viscous oil	
Colour visual	colourless	colourless almost colourless slightly yellow slightly greenish yellow	
Identity GC	corresponds	corresponds	
Optical rotation Ph.Eur.	0.00	-0.01 to +0.01	°
Heavymetals ICP-MS	corresponds*	max. 10	ppm
Lead ICP-MS	corresponds*	max. 2	ppm
Arsenic ICP-MS	corresponds*	max. 1	ppm
Mercury ICP-MS	corresponds*	max. 0.1	ppm
Cadmium ICP-MS	corresponds*	max. 0.5	ppm
Residual Solvents - Pyridine GC	corresponds*	max. 200	ppm
- Toluene GC	corresponds*	max. 890	ppm
Acidity Titration / USP	0.1	max. 1.0	ml 0.10N NaOH
Related Subst. (Ph.Eur.) - Impurity A GC	0.1	max. 0.5	%
- Impurity B GC	0.6	max. 0.6	%
- Impurity C (free tocopherol) GC	0.1	max. 0.5	%
- Impurity D and E GC	0.3	max. 1.0	%
- Any other impurity, each GC	0.07	max. 0.25	%
- Total GC	1.6	max. 2.5	%

**DL-A-TOCOPHERYL ACETATE*****CERTIFICATE OF ANALYSIS***

Productcode : 0420085

Lot No. : UT18080219

Analysis No. : 03D07192

Test	Result	Limits / Specifications	Dimension / Units
Assay Tocopherylacetate (Ph.Eur.) GC	99.4	96.5 to 102.0	%
Assay Tocopherylacetate (USP/FCC) GC	98.5	96.0 to 102.0	%

*) checked at regular intervals

This lot was analysed and released by our authorized Quality Control Department and was found to meet the specifications as given above.

The product meets all requirements of the following valid compendia when tested accordingly:

USP, FCC, Ph.Eur.

DSM Nutritional Products Ltd

The Quality Assurance Manager

Zoehner Juergen

Lampiran 2 CoA Geleol



GATTEFOSSE
Certificate of Analysis

Product name : GELEOL MONO AND DIGLYCERIDES NF			
Item N°	: 5749PPD		
Batch N°	: 176267		
Manufacturing date	: 07.2019		
Expiry date	: 07.2022		

CHEMICAL DEFINITION :
Glycerol monostearate 40-55 (Type I) EP current edition /
Mono and diglycerides NF current edition.

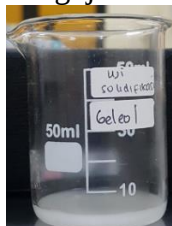
Characteristic	Method	Specification	Result
APPEARANCE	MA0193	Waxy solid	Conforms
ODOUR	MA0170	Faint	Conforms
COLOUR (Gardner Scale)	MA0214	< = 3.0	1.0
MELTING POINT (Cap Tube)	MA0167	54.0 to 64.0 °C	58.5
DROP POINT (METTLER)	MA0003	54.5 to 64.5 °C	59.3
ACID VALUE	MA0008	< = 1.5 mgKOH/g	0.2
SAPONIFICATION VALUE (NV = 174)	MA0172	158 to 177 mgKOH/g	174
IODINE VALUE (NV < 3)	MA0092	< = 3.0 gI2/100g	< = 3.0*
WATER CONTENT	MA0007	< = 1.0 %	< 0.1
HYDROXYL VALUE (NV = 216)	MA0172	194 to 237 mgKOH/g	227
FREE GLYCEROL CONTENT	MA0006	< = 3.0 %	1.4
TOTAL MONOGLYCERIDES CONTENT (NV = 47)	MA0006	42.3 to 51.7 %	50.1
TOTAL DIESTERS CONTENT	MA0006	30.0 to 45.0 %	40.3
TOTAL TRIESTERS CONTENT	MA0006	5.0 to 15.0 %	8.1
STEARIC ACID (C18)	MA0002	40.0 to 60.0 %	53.4
SUM OF PALMITIC AND STEARIC ACIDS	MA0002	> = 90.0 %	98.6
TOTAL ASHES CONTENT	MA0028	< = 0.1 %	< = 0.1*
HEAVY METALS CONTENT (Pb)	MA0032	< 10 ppm	Conforms *
NICKEL CONTENT	MA0256	< 1 ppm	Conforms *
ARSENIC CONTENT	MA0323	< 2 ppm	Conforms *
RESIDUAL SOLVENTS (Eur. Pharm., USP/NF)		Meets the requirements	Conforms *
EUR. PHARM. AND USP/NF (Current ed.)		Conforms	Conforms *
RESIDUE ON IGNITION	MA0028	< = 0.10 %	< = 0.10*
MONOESTER AND DIESTER CONTENT	MA0006	> = 70 %	90
LEAD CONTENT	MA0323	< 2 ppm	Conforms *
MERCURY CONTENT	MA0323	< 1 ppm	Conforms *
CADMIUM CONTENT	MA0323	< 1 ppm	Conforms *
TOTAL GLYCEROL CONTENT	MA0328	16.0 to 33.0 %	21.9

* Characteristic guaranteed but not tested.

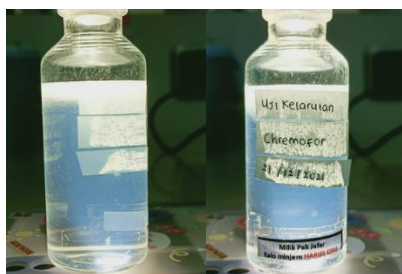
This batch was released by our authorized Quality Manager and was found to meet the specifications as stated above. The above results do not discharge the customer from the obligation to carry out an inspection of goods received.

This report has been produced electronically and does not require a signature.

Page : 1 / 2

Lampiran 3 Hasil Uji Pendahuluan**A. Pengujian daya larut dan solidifikasi**

Geleol 1 g + Myritol 1 g + Vitamin e 6 %

B. Pengujian kelarutan surfaktan

Cremophore Rh 40 3% + Vitamin E Asetat 2%

Lampiran 4 Kurva Kalibrasi Vitamin E Asetat

1.1 Perhitungan Pembuatan Larutan Vitamin E Asetat

1.1.1 Larutan Induk

$$\text{Konsentrasi Larutan} = \frac{\text{Bobot vitamin E asetat}}{\text{volume}}$$

$$100 \text{ ppm} = \frac{100 \text{ mg}}{1000 \text{ mL}}$$

$$= \frac{10 \text{ mg}}{100 \text{ mL}}$$

$$\text{Bobot vitamin E asetat} = \frac{5 \text{ mg}}{50 \text{ mL}}$$

1.1.2 Pengenceran Larutan

a. Konsentrasi 10 ppm

$$V1 \times C1 = V2 \times C2$$

$$V1 \times 100 \text{ ppm} = 5 \text{ ml} \times 10 \text{ ppm}$$

$$V1 = \frac{50 \text{ ml}}{100 \text{ ppm}}$$

$$V1 = 0,5 \text{ ml} = 500 \text{ }\mu\text{L}$$

b. Konsentrasi 9 ppm

$$V1 \times C1 = V2 \times C2$$

$$V1 \times 100 \text{ ppm} = 5 \text{ ml} \times 9 \text{ ppm}$$

$$V1 = \frac{45 \text{ ml}}{100 \text{ ppm}}$$

$$V1 = 0,45 \text{ ml} = 450 \text{ }\mu\text{L}$$

c. Konsentrasi 8 ppm

$$V1 \times C1 = V2 \times C2$$

$$V1 \times 100 \text{ ppm} = 5 \text{ ml} \times 8 \text{ ppm}$$

$$V1 = \frac{40 \text{ ml}}{100 \text{ ppm}}$$

$$V1 = 0,4 \text{ ml} = 400 \text{ }\mu\text{L}$$

d. Konsentrasi 7 ppm

$$V1 \times C1 = V2 \times C2$$

$$V1 \times 100 \text{ ppm} = 5 \text{ ml} \times 7 \text{ ppm}$$

$$V1 = \frac{35 \text{ ml}}{100 \text{ ppm}}$$

$$V1 = 0,35 \text{ ml} = 350 \text{ }\mu\text{L}$$

e. Konsentrasi 6 ppm

$$V1 \times C1 = V2 \times C2$$

$$V1 \times 100 \text{ ppm} = 5 \text{ ml} \times 6 \text{ ppm}$$

$$V1 = \frac{30 \text{ ml}}{100 \text{ ppm}}$$

$$V1 = 0,3 \text{ ml} = 300 \text{ } \mu\text{L}$$

f. Konsentrasi 5 ppm

$$V1 \times C1 = V2 \times C2$$

$$V1 \times 100 \text{ ppm} = 5 \text{ ml} \times 5 \text{ ppm}$$

$$V1 = \frac{25 \text{ ml}}{100 \text{ ppm}}$$

$$V1 = 0,25 \text{ ml} = 250 \text{ } \mu\text{L}$$

g. Konsentrasi 4 ppm

$$V1 \times C1 = V2 \times C2$$

$$V1 \times 100 \text{ ppm} = 5 \text{ ml} \times 4 \text{ ppm}$$

$$V1 = \frac{20 \text{ ml}}{100 \text{ ppm}}$$

$$V1 = 0,2 \text{ ml} = 200 \text{ } \mu\text{L}$$

h. Konsentrasi 3 ppm

$$V1 \times C1 = V2 \times C2$$

$$V1 \times 100 \text{ ppm} = 5 \text{ ml} \times 3 \text{ ppm}$$

$$V1 = \frac{15 \text{ ml}}{100 \text{ ppm}}$$

$$V1 = 0,15 \text{ ml} = 150 \text{ } \mu\text{L}$$

i. Konsentrasi 2 ppm

$$V1 \times C1 = V2 \times C2$$

$$V1 \times 100 \text{ ppm} = 5 \text{ ml} \times 2 \text{ ppm}$$

$$V1 = \frac{10 \text{ ml}}{100 \text{ ppm}}$$

$$V1 = 0,1 \text{ ml} = 100 \text{ } \mu\text{L}$$

j. Konsentrasi 1 ppm

$$V1 \times C1 = V2 \times C2$$

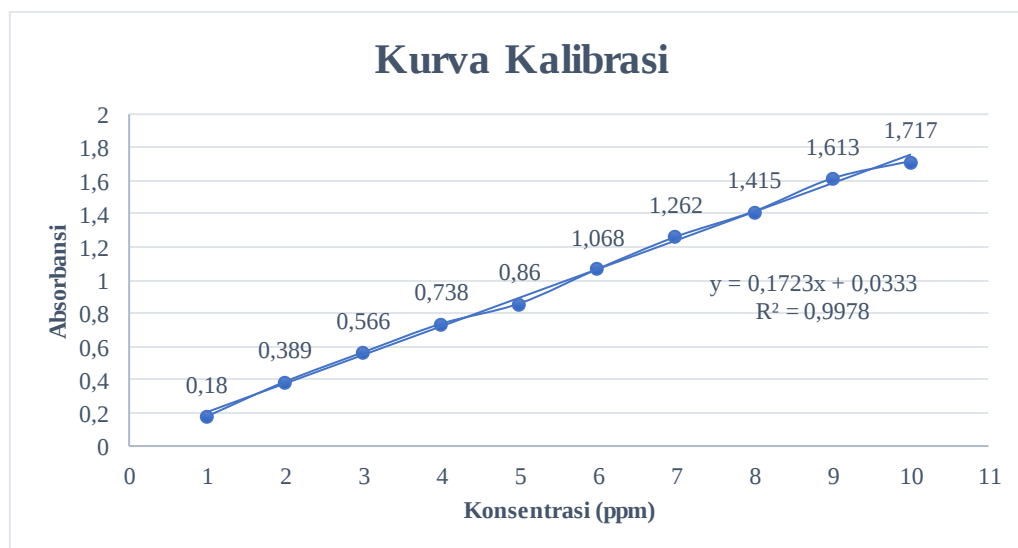
$$V1 \times 100 \text{ ppm} = 5 \text{ ml} \times 1 \text{ ppm}$$

$$V1 = \frac{5 \text{ ml}}{100 \text{ ppm}}$$

V1 = 0,05 ml = 50 μ L

1.2 Kurva Kalibrasi Vitamin E Asetat

Konsentrasi	Absorbansi
1 ppm	0,18
2 ppm	0,389
3 ppm	0,566
4 ppm	0,738
5 ppm	0,86
6 ppm	1,068
7 ppm	1,262
8 ppm	1,415
9 ppm	1,613
10 ppm	1,717



Lampiran 5 Perhitungan %EE NLC Vitamin E Asetat

a. Konsentrasi Larutan

$$\text{Konsentrasi} = \frac{y-a}{b}$$

b. Bobot zat aktif bebas

$$\text{Bobot zat aktif bebas} = \text{konsentrasi} \times \text{volume} \times \text{fp}$$

c. Rumus %EE

$$\%EE = \frac{\text{Total zat aktif} - \text{zat aktif bebas}}{\text{total zat aktif}} \times 100\%$$

Data Pengukuran Efisiensi Penjerapan Hari Ke-1

Formula	Absorbansi			Efficiency Entrapment (%)			SD
	1	2	3	1	2	3	
F1	0,298	0,215	0,195	94,88	96,48	96,87	1,05453
F2	0,494	0,503	0,495	91,09	90,91	91,07	0,098658
F3	0,446	0,566	0,604	92,02	89,69	88,96	1,598197
F4	0,241	0,221	0,244	95,98	96,37	95,92	0,244336
F5	0,424	0,383	0,319	92,44	93,23	94,47	1,023279

Perhitungan

1. F1

a. Absorbansi 1

$$\text{Konsentrasi} = \frac{0,298 - 0,0333}{0,1723} = 1,5363 \text{ ppm}$$

$$\begin{aligned} \text{Bobot zat aktif bebas} &= 1,5363 \text{ ppm} \times 10 \text{ mL} \times 100 \\ &= 1536,274 \text{ } \mu\text{g} \\ &= 1,5363 \text{ mg} \end{aligned}$$

$$\begin{aligned} \%EE &= \frac{30 \text{ mg} - 1,5363 \text{ mg}}{30 \text{ mg}} \times 100\% \\ &= 94,88 \% \end{aligned}$$

b. Absorbansi 2

$$\text{Konsentrasi} = \frac{0,215 - 0,0333}{0,1723} = 1,0546 \text{ ppm}$$

$$\begin{aligned} \text{Bobot zat aktif bebas} &= 1,0546 \text{ ppm} \times 10 \text{ mL} \times 100 \\ &= 1054,556 \text{ } \mu\text{g} \\ &= 1,0546 \text{ mg} \end{aligned}$$

$$\%EE = \frac{30 \text{ mg} - 1,0546 \text{ mg}}{30 \text{ mg}} \times 100\%$$

$$= 96,48\%$$

c. Absorbansi 3

$$\text{Konsentrasi} = \frac{0,195 - 0,0333}{0,1723} = 0,9385 \text{ ppm}$$

$$\begin{aligned} \text{Bobot zat aktif bebas} &= 0,9385 \text{ ppm} \times 10 \text{ mL} \times 100 \\ &= 938,4794 \mu\text{g} \\ &= 0,9385 \text{ mg} \end{aligned}$$

$$\begin{aligned} \%EE &= \frac{30 \text{ mg} - 0,9385 \text{ mg}}{30 \text{ mg}} \times 100\% \\ &= 96,87\% \end{aligned}$$

2. F2

a. Absorbansi 1

$$\text{Konsentrasi} = \frac{0,494 - 0,0333}{0,1723} = 2,6738 \text{ ppm}$$

$$\begin{aligned} \text{Bobot zat aktif bebas} &= 2,6738 \text{ ppm} \times 10 \text{ mL} \times 100 \\ &= 2673,825 \mu\text{g} \\ &= 2,6738 \text{ mg} \end{aligned}$$

$$\begin{aligned} \%EE &= \frac{30 \text{ mg} - 2,56738 \text{ mg}}{30 \text{ mg}} \times 100\% \\ &= 91,09\% \end{aligned}$$

b. Absorbansi 2

$$\text{Konsentrasi} = \frac{0,503 - 0,0333}{0,1723} = 2,7261 \text{ ppm}$$

$$\begin{aligned} \text{Bobot zat aktif bebas} &= 2,7261 \text{ ppm} \times 10 \text{ mL} \times 100 \\ &= 2726,059 \mu\text{g} \\ &= 2,7261 \text{ mg} \end{aligned}$$

$$\begin{aligned} \%EE &= \frac{30 \text{ mg} - 2,7261 \text{ mg}}{30 \text{ mg}} \times 100\% \\ &= 90,91\% \end{aligned}$$

c. Absorbansi 3

$$\text{Konsentrasi} = \frac{0,495 - 0,0333}{0,1723} = 2,6796 \text{ ppm}$$

$$\begin{aligned} \text{Bobot zat aktif bebas} &= 2,6796 \text{ ppm} \times 10 \text{ mL} \times 100 \\ &= 2679,629 \mu\text{g} \\ &= 2,6796 \text{ mg} \end{aligned}$$

$$\%EE = \frac{30 \text{ mg} - 2,6796 \text{ mg}}{30 \text{ mg}} \times 100\%$$

$$= 91,07\%$$

3. F3

a. Absorbansi 1

$$\text{Konsentrasi} = \frac{0,446 - 0,0333}{0,1723} = 2,3952 \text{ ppm}$$

$$\begin{aligned} \text{Bobot zat aktif bebas} &= 2,3952 \text{ ppm} \times 10 \text{ mL} \times 100 \\ &= 2395,241 \text{ } \mu\text{g} \\ &= 2,3952 \text{ mg} \end{aligned}$$

$$\begin{aligned} \%EE &= \frac{30 \text{ mg} - 2,3952 \text{ mg}}{30 \text{ mg}} \times 100\% \\ &= 92,02 \% \end{aligned}$$

b. Absorbansi 2

$$\text{Konsentrasi} = \frac{0,566 - 0,0333}{0,1723} = 3,0917 \text{ ppm}$$

$$\begin{aligned} \text{Bobot zat aktif bebas} &= 3,0917 \text{ ppm} \times 10 \text{ mL} \times 100 \\ &= 3091,701 \text{ } \mu\text{g} \\ &= 3,0917 \text{ mg} \end{aligned}$$

$$\begin{aligned} \%EE &= \frac{30 \text{ mg} - 3,0917 \text{ mg}}{30 \text{ mg}} \times 100\% \\ &= 89,69 \% \end{aligned}$$

c. Absorbansi 3

$$\text{Konsentrasi} = \frac{0,604 - 0,0333}{0,1723} = 3,3122 \text{ ppm}$$

$$\begin{aligned} \text{Bobot zat aktif bebas} &= 3,3122 \text{ ppm} \times 10 \text{ mL} \times 100 \\ &= 3312,246 \text{ } \mu\text{g} \\ &= 3,3122 \text{ mg} \end{aligned}$$

$$\begin{aligned} \%EE &= \frac{30 \text{ mg} - 3,3122 \text{ mg}}{30 \text{ mg}} \times 100\% \\ &= 88,96 \% \end{aligned}$$

4. F4

a. Absorbansi 1

$$\text{Konsentrasi} = \frac{0,241 - 0,0333}{0,1723} = 1,2055 \text{ ppm}$$

$$\begin{aligned} \text{Bobot zat aktif bebas} &= 1,2055 \text{ ppm} \times 10 \text{ mL} \times 100 \\ &= 1,205456 \text{ } \mu\text{g} \\ &= 1,2055 \text{ mg} \end{aligned}$$

$$\begin{aligned}\%EE &= \frac{30 \text{ mg} - 1,2055 \text{ mg}}{30 \text{ mg}} \times 100\% \\ &= 95,98 \%\end{aligned}$$

b. Absorbansi 2

$$\text{Konsentrasi} = \frac{0,221 - 0,0333}{0,1723} = 1,0894 \text{ ppm}$$

$$\begin{aligned}\text{Bobot zat aktif bebas} &= 1,0894 \text{ ppm} \times 10 \text{ mL} \times 100 \\ &= 1,0894 \mu\text{g} \\ &= 1089,379 \text{ mg}\end{aligned}$$

$$\begin{aligned}\%EE &= \frac{30 \text{ mg} - 1,0894 \text{ mg}}{30 \text{ mg}} \times 100\% \\ &= 96,37 \%\end{aligned}$$

c. Absorbansi 3

$$\text{Konsentrasi} = \frac{0,244 - 0,0333}{0,1723} = 1,2229 \text{ ppm}$$

$$\begin{aligned}\text{Bobot zat aktif bebas} &= 1,2229 \text{ ppm} \times 10 \text{ mL} \times 100 \\ &= 1,222,867 \mu\text{g} \\ &= 1,2229 \text{ mg}\end{aligned}$$

$$\begin{aligned}\%EE &= \frac{30 \text{ mg} - 1,2229 \text{ mg}}{30 \text{ mg}} \times 100\% \\ &= 95,92 \%\end{aligned}$$

5. F5

a. Absorbansi 1

$$\text{Konsentrasi} = \frac{0,424 - 0,0333}{0,1723} = 2,2676 \text{ ppm}$$

$$\begin{aligned}\text{Bobot zat aktif bebas} &= 2,2676 \text{ ppm} \times 10 \text{ mL} \times 100 \\ &= 2267,557 \mu\text{g} \\ &= 2,2676 \text{ mg}\end{aligned}$$

$$\begin{aligned}\%EE &= \frac{30 \text{ mg} - 2,2676 \text{ mg}}{30 \text{ mg}} \times 100\% \\ &= 92,44 \%\end{aligned}$$

b. Absorbansi 2

$$\text{Konsentrasi} = \frac{0,383 - 0,0333}{0,1723} = 2,0296 \text{ ppm}$$

$$\begin{aligned}\text{Bobot zat aktif bebas} &= 2,0296 \text{ ppm} \times 10 \text{ mL} \times 100 \\ &= 2029,6 \mu\text{g} \\ &= 2,0296 \text{ mg}\end{aligned}$$

$$\%EE = \frac{30 \text{ mg} - 2,0296 \text{ mg}}{30 \text{ mg}} \times 100\%$$

$$= 93,23\%$$

c. Absorbansi 3

$$\text{Konsentrasi} = \frac{0,319 - 0,0333}{0,1723} = 1,6582 \text{ ppm}$$

$$\text{Bobot zat aktif bebas} = 1,6582 \text{ ppm} \times 10 \text{ mL} \times 100$$

$$= 1,6582 \text{ } \mu\text{g}$$

$$= 1658,154 \text{ mg}$$

$$\%EE = \frac{30 \text{ mg} - 1,6582 \text{ mg}}{30 \text{ mg}} \times 100\%$$

$$= 94,47\%$$

Data Pengukuran Efisiensi Penjerapan Hari Ke-30

Formula	Absorbansi			Efficiency Entrapment (%)			SD
	1	2	3	1	2	3	
F1	0,249	0,231	0,254	95,83	96,18	95,73	0,236291
F2	0,617	0,521	0,526	88,71	90,56	90,47	1,043088
F3	0,537	0,693	0,719	90,26	87,24	86,73	1,90794
F4	0,207	0,28	0,228	96,64	95,23	96,23	0,725282
F5	0,626	0,451	0,525	88,53	91,92	90,49	1,701891

Perhitungan

1. F1

a. Absorbansi 1

$$\text{Konsentrasi} = \frac{0,249 - 0,0333}{0,1723} = 1,2519 \text{ ppm}$$

$$\text{Bobot zat aktif bebas} = 1,2519 \text{ ppm} \times 10 \text{ mL} \times 100$$

$$= 1251,886 \text{ } \mu\text{g}$$

$$= 1,2519 \text{ mg}$$

$$\%EE = \frac{30 \text{ mg} - 1,2519 \text{ mg}}{30 \text{ mg}} \times 100\%$$

$$= 95,83 \%$$

b. Absorbansi 2

$$\text{Konsentrasi} = \frac{0,231 - 0,0333}{0,1723} = 1,1474 \text{ ppm}$$

$$\text{Bobot zat aktif bebas} = 1,1474 \text{ ppm} \times 10 \text{ mL} \times 100$$

$$= 1147,417 \text{ } \mu\text{g}$$

$$= 1,1474 \text{ mg}$$

$$\%EE = \frac{30 \text{ mg} - 1,1474 \text{ mg}}{30 \text{ mg}} \times 100\%$$

$$= 96,18 \%$$

c. Absorbansi 3

$$\text{Konsentrasi} = \frac{0,254 - 0,0333}{0,1723} = 1,2809 \text{ ppm}$$

$$\begin{aligned} \text{Bobot zat aktif bebas} &= 1,2809 \text{ ppm} \times 10 \text{ mL} \times 100 \\ &= 1280,905 \text{ } \mu\text{g} \\ &= 1,2809 \text{ mg} \end{aligned}$$

$$\begin{aligned} \%EE &= \frac{30 \text{ mg} - 1,2809 \text{ mg}}{30 \text{ mg}} \times 100\% \\ &= 95,73 \% \end{aligned}$$

2. F2

a. Absorbansi 1

$$\text{Konsentrasi} = \frac{0,617 - 0,0333}{0,1723} = 3,3877 \text{ ppm}$$

$$\begin{aligned} \text{Bobot zat aktif bebas} &= 3,3877 \text{ ppm} \times 10 \text{ mL} \times 100 \\ &= 3387,696 \text{ } \mu\text{g} \\ &= 3,3877 \text{ mg} \end{aligned}$$

$$\begin{aligned} \%EE &= \frac{30 \text{ mg} - 3,3877 \text{ mg}}{30 \text{ mg}} \times 100\% \\ &= 88,71 \% \end{aligned}$$

b. Absorbansi 2

$$\text{Konsentrasi} = \frac{0,521 - 0,0333}{0,1723} = 2,8305 \text{ ppm}$$

$$\begin{aligned} \text{Bobot zat aktif bebas} &= 2,8305 \text{ ppm} \times 10 \text{ mL} \times 100 \\ &= 2830,528 \text{ } \mu\text{g} \\ &= 2,8305 \text{ mg} \end{aligned}$$

$$\begin{aligned} \%EE &= \frac{30 \text{ mg} - 2,8305 \text{ mg}}{30 \text{ mg}} \times 100\% \\ &= 90,56\% \end{aligned}$$

c. Absorbansi 3

$$\text{Konsentrasi} = \frac{0,526 - 0,0333}{0,1723} = 2,8595 \text{ ppm}$$

$$\begin{aligned} \text{Bobot zat aktif bebas} &= 2,8595 \text{ ppm} \times 10 \text{ mL} \times 100 \\ &= 2859,547 \text{ } \mu\text{g} \\ &= 2,8595 \text{ mg} \end{aligned}$$

$$\begin{aligned} \%EE &= \frac{30 \text{ mg} - 2,8595 \text{ mg}}{30 \text{ mg}} \times 100\% \end{aligned}$$

$$= 90,47 \%$$

3. F3

a. Absorbansi 1

$$\text{Konsentrasi} = \frac{0,537 - 0,0333}{0,1723} = 2,9234 \text{ ppm}$$

$$\begin{aligned} \text{Bobot zat aktif bebas} &= 2,9234 \text{ ppm} \times 10 \text{ mL} \times 100 \\ &= 2923,389 \mu\text{g} \\ &= 2,9234 \text{ mg} \end{aligned}$$

$$\begin{aligned} \%EE &= \frac{30 \text{ mg} - 2,9234 \text{ mg}}{30 \text{ mg}} \times 100\% \\ &= 90,26 \% \end{aligned}$$

b. Absorbansi 2

$$\text{Konsentrasi} = \frac{0,693 - 0,0333}{0,1723} = 3,8288 \text{ ppm}$$

$$\begin{aligned} \text{Bobot zat aktif bebas} &= 3,8288 \text{ ppm} \times 10 \text{ mL} \times 100 \\ &= 3828,787 \mu\text{g} \\ &= 3,8288 \text{ mg} \end{aligned}$$

$$\begin{aligned} \%EE &= \frac{30 \text{ mg} - 3,8288 \text{ mg}}{30 \text{ mg}} \times 100\% \\ &= 87,24 \% \end{aligned}$$

c. Absorbansi 3

$$\text{Konsentrasi} = \frac{0,719 - 0,0333}{0,1723} = 3,9797 \text{ ppm}$$

$$\begin{aligned} \text{Bobot zat aktif bebas} &= 3,9797 \text{ ppm} \times 10 \text{ mL} \times 100 \\ &= 3,9797 \mu\text{g} \\ &= 3979,687 \text{ mg} \end{aligned}$$

$$\begin{aligned} \%EE &= \frac{30 \text{ mg} - 3,9797 \text{ mg}}{30 \text{ mg}} \times 100\% \\ &= 86,73 \% \end{aligned}$$

4. F4

a. Absorbansi 1

$$\text{Konsentrasi} = \frac{0,207 - 0,0333}{0,1723} = 1,0081 \text{ ppm}$$

$$\begin{aligned} \text{Bobot zat aktif bebas} &= 1,0081 \text{ ppm} \times 10 \text{ mL} \times 100 \\ &= 1008,125 \mu\text{g} \\ &= 1,0081 \text{ mg} \end{aligned}$$

$$\begin{aligned}\%EE &= \frac{30 \text{ mg} - 1,0081 \text{ mg}}{30 \text{ mg}} \times 100\% \\ &= 96,64 \%\end{aligned}$$

b. Absorbansi 2

$$\text{Konsentrasi} = \frac{0,28 - 0,0333}{0,1723} = 1,4318 \text{ ppm}$$

$$\begin{aligned}\text{Bobot zat aktif bebas} &= 1,4318 \text{ ppm} \times 10 \text{ mL} \times 100 \\ &= 1431,805 \mu\text{g} \\ &= 1,4318 \text{ mg}\end{aligned}$$

$$\begin{aligned}\%EE &= \frac{30 \text{ mg} - 1,4318 \text{ mg}}{30 \text{ mg}} \times 100\% \\ &= 95,23 \%\end{aligned}$$

c. Absorbansi 3

$$\text{Konsentrasi} = \frac{0,228 - 0,0333}{0,1723} = 1,1300 \text{ ppm}$$

$$\begin{aligned}\text{Bobot zat aktif bebas} &= 1,1300 \text{ ppm} \times 10 \text{ mL} \times 100 \\ &= 1130,006 \mu\text{g} \\ &= 1,1300 \text{ mg}\end{aligned}$$

$$\begin{aligned}\%EE &= \frac{30 \text{ mg} - 1,1300 \text{ mg}}{30 \text{ mg}} \times 100\% \\ &= 96,23 \%\end{aligned}$$

5. F5

a. Absorbansi 1

$$\text{Konsentrasi} = \frac{0,626 - 0,0333}{0,1723} = 3,4399 \text{ ppm}$$

$$\begin{aligned}\text{Bobot zat aktif bebas} &= 3,4399 \text{ ppm} \times 10 \text{ mL} \times 100 \\ &= 3439,93 \mu\text{g} \\ &= 3,4399 \text{ mg}\end{aligned}$$

$$\begin{aligned}\%EE &= \frac{30 \text{ mg} - 3,4399 \text{ mg}}{30 \text{ mg}} \times 100\% \\ &= 88,53 \%\end{aligned}$$

b. Absorbansi 2

$$\text{Konsentrasi} = \frac{0,451 - 0,0333}{0,1723} = 2,4242 \text{ ppm}$$

$$\begin{aligned}\text{Bobot zat aktif bebas} &= 2,4242 \text{ ppm} \times 10 \text{ mL} \times 100 \\ &= 2424,26 \mu\text{g} \\ &= 2,4242 \text{ mg}\end{aligned}$$

$$\begin{aligned}\%EE &= \frac{30 \text{ mg} - 2,4242 \text{ mg}}{30 \text{ mg}} \times 100\% \\ &= 91,92 \%\end{aligned}$$

c. Absorbansi 3

$$\text{Konsentrasi} = \frac{0,525 - 0,0333}{0,1723} = 2,8537 \text{ ppm}$$

$$\begin{aligned}\text{Bobot zat aktif bebas} &= 2,8537 \text{ ppm} \times 10 \text{ mL} \times 100 \\ &= 2853,743 \text{ }\mu\text{g} \\ &= 2,8537 \text{ mg}\end{aligned}$$

$$\begin{aligned}\%EE &= \frac{30 \text{ mg} - 2,8537 \text{ mg}}{30 \text{ mg}} \times 100\% \\ &= 90,49 \%\end{aligned}$$

Lampiran 6 Hasil Karakterisasi NLC Vitamin E Asetat**Data Karakterisasi NLC Vitamin E Asetat Hari Ke-1**

Formula	Ukuran Partikel (nm)	PdI	Zeta Potensial (mV)	Entrapment Efficiency (%)
F1	173,3 ± 2,82	0,503 ± 0,05	-19,63 ± 0,55	96,08 ± 1,05
F2	133,81 ± 71,32	0,393 ± 0,05	-19,67 ± 1,31	91,02 ± 0,11
F3	207,3 ± 3,08	0,397 ± 0,04	-17,17 ± 0,42	90,22 ± 1,61
F4	232,73 ± 1,46	0,551 ± 0,13	-18,4 ± 0,17	96,09 ± 0,24
F5	192,4 ± 4,95	0,397 ± 0,06	-16,67 ± 0,35	93,38 ± 1,02

Data Karakterisasi NLC Vitamin E Asetat Hari Ke-30

Formula	Ukuran Partikel (nm)	PdI	Zeta Potensial (mV)	Entrapment Efficiency (%)
F1	133,63 ± 1,03	0,392 ± 0,01	-26 ± 2,01	95,91 ± 0,24
F2	77,08 ± 2,70	0,339 ± 0,03	-29,87 ± 0,81	89,91 ± 1,04
F3	183,43 ± 0,42	0,269 ± 0,01	-23,37 ± 0,38	88,08 ± 1,90
F4	198,6 ± 5,31	0,609 ± 0,01	-26,67 ± 0,83	96,03 ± 0,73
F5	165,6 ± 3,81	0,284 ± 0,02	-22,23 ± 0,31	90,31 ± 1,70

Lampiran 7 Hasil data T-TEST

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	F1_Ukuran_Partikel H1 - F1_ukuran_Partikel_H30	38.66667	3.72066	2.14813	29.42403	47.90931	18.000	2	.003
Pair 2	F1_PDI_H1 - F1 PDI H30	.11033	.04606	.02659	-.00408	.22475	4.149	2	.053
Pair 3	F1_Zeta_H1 - F1 Zeta H30	6.36667	1.81475	1.04775	1.85857	10.87477	6.077	2	.026
Pair 4	F1_EE_H1 - F1_EE_H30	.16300	1.05221	.60749	-2.45084	2.77684	.268	2	.814
Pair 5	F2_Ukuran_Partikel H1 - F2_Ukuran_Partikel_H30	56.72333	69.00942	39.84261	-114.70558	228.15224	1.424	2	.291
Pair 6	F2_PDI_H1 - F2_PDI_H30	.05333	.02916	.01684	-.01911	.12577	3.168	2	.087
Pair 7	F2_Zeta_H1 - F2_Zeta_H30	10.30000	.60828	.35119	8.78896	11.81104	29.329	2	.001
Pair 8	F2_EE_H1 - F2_EE_H30	1.10800	1.10590	.63849	-1.63922	3.85522	1.735	2	.225
Pair 9	F3_Ukuran_Partikel H1 - F3_Ukuran_Partikel_H30	23.86667	3.46458	2.00028	15.26017	32.47317	11.932	2	.007
Pair 10	F3_PDI_H1 - F3 PDI H30	.09467	.01701	.00982	.05241	.13692	9.640	2	.011
Pair 11	F3_Zeta_H1 - F3_Zeta_H30	5.36667	1.92180	1.10955	.59264	10.14069	4.837	2	.040
Pair 12	F3_EE_H1 - F3 EE H30	2.14133	.35395	.20435	1.26207	3.02059	10.479	2	.009

Pair 13	F4_Ukuran_Partikel_H1 - F4_Ukuran_Partikel_H30	34.13333	3.85270	2.22436	24.56268	43.70398	15.345	2	.004
Pair 14	F4_PDI_H1 - F4_PDI_H30	-.05833	.14162	.08177	-.41015	.29348	-.713	2	.550
Pair 15	F4_Zeta_H1 - F4_Zeta_H30	8.26667	.72342	.41767	6.46960	10.06374	19.793	2	.003
Pair 16	F4_EE_H1 - F4_EE_H30	.05600	.95324	.55035	-2.31198	2.42398	.102	2	.928
Pair 17	F5_Ukuran_Partikel_H1 - F5_Ukuran_Partikel_H30	26.80000	8.71550	5.03190	5.14949	48.45051	5.326	2	.033
Pair 18	F5_PDI_H1 - F5_PDI_H30	.11267	.04769	.02753	-.00580	.23114	4.092	2	.055
Pair 19	F5_Zeta_H1 - F5_Zeta_H30	5.56667	.05774	.03333	5.42324	5.71009	167.00 0	2	.000
Pair 20	F5_EE_H1 - F5_EE_H30	3.06767	1.52262	.87909	-.71473	6.85007	3.490	2	.073

Lampiran 8 Surat Pernyataan Bebas Plagiarisme**SURAT PERNYATAAN**

Yang bertanda tangan di bawah ini,

Nama : Rian Saefulloh

N P M : 11181135

adalah mahasiswa Fakultas Farmasi, Universitas Bhakti Kencana, menyatakan dengan sesungguhnya bahwa Naskah Tugas Akhir/Skripsi yang saya tulis dengan judul:

**Pengembangan Formulasi dan Karakterisasi Nanostructured Lipid Carriers (NLC)
Vitamin E Asetat Dengan Lipid Padat Glyceryl Monostearate dan Surfaktan
Cremophore Rh 40 Menggunakan Design Expert**

adalah benar-benar merupakan hasil karya saya sendiri. Apabila di kemudian hari diketahui bahwa isi Naskah Skripsi ini merupakan hasil plagiasi, maka saya bersedia menerima sanksi berupa pembatalan kelulusan dan atau pencabutan gelar yang saya peroleh.

Demikian surat pernyataan ini saya buat untuk dapat dipergunakan sebagaimana mestinya.

Bandung , September 2022

Yang membuat pernyataan,

(Rian Saefulloh)

NPM 11181135

Lampiran 9: Format Surat Persetujuan untuk dipublikasikan di media on line**SURAT PERNYATAAN**

Yang bertanda tangan di bawah ini,

Nama : Rian Saefulloh

N P M : 11181135

Menyatakan bahwa demi kepentingan perkembangan ilmu pengetahuan, saya menyetujui abstrak Skripsi yang saya tulis dengan judul:

**Pengembangan Formulasi dan Karakterisasi Nanostructured Lipid Carriers (NLC)
Vitamin E Asetat Dengan Lipid Padat Glyceryl Monostearate dan Surfaktan
Cremophore Rh 40 Menggunakan Design Expert**

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Bandung , September 2022

Yang membuat pernyataan,

(Rian Saefulloh)

NPM 11181135