

LAMPIRAN

Lampiran 1 Certificate of Analysis 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	°
Heavy metals 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	%

DSM Nutritional Products Ltd
 Branch Site Sisseln
 Quality Management
 CH-4334 Sisseln

1 / 2

Date of issue : 31-Aug-2018

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

Juergen Zoenner

Zoenner Juergen

Lampiran 2 Kurva Kalibrasi Vitamin E Asetat

1.1 Perhitungan Pembuatan Larutan Vitamin E Asetat

1.1.1 Larutan Induk

$$\begin{aligned}\text{Konsentrasi Larutan} &= \frac{\text{Bobot vitamin E asetat}}{\text{volume}} \\ 100 \text{ ppm} &= \frac{100 \text{ mg}}{1000 \text{ mL}} \\ &= \frac{10 \text{ mg}}{100 \text{ mL}} \\ \text{Bobot vitamin E asetat} &= \frac{5 \text{ mg}}{50 \text{ mL}}\end{aligned}$$

1.1.2 Pengenceran Larutan

a. Konsentrasi 10 ppm

$$\begin{aligned}V_1 \times C_1 &= V_2 \times C_2 \\ V_1 \times 100 \text{ ppm} &= 5 \text{ ml} \times 10 \text{ ppm} \\ V_1 &= \frac{50 \text{ ml}}{100 \text{ ppm}} \\ V_1 &= 0,5 \text{ ml} = 500 \mu\text{L}\end{aligned}$$

b. Konsentrasi 9 ppm

$$\begin{aligned}V_1 \times C_1 &= V_2 \times C_2 \\ V_1 \times 100 \text{ ppm} &= 5 \text{ ml} \times 9 \text{ ppm} \\ V_1 &= \frac{45 \text{ ml}}{100 \text{ ppm}} \\ V_1 &= 0,45 \text{ ml} = 450 \mu\text{L}\end{aligned}$$

c. Konsentrasi 8 ppm

$$\begin{aligned}V_1 \times C_1 &= V_2 \times C_2 \\ V_1 \times 100 \text{ ppm} &= 5 \text{ ml} \times 8 \text{ ppm} \\ V_1 &= \frac{40 \text{ ml}}{100 \text{ ppm}} \\ V_1 &= 0,4 \text{ ml} = 400 \mu\text{L}\end{aligned}$$

d. Konsentrasi 7 ppm

$$\begin{aligned}V_1 \times C_1 &= V_2 \times C_2 \\ V_1 \times 100 \text{ ppm} &= 5 \text{ ml} \times 7 \text{ ppm} \\ V_1 &= \frac{35 \text{ ml}}{100 \text{ ppm}} \\ V_1 &= 0,35 \text{ ml} = 350 \mu\text{L}\end{aligned}$$

e. Konsentrasi 6 ppm

$$\begin{aligned}V_1 \times C_1 &= V_2 \times C_2 \\ V_1 \times 100 \text{ ppm} &= 5 \text{ ml} \times 6 \text{ ppm} \\ V_1 &= \frac{30 \text{ ml}}{100 \text{ ppm}}\end{aligned}$$

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

f. Konsentrasi 5 ppm

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

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

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

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

g. Konsentrasi 4 ppm

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

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

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

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

h. Konsentrasi 3 ppm

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

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

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

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

i. Konsentrasi 2 ppm

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

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

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

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

j. Konsentrasi 1 ppm

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

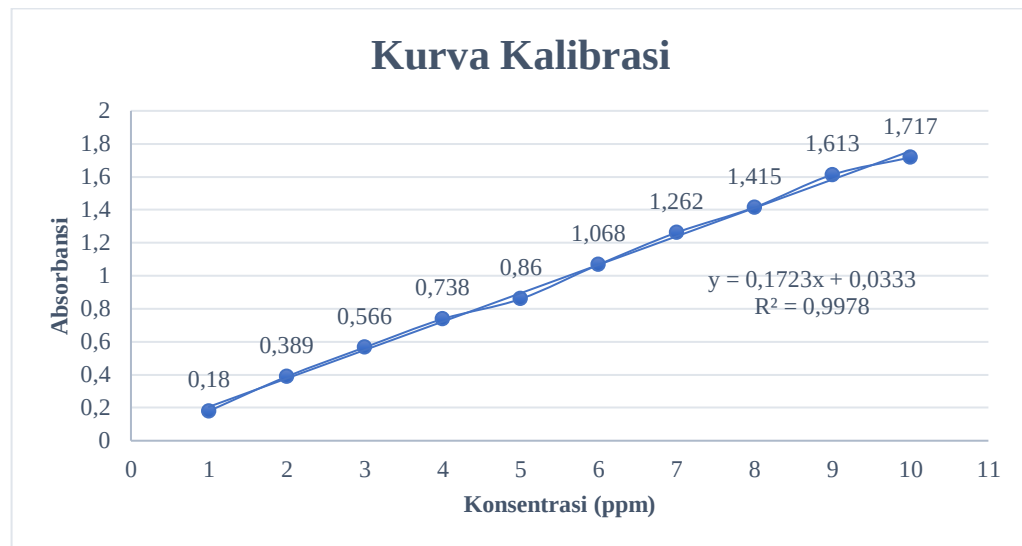
$$V1 \times 100 \text{ ppm} = 5 \text{ ml} \times 1 \text{ ppm}$$

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

$$V1 = 0,05 \text{ ml} = 50 \mu\text{L}$$

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 3 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	0,268	0,164	0,231	95,46	97,47	96,18	1,02
F2	0,122	0,173	0,128	98,28	97,30	98,17	0,54
F3	0,269	0,124	0,183	95,44	98,25	97,10	1,41
F4	0,4	0,486	0,306	92,91	91,24	94,72	1,74
F5	0,072	0,127	0,098	99,25	98,19	98,75	0,53

Perhitungan

1. F1

a. Absorbansi 1

$$\text{Konsentrasi} = \frac{0,268-0,0333}{0,1723} = 1,3622 \text{ ppm}$$

$$\text{Bobot zat aktif bebas} = 1,3622 \text{ ppm} \times 10 \text{ mL} \times 100$$

$$= 1362,159 \text{ } \mu\text{g}$$

$$= 1,3622 \text{ mg}$$

$$\%EE = \frac{30 \text{ mg} - 1,3622 \text{ mg}}{30 \text{ mg}} \times 100\%$$

$$= 95,46 \%$$

b. Absorbansi 2

$$\text{Konsentrasi} = \frac{0,164-0,0333}{0,1723} = 0,7585 \text{ ppm}$$

$$\text{Bobot zat aktif bebas} = 0,7586 \text{ ppm} \times 10 \text{ mL} \times 100$$

$$= 758,5607 \text{ } \mu\text{g}$$

$$= 0,7586 \text{ mg}$$

$$\%EE = \frac{30 \text{ mg} - 0,7586 \text{ mg}}{30 \text{ mg}} \times 100\%$$

$$= 97,47\%$$

c. Absorbansi 3

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

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

$$\begin{aligned}
 &= 1147,417 \mu\text{g} \\
 &= 1,1474 \text{ mg} \\
 \%EE &= \frac{30 \text{ mg} - 1,1474 \text{ mg}}{30 \text{ mg}} \times 100\% \\
 &= 96,18\%
 \end{aligned}$$

2. F2

a. Absorbansi 1

$$\begin{aligned}
 \text{Konsentrasi} &= \frac{0,122 - 0,0333}{0,1723} = 0,5148 \text{ ppm} \\
 \text{Bobot zat aktif bebas} &= 0,5148 \text{ ppm} \times 10 \text{ mL} \times 100 \\
 &= 514,7998 \mu\text{g} \\
 &= 0,5148 \text{ mg} \\
 \%EE &= \frac{30 \text{ mg} - 0,5148 \text{ mg}}{30 \text{ mg}} \times 100\% \\
 &= 98,28 \%
 \end{aligned}$$

b. Absorbansi 2

$$\begin{aligned}
 \text{Konsentrasi} &= \frac{0,173 - 0,0333}{0,1723} = 0,8108 \text{ ppm} \\
 \text{Bobot zat aktif bebas} &= 0,8108 \text{ ppm} \times 10 \text{ mL} \times 100 \\
 &= 810,7951 \mu\text{g} \\
 &= 0,8108 \text{ mg} \\
 \%EE &= \frac{30 \text{ mg} - 0,8108 \text{ mg}}{30 \text{ mg}} \times 100\% \\
 &= 97,30\%
 \end{aligned}$$

c. Absorbansi 3

$$\begin{aligned}
 \text{Konsentrasi} &= \frac{0,128 - 0,0333}{0,1723} = 0,5496 \text{ ppm} \\
 \text{Bobot zat aktif bebas} &= 0,5496 \text{ ppm} \times 10 \text{ mL} \times 100 \\
 &= 549,6228 \mu\text{g} \\
 &= 0,5496 \text{ mg} \\
 \%EE &= \frac{30 \text{ mg} - 0,5496 \text{ mg}}{30 \text{ mg}} \times 100\% \\
 &= 98,17\%
 \end{aligned}$$

3. F3

a. Absorbansi 1

$$\begin{aligned}
 \text{Konsentrasi} &= \frac{0,269 - 0,0333}{0,1723} = 1,3680 \text{ ppm} \\
 \text{Bobot zat aktif bebas} &= 1,3680 \text{ ppm} \times 10 \text{ mL} \times 100 \\
 &= 1367,963 \mu\text{g} \\
 &= 1,3680 \text{ mg}
 \end{aligned}$$

$$\begin{aligned}\%EE &= \frac{30\text{ mg}-1,3680\text{ mg}}{30\text{ mg}} \times 100\% \\ &= 95,44\%\end{aligned}$$

b. Absorbansi 2

$$\text{Konsentrasi} = \frac{0,124-0,0333}{0,1723} = 0,5264\text{ ppm}$$

$$\begin{aligned}\text{Bobot zat aktif bebas} &= 0,5264\text{ ppm} \times 10\text{ mL} \times 100 \\ &= 526,4074\text{ }\mu\text{g} \\ &= 0,5264\text{ mg}\end{aligned}$$

$$\begin{aligned}\%EE &= \frac{30\text{ mg}-0,5264\text{ mg}}{30\text{ mg}} \times 100\% \\ &= 98,25\%\end{aligned}$$

c. Absorbansi 3

$$\text{Konsentrasi} = \frac{0,183-0,0333}{0,1723} = 0,8688\text{ ppm}$$

$$\begin{aligned}\text{Bobot zat aktif bebas} &= 0,8688\text{ ppm} \times 10\text{ mL} \times 100 \\ &= 868,8334\text{ }\mu\text{g} \\ &= 0,8688\text{ mg}\end{aligned}$$

$$\begin{aligned}\%EE &= \frac{30\text{ mg}-0,8688\text{ mg}}{30\text{ mg}} \times 100\% \\ &= 97,10\%\end{aligned}$$

4. F4

a. Absorbansi 1

$$\text{Konsentrasi} = \frac{0,4-0,0333}{0,1723} = 2,1283\text{ ppm}$$

$$\begin{aligned}\text{Bobot zat aktif bebas} &= 2,1283\text{ ppm} \times 10\text{ mL} \times 100 \\ &= 2128,265\text{ }\mu\text{g} \\ &= 2,1283\text{ mg}\end{aligned}$$

$$\begin{aligned}\%EE &= \frac{30\text{ mg}-2,1283\text{ mg}}{30\text{ mg}} \times 100\% \\ &= 92,91\%\end{aligned}$$

b. Absorbansi 2

$$\text{Konsentrasi} = \frac{0,486-0,0333}{0,1723} = 2,6274\text{ ppm}$$

$$\begin{aligned}\text{Bobot zat aktif bebas} &= 2,6274\text{ ppm} \times 10\text{ mL} \times 100 \\ &= 2627,394\text{ }\mu\text{g} \\ &= 2,6274\text{ mg}\end{aligned}$$

$$\begin{aligned}\%EE &= \frac{30\text{ mg}-2,6274\text{ mg}}{30\text{ mg}} \times 100\% \\ &= 91,24\%\end{aligned}$$

c. Absorbansi 3

$$\text{Konsentrasi} = \frac{0,306-0,0333}{0,1723} = 1,5827 \text{ ppm}$$

$$\text{Bobot zat aktif bebas} = 1,5827 \text{ ppm} \times 10 \text{ mL} \times 100$$

$$= 1582,705 \text{ } \mu\text{g}$$

$$= 1,5287 \text{ mg}$$

$$\%EE = \frac{30 \text{ mg} - 1,5287 \text{ mg}}{30 \text{ mg}} \times 100\%$$

$$= 94,72 \%$$

5. F5

a. Absorbansi 1

$$\text{Konsentrasi} = \frac{0,072-0,0333}{0,1723} = 0,2246 \text{ ppm}$$

$$\text{Bobot zat aktif bebas} = 0,2246 \text{ ppm} \times 10 \text{ mL} \times 100$$

$$= 224,6082 \text{ } \mu\text{g}$$

$$= 0,2246 \text{ mg}$$

$$\%EE = \frac{30 \text{ mg} - 0,2246 \text{ mg}}{30 \text{ mg}} \times 100\%$$

$$= 99,25 \%$$

b. Absorbansi 2

$$\text{Konsentrasi} = \frac{0,127-0,0333}{0,1723} = 0,5438 \text{ ppm}$$

$$\text{Bobot zat aktif bebas} = 0,5438 \text{ ppm} \times 10 \text{ mL} \times 100$$

$$= 543,8189 \text{ } \mu\text{g}$$

$$= 0,5438 \text{ mg}$$

$$\%EE = \frac{30 \text{ mg} - 0,5438 \text{ mg}}{30 \text{ mg}} \times 100\%$$

$$= 98,19\%$$

c. Absorbansi 3

$$\text{Konsentrasi} = \frac{0,098-0,0333}{0,1723} = 0,3755 \text{ ppm}$$

$$\text{Bobot zat aktif bebas} = 0,3755 \text{ ppm} \times 10 \text{ mL} \times 100$$

$$= 375,5078 \text{ } \mu\text{g}$$

$$= 0,3755 \text{ mg}$$

$$\%EE = \frac{30 \text{ mg} - 0,3755 \text{ mg}}{30 \text{ mg}} \times 100\%$$

$$= 98,75\%$$

Data Pengukuran Efisiensi Penjerapan Hari Ke-30

Formula	Absorbansi			Efficiency Entrapment (%)			SD
	1	2	3	1	2	3	
F1	0,418	0,325	0,32	92,56	94,36	94,45	1,07
F2	0,135	0,135	0,135	98,03	98,03	96,74	0,75
F3	0,247	0,206	0,135	95,87	96,66	95,44	0,62
F4	0,392	0,427	0,202	93,06	91,51	92,44	0,78
F5	0,243	0,19	0,247	95,94	96,97	98,26	1,16

Perhitungan

1. F1

a. Absorbansi 1

$$\text{Konsentrasi} = \frac{0,418 - 0,0333}{0,1723} = 2,2327 \text{ ppm}$$

$$\begin{aligned} \text{Bobot zat aktif bebas} &= 2,2327 \text{ ppm} \times 10 \text{ mL} \times 100 \\ &= 2232,7336 \text{ } \mu\text{g} \\ &= 2,2327 \text{ mg} \end{aligned}$$

$$\begin{aligned} \%EE &= \frac{30 \text{ mg} - 1,3622 \text{ mg}}{30 \text{ mg}} \times 100\% \\ &= 92,56 \% \end{aligned}$$

b. Absorbansi 2

$$\text{Konsentrasi} = \frac{0,325 - 0,0333}{0,1723} = 1,6930 \text{ ppm}$$

$$\begin{aligned} \text{Bobot zat aktif bebas} &= 1,6930 \text{ ppm} \times 10 \text{ mL} \times 100 \\ &= 1692,9774 \text{ } \mu\text{g} \\ &= 1,6930 \text{ mg} \end{aligned}$$

$$\begin{aligned} \%EE &= \frac{30 \text{ mg} - 1,6930 \text{ mg}}{30 \text{ mg}} \times 100\% \\ &= 94,36 \% \end{aligned}$$

c. Absorbansi 3

$$\text{Konsentrasi} = \frac{0,32 - 0,0333}{0,1723} = 1,6640 \text{ ppm}$$

$$\begin{aligned} \text{Bobot zat aktif bebas} &= 1,6640 \text{ ppm} \times 10 \text{ mL} \times 100 \\ &= 1663,9582 \text{ } \mu\text{g} \\ &= 1,6640 \text{ mg} \end{aligned}$$

$$\begin{aligned} \%EE &= \frac{30 \text{ mg} - 1,6640 \text{ mg}}{30 \text{ mg}} \times 100\% \\ &= 94,45 \% \end{aligned}$$

2. F2

a. Absorbansi 1

$$\text{Konsentrasi} = \frac{0,135 - 0,0333}{0,1723} = 0,5902 \text{ ppm}$$

$$\text{Bobot zat aktif bebas} = 0,5902 \text{ ppm} \times 10 \text{ mL} \times 100$$

$$\begin{aligned}
 &= 590,2496 \mu\text{g} \\
 &= 0,5902 \text{ mg} \\
 \%EE &= \frac{30 \text{ mg} - 0,5902 \text{ mg}}{30 \text{ mg}} \times 100\% \\
 &= 98,03 \%
 \end{aligned}$$

b. Absorbansi 2

$$\begin{aligned}
 \text{Konsentrasi} &= \frac{0,135 - 0,0333}{0,1723} = 0,5902 \text{ ppm} \\
 \text{Bobot zat aktif bebas} &= 0,5902 \text{ ppm} \times 10 \text{ mL} \times 100 \\
 &= 590,2496 \mu\text{g} \\
 &= 0,5902 \text{ mg} \\
 \%EE &= \frac{30 \text{ mg} - 0,5902 \text{ mg}}{30 \text{ mg}} \times 100\% \\
 &= 98,03 \%
 \end{aligned}$$

c. Absorbansi 3

$$\begin{aligned}
 \text{Konsentrasi} &= \frac{0,202 - 0,0333}{0,1723} = 0,9791 \text{ ppm} \\
 \text{Bobot zat aktif bebas} &= 0,9791 \text{ ppm} \times 10 \text{ mL} \times 100 \\
 &= 979,1062 \mu\text{g} \\
 &= 0,9791 \text{ mg} \\
 \%EE &= \frac{30 \text{ mg} - 0,9791 \text{ mg}}{30 \text{ mg}} \times 100\% \\
 &= 96,74 \%
 \end{aligned}$$

3. F3

a. Absorbansi 1

$$\begin{aligned}
 \text{Konsentrasi} &= \frac{0,247 - 0,0333}{0,1723} = 1,2403 \text{ ppm} \\
 \text{Bobot zat aktif bebas} &= 1,2403 \text{ ppm} \times 10 \text{ mL} \times 100 \\
 &= 1240,2786 \mu\text{g} \\
 &= 1,2403 \text{ mg} \\
 \%EE &= \frac{30 \text{ mg} - 1,2403 \text{ mg}}{30 \text{ mg}} \times 100\% \\
 &= 95,87 \%
 \end{aligned}$$

b. Absorbansi 2

$$\begin{aligned}
 \text{Konsentrasi} &= \frac{0,206 - 0,0333}{0,1723} = 1,0023 \text{ ppm} \\
 \text{Bobot zat aktif bebas} &= 1,0023 \text{ ppm} \times 10 \text{ mL} \times 100 \\
 &= 1002,3215 \mu\text{g} \\
 &= 1,0023 \text{ mg} \\
 \%EE &= \frac{30 \text{ mg} - 1,0023 \text{ mg}}{30 \text{ mg}} \times 100\%
 \end{aligned}$$

$$= 96,66 \%$$

c. Absorbansi 3

$$\text{Konsentrasi} = \frac{0,269-0,0333}{0,1723} = 1,3680 \text{ ppm}$$

$$\text{Bobot zat aktif bebas} = 1,3680 \text{ ppm} \times 10 \text{ mL} \times 100$$

$$= 1367,9629 \mu\text{g}$$

$$= 1,3680 \text{ mg}$$

$$\%EE = \frac{30 \text{ mg} - 1,3680 \text{ mg}}{30 \text{ mg}} \times 100\%$$

$$= 95,44 \%$$

4. F4

a. Absorbansi 1

$$\text{Konsentrasi} = \frac{0,392-0,0333}{0,1723} = 2,0818 \text{ ppm}$$

$$\text{Bobot zat aktif bebas} = 2,0818 \text{ ppm} \times 10 \text{ mL} \times 100$$

$$= 2081,8340 \mu\text{g}$$

$$= 2,0818 \text{ mg}$$

$$\%EE = \frac{30 \text{ mg} - 2,0818 \text{ mg}}{30 \text{ mg}} \times 100\%$$

$$= 93,06 \%$$

b. Absorbansi 2

$$\text{Konsentrasi} = \frac{0,472-0,0333}{0,1723} = 2,5461 \text{ ppm}$$

$$\text{Bobot zat aktif bebas} = 2,5461 \text{ ppm} \times 10 \text{ mL} \times 100$$

$$= 2546,1405 \mu\text{g}$$

$$= 2,5461 \text{ mg}$$

$$\%EE = \frac{30 \text{ mg} - 2,5461 \text{ mg}}{30 \text{ mg}} \times 100\%$$

$$= 91,51 \%$$

c. Absorbansi 3

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

$$\text{Bobot zat aktif bebas} = 2,2676 \text{ ppm} \times 10 \text{ mL} \times 100$$

$$= 2267,5566 \mu\text{g}$$

$$= 2,2676 \text{ mg}$$

$$\%EE = \frac{30 \text{ mg} - 2,2676 \text{ mg}}{30 \text{ mg}} \times 100\%$$

$$= 92,44 \%$$

5. F5

a. Absorbansi 1

$$\text{Konsentrasi} = \frac{0,243-0,0333}{0,1723} = 1,2171 \text{ ppm}$$

$$\begin{aligned}\text{Bobot zat aktif bebas} &= 1,2171 \text{ ppm} \times 10 \text{ mL} \times 100 \\ &= 1217,0633 \mu\text{g} \\ &= 1,2171 \text{ mg} \\ \text{\%EE} &= \frac{30 \text{ mg} - 1,2171 \text{ mg}}{30 \text{ mg}} \times 100\% \\ &= 95,94 \%\end{aligned}$$

b. Absorbansi 2

$$\begin{aligned}\text{Konsentrasi} &= \frac{0,19 - 0,0333}{0,1723} = 0,9095 \text{ ppm} \\ \text{Bobot zat aktif bebas} &= 0,9095 \text{ ppm} \times 10 \text{ mL} \times 100 \\ &= 90,9460 \mu\text{g} \\ &= 0,9095 \text{ mg} \\ \text{\%EE} &= \frac{30 \text{ mg} - 0,9095 \text{ mg}}{30 \text{ mg}} \times 100\% \\ &= 96,97 \%\end{aligned}$$

c. Absorbansi 3

$$\begin{aligned}\text{Konsentrasi} &= \frac{0,123 - 0,0333}{0,1723} = 0,5206 \text{ ppm} \\ \text{Bobot zat aktif bebas} &= 0,5206 \text{ ppm} \times 10 \text{ mL} \times 100 \\ &= 520,6036 \mu\text{g} \\ &= 0,5206 \text{ mg} \\ \text{\%EE} &= \frac{30 \text{ mg} - 0,5206 \text{ mg}}{30 \text{ mg}} \times 100\% \\ &= 98,26 \%\end{aligned}$$

Lampiran 4 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	284,50 ± 6,18	0,30 ± 0,01	-29,73 ± 0,91	96,37 ± 1,02
F2	676,20 ± 58,70	0,99 ± 0,02	-24,77 ± 1,11	97,92 ± 0,54
F3	253,33 ± 5,99	0,41 ± 0,03	-26,00 ± 0,30	96,93 ± 1,41
F4	270,03 ± 6,27	0,28 ± 0,02	-24,57 ± 0,65	92,96 ± 1,74
F5	242 ± 4,42	0,49 ± 0,07	-30,93 ± 0,95	98,73 ± 0,53

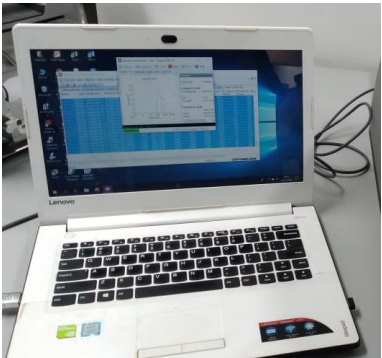
Data Karakterisasi NLC Vitamin E Asetat Hari Ke-30

Formula	Ukuran Partikel (nm)	PdI	Zeta Potensial (mV)	Entrapment Efficiency (%)
F1	318,60 ± 5,93	0,41 ± 0,02	-26,53 ± 0,31	93,79 ± 1,07
F2	765,23 ± 16,62	1 ± 0	-23,77 ± 0,40	97,60 ± 0,75
F3	280,20 ± 9,34	0,43 ± 0,02	-28,80 ± 0,61	95,99 ± 0,62
F4	375,63 ± 4,18	0,13 ± 0,04	-24,17 ± 0,25	92,34 ± 0,78
F5	287,13 ± 7,46	0,44 ± 0,02	-28,13 ± 2,19	97,06 ± 1,16

Lampiran 5 Hasil Uji T-Test Karakterisasi NLC Vitamin E Asetat

		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig.(2- tailed)
					Lower	Upper			
1	F1_Ukuran_Partikel_H1 - F1_Ukuran_Partikel_H30	-40.60000	9.78724	5.65066	-64.91284	-16.28716	-7.185	2	.019
2	F2_Ukuran_Partikel_H1 - F2_Ukuran_Partikel_H30	-89.03333	74.19571	42.83691	-273.34569	95.27903	-2.078	2	.173
3	F3_Ukuran_Partikel_H1 - F3_Ukuran_Partikel_H30	-26.86667	12.34193	7.12562	-57.52573	3.79240	-3.770	2	.064
4	F4_Ukuran_Partikel_H1 - F4_Ukuran_Partikel_H30	- 105.60000	9.96945	5.75587	-130.36550	-80.83450	- 18.346	2	.003
5	F5_Ukuran_Partikel_H1 - F5_Ukuran_Partikel_H30	-45.13333	9.23923	5.33427	-68.08485	-22.18182	-8.461	2	.014
6	F1_PDI_H1 - F1_PDI_H30	-.11467	.01955	.01129	-.16324	-.06609	-10.15	2	.010
7	F2_PDI_H1 - F2_PDI_H30	-.01400	.02425	.01400	-.07424	.04624	-1.000	2	.423
8	F3_PDI_H1 - F3_PDI_H30	-.02467	.01850	.01068	-.07063	.02130	-2.309	2	.147
9	F4_PDI_H1 - F4_PDI_H30	.15000	.02615	.01510	.08503	.21497	9.934	2	.010
10	F5_PDI_H1 - F5_PDI_H30	.04900	.08047	.04646	-.15089	.24889	1.055	2	.402
11	F1_ZP_H1 - F1_ZP_H30	-3.20000	.78102	.45092	-5.14017	-1.25983	-7.097	2	.019
12	F2_ZP_H1 - F2_ZP_H30	-1.00000	.72111	.41633	-2.79134	.79134	-2.402	2	.138
13	F3_ZP_H1 - F3_ZP_H30	2.80000	.65574	.37859	1.17104	4.42896	7.396	2	.018
14	F4_ZP_H1 - F4_ZP_H30	-.40000	.81854	.47258	-2.43335	1.63335	-.846	2	.486
15	F5_ZP_H1 - F5_ZP_H30	-2.80000	2.21133	1.27671	-8.29326	2.69326	-2.193	2	.160
16	F1_%EE_H1 - F1_%EE_H30	-4.51667	1.27610	.73676	-7.68668	-1.34666	-6.130	2	.026
17	F2_%EE_H1 - F2_%EE_H30	1.61667	.85676	.49465	-.51164	3.74497	3.268	2	.082
18	F3_%EE_H1 - F3_%EE_H30	-.94000	1.18697	.68530	-3.88860	2.00860	-1.372	2	.304
19	F4_%EE_H1 - F4_%EE_H30	1.31667	.94028	.54287	-1.01913	3.65246	2.425	2	.136
20	F5_%EE_H1 - F5_%EE_H30	-1.67333	1.46364	.84503	-5.30921	1.96254	-1.980	2	.186

Lampiran 6 Dokumentasi Penelitian

 Alat Sonikator	 Proses pembuatan NLC dengan alat sonikator	 Hasil pematatan kembali lipid padat + vitamin E asetat Hasil pengujian kelarutan dan solidifikasi kembali lipid padat comptrtol
 Alat sentrifuga	 Tabung appendorf	 Alat Particle Size Analyzer
 Hasil pengujian kelarutan vitamin E asetat dalam surfaktan plantacare Fasa minyak, yang menandakan tidak terlarutnya vitamin E asetat dalam surfaktan	 Proses homogenisasi panas dengan menggunakan magnetic stirrer	 Laptop untuk mengolah data dan membaca hasil dari PSA

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