BAB V

KESIMPULAN DAN SARAN

A. Kesimpulan

Hasil dari pengujian viskositas dan pemisahan sentrifugasi minyak jinten hitam dapat disimpulkan bahwa minyak jinten hitam dapat dibuat dalam sediaan emulsi dengan emulgator PGA dan pengental CMC yang memenuhi stabilitas emulsi. Perbedaan konsentrasi CMC 0,5%, 1%, 1,5 % menunjukan adanya perbedaan stabilitas emulsi. Semakin besar konsentrasi CMC yaitu formula 3 menunjukan hasil emulsi yang paling stabil. Penyimpanan emulsi minyak jinten hitam (*Nigella sativa* L.) yang semakin lama akan meningkatkan pemisahan sehingga kestabilan semakin berkurang.

B. Saran

Pertama, perlu dipertimbangkan dosis minyak jinten hitam untuk memberikan efek farmakologis.

Kedua, Perlu diadakan penelitian lebih lanjut dalam penggunaan kombinasi pengental yang berbeda.

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Lampiran 2. Hasil uji viskositas minyak jinten hitam (*Nigella sativa* L.)

Minggu	Viskositas (d pas)								
	CMC 0,5 gr (I)			CMC 1 gr (II)			CMC 1,5 gr (III)		
	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3
0	0,6	0,5	0,6	0,7	0,5	0,6	1	0,7	0,8
1	0,9	0,8	0,7	1	0,8	0,9	1,4	1,1	1
2	1,1	0,9	1	1,2	1	1,1	1,7	1,5	1,3

Lampiran 3. Hasil Uji sentrifus minyak jinten hitam *(Nigella sativa* **L.***)*

Formula		Pemisahan sentrifugasi		
		Minggu 0	Minggu 1	Minggu 2
Formula I	Replikasi 1	0,14	0,16	0,17
	Replikasi 2	0,14	0,16	0,18
	Replikasi 3	0,10	0,13	0,15
Formula II	Replikasi 1	0,10	0,14	0,16
	Replikasi 2	O,12	0,14	0,15
	Replikasi 3	0,08	0,11	0,12
Formula III	Replikasi 1	0,06	0,09	0,11
	Replikasi 2	0,02	0,06	0,07
	Replikasi 3	0,01	0,03	0,04

Lampiran 4. Perhitungan volume sedimentasi uji sentrifugasi

Rumus: $F = \dfrac{vu}{vo}$

Ket: F= Volume Sedimentasi

Vu= Volume akhir emulsi

Vo= Volume akhir emulsi

1. CMC 0,5% Minggu ke-0   **CMC 1% Minggu ke-0**   **CMC**
1,5% Minggu ke-0

Replikasi 1: $\dfrac{1,4}{10} = 0,14$ ml   Replikasi 1: $\dfrac{1}{10} = 0,10$ ml   Replikasi 1:

$\dfrac{0,6}{10} = 0,06$ ml

Replikasi 2: $\dfrac{1,4}{10} = 0,14$ ml   Replikasi 2: $\dfrac{1,2}{10} = 0,12$ ml   Replikasi 2:

$\dfrac{0,2}{10} = 0,02$ ml

Replikasi 3: $\dfrac{1,0}{10} = 0,10$ ml   Replikasi 3: $\dfrac{0,8}{10} = 0,08$ ml   Replikasi 3:

$\dfrac{0,1}{10} = 0,01$ ml

2. CMC 0,5% Minggu ke-1   **CMC 1% Minggu ke-1**   **CMC 1,5%**
Minggu ke-1

Replikasi 1: $\dfrac{1,6}{10} = 0,16$ ml   Replikasi 1: $\dfrac{1,4}{10} = 0,14$ ml   Replikasi 1:

$\dfrac{0,9}{10} = 0,09$ ml

Replikasi 2: $\dfrac{1,6}{10} = 0,16$ ml   Replikasi 2: $\dfrac{1,4}{10} = 0,14$ ml   Replikasi 2:

$\dfrac{0,6}{10} = 0,06$ ml

Replikasi 3: $\dfrac{1,3}{10} = 0,13$ ml   Replikasi 3: $\dfrac{1,1}{10} = 0,11$ ml   Replikasi 3:

$\dfrac{0,3}{10} = 0,03$ ml

**3. CMC 0,5% Minggu ke-2   CMC 1% Minggu ke-2   CMC 1,5%
   Minggu ke-2**

Replikasi 1: $\dfrac{1,7}{10} = 0,17$ ml   Replikasi 1: $\dfrac{1,6}{10} = 0,16$ ml   Replikasi 1:

$\dfrac{1,1}{10} = 0,11$ ml

Replikasi 2: $\dfrac{1,8}{10} = 0,18$ ml   Replikasi 2: $\dfrac{1,5}{10} = 0,15$ ml   Replikasi 2:

$\dfrac{0,7}{10} = 0,07$ ml

Replikasi 3: $\dfrac{1,5}{10} = 0,15$ ml   Replikasi 3: $\dfrac{1,2}{10} = 9,12$ ml   Replikasi 3:

$\dfrac{0,4}{10} = 0,04$ ml

Lampiran 5. Hasil uji viskositas minyak jinten minggu ke-0

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
viksositas	9	.667	.1581	.5	1.0

One-Sample Kolmogorov-Smirnov Test

		viksositas
N		9
Normal Parameters[a,b]	Mean	.667
	Std. Deviation	.1581
Most Extreme Differences	Absolute	.219
	Positive	.219
	Negative	-.146
Kolmogorov-Smirnov Z		.657
Asymp. Sig. (2-tailed)		.782

a. Test distribution is Normal.

b. Calculated from data.

Oneway

Test of Homogeneity of Variances

viksositas

Levene Statistic	df1	df2	Sig.
1.217	2	6	.360

ANOVA

Viksositas

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.127	2	.063	5.182	.049
Within Groups	.073	6	.012		
Total	.200	8			

Post Hoc Tests

Multiple Comparisons

Viksositas
LSD

(I) formula	(J) formula	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
formula 1	formula 2	-.0333	.0903	.725	-.254	.188
	formula 3	-.2667*	.0903	.025	-.488	-.046
formula 2	formula 1	.0333	.0903	.725	-.188	.254
	formula 3	-.2333*	.0903	.041	-.454	-.012
formula 3	formula 1	.2667*	.0903	.025	.046	.488
	formula 2	.2333*	.0903	.041	.012	.454

*. The mean difference is significant at the 0.05 level.

Lampiran 6. Hasil statistik uji viskositas minggu Ke-1

NPar Tests

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
viskositas minggu ke-1	9	.956	.2068	.7	1.4

One-Sample Kolmogorov-Smirnov Test

		viskositas minggu ke-1
N		9
Normal Parameters[a,b]	Mean	.956
	Std. Deviation	.2068
Most Extreme Differences	Absolute	.193
	Positive	.193
	Negative	-.115
Kolmogorov-Smirnov Z		.578
Asymp. Sig. (2-tailed)		.892

a. Test distribution is Normal.

b. Calculated from data.

Oneway

ANOVA

viskositas minggu ke-1

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.216	2	.108	5.105	.051
Within Groups	.127	6	.021		
Total	.342	8			

Post Hoc Tests

Multiple Comparisons

viskositas minggu ke-1
LSD

(I) formula	(J) formula	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
formula 1	formula 2	-.1000	.1186	.432	-.390	.190
	formula 3	-.3667*	.1186	.021	-.657	-.076
formula 2	formula 1	.1000	.1186	.432	-.190	.390
	formula 3	-.2667	.1186	.066	-.557	.024
formula 3	formula 1	.3667*	.1186	.021	.076	.657
	formula 2	.2667	.1186	.066	-.024	.557

*. The mean difference is significant at the 0.05 level.

Lampiran 7. Hasil statistik uji viskositas minggu ke-2

NPar Tests

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
viksositas	9	1.200	.2598	.9	1.7

One-Sample Kolmogorov-Smirnov Test

		viksositas
N		9
Normal Parameters[a,b]	Mean	1.200
	Std. Deviation	.2598
Most Extreme Differences	Absolute	.205
	Positive	.205
	Negative	-.124
Kolmogorov-Smirnov Z		.616
Asymp. Sig. (2-tailed)		.842

a. Test distribution is Normal.

b. Calculated from data.

Oneway

Test of Homogeneity of Variances

Viksositas

Levene Statistic	df1	df2	Sig.
.667	2	6	.548

ANOVA

Viksositas

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.420	2	.210	10.500	.011
Within Groups	.120	6	.020		
Total	.540	8			

Post Hoc Tests

Multiple Comparisons

viksositas
LSD

(I) formula	(J) formula	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
formula 1	formula 2	-.1000	.1155	.420	-.383	.183
	formula 3	-.5000*	.1155	.005	-.783	-.217
formula 2	formula 1	.1000	.1155	.420	-.183	.383
	formula 3	-.4000*	.1155	.013	-.683	-.117
formula 3	formula 1	.5000*	.1155	.005	.217	.783
	formula 2	.4000*	.1155	.013	.117	.683

*. The mean difference is significant at the 0.05 level.

Lampiran 8. Hasil statistik uji sentrifus minggu ke-0

NPar Tests

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
sentrifus	9	.7456	1.97097	.01	6.00

One-Sample Kolmogorov-Smirnov Test

		Sentrifus
N		9
Normal Parameters[a,b]	Mean	.7456
	Std. Deviation	1.97097
Most Extreme Differences	Absolute	.510
	Positive	.510
	Negative	-.355
Kolmogorov-Smirnov Z		1.529
Asymp. Sig. (2-tailed)		.019

a. Test distribution is Normal.

b. Calculated from data.

Oneway

Test of Homogeneity of Variances

sentrifus

Levene Statistic	df1	df2	Sig.
15.811	2	6	.004

ANOVA

Sentrifus

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	7.196	2	3.598	.904	.454
Within Groups	23.882	6	3.980		
Total	31.078	8			

Post Hoc Tests

Multiple Comparisons

sentrifus

Dunnett T3

(I) formula	(J) formula	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
formula 1	formula 2	.02667	.01764	.443	-.0400	.0934
	formula 3	-1.88333	1.99505	.748	-14.5316	10.7650
formula 2	formula 1	-.02667	.01764	.443	-.0934	.0400
	formula 3	-1.91000	1.99504	.741	-14.5585	10.7385
formula 3	formula 1	1.88333	1.99505	.748	-10.7650	14.5316
	formula 2	1.91000	1.99504	.741	-10.7385	14.5585

Lampiran 9. Hasil statistik uji sentrifus minggu ke-1

NPar Tests

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
sentrifus	9	.1133	.04528	.03	.16

One-Sample Kolmogorov-Smirnov Test

		sentrifus
N		9
Normal Parameters[a,b]	Mean	.1133
	Std. Deviation	.04528
Most Extreme Differences	Absolute	.199
	Positive	.151
	Negative	-.199
Kolmogorov-Smirnov Z		.597
Asymp. Sig. (2-tailed)		.868

a. Test distribution is Normal.

b. Calculated from data.

Oneway

Test of Homogeneity of Variances

sentrifus

Levene Statistic	df1	df2	Sig.
.364	2	6	.709

ANOVA

Sentrifus

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.013	2	.007	13.400	.006
Within Groups	.003	6	.001		
Total	.016	8			

Post Hoc Tests

Multiple Comparisons

sentrifus

LSD

(I) formula	(J) formula	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
formula 1	formula 2	.02000	.01826	.315	-.0247	.0647
	formula 3	.09000*	.01826	.003	.0453	.1347
formula 2	formula 1	-.02000	.01826	.315	-.0647	.0247
	formula 3	.07000*	.01826	.009	.0253	.1147
formula 3	formula 1	-.09000*	.01826	.003	-.1347	-.0453
	formula 2	-.07000*	.01826	.009	-.1147	-.0253

*. The mean difference is significant at the 0.05 level.

Lampiran 10. Hasil statistik uji sentrifus minggu ke-2

NPar Tests

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
sentrifus	9	.1278	.04738	.04	.18

One-Sample Kolmogorov-Smirnov Test

		Sentrifus
N		9
Normal Parameters[a,b]	Mean	.1278
	Std. Deviation	.04738
Most Extreme Differences	Absolute	.236
	Positive	.135
	Negative	-.236
Kolmogorov-Smirnov Z		.708
Asymp. Sig. (2-tailed)		.698

a. Test distribution is Normal.

b. Calculated from data.

Oneway

Test of Homogeneity of Variances

sentrifus

Levene Statistic	df1	df2	Sig.
.911	2	6	.451

ANOVA

Sentrifus

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.014	2	.007	11.175	.009
Within Groups	.004	6	.001		
Total	.018	8			

Post Hoc Tests

Multiple Comparisons

Sentrifus
LSD

(I) formula	(J) formula	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
formula 1	formula 2	.02333	.02055	.299	-.0269	.0736
	formula 3	.09333*	.02055	.004	.0431	.1436
formula 2	formula 1	-.02333	.02055	.299	-.0736	.0269
	formula 3	.07000*	.02055	.014	.0197	.1203
formula 3	formula 1	-.09333*	.02055	.004	-.1436	-.0431
	formula 2	-.07000*	.02055	.014	-.1203	-.0197

*. The mean difference is significant at the 0.05 level.

Lampiran 23. Emulsi minyak jinten hitam *(Nigella sativa* **L.***)*
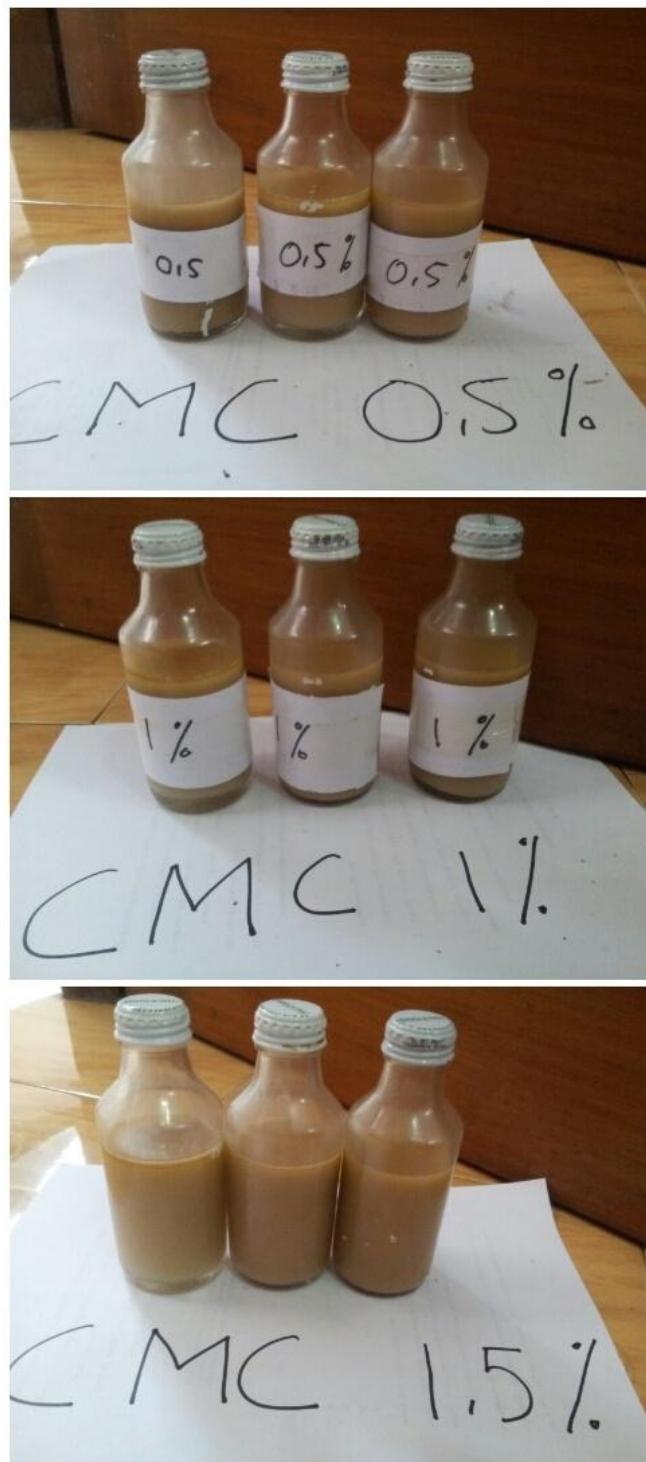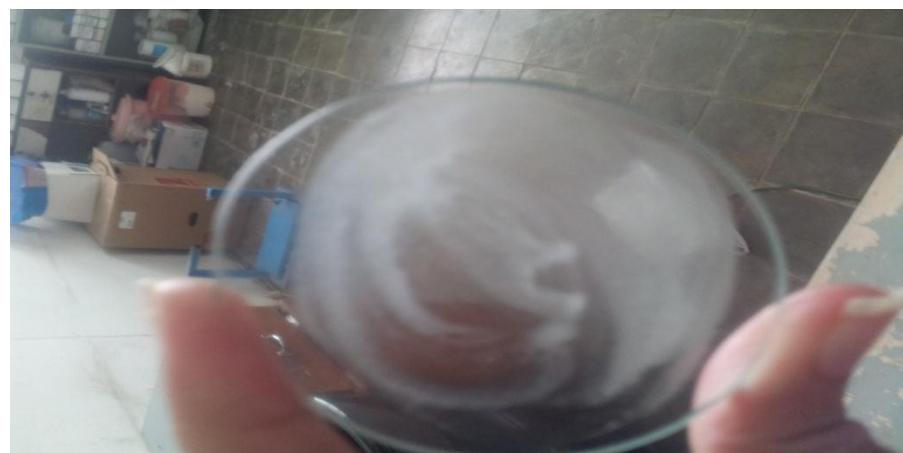
Lampiran 24. Minyak jinten hitam (*Nigella sativa* L.)

Lampiran 25. Penimbangan CMC sebagai variasi konsentrasi sebagai pengental

Lampiran 26. Alat viskotester
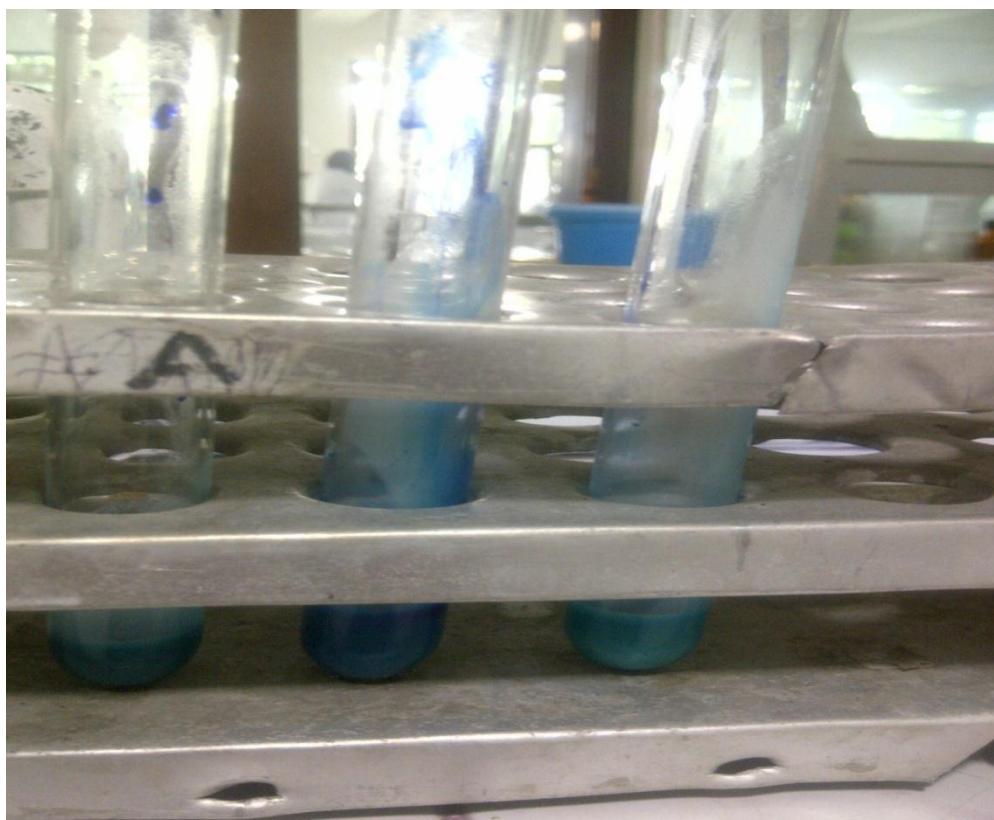
Lampiran 27. Alat Sentrifugasi

Lampiran 28. Hasil pengujian sentrifugasi

Lampiran 29. Hasil uji homogenitas

Lampiran 30. Alat penghantar listrik untuk menentukan jenis emulsi

Lampiran 31. Hasil penentuan jenis emulsi menggunakan kertas saring

Lampiran 32. Hasil penambahan reagen metylen Blue

Lampiran 33. Hasil penambahan sudan III