V. SIMPULAN DAN SARAN

A. Simpulan

Simpulan yang dapat diambil dalam penelitian ini yaitu:

1. Ekstrak minyak atsiri dari tanaman jotang (*Spilanthes paniculata*) baik bagian daun maupun bunga mempunyai kemampuan menghambat aktivitas *Lactobacillus acidophilus* dan *Escherichia coli*.
2. Ekstrak minyak atsiri dari bagian bunga tanaman jotang (*Spilanthes paniculata*) mempunyai aktivitas antibakteri terhadap bakteri *Lactobacillus acidophilus* dan *Escherichia coli* dengan lebih baik daripada ekstrak minyak atsiri dari bagian daun tanaman jotang (*Spilanthes paniculata*).
3. Ekstrak minyak atsiri dari bagian bunga dan daun dari tanaman jotang (*Spilanthes paniculata*) memiliki konsentrasi hambat minimum pada konsentrasi 2,5% terhadap *Lactobacillus acidophilus* dan *Escherichia coli.*

B. Saran

Penelitian ini hanya mengkaji aktivitas antibakteri tanaman jotang dengan membandingkan efektivitas antibakteri pada bagian bunga dan daun tanaman jotang. Penelitian lebih lanjut dapat dilakukan dengan mengetahui kandungan senyawa antibakteri pada bagian tanaman lainnya, seperti akar dan batang.

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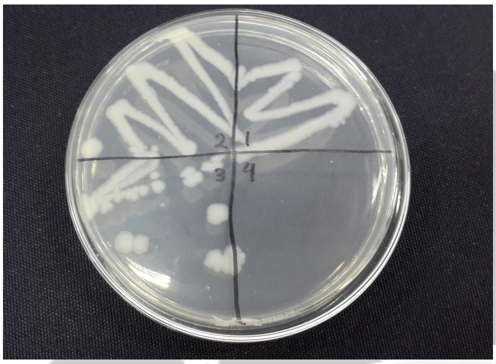
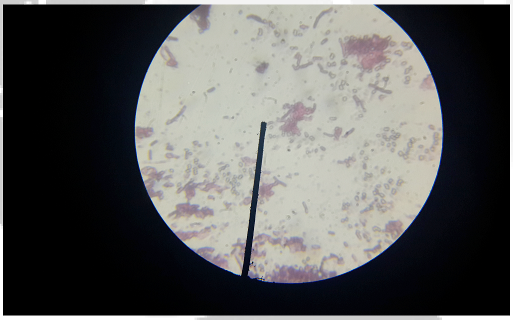
LAMPIRAN

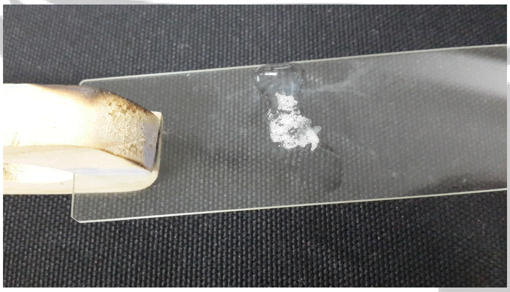
Lampiran 1. Hasil Uji Kemurnian *Escherichia coli*



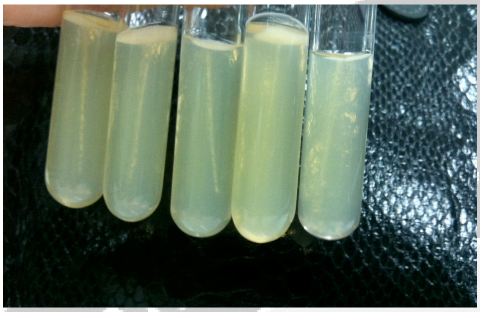
Gambar 10 . Morfologi koloni
Keterangan: 1. Koloni *Escherichia coli*



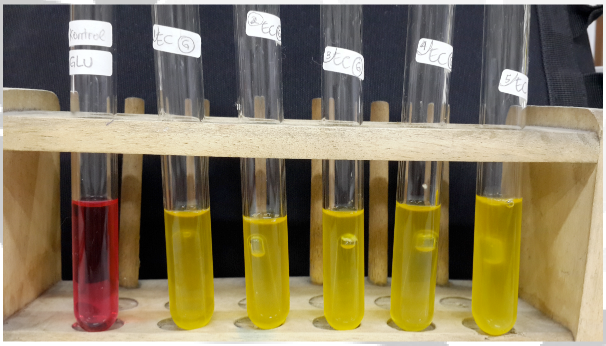
Gambar 11. Pengecatan Gram
Keterangan: sel berwarna merah (-)



Gambar 12. Uji Katalase
Keterangan: Katalase Positif



Gambar 13 . Uji Motilitas
Keterangan: Non motil



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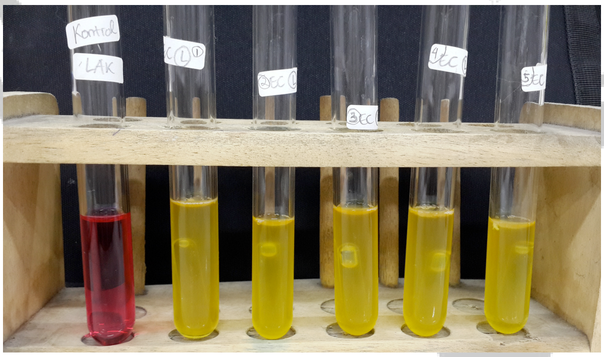
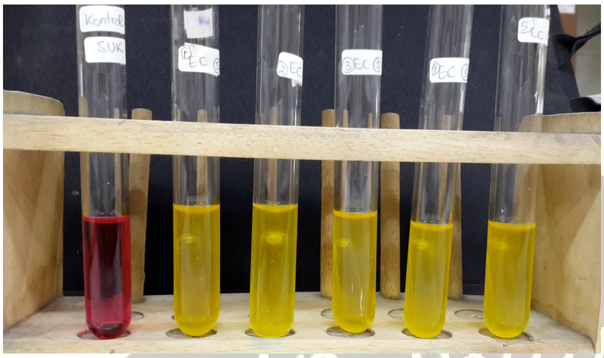
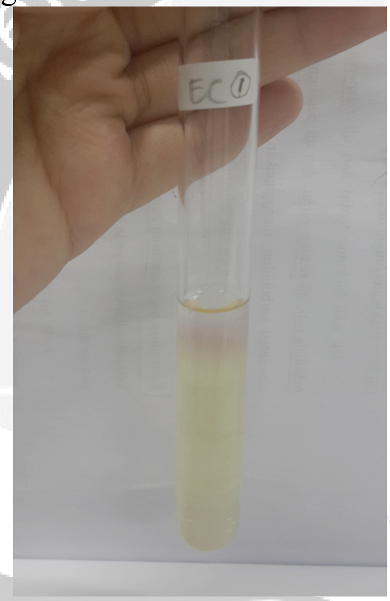


b

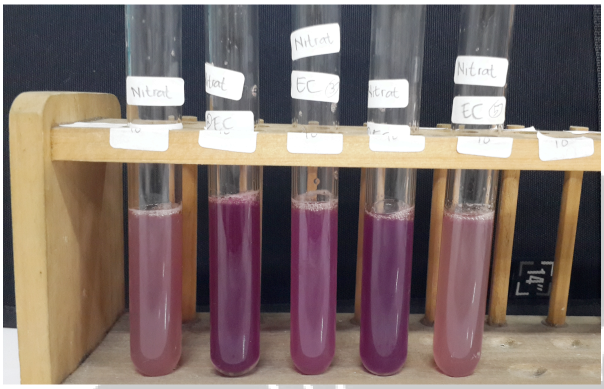


c

Gambar 14. Uji Fermentasi Karbohidrat
Keterangan: A. Glukosa B. Laktosa C. Sukrosa

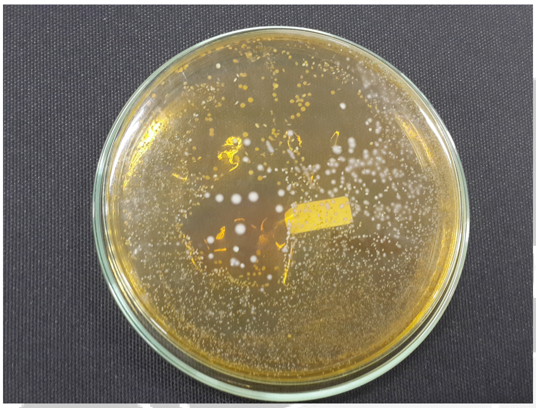


Gambar 15. Uji Pembentukan Indol
Keterangan: Terbentuk cincin Indol

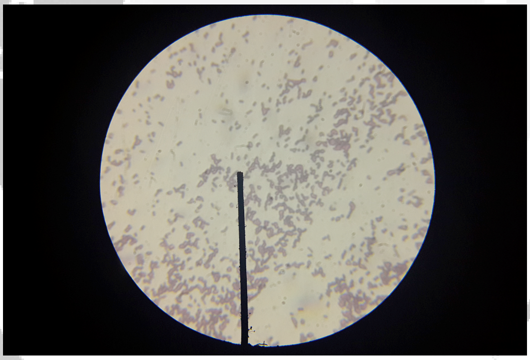


Gambar 16. Uji Reduksi Nitrat
Keterangan: Hasil Positif

Lampiran 2. Hasil Uji Kemurnian *Lactobacillus acidophilus*



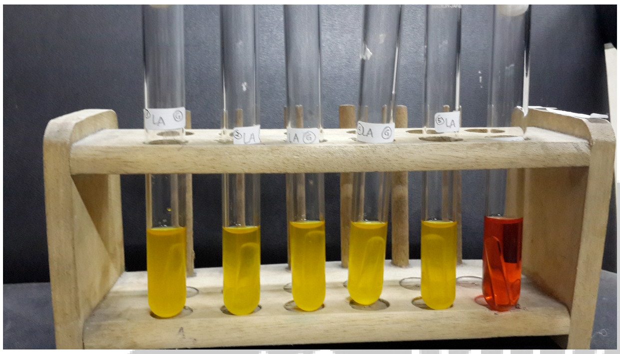
Gambar 17. Morfologi koloni
Keterangan: Koloni *Lactobacillus acidophilus*



Gambar 18. Pengecatan Gram
Keterangan: sel berwarna Ungu (+)

Gambar 19. Uji Katalase
Keterangan: Katalase Negatif

Gambar 20. Uji Motilitas
Keterangan: Non motil



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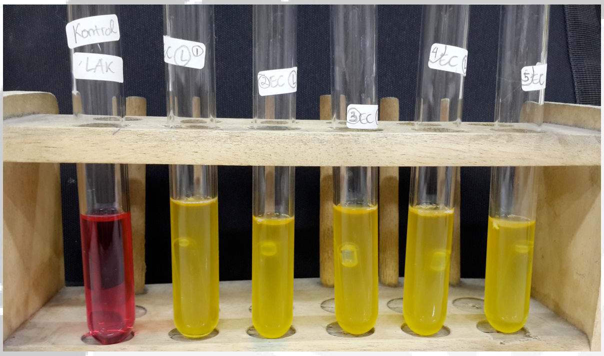

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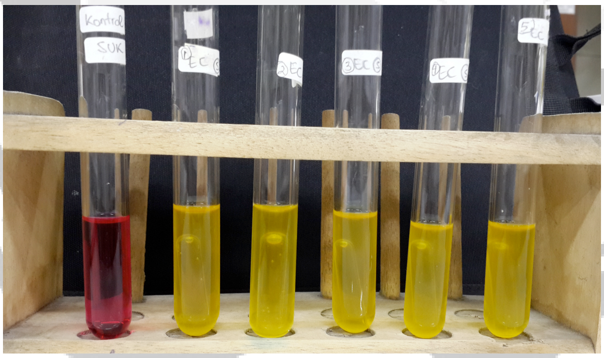
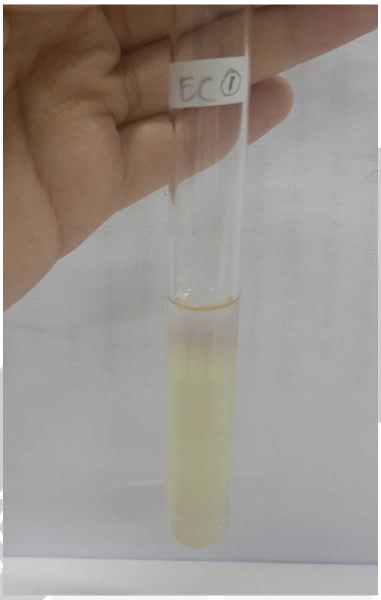
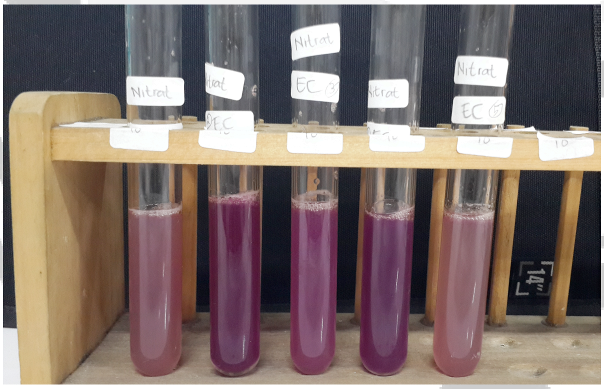


c

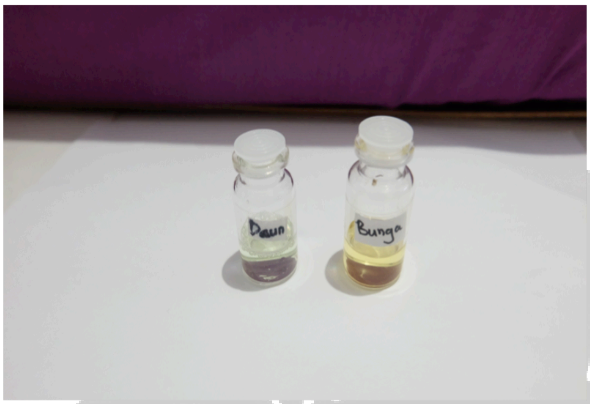
Gambar 21. Uji Fermentasi Karbohidrat
Keterangan: A. Glukosa B. Laktosa C. Sukrosa



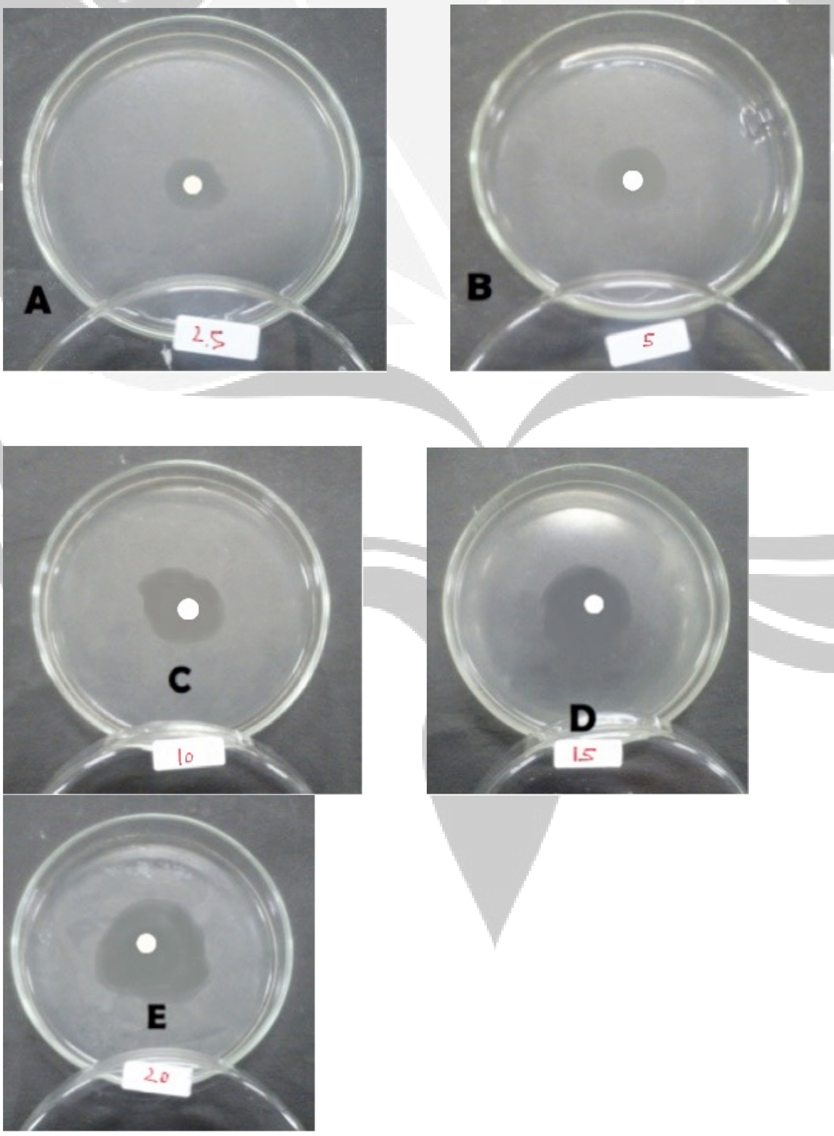
Gambar 22. Uji Pembentukan Indol
Keterangan: Terbentuk cincin Indol



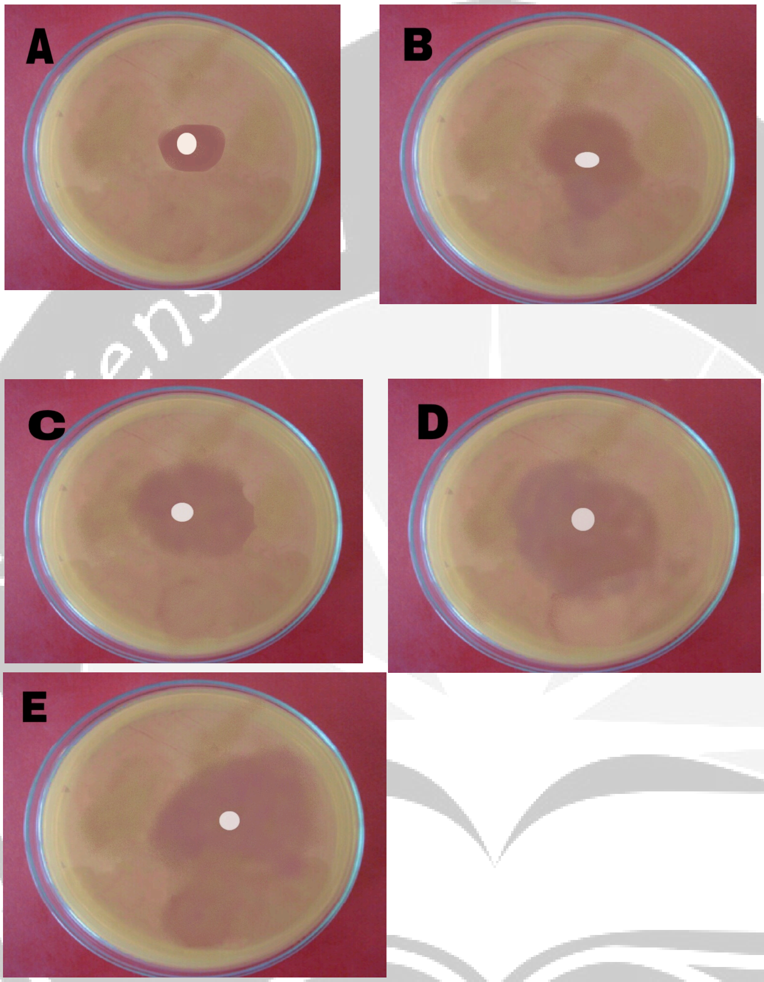
Gambar 23. Uji Reduksi Nitrat
Keterangan: Hasil Positif



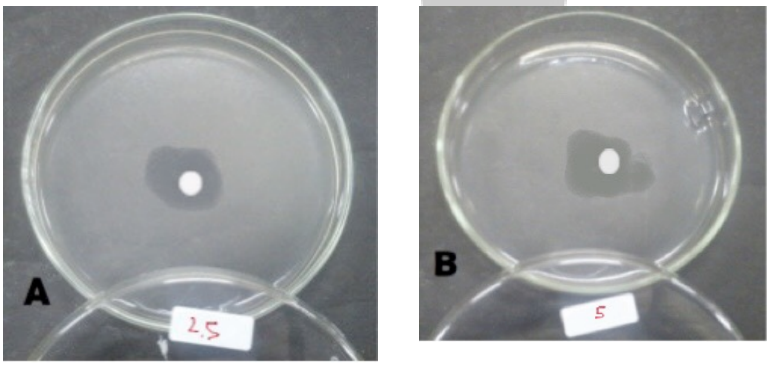
Gambar 24. Minyak Atsiri Daun dan Bunga Jotang

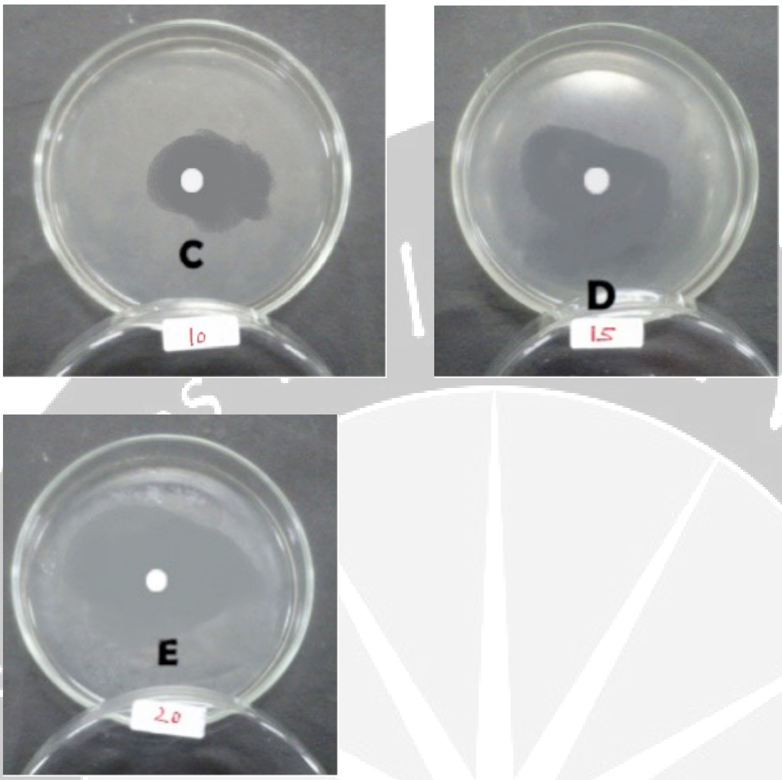


Gambar 25. Pengujian KHM Ekstrak daun Jotang terhadap bakteri *Escherichia coli* dengan konsentrasi ekstrak A. 2,5% ; B. 5% ; C. 10% ; D. 15% dan E. 20%

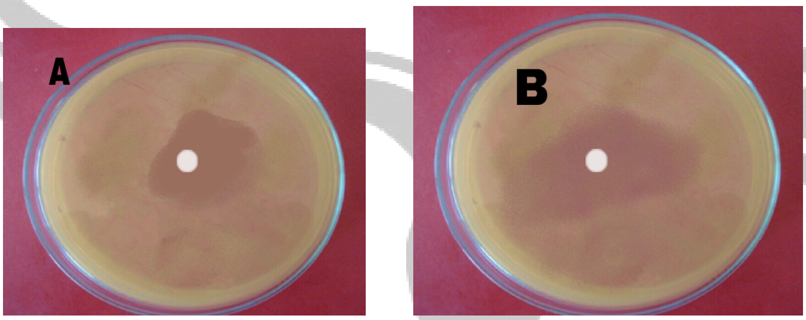


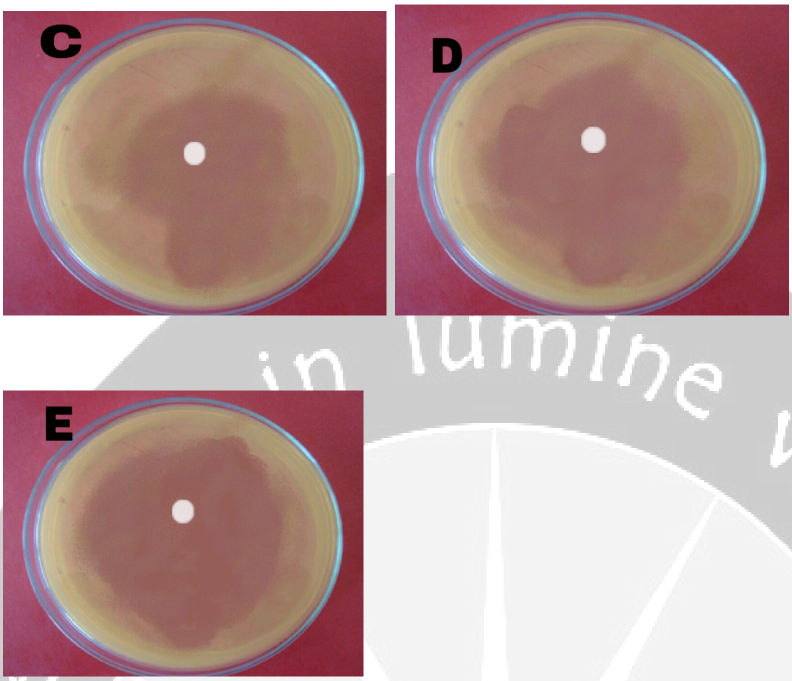
Gambar 26. Pengujian KHM Ekstrak daun Jotang terhadap bakteri *Lactobacillus acidophillus* dengan konsentrasi ekstrak A. 2,5% ; B. 5% ; C. 10% ; D. 15% dan E. 20%





Gambar 27. Pengujian KHM Ekstrak bunga Jotang terhadap bakteri *Escherichia coli* dengan konsentrasi ekstrak A. 2,5% ; B. 5% ; C. 10% ; D. 15% dan E. 20%





Gambar 28. Pengujian KHM Ekstrak bunga Jotang terhadap bakteri *Lactobacillus acidophillus* dengan konsentrasi ekstrak A. 2,5% ; B. 5% ; C. 10% ; D. 15% dan E. 20%

Lampiran
Tabel 12. Output one way ANOVA

Descriptives

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
						Lower Bound	Upper Bound
bunga_E.coli	1.00	5	5.2100	.00000	.00000	5.2100	5.2100
	2.00	5	5.8380	.22421	.10027	5.5596	6.1164
	3.00	5	7.4620	.31721	.14186	7.0681	7.8559
	4.00	5	15.3660	.41573	.18592	14.8498	15.8822
	5.00	5	19.2680	.62054	.27751	18.4975	20.0385
	6.00	5	23.7980	.28543	.12765	23.4436	24.1524
	7.00	5	40.2300	.00000	.00000	40.2300	40.2300
	Total	35	16.7389	11.80966	1.99620	12.6821	20.7956
daun_E.coli	1.00	5	5.1200	.00000	.00000	5.1200	5.1200
	2.00	5	5.6940	.39278	.17566	5.2063	6.1817
	3.00	5	7.2140	.15694	.07019	7.0191	7.4089
	4.00	5	9.2940	.39055	.17466	8.8091	9.7789
	5.00	5	12.0760	.27355	.12234	11.7363	12.4157
	6.00	5	15.3360	.44315	.19818	14.7858	15.8862
	7.00	5	35.2300	.00000	.00000	35.2300	35.2300
	Total	35	12.8520	9.87791	1.66967	9.4588	16.2452
bunga_L.adis	1.00	5	6.7800	.00000	.00000	6.7800	6.7800
	2.00	5	6.3820	.49068	.21944	5.7727	6.9913
	3.00	5	6.5420	.46289	.20701	5.9672	7.1168
	4.00	5	9.5100	.55960	.25026	8.8152	10.2048
	5.00	5	22.1460	.38991	.17437	21.6619	22.6301
	6.00	5	28.1260	.91046	.40717	26.9955	29.2565
	7.00	5	42.1100	.00000	.00000	42.1100	42.1100
	Total	35	17.3709	13.08276	2.21139	12.8768	21.8649
daun_L.adis	1.00	5	5.8800	.00000	.00000	5.8800	5.8800
	2.00	5	5.8920	.13405	.05995	5.7256	6.0584
	3.00	5	6.6440	.55261	.24714	5.9578	7.3302
	4.00	5	8.9020	.42092	.18824	8.3794	9.4246
	5.00	5	13.9120	.15643	.06996	13.7178	14.1062
	6.00	5	15.5800	.37630	.16829	15.1128	16.0472
	7.00	5	37.4800	.00000	.00000	37.4800	37.4800
	Total	35	13.4700	10.60075	1.79185	9.8285	17.1115

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
bunga_E.coli	5.636	6	28	.001
daun_E.coli	4.160	6	28	.004
bunga_L.adis	4.257	6	28	.004
daun_L.adis	7.163	6	28	.000

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
bunga_E.coli	Between Groups	4738.750	6	789.792	6995.851	.000
	Within Groups	3.161	28	.113		
	Total	4741.911	34			
daun_E.coli	Between Groups	3315.073	6	552.512	6417.630	.000
	Within Groups	2.411	28	.086		
	Total	3317.483	34			
bunga_L.adis	Between Groups	5812.394	6	968.732	3876.812	.000
	Within Groups	6.997	28	.250		
	Total	5819.390	34			
daun_L.adis	Between Groups	3818.113	6	636.352	6682.467	.000
	Within Groups	2.666	28	.095		
	Total	3820.780	34			

1. Output LSD
    a. Bunga E.coli

Between-Subjects Factors

		N
konsentrasi	1.00	5
	2.00	5
	3.00	5
	4.00	5
	5.00	5
	6.00	5
	7.00	5

Descriptive Statistics

Dependent Variable: bunga_E.coli

konsentrasi	Mean	Std. Deviation	N
1.00	5.2100	.00000	5
2.00	5.8380	.22421	5
3.00	7.4620	.31721	5
4.00	15.3660	.41573	5
5.00	19.2680	.62054	5
6.00	23.7980	.28543	5
7.00	40.2300	.00000	5
Total	16.7389	11.80966	35

Levene's Test of Equality of Error Variances[a]

Dependent Variable: bunga_E.coli

F	df1	df2	Sig.
5.636	6	28	.001

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+konsentrasi

Tests of Between-Subjects Effects

Dependent Variable: bunga_E.coli

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	4738.750[a]	6	789.792	6995.851	.000	.999
Intercept	9806.627	1	9806.627	86865.573	.000	1.000
konsentrasi	4738.750	6	789.792	6995.851	.000	.999
Error	3.161	28	.113			
Total	14548.537	35				
Corrected Total	4741.911	34				

a. R Squared = .999 (Adjusted R Squared = .999)

konsentrasi

Dependent Variable: bunga_E.coli

konsentrasi	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1.00	5.210	.150	4.902	5.518
2.00	5.838	.150	5.530	6.146
3.00	7.462	.150	7.154	7.770
4.00	15.366	.150	15.058	15.674
5.00	19.268	.150	18.960	19.576
6.00	23.798	.150	23.490	24.106
7.00	40.230	.150	39.922	40.538

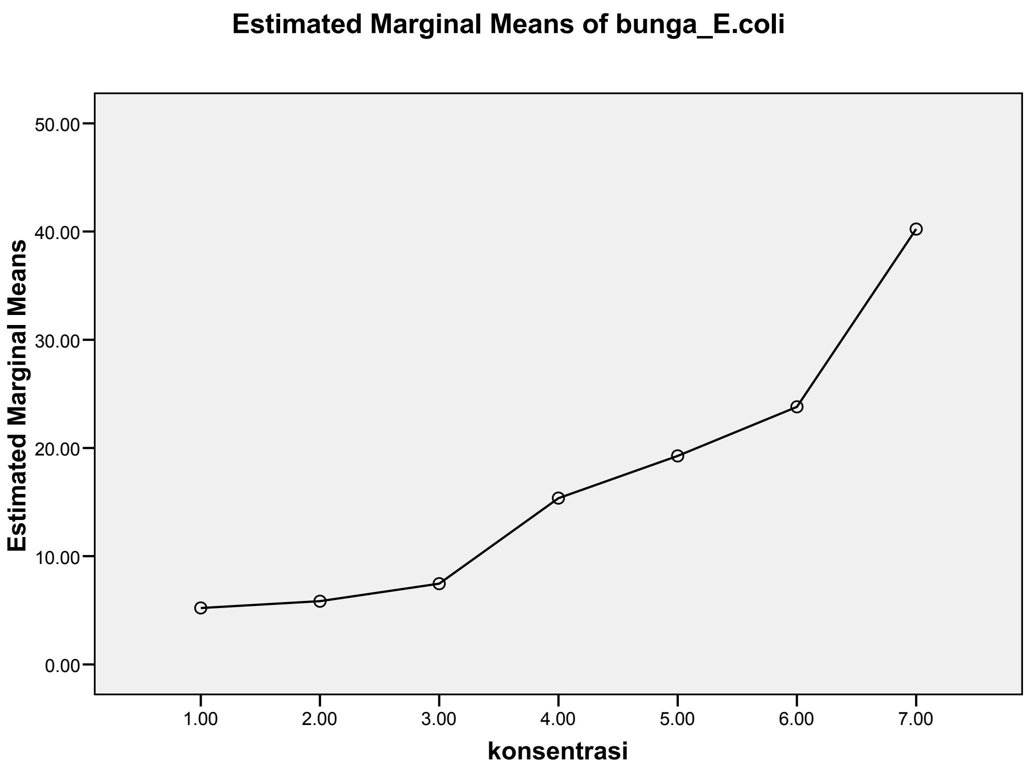
Multiple Comparisons

Dependent Variable: bunga_E.coli
LSD

(I) konsentrasi	(J) konsentrasi	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	Upper Bound
1.00	2.00	-.6280*	.21250	.006	-1.0633	-.1927
	3.00	-2.2520*	.21250	.000	-2.6873	-1.8167
	4.00	-10.1560*	.21250	.000	-10.5913	-9.7207
	5.00	-14.0580*	.21250	.000	-14.4933	-13.6227
	6.00	-18.5880*	.21250	.000	-19.0233	-18.1527
	7.00	-35.0200*	.21250	.000	-35.4553	-34.5847
2.00	1.00	.6280*	.21250	.006	.1927	1.0633
	3.00	-1.6240*	.21250	.000	-2.0593	-1.1887
	4.00	-9.5280*	.21250	.000	-9.9633	-9.0927
	5.00	-13.4300*	.21250	.000	-13.8653	-12.9947
	6.00	-17.9600*	.21250	.000	-18.3953	-17.5247
	7.00	-34.3920*	.21250	.000	-34.8273	-33.9567
3.00	1.00	2.2520*	.21250	.000	1.8167	2.6873
	2.00	1.6240*	.21250	.000	1.1887	2.0593
	4.00	-7.9040*	.21250	.000	-8.3393	-7.4687
	5.00	-11.8060*	.21250	.000	-12.2413	-11.3707
	6.00	-16.3360*	.21250	.000	-16.7713	-15.9007
	7.00	-32.7680*	.21250	.000	-33.2033	-32.3327
4.00	1.00	10.1560*	.21250	.000	9.7207	10.5913
	2.00	9.5280*	.21250	.000	9.0927	9.9633
	3.00	7.9040*	.21250	.000	7.4687	8.3393
	5.00	-3.9020*	.21250	.000	-4.3373	-3.4667
	6.00	-8.4320*	.21250	.000	-8.8673	-7.9967
	7.00	-24.8640*	.21250	.000	-25.2993	-24.4287
5.00	1.00	14.0580*	.21250	.000	13.6227	14.4933
	2.00	13.4300*	.21250	.000	12.9947	13.8653
	3.00	11.8060*	.21250	.000	11.3707	12.2413
	4.00	3.9020*	.21250	.000	3.4667	4.3373
	6.00	-4.5300*	.21250	.000	-4.9653	-4.0947
	7.00	-20.9620*	.21250	.000	-21.3973	-20.5267
6.00	1.00	18.5880*	.21250	.000	18.1527	19.0233
	2.00	17.9600*	.21250	.000	17.5247	18.3953
	3.00	16.3360*	.21250	.000	15.9007	16.7713
	4.00	8.4320*	.21250	.000	7.9967	8.8673
	5.00	4.5300*	.21250	.000	4.0947	4.9653
	7.00	-16.4320*	.21250	.000	-16.8673	-15.9967
7.00	1.00	35.0200*	.21250	.000	34.5847	35.4553
	2.00	34.3920*	.21250	.000	33.9567	34.8273
	3.00	32.7680*	.21250	.000	32.3327	33.2033
	4.00	24.8640*	.21250	.000	24.4287	25.2993
	5.00	20.9620*	.21250	.000	20.5267	21.3973
	6.00	16.4320*	.21250	.000	15.9967	16.8673

Based on observed means.

*. The mean difference is significant at the .05 level.



a. Daun E.colijz yt

Between-Subjects Factors

		N
konsentrasi	1.00	5
	2.00	5
	3.00	5
	4.00	5
	5.00	5
	6.00	5
	7.00	5

Descriptive Statistics

Dependent Variable: daun_E.coli

konsentrasi	Mean	Std. Deviation	N
1.00	5.1200	.00000	5
2.00	5.6940	.39278	5
3.00	7.2140	.15694	5
4.00	9.2940	.39055	5
5.00	12.0760	.27355	5
6.00	15.3360	.44315	5
7.00	35.2300	.00000	5
Total	12.8520	9.87791	35

Levene's Test of Equality of Error Variances[a]

Dependent Variable: daun_E.coli

F	df1	df2	Sig.
4.160	6	28	.004

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+konsentrasi

Tests of Between-Subjects Effects

Dependent Variable: daun_E.coli

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	3315.073[a]	6	552.512	6417.630	.000	.999
Intercept	5781.087	1	5781.087	67149.434	.000	1.000
konsentrasi	3315.073	6	552.512	6417.630	.000	.999
Error	2.411	28	.086			
Total	9098.570	35				
Corrected Total	3317.483	34				

a. R Squared = .999 (Adjusted R Squared = .999)

konsentrasi

Dependent Variable: daun_E.coli

konsentrasi	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1.00	5.120	.131	4.851	5.389
2.00	5.694	.131	5.425	5.963
3.00	7.214	.131	6.945	7.483
4.00	9.294	.131	9.025	9.563
5.00	12.076	.131	11.807	12.345
6.00	15.336	.131	15.067	15.605
7.00	35.230	.131	34.961	35.499

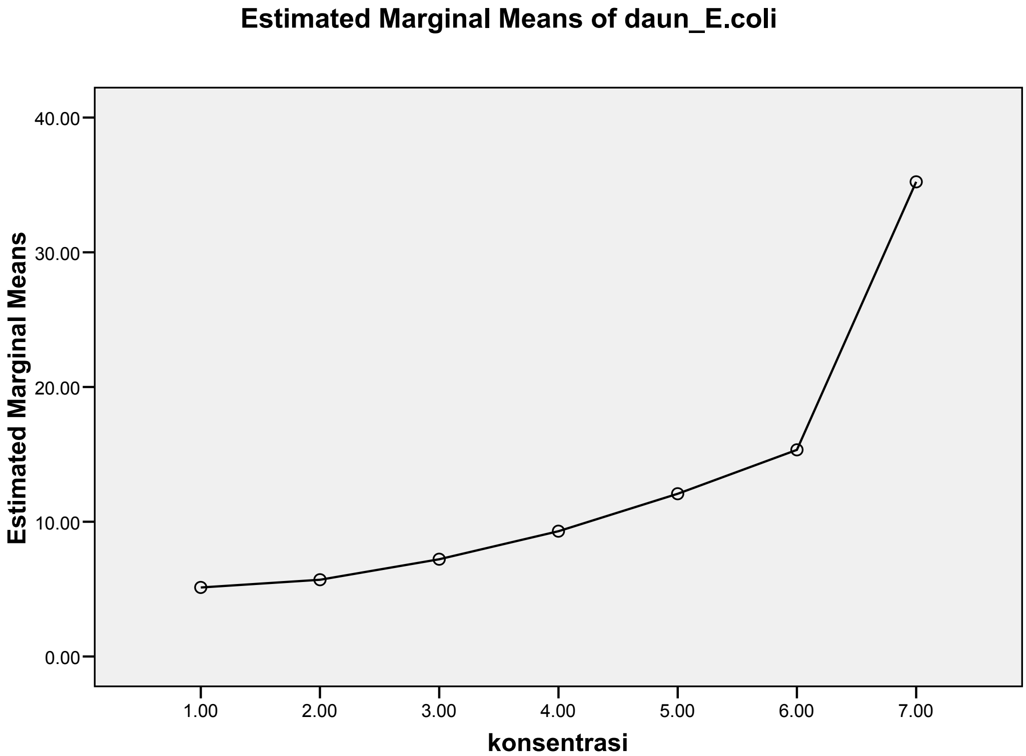
Multiple Comparisons

Dependent Variable: daun_E.coli
LSD

(I) konsentrasi	(J) konsentrasi	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	Upper Bound
1.00	2.00	-.5740*	.18557	.004	-.9541	-.1939
	3.00	-2.0940*	.18557	.000	-2.4741	-1.7139
	4.00	-4.1740*	.18557	.000	-4.5541	-3.7939
	5.00	-6.9560*	.18557	.000	-7.3361	-6.5759
	6.00	-10.2160*	.18557	.000	-10.5961	-9.8359
	7.00	-30.1100*	.18557	.000	-30.4901	-29.7299
2.00	1.00	.5740*	.18557	.004	.1939	.9541
	3.00	-1.5200*	.18557	.000	-1.9001	-1.1399
	4.00	-3.6000*	.18557	.000	-3.9801	-3.2199
	5.00	-6.3820*	.18557	.000	-6.7621	-6.0019
	6.00	-9.6420*	.18557	.000	-10.0221	-9.2619
	7.00	-29.5360*	.18557	.000	-29.9161	-29.1559
3.00	1.00	2.0940*	.18557	.000	1.7139	2.4741
	2.00	1.5200*	.18557	.000	1.1399	1.9001
	4.00	-2.0800*	.18557	.000	-2.4601	-1.6999
	5.00	-4.8620*	.18557	.000	-5.2421	-4.4819
	6.00	-8.1220*	.18557	.000	-8.5021	-7.7419
	7.00	-28.0160*	.18557	.000	-28.3961	-27.6359
4.00	1.00	4.1740*	.18557	.000	3.7939	4.5541
	2.00	3.6000*	.18557	.000	3.2199	3.9801
	3.00	2.0800*	.18557	.000	1.6999	2.4601
	5.00	-2.7820*	.18557	.000	-3.1621	-2.4019
	6.00	-6.0420*	.18557	.000	-6.4221	-5.6619
	7.00	-25.9360*	.18557	.000	-26.3161	-25.5559
5.00	1.00	6.9560*	.18557	.000	6.5759	7.3361
	2.00	6.3820*	.18557	.000	6.0019	6.7621
	3.00	4.8620*	.18557	.000	4.4819	5.2421
	4.00	2.7820*	.18557	.000	2.4019	3.1621
	6.00	-3.2600*	.18557	.000	-3.6401	-2.8799
	7.00	-23.1540*	.18557	.000	-23.5341	-22.7739
6.00	1.00	10.2160*	.18557	.000	9.8359	10.5961
	2.00	9.6420*	.18557	.000	9.2619	10.0221
	3.00	8.1220*	.18557	.000	7.7419	8.5021
	4.00	6.0420*	.18557	.000	5.6619	6.4221
	5.00	3.2600*	.18557	.000	2.8799	3.6401
	7.00	-19.8940*	.18557	.000	-20.2741	-19.5139
7.00	1.00	30.1100*	.18557	.000	29.7299	30.4901
	2.00	29.5360*	.18557	.000	29.1559	29.9161
	3.00	28.0160*	.18557	.000	27.6359	28.3961
	4.00	25.9360*	.18557	.000	25.5559	26.3161
	5.00	23.1540*	.18557	.000	22.7739	23.5341
	6.00	19.8940*	.18557	.000	19.5139	20.2741

Based on observed means.

*. The mean difference is significant at the .05 level.



b. Bunga L. adis

Between-Subjects Factors

		N
konsentrasi	1.00	5
	2.00	5
	3.00	5
	4.00	5
	5.00	5
	6.00	5
	7.00	5

Descriptive Statistics

Dependent Variable: bunga_L.adis

konsentrasi	Mean	Std. Deviation	N
1.00	6.7800	.00000	5
2.00	6.3820	.49068	5
3.00	6.5420	.46289	5
4.00	9.5100	.55960	5
5.00	22.1460	.38991	5
6.00	28.1260	.91046	5
7.00	42.1100	.00000	5
Total	17.3709	13.08276	35

Levene's Test of Equality of Error Variances[a]

Dependent Variable: bunga_L.adis

F	df1	df2	Sig.
4.257	6	28	.004

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+konsentrasi

Tests of Between-Subjects Effects

Dependent Variable: bunga_L.adis

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	5812.394[a]	6	968.732	3876.812	.000	.999
Intercept	10561.134	1	10561.134	42265.064	.000	.999
konsentrasi	5812.394	6	968.732	3876.812	.000	.999
Error	6.997	28	.250			
Total	16380.524	35				
Corrected Total	5819.390	34				

a. R Squared = .999 (Adjusted R Squared = .999)

konsentrasi

Dependent Variable: bunga_L.adis

konsentrasi	Mean	Std. Error	95% Confidence Interval Lower Bound	Upper Bound
1.00	6.780	.224	6.322	7.238
2.00	6.382	.224	5.924	6.840
3.00	6.542	.224	6.084	7.000
4.00	9.510	.224	9.052	9.968
5.00	22.146	.224	21.688	22.604
6.00	28.126	.224	27.668	28.584
7.00	42.110	.224	41.652	42.568

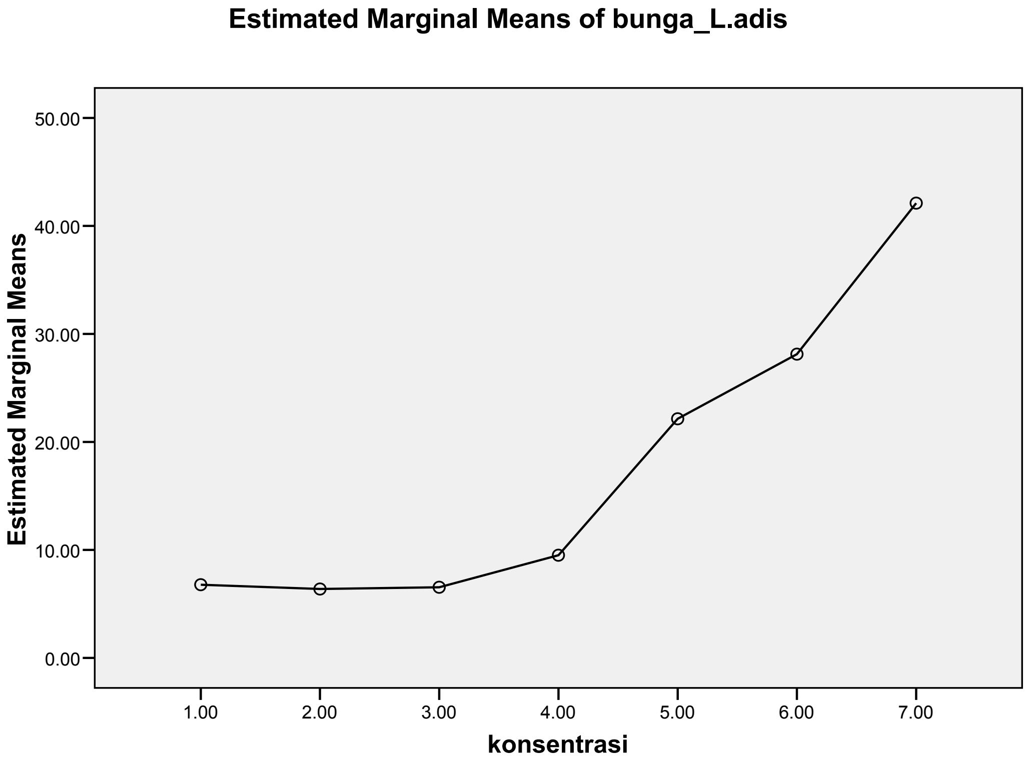
Multiple Comparisons

Dependent Variable: bunga_L.adis
LSD

(I) konsentrasi	(J) konsentrasi	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1.00	2.00	.3980	.31615	.218	-.2496	1.0456
	3.00	.2380	.31615	.458	-.4096	.8856
	4.00	-2.7300*	.31615	.000	-3.3776	-2.0824
	5.00	-15.3660*	.31615	.000	-16.0136	-14.7184
	6.00	-21.3460*	.31615	.000	-21.9936	-20.6984
	7.00	-35.3300*	.31615	.000	-35.9776	-34.6824
2.00	1.00	-.3980	.31615	.218	-1.0456	.2496
	3.00	-.1600	.31615	.617	-.8076	.4876
	4.00	-3.1280*	.31615	.000	-3.7756	-2.4804
	5.00	-15.7640*	.31615	.000	-16.4116	-15.1164
	6.00	-21.7440*	.31615	.000	-22.3916	-21.0964
	7.00	-35.7280*	.31615	.000	-36.3756	-35.0804
3.00	1.00	-.2380	.31615	.458	-.8856	.4096
	2.00	.1600	.31615	.617	-.4876	.8076
	4.00	-2.9680*	.31615	.000	-3.6156	-2.3204
	5.00	-15.6040*	.31615	.000	-16.2516	-14.9564
	6.00	-21.5840*	.31615	.000	-22.2316	-20.9364
	7.00	-35.5680*	.31615	.000	-36.2156	-34.9204
4.00	1.00	2.7300*	.31615	.000	2.0824	3.3776
	2.00	3.1280*	.31615	.000	2.4804	3.7756
	3.00	2.9680*	.31615	.000	2.3204	3.6156
	5.00	-12.6360*	.31615	.000	-13.2836	-11.9884
	6.00	-18.6160*	.31615	.000	-19.2636	-17.9684
	7.00	-32.6000*	.31615	.000	-33.2476	-31.9524
5.00	1.00	15.3660*	.31615	.000	14.7184	16.0136
	2.00	15.7640*	.31615	.000	15.1164	16.4116
	3.00	15.6040*	.31615	.000	14.9564	16.2516
	4.00	12.6360*	.31615	.000	11.9884	13.2836
	6.00	-5.9800*	.31615	.000	-6.6276	-5.3324
	7.00	-19.9640*	.31615	.000	-20.6116	-19.3164
6.00	1.00	21.3460*	.31615	.000	20.6984	21.9936
	2.00	21.7440*	.31615	.000	21.0964	22.3916
	3.00	21.5840*	.31615	.000	20.9364	22.2316
	4.00	18.6160*	.31615	.000	17.9684	19.2636
	5.00	5.9800*	.31615	.000	5.3324	6.6276
	7.00	-13.9840*	.31615	.000	-14.6316	-13.3364
7.00	1.00	35.3300*	.31615	.000	34.6824	35.9776
	2.00	35.7280*	.31615	.000	35.0804	36.3756
	3.00	35.5680*	.31615	.000	34.9204	36.2156
	4.00	32.6000*	.31615	.000	31.9524	33.2476
	5.00	19.9640*	.31615	.000	19.3164	20.6116
	6.00	13.9840*	.31615	.000	13.3364	14.6316

Based on observed means.

*. The mean difference is significant at the .05 level.


Estimated Marginal Means of bunga_L.adis
Estimated Marginal Means
50.00
40.00
30.00
20.00
10.00
0.00
1.00
2.00
3.00
4.00
5.00
6.00
7.00
konsentrasi

c. Daun L. adis