

## LAMPIRAN 1

**ANALISIS DATA TERHADAP MUTU KIMIA pH KEFIR  
SUSU KACANG TANAH**

Variasi Bahan Baku (G)	Inokulum (F)	Ulangan		Jumlah Perlakuan	Rataan Perlakuan
		1	2		
G1	F1	4,4	4,5	8,900	4,450
	F2	4,5	4,5	9,000	4,500
	F3	4,2	4,3	8,500	4,250
G2	F1	4,6	4,7	9,300	4,650
	F2	4,7	4,6	9,300	4,650
	F3	4,7	4,6	9,300	4,650
G3	F1	4,5	4,5	9,000	4,500
	F2	4,4	4,4	8,800	4,400
	F3	4,3	4,4	8,700	4,350
<b>Jumlah Umum (G)</b>				80,800	
<b>Rataan Umum</b>					2,244

Keterangan :

Faktor G (Variasi Bahan Baku)

G<sub>1</sub> : Konsentrasi variasi bahan baku 5%

G<sub>2</sub> : Konsentrasi variasi bahan baku 10%

G<sub>3</sub> : Konsentrasi variasi bahan baku 15%

Faktor F (Konsentrasi Inokulum)

F<sub>1</sub> : Konsentrasi inokulum 2 %

F<sub>2</sub> : Konsentrasi inokulum 4 %

F<sub>3</sub> : Konsentrasi inokulum 6 %

## LAMPIRAN 2

### PERHITUNGAN ANOVA TERHADAP pH KEFIR SUSU KACANG TANAH

#### 1. db = Derajat bebas

db Perlakuan	= a.b - 1	Keterangan : a : banyaknya perlakuan variasi bahan baku b : banyaknya perlakuan inokulum r : banyaknya kelompok /
	= 3 x 3 - 1	
	= 5	
db Variasi Bahan Baku (A)	= a - 1	
	= 3 - 1	
	= 2	
db Inokulum (B)	= b - 1	
	= 3 - 1	
	= 2	
db Interaksi (A × B)	= (a - 1)(b - 1)	
	= (3 - 1)(3 - 1)	
	= 4	
db Galat	= (r - 1)a.b	
	= (2 - 1)3.3	
	= 9	
db Total	= r.a.b - 1	
	= 2.3.3 - 1	
	= 17	

#### 2. Faktor Koreksi

$$\begin{aligned}
 FK &= \frac{(G)^2}{abr} \\
 &= \frac{(80,800)^2}{(3)(3)(2)} \\
 &= 362,702
 \end{aligned}$$

### 3. Jumlah Kuadrat (JK)

$$JK \text{ Umum} = \sum X^2 - FK$$

$$= \{(4,4)^2 + (4,5)^2 + (4,5)^2 + (4,5)^2 + (4,2)^2 + (4,3)^2 + (4,6)^2 + (4,7)^2 + (4,7)^2 + (4,6)^2 + (4,7)^2 + (4,6)^2 + (4,5)^2 + (4,5)^2 + (4,4)^2 + (4,4)^2 + (4,3)^2 + (4,4)^2\} - (362,702)$$

$$= \{(19,360) + (20,250) + (20,250) + (20,250) + (17,640) + (18,490) + (21,160) + (22,090) + (22,090) + (21,160) + (22,090) + (21,160) + (20,250) + (20,250) + (19,360) + (19,360) + (18,490) + (19,360)\} - (362,702)$$

$$= 363,060 - 362,702$$

$$= 0,358$$

$$JK \text{ Perlakuan} = \frac{\sum T^2}{r} - FK$$

$$= \frac{(8,9)^2 + (9)^2 + (8,5)^2 + (9,3)^2 + (9,3)^2 + (9,3)^2 + (9)^2 + (8,8)^2 + (8,7)^2}{2} - 362,702$$

$$= \frac{(79,210) + (81) + (72,25) + (86,49) + (86,49) + (86,49) + (81) + (77,44) + (75,69)}{2} - 362,702$$

$$= \frac{726,060}{2} - 362,702$$

$$= 0,328$$

$$JK \text{ Galat} = JK \text{ umum} - JK \text{ perlakuan}$$

$$= 0,358 - 0,328$$

$$= 0,030$$

Tabel Analisis Faktorial (Interaksi AB)

Variasi Bahan Baku (A)	Inokulum (B)			Jumlah A	Rataan A
	F1	F2	F3		
G1	8,900	9,000	8,500	26,400	4,400
G2	9,300	9,300	9,300	27,900	4,650
G3	9,000	8,800	8,700	26,500	4,417
Jumlah B	27,200	27,100	26,500	80,800	
Rataan B	4,533	4,517	4,418		

$$\begin{aligned}
 \text{JK Variasi Bahan Baku (A)} &= \frac{\sum A^2}{rb} - F.K \\
 &= \frac{(26,400)^2 + (27,900)^2 + (26,500)^2}{(2)(3)} - 362,702 \\
 &= \frac{(696,960) + (778,410) + (702,250)}{6} - 362,702 \\
 &= \frac{2177,620}{6} - 362,702 \\
 &= 0,234
 \end{aligned}$$

$$\begin{aligned}
 \text{JK Inokulum (B)} &= \frac{\sum B^2}{ra} - F.K \\
 &= \frac{(27,200)^2 + (27,100)^2 + (26,500)^2}{2(3)} - 362,702 \\
 &= \frac{(739,840) + (734,410) + (702,250)}{6} - 362,702 \\
 &= \frac{2176,500}{6} - 362,702 \\
 &= 0,048
 \end{aligned}$$

$$\mathbf{JK \text{ Interaksi AB} = JK \text{ perlakuan} - JK A - JK B}$$

$$= 0,328 - 0,234 - 0,048$$

$$= 0,046$$

#### 4. **KT = Kuadrat Tengah**

$$KT \text{ Perlakuan} = \frac{JK \text{ perlakuan}}{db \text{ perlakuan}}$$

$$= 0,328 / 8$$

$$= 0,041$$

$$KT \text{ Galat} = \frac{JKGalat}{dbGalat}$$

$$= 0,030 / 9$$

$$= 0,003$$

$$KT A = \frac{JK A}{db a}$$

$$= 0,234 / 2$$

$$= 0,117$$

$$KT B = \frac{JK B}{db b}$$

$$= 0,048 / 2$$

$$= 0,024$$

$$KT \text{ Interaksi AB} = \frac{JKAB}{dbAB}$$

$$= 0,046 / 4$$

$$= 0,011$$

#### 5. **F<sub>hitung</sub>**

$$F_{hitung} \text{ Perlakuan} = \frac{KT \text{ perlakuan}}{KT \text{ Galat}} = \frac{0,041}{0,003} = 12,292$$

$$F_{hitung} \text{ Variasi Bahan Baku (A)} = \frac{KT A}{KT \text{ Galat}} = \frac{0,117}{0,003} = 35,167$$

$$F_{\text{hitung Inokulum (B)}} = \frac{KT \ B}{KT \ Galat} = \frac{0,024}{0,003} = 7,167$$

$$F_{\text{hitung Interaksi AB}} = \frac{KT \ AB}{KT \ Galat} = \frac{0,011}{0,003} = 3,417$$

#### 6. Koefisien keragaman (kk)

$$Kk = \frac{\sqrt{KT_{\text{galat}}}}{\text{Rataan umum}} \times 100$$

$$= \frac{\sqrt{0,003}}{2,244} \times 100$$

$$= 2,57\%$$

#### ANOVA TERHADAP pH KEFIR SUSU KACANG TANAH

Sumber Keragaman SK	Derajat bebas db	Jumlah Kuadrat JK	Kuadrat Tengah KT	F Hitung	F tabel	
					5%	1%
Perlakuan	8	0,328	0,041	12,292	3,23	5,47
<b>Variasi Bahan</b>						
<b>Baku (A)</b>	2	0,234	0,117	35,167**	4,26	8,02
<b>Inokulum (B)</b>	2	0,048	0,024	7,167*	4,26	8,02
<b>Interaksi AB</b>	4	0,046	0,011	3,417 <sup>ts</sup>	3,63	6,42
<b>Galat</b>	9	0,030	0,003			
<b>Umum</b>	17	0,358				

Keterangan :

\* = signifikan (beda nyata) pada taraf 5%

\*\* = sangat signifikan (sangat beda nyata) pada taraf nyata 1%

ts = tidak signifikan (tidak beda nyata) pada taraf nyata 5% dan 1%

kk = 2,57%

## LAMPIRAN 3

**ANALISIS DATA TERHADAP KADAR ASAM LAKTAT  
KEFIR SUSU KACANG TANAH DALAM SATUAN %**

Variasi Bahan Baku (G)	Inokulum (F)	Ulangan		Jumlah Perlakuan	Rataan Perlakuan
		1	2		
G1	F1	0,63	0,63	1,260	0,630
	F2	0,27	0,36	0,630	0,315
	F3	0,36	0,45	0,810	0,405
G2	F1	0,09	0,45	0,540	0,270
	F2	0,27	0,36	0,630	0,315
	F3	0,45	0,27	0,720	0,360
G3	F1	0,18	0,18	0,360	0,180
	F2	0,27	0,18	0,450	0,225
	F3	0,36	0,36	0,720	0,360
<b>Jumlah Umum (G)</b>				6,120	
<b>Rataan Umum</b>					0,170

Keterangan :

Faktor G (Variasi Bahan Baku)

G<sub>1</sub> : Konsentrasi variasi bahan baku 5%

G<sub>2</sub> : Konsentrasi variasi bahan baku 10%

G<sub>3</sub> : Konsentrasi variasi bahan baku 15%

Faktor F (Konsentrasi Inokulum)

F<sub>1</sub> : Konsentrasi inokulum 2 %

F<sub>2</sub> : Konsentrasi inokulum 4 %

F<sub>3</sub> : Konsentrasi inokulum 6 %

## LAMPIRAN 4

### PERHITUNGAN ANOVA TERHADAP KADAR ASAM LAKTAT KEFIR SUSU KACANG TANAH

#### 1. db = Derajat bebas

$$\begin{aligned} \text{db Perlakuan} &= a \cdot b - 1 \\ &= 3 \times 3 - 1 \\ &= 5 \end{aligned}$$

$$\begin{aligned} \text{db Variasi Bahan Baku (A)} &= a - 1 \\ &= 3 - 1 \\ &= 2 \end{aligned}$$

$$\begin{aligned} \text{db Inokulum (B)} &= b - 1 \\ &= 3 - 1 \\ &= 2 \end{aligned}$$

$$\begin{aligned} \text{db Interaksi (A} \times \text{B)} &= (a - 1)(b - 1) \\ &= (3 - 1)(3 - 1) \\ &= 4 \end{aligned}$$

$$\begin{aligned} \text{db Galat} &= (r - 1) \cdot a \cdot b \\ &= (2 - 1) \cdot 3 \cdot 3 \\ &= 9 \end{aligned}$$

$$\begin{aligned} \text{db Total} &= r \cdot a \cdot b - 1 \\ &= 2 \cdot 3 \cdot 3 - 1 \\ &= 17 \end{aligned}$$

Keterangan :

a : banyaknya perlakuan  
variasi bahan baku

b : banyaknya perlakuan  
inokulum

r : banyaknya  
kelompok / ulangan

#### 2. Faktor Koreksi

$$\begin{aligned} FK &= \frac{(G)^2}{abr} \\ &= \frac{(6,120)^2}{(3)(3)(2)} \\ &= 2,081 \end{aligned}$$



### 3. Jumlah Kuadrat (JK)

$$\begin{aligned}
 \text{JK Umum} &= \sum X^2 - F.K \\
 &= \{(0,63)^2 + (0,63)^2 + (0,27)^2 + (0,36)^2 + (0,36)^2 + (0,45)^2 + (0,09)^2 + \\
 &\quad (0,45)^2 + (0,27)^2 + (0,36)^2 + (0,45)^2 + (0,27)^2 + (0,18)^2 + (0,18)^2 + \\
 &\quad (0,27)^2 + (0,18)^2 + (0,36)^2 + (0,36)^2\} - (2,081) \\
 &= \{(0,397) + (0,397) + (0,073) + (0,130) + (0,130) + (0,203) + (0,008) + (0,2 \\
 &\quad 03) + (0,073) + (0,130) + (0,203) + (0,073) + (0,032) + (0,032) + (0,073) \\
 &\quad + (0,032) + (0,130) + (0,130)\} - (2,081) \\
 &= 2,446 - 2,081 \\
 &= 0,365
 \end{aligned}$$

$$\begin{aligned}
 \text{JK Perlakuan} &= \frac{\sum T^2}{r} - F.K \\
 &= \frac{(1,260)^2 + (0,630)^2 + \dots + (0,450)^2 + (0,720)^2}{2} - 2,081 \\
 &= \frac{(1,588) + (0,397) + \dots + (0,203) + (0,518)}{2} - 2,081 \\
 &= \frac{4,698}{2} - 2,081 \\
 &= 0,268
 \end{aligned}$$

$$\begin{aligned}
 \text{JK Galat} &= \text{JK umum} - \text{JK perlakuan} \\
 &= 0,365 - 0,268 \\
 &= 0,097
 \end{aligned}$$

**Tabel Analisis Faktorial (Interaksi AB)**

Variasi Bahan Baku (A)	Inokulum (B)			Jumlah A	Rataan A
	F1	F2	F3		
G1	1,260	0,630	0,810	2,700	0,450
G2	0,540	0,630	0,720	1,890	0,315
G3	0,360	0,450	0,720	1,530	0,255
<b>Jumlah B</b>	2,160	1,710	2,250	6,120	
<b>Rataan B</b>	0,3600	0,2850	0,3750		

$$\begin{aligned}
 \text{JK Variasi Bahan Baku (A)} &= \frac{\sum A^2}{rb} - F.K \\
 &= \frac{(2,700)^2 + (1,890)^2 + (1,530)^2}{(2)(3)} - 2,081 \\
 &= \frac{(7,290) + (3,572) + (2,341)}{6} - 2,081 \\
 &= \frac{13,203}{6} - 2,081 \\
 &= 0,120
 \end{aligned}$$

$$\begin{aligned}
 \text{JK Inokulum (B)} &= \frac{\sum B^2}{ra} - F.K \\
 &= \frac{(2,160)^2 + (1,710)^2 + (2,250)^2}{2(3)} - 2,081 \\
 &= \frac{(4,6656) + (2,9241) + (5,0625)}{6} - 2,081 \\
 &= \frac{12,6522}{6} - 2,081 \\
 &= 0,028
 \end{aligned}$$

$$\begin{aligned}
 \text{JK Interaksi AB} &= \text{JK perlakuan} - \text{JK A} - \text{JK B} \\
 &= 0,268 - 0,120 - 0,028 \\
 &= 0,121
 \end{aligned}$$

#### 4. KT = Kuadrat Tengah

$$\begin{aligned}
 \text{KT Perlakuan} &= \frac{JK \text{ perlakuan}}{db \text{ perlakuan}} \\
 &= 0,268 / 8 \\
 &= 0,034 \\
 \text{KT Galat} &= \frac{JK \text{ Galat}}{db \text{ Galat}} \\
 &= 0,097 / 9
 \end{aligned}$$

$$= 0,011$$

$$KT A = \frac{JK A}{db a}$$

$$= 0,120 / 2$$

$$= 0,060$$

$$KT B = \frac{JK B}{db b}$$

$$= 0,028 / 2$$

$$= 0,014$$

$$KT \text{ Interaksi AB} = \frac{JKAB}{dbAB}$$

$$= 0,121 / 4$$

$$= 0,030$$

### 5. $F_{hitung}$

$$F_{hitung} \text{ Perlakuan} = \frac{KT \text{ perlakuan}}{KT \text{ Galat}} = \frac{0,034}{0,011} = 3,104$$

$$F_{hitung} \text{ Variasi Bahan Baku (A)} = \frac{KT A}{KT \text{ Galat}} = \frac{0,060}{0,011} = 5,542$$

$$F_{hitung} \text{ Inokulum (B)} = \frac{KT B}{KT \text{ Galat}} = \frac{0,014}{0,011} = 1,292$$

$$F_{hitung} \text{ Interaksi AB} = \frac{KT AB}{KT \text{ Galat}} = \frac{0,030}{0,011} = 2,792$$

### 6. Koefisien keragaman (kk)

$$Kk = \frac{\sqrt{KTgalat}}{Rataan \text{ umum}} \times 100$$

$$= \frac{\sqrt{0,011}}{6,120} \times 100$$

$$= 61,13\%$$

**ANOVA TERHADAP KADAR ASAM LAKTAT KEFIR SUSU  
KACANG TANAH**

Sumber Keragaman SK	Derajat bebas db	Jumlah Kuadrat JK	Kuadrat Tengah KT	F Hitung	F tabel	
					5%	1%
<b>Perlakuan</b>	8	0,268	0,034	3,104 <sub>ts</sub>	3,23	5,47
<b>Variasi Bahan Baku (A)</b>	2	0,120	0,060	<b>5,542*</b>	4,26	8,02
<b>Inokulum (B)</b>	2	0,028	0,014	1,292 <sub>ts</sub>	4,26	8,02
<b>Interaksi AB</b>	4	0,121	0,030	2,792 <sub>ts</sub>	3,63	6,42
<b>Galat</b>	9	0,097	0,011			
<b>Umum</b>	17	0,365				

Keterangan :

\* = signifikan (beda nyata) pada taraf 5%

ts = tidak signifikan (tidak beda nyata) pada taraf nyata 5% dan 1%

kk = 61,13%

## LAMPIRAN 5

**ANALISIS DATA TERHADAP KADAR ALKOHOL KEFIR  
SUSU KACANG TANAH DALAM SATUAN %**

Variasi Bahan Baku (G)	Inokulum (F)	Ulangan		Jumlah Perlakuan	Rataan Perlakuan
		1	2		
G1	F1	0,969	1,007	1,976	0,988
	F2	0,922	1,01	1,932	0,966
	F3	0,862	0,995	1,857	0,929
G2	F1	1,024	1,007	2,031	1,016
	F2	0,962	1,009	1,971	0,986
	F3	0,508	1,001	1,509	0,755
G3	F1	1,02	1,028	2,048	1,024
	F2	0,924	0,998	1,922	0,961
	F3	0,925	1,009	1,934	0,967
<b>Jumlah Umum (G)</b>				17,180	
<b>Rataan Umum</b>					0,477

Keterangan :

Faktor G (Variasi Bahan Baku)

G<sub>1</sub> : Konsentrasi variasi bahan baku 5%

G<sub>2</sub> : Konsentrasi variasi bahan baku 10%

G<sub>3</sub> : Konsentrasi variasi bahan baku 15%

Faktor F (Konsentrasi Inokulum)

F<sub>1</sub> : Konsentrasi inokulum 2 %

F<sub>2</sub> : Konsentrasi inokulum 4 %

F<sub>3</sub> : Konsentrasi inokulum 6 %

## LAMPIRAN 6

### PERHITUNGAN ANOVA TERHADAP KADAR ALKOHOL KEFIR SUSU KACANG TANAH

#### 1. db = Derajat bebas

db Perlakuan	= a.b - 1	Keterangan : a : banyaknya perlakuan variasi bahan baku b : banyaknya perlakuan inokulum r : banyaknya kelompok / ulangan
	= 3 x 3 - 1	
	= 5	
db Variasi Bahan Baku (A)	= a - 1	
	= 3 - 1	
	= 2	
db Inokulum (B)	= b - 1	
	= 3 - 1	
	= 2	
db Interaksi (A × B)	= (a - 1)(b - 1)	
	= (3 - 1)(3 - 1)	
	= 4	
db Galat	= (r - 1)a.b	
	= (2 - 1)3.3	
	= 9	
db Total	= r.a.b - 1	
	= 2.3.3 - 1	
	= 17	

#### 2. Faktor Koreksi

$$\begin{aligned}
 FK &= \frac{(G)^2}{abr} \\
 &= \frac{(17,180)^2}{(3)(3)(2)} \\
 &= 16,397
 \end{aligned}$$

### 3. Jumlah Kuadrat (JK)

$$\begin{aligned}
 \text{JK Umum} &= \sum X^2 - F.K \\
 &= \{(0,969)^2 + (1,007)^2 + (0,922)^2 + (1,01)^2 + (0,862)^2 + (0,995)^2 + \\
 &\quad (1,024)^2 + (1,007)^2 + (0,962)^2 + (1,009)^2 + (0,508)^2 + (1,001)^2 \\
 &\quad + (1,02)^2 + (1,028)^2 + (0,924)^2 + (0,998)^2 + (0,925)^2 + (1,009)^2 \} \\
 &\quad - (16,397) \\
 &= \{(0,939) + (1,014) + (0,850) + (1,020) + (0,743) + (0,990) + (1,049) + (1,0 \\
 &\quad 14) + (0,925) + (1,018) + (0,258) + (1,002) + (1,040) + (1,057) + (0,854) \\
 &\quad + (0,996) + (0,856) + (1,018) \} - (16,397) \\
 &= 16,643 - 16,397 \\
 &= 0,246
 \end{aligned}$$

$$\begin{aligned}
 \text{JK Perlakuan} &= \frac{\sum T^2}{r} - F.K \\
 &= \frac{(1,976)^2 + (1,932)^2 + \dots + (1,922)^2 + (1,934)^2}{2} - 16,397 \\
 &= \frac{(3,905) + (3,733) + \dots + (3,694) + (3,740)}{2} - 16,397 \\
 &= \frac{33,001}{2} - 16,397 \\
 &= 0,103
 \end{aligned}$$

$$\begin{aligned}
 \text{JK Galat} &= \text{JK umum} - \text{JK perlakuan} \\
 &= 0,246 - 0,103 \\
 &= 0,143
 \end{aligned}$$

**Tabel Analisis Faktorial (Interaksi AB)**

Variasi Bahan Baku (A)	Inokulum (B)			Jumlah A	Rataan A
	F1	F2	F3		
<b>G1</b>	1,976	1,932	1,857	5,765	0,961
<b>G2</b>	2,031	1,971	1,509	5,511	0,919
<b>G3</b>	2,048	1,922	1,934	5,904	0,984
<b>Jumlah B</b>	6,055	5,825	5,300	17,180	
<b>Rataan B</b>	1,009	0,971	0,883		

$$\begin{aligned}
 \text{JK Variasi Bahan Baku (A)} &= \frac{\sum A^2}{rb} - F.K \\
 &= \frac{(5,765)^2 + (5,511)^2 + (5,904)^2}{(2)(3)} - 16,397 \\
 &= \frac{(33,235) + (30,371) + (34,857)}{6} - 16,397 \\
 &= \frac{98,464}{6} - 16,397 \\
 &= 0,013
 \end{aligned}$$

$$\begin{aligned}
 \text{JK Inokulum (B)} &= \frac{\sum B^2}{ra} - F.K \\
 &= \frac{(6,055)^2 + (5,825)^2 + (5,300)^2}{2(3)} - 16,397 \\
 &= \frac{(36,663) + (33,931) + (28,090)}{6} - 16,397 \\
 &= \frac{98,684}{6} - 16,397 \\
 &= 0,050
 \end{aligned}$$

$$\begin{aligned}
 \text{JK Interaksi AB} &= \text{JK perlakuan} - \text{JK A} - \text{JK B} \\
 &= 0,103 - 0,013 - 0,050 \\
 &= 0,040
 \end{aligned}$$

#### 4. KT = Kuadrat Tengah

$$\begin{aligned}
 \text{KT Perlakuan} &= \frac{JK \text{ perlakuan}}{db \text{ perlakuan}} \\
 &= 0,103 / 8 \\
 &= 0,013 \\
 \text{KT Galat} &= \frac{JKGalat}{dbGalat} \\
 &= 0,143 / 9
 \end{aligned}$$



$$= 0,016$$

$$KT A = \frac{JK A}{db a}$$

$$= 0,013 / 2$$

$$= 0,007$$

$$KT B = \frac{JK B}{db b}$$

$$= 0,050 / 2$$

$$= 0,025$$

$$KT \text{ Interaksi AB} = \frac{JKAB}{dbAB}$$

$$= 0,040 / 4$$

$$= 0,010$$

#### 5. $F_{hitung}$

$$F_{hitung} \text{ Perlakuan} = \frac{KT \text{ perlakuan}}{KT \text{ Galat}} = \frac{0,013}{0,016} = 0,815$$

$$F_{hitung} \text{ Variasi Bahan Baku (A)} = \frac{KT A}{KT \text{ Galat}} = \frac{0,007}{0,016} = 0,418$$

$$F_{hitung} \text{ Inokulum (B)} = \frac{KT B}{KT \text{ Galat}} = \frac{0,025}{0,016} = 1,576$$

$$F_{hitung} \text{ Interaksi AB} = \frac{KT AB}{KT \text{ Galat}} = \frac{0,010}{0,016} = 0,634$$

#### 6. Koefisien keragaman (kk)

$$Kk = \frac{\sqrt{KTgalat}}{Rataan umum} \times 100$$

$$= \frac{\sqrt{0,016}}{0,477} \times 100$$

$$= 26,37\%$$

**ANOVA TERHADAP KADAR ALKOHOL KEFIR SUSU  
KACANG TANAH**

Sumber Keragaman SK	Derajat bebas db	Jumlah Kuadrat JK	Kuadrat Tengah KT	F Hitung	F tabel	
					5%	1%
<b>Perlakuan</b>	8	0,103	0,013	0,815ts	3,23	5,47
<b>Variasi Bahan Baku (A)</b>	2	0,013	0,007	<b>0,418ts</b>	4,26	8,02
<b>Inokulum (B)</b>	2	0,050	0,025	1,576ts	4,26	8,02
<b>Interaksi AB</b>	4	0,040	0,010	0,634ts	3,63	6,42
<b>Galat</b>	9	0,143	0,016			
<b>Umum</b>	17	0,246				

Keterangan :

ts = tidak signifikan (tidak beda nyata) pada taraf nyata 5% dan 1%

kk = 26,37%

**SPSS ANALISIS VARIANS PENGUKURAN pH KEFIR SUSU KACANG  
TANAH DENGAN VARIASI KADAR SUSU SKIM DAN INOKULUM**

**Univariate Analysis of Variance**

**Between-Subjects Factors**

		Value Label	N
Variasi Bahan Baku	1	G1 (5%)	6
	2	G2 (10%)	6
	3	G3 (15%)	6
Inokulum	1,00	F1 (2%)	6
	2,00	F2 (4%)	6
	3,00	F3 (6%)	6

**Descriptive Statistics**

Dependent Variable: pH

Variasi Bahan Baku	Inokulum	Mean	Std. Deviation	N
G1 (5%)	F1 (2%)	4,4500	,07071	2
	F2 (4%)	4,5000	,00000	2
	F3 (6%)	4,2500	,07071	2
	Total	4,4000	,12649	6
G2 (10%)	F1 (2%)	4,6500	,07071	2
	F2 (4%)	4,6500	,07071	2
	F3 (6%)	4,6500	,07071	2
	Total	4,6500	,05477	6
G3 (15%)	F1 (2%)	4,5000	,00000	2
	F2 (4%)	4,4000	,00000	2
	F3 (6%)	4,3500	,07071	2
	Total	4,4167	,07528	6
Total	F1 (2%)	4,5333	,10328	6
	F2 (4%)	4,5167	,11690	6
	F3 (6%)	4,4167	,19408	6
	Total	4,4889	,14507	18

### Tests of Between-Subjects Effects

Dependent Variable: pH

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	,328 <sup>a</sup>	8	,041	12,292	,001
Intercept	362,702	1	362,702	108810,667	,000
VariasiBB	,234	2	,117	35,167	,000
Inokulum	,048	2	,024	7,167	,014
VariasiBB *	,046	4	,011	3,417	,058
Inokulum	,030	9	,003		
Error	,030	9	,003		
Total	363,060	18			
Corrected Total	,358	17			

a. R Squared = ,916 (Adjusted R Squared = ,842)

### Post Hoc Tests

#### Variasi Bahan Baku

#### Multiple Comparisons

Dependent Variable: pH

(I) Variasi Bahan Baku	(J) Variasi Bahan Baku	Mean Difference (I-J)	Std. Error	Sig.	
LSD	G1 (5%)	G2 (10%)	-,2500*	,03333	,000
		G3 (15%)	-,0167	,03333	,629
	G2 (10%)	G1 (5%)	,2500*	,03333	,000
		G3 (15%)	,2333*	,03333	,000
	G3 (15%)	G1 (5%)	,0167	,03333	,629
		G2 (10%)	-,2333*	,03333	,000

### Multiple Comparisons

Dependent Variable: pH

	(I) Variasi Bahan Baku	(J) Variasi Bahan Baku	95% Confidence Interval	
			Lower Bound	Upper Bound
LSD	G1 (5%)	G2 (10%)	-,3254*	-,1746
		G3 (15%)	-,0921	,0587
	G2 (10%)	G1 (5%)	,1746*	,3254
		G3 (15%)	,1579*	,3087
	G3 (15%)	G1 (5%)	-,0587	,0921
		G2 (10%)	-,3087*	-,1579

Based on observed means.

The error term is Mean Square(Error) = ,003.

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

### Homogeneous Subsets

		pH		
	Variasi Bahan Baku	N	Subset	
			1	2
Duncan <sup>a,b</sup>	G1 (5%)	6	4,4000	
	G3 (15%)	6	4,4167	
	G2 (10%)	6		4,6500
	Sig.		,629	1,000

Means for groups in homogeneous subsets are displayed.

Based on observed means.

The error term is Mean Square(Error) = ,003.

a. Uses Harmonic Mean Sample Size = 6,000.

b. Alpha = ,05.

## Inokulum

### Multiple Comparisons

Dependent Variable: pH

(I) Inokulum	(J) Inokulum	Mean Difference (I- J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	
LSD	F1 (2%)	F2 (4%)	,0167	,03333	,629	-,0587
		F3 (6%)	,1167*	,03333	,007	,0413
	F2 (4%)	F1 (2%)	-,0167	,03333	,629	-,0921
		F3 (6%)	,1000*	,03333	,015	,0246
	F3 (6%)	F1 (2%)	-,1167*	,03333	,007	-,1921
		F2 (4%)	-,1000*	,03333	,015	-,1754

### Multiple Comparisons

Dependent Variable: pH

(I) Inokulum	(J) Inokulum	95% Confidence Interval	
		Upper Bound	
LSD	F1 (2%)	F2 (4%)	,0921
		F3 (6%)	,1921*
	F2 (4%)	F1 (2%)	,0587
		F3 (6%)	,1754*
	F3 (6%)	F1 (2%)	-,0413*
		F2 (4%)	-,0246*

Based on observed means.

The error term is Mean Square(Error) = ,003.

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

## Homogeneous Subsets

		pH		
	Inokulum	N	Subset	
			1	2
Duncan <sup>a,b</sup>	F3 (6%)	6	4,4167	
	F2 (4%)	6		4,5167
	F1 (2%)	6		4,5333
	Sig.		1,000	,629

Means for groups in homogeneous subsets are displayed.

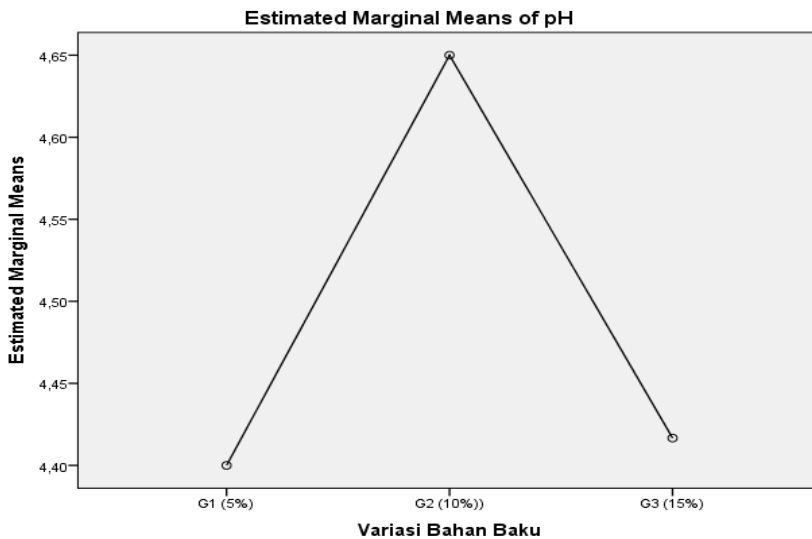
Based on observed means.

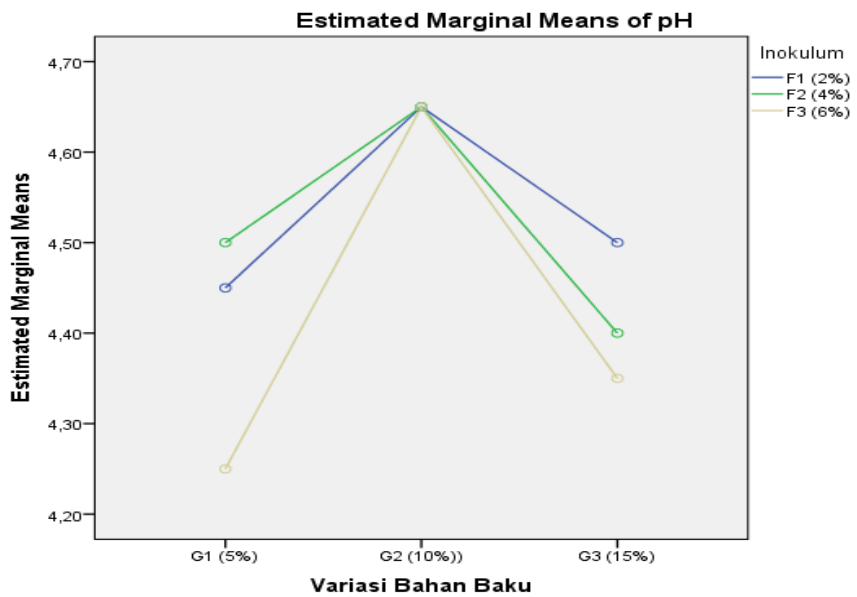
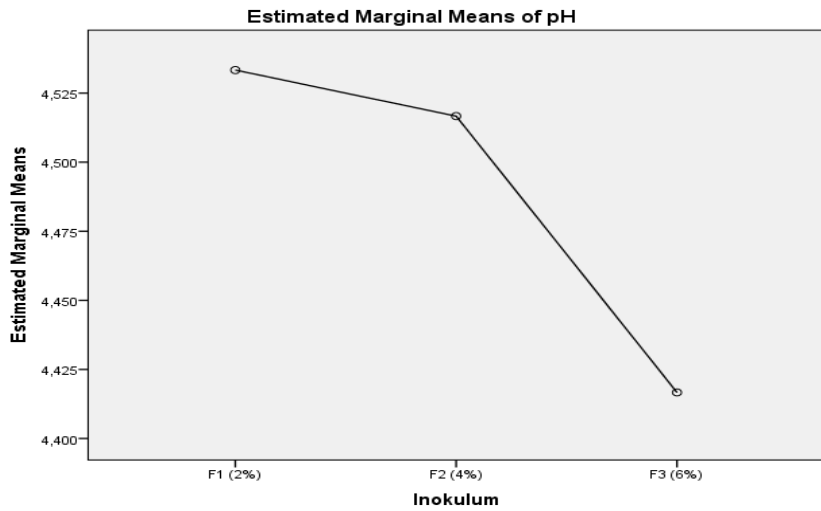
The error term is Mean Square(Error) = ,003.

a. Uses Harmonic Mean Sample Size = 6,000.

b. Alpha = ,05.

## Profile Plots







**SPSS ANALISIS VARIANS KADAR ASAM LAKTAT KEFIR SUSU KACANG  
TANAH DENGAN VARIASI KADAR SUSU SKIM DAN INOKULUM**

**Univariate Analysis of Variance**

**Between-Subjects Factors**

		Value Label	N
Variasi Bahan Baku	1	G1 (5%)	6
	2	G2 (10%)	6
	3	G3 (15%)	6
Inokulum	1,00	F1 (2%)	6
	2,00	F2 (4%)	6
	3,00	F3 (6%)	6

**Descriptive Statistics**

Dependent Variable: Kadar Asam Laktat (%)

Variasi Bahan Baku	Inokulum	Mean	Std. Deviation	N
G1 (5%)	F1 (2%)	,63000	,000000	2
	F2 (4%)	,31500	,063640	2
	F3 (6%)	,40500	,063640	2
	Total	,45000	,150599	6
G2 (10%)	F1 (2%)	,27000	,254558	2
	F2 (4%)	,31500	,063640	2
	F3 (6%)	,36000	,127279	2
	Total	,31500	,136492	6
G3 (15%)	F1 (2%)	,18000	,000000	2
	F2 (4%)	,22500	,063640	2
	F3 (6%)	,36000	,000000	2
	Total	,25500	,088487	6
Total	F1 (2%)	,36000	,241495	6
	F2 (4%)	,28500	,067750	6
	F3 (6%)	,37500	,067750	6
	Total	,34000	,146609	18

### Tests of Between-Subjects Effects

Dependent Variable: Kadar Asam Laktat (%)

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	,268 <sup>a</sup>	8	,034	3,104	,056
Intercept	2,081	1	2,081	192,667	,000
VariasiBB	,120	2	,060	5,542	,027
Inokulum	,028	2	,014	1,292	,321
VariasiBB * Inokulum	,121	4	,030	2,792	,093
Error	,097	9	,011		
Total	2,446	18			
Corrected Total	,365	17			

a. R Squared = ,734 (Adjusted R Squared = ,498)

### Post Hoc Tests

#### Variasi Bahan Baku

### Multiple Comparisons

Dependent Variable: Kadar Asam Laktat (%)

(I) Variasi Bahan Baku	(J) Variasi Bahan Baku	Mean Difference (I-J)	Std. Error	Sig.	
LSD	G1 (5%)	G2 (10%)	,13500	,060000	,051
		G3 (15%)	,19500*	,060000	,010
	G2 (10%)	G1 (5%)	-,13500	,060000	,051
		G3 (15%)	,06000	,060000	,343
	G3 (15%)	G1 (5%)	-,19500*	,060000	,010
		G2 (10%)	-,06000	,060000	,343

### Multiple Comparisons

Dependent Variable: Kadar Asam Laktat (%)

(I) Variasi Bahan Baku	(J) Variasi Bahan Baku	95% Confidence Interval	
		Lower Bound	Upper Bound
LSD	G1 (5%)	-,00073	,27073
	G2 (10%)	,05927*	,33073
	G3 (15%)	-,27073	,00073
	G1 (5%)	-,07573	,19573
	G2 (10%)	-,33073*	-,05927
	G3 (15%)	-,19573	,07573

Based on observed means.

The error term is Mean Square(Error) = ,011.

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

### Homogeneous Subsets

#### Kadar Asam Laktat (%)

	Variasi Bahan Baku	N	Subset	
			1	2
Duncan <sup>a,b</sup>	G3 (15%)	6	,25500	
	G2 (10%)	6	,31500	,31500
	G1 (5%)	6		,45000
	Sig.		,343	,051

Means for groups in homogeneous subsets are displayed.

Based on observed means.

The error term is Mean Square(Error) = ,011.

a. Uses Harmonic Mean Sample Size = 6,000.

b. Alpha = ,05.

## Inokulum

### Multiple Comparisons

Dependent Variable: Kadar Asam Laktat (%)

(I) Inokulum	(J) Inokulum	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	
LSD	F1 (2%)	,07500	,060000	,243	-,06073	
		F3 (6%)	-,01500	,060000	,808	-,15073
	F2 (4%)	F1 (2%)	-,07500	,060000	,243	-,21073
		F3 (6%)	-,09000	,060000	,168	-,22573
	F3 (6%)	F1 (2%)	,01500	,060000	,808	-,12073
		F2 (4%)	,09000	,060000	,168	-,04573

### Multiple Comparisons

Dependent Variable: Kadar Asam Laktat (%)

(I) Inokulum	(J) Inokulum	95% Confidence Interval	
		Upper Bound	
LSD	F1 (2%)	F2 (4%)	,21073
		F3 (6%)	,12073
	F2 (4%)	F1 (2%)	,06073
		F3 (6%)	,04573
	F3 (6%)	F1 (2%)	,15073
		F2 (4%)	,22573

Based on observed means.

The error term is Mean Square(Error) = ,011.

**Homogeneous Subsets**

<b>Kadar Asam Laktat (%)</b>			
	Inokulum	N	Subset
			1
Duncan <sup>a,b</sup>	F2 (4%)	6	,28500
	F1 (2%)	6	,36000
	F3 (6%)	6	,37500
	Sig.		,185

Means for groups in homogeneous subsets are displayed.

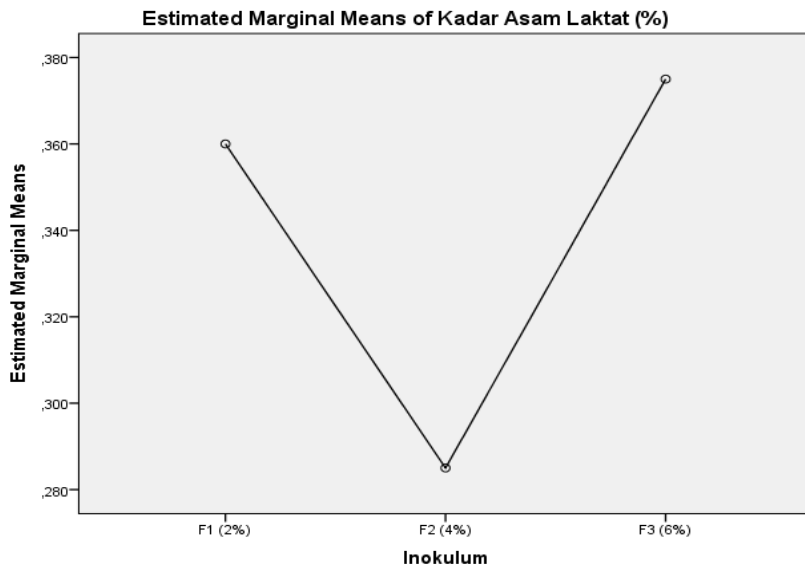
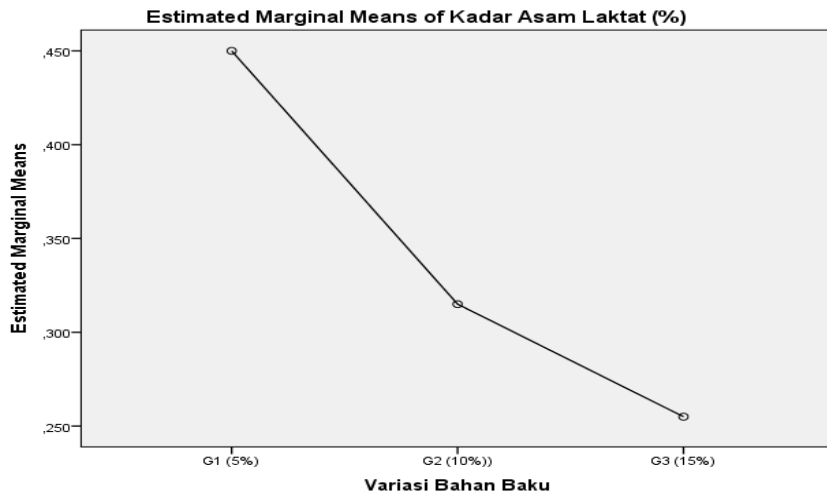
Based on observed means.

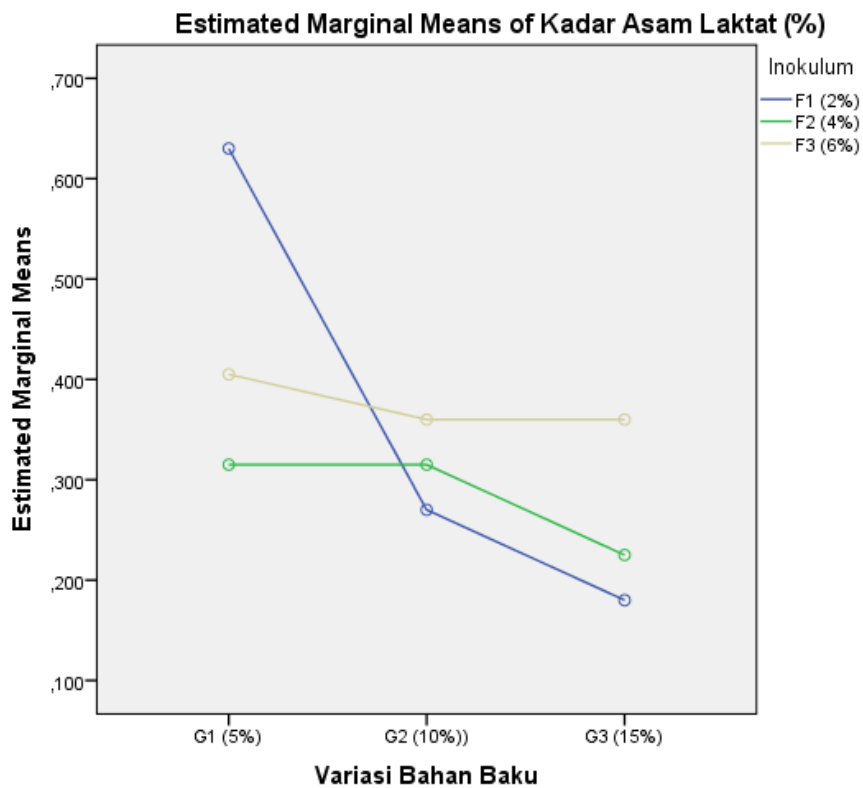
The error term is Mean Square(Error) = ,011.

a. Uses Harmonic Mean Sample Size = 6,000.

b. Alpha = ,05.

## Profile Plots





**SPSS ANALISIS VARIANS KADAR ALKOHOL KEFIR SUSU KACANG  
TANAH DENGAN VARIASI KADAR SUSU SKIM DAN INOKULUM**

**Univariate Analysis of Variance**

**Between-Subjects Factors**

		Value Label	N
Variasi Bahan Baku	1	G1 (5%)	6
	2	G2 (10%)	6
	3	G3 (15%)	6
Inokulum	1,00	F1 (2%)	6
	2,00	F2 (4%)	6
	3,00	F3 (6%)	6

**Descriptive Statistics**

Dependent Variable: Kadar Alkohol (%)

Variasi Bahan Baku	Inokulum	Mean	Std. Deviation	N
G1 (5%)	F1 (2%)	,98800	,026870	2
	F2 (4%)	,96600	,062225	2
	F3 (6%)	,92850	,094045	2
	Total	,96083	,058410	6
G2 (10%)	F1 (2%)	1,01550	,012021	2
	F2 (4%)	,98550	,033234	2
	F3 (6%)	,75450	,348604	2
	Total	,91850	,202169	6
G3 (15%)	F1 (2%)	1,02400	,005657	2
	F2 (4%)	,96100	,052326	2
	F3 (6%)	,96700	,059397	2
	Total	,98400	,047189	6
Total	F1 (2%)	1,00917	,021517	6
	F2 (4%)	,97083	,040951	6
	F3 (6%)	,88333	,192444	6
	Total	,95444	,120243	18



### Tests of Between-Subjects Effects

Dependent Variable: Kadar Alkohol (%)

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	,103 <sup>a</sup>	8	,013	,815	,608
Intercept	16,397	1	16,397	1035,550	,000
VariasiBB	,013	2	,007	,418	,671
Inokulum	,050	2	,025	1,576	,259
VariasiBB * Inokulum	,040	4	,010	,634	,651
Error	,143	9	,016		
Total	16,643	18			
Corrected Total	,246	17			

a. R Squared = ,420 (Adjusted R Squared = -,095)

### Post Hoc Tests

#### Variasi Bahan Baku

### Multiple Comparisons

Dependent Variable: Kadar Alkohol (%)

(I) Variasi Bahan Baku	(J) Variasi Bahan Baku	Mean Difference (I-J)	Std. Error	Sig.
LSD	G1 (5%)	,04233	,072651	,574
	G2 (10%)	-,02317	,072651	,757
	G3 (15%)	-,04233	,072651	,574
	G1 (5%)	-,06550	,072651	,391
	G2 (10%)	,02317	,072651	,757
	G3 (15%)	,06550	,072651	,391

### Multiple Comparisons

Dependent Variable: Kadar Alkohol (%)

	(I) Variasi Bahan Baku	(J) Variasi Bahan Baku	95% Confidence Interval	
			Lower Bound	Upper Bound
LSD	G1 (5%)	G2 (10%)	-,12201	,20668
		G3 (15%)	-,18751	,14118
	G2 (10%)	G1 (5%)	-,20668	,12201
		G3 (15%)	-,22985	,09885
	G3 (15%)	G1 (5%)	-,14118	,18751
		G2 (10%)	-,09885	,22985

Based on observed means.

The error term is Mean Square(Error) = ,016.

### Homogeneous Subsets

#### Kadar Alkohol (%)

	Variasi Bahan Baku	N	Subset
			1
Duncan <sup>a,b</sup>	G2 (10%)	6	,91850
	G1 (5%)	6	,96083
	G3 (15%)	6	,98400
	Sig.		,411

Means for groups in homogeneous subsets are displayed.

Based on observed means.

The error term is Mean Square(Error) = ,016.

a. Uses Harmonic Mean Sample Size = 6,000.

b. Alpha = ,05.

**Inokulum****Multiple Comparisons**

Dependent Variable: Kadar Alkohol (%)

(I) Inokulum	(J) Inokulum	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	
LSD	F1 (2%)	F2 (4%)	,03833	,072651	,611	-,12601
		F3 (6%)	,12583	,072651	,117	-,03851
	F2 (4%)	F1 (2%)	-,03833	,072651	,611	-,20268
		F3 (6%)	,08750	,072651	,259	-,07685
	F3 (6%)	F1 (2%)	-,12583	,072651	,117	-,29018
		F2 (4%)	-,08750	,072651	,259	-,25185

**Multiple Comparisons**

Dependent Variable: Kadar Alkohol (%)

(I) Inokulum	(J) Inokulum	95% Confidence Interval	
		Upper Bound	
LSD	F1 (2%)	F2 (4%)	,20268
		F3 (6%)	,29018
	F2 (4%)	F1 (2%)	,12601
		F3 (6%)	,25185
	F3 (6%)	F1 (2%)	,03851
		F2 (4%)	,07685

Based on observed means.

The error term is Mean Square(Error) = ,016.

## Homogeneous Subsets

### Kadar Alkohol (%)

	Inokulum	N	Subset
			1
Duncan <sup>a,b</sup>	F3 (6%)	6	,88333
	F2 (4%)	6	,97083
	F1 (2%)	6	1,00917
	Sig.		,132

Means for groups in homogeneous subsets are displayed.

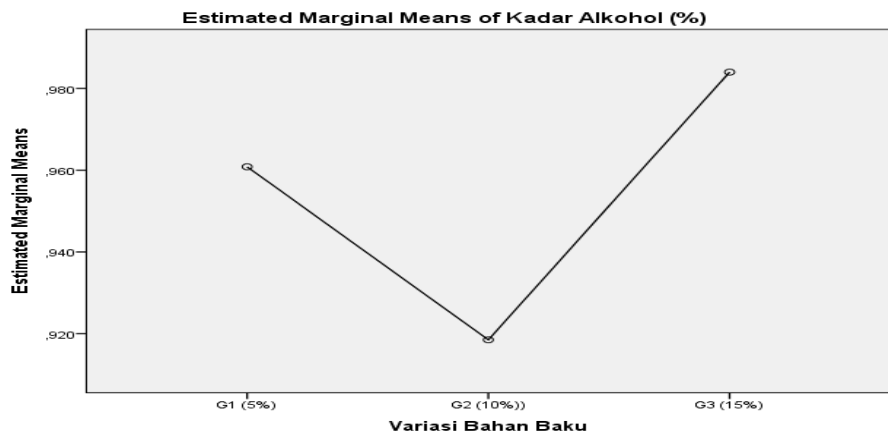
Based on observed means.

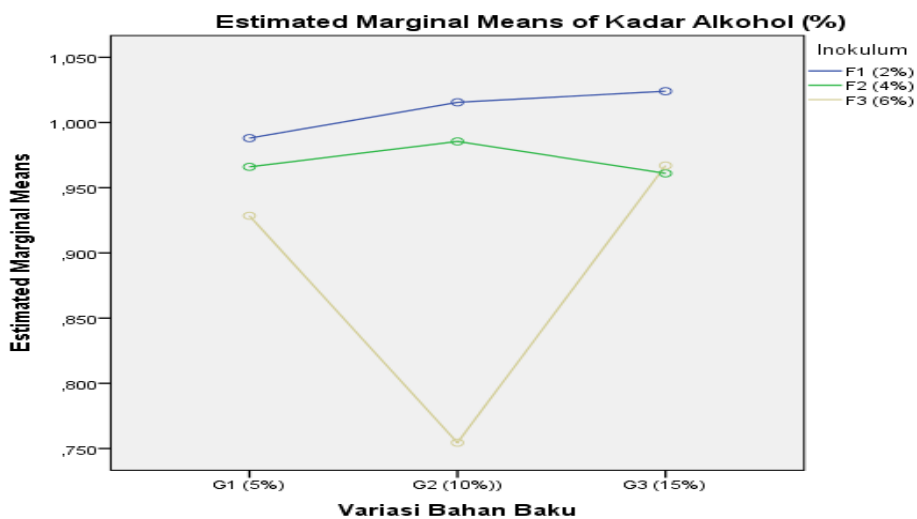
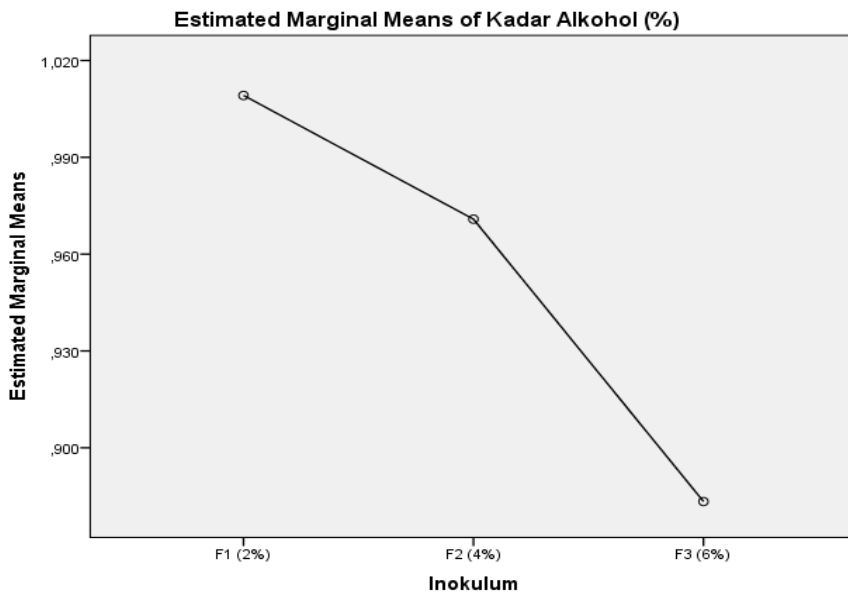
The error term is Mean Square(Error) = ,016.

a. Uses Harmonic Mean Sample Size = 6,000.

b. Alpha = ,05.

## Profile Plots





## LAMPIRAN 7

### PERHITUNGAN UJI JARAK GANDA DUNCAN TERHADAP PENGUKURAN pH KEFIR SUSU KACANG TANAH

#### a. Perbandingan Dua Rata – rata Faktor A (Variasi Bahan Baku)

p	rp (0,05)	rp (0,01)
2	3,20	4,60
3	3,34	4,86

$$R_p = \frac{(r_p) \cdot (S^{-d})}{\sqrt{2}}, \text{ nilai } S^{-d} = \sqrt{\frac{2 \cdot KTGalat}{rb}}$$

Dimana :

r : Ulangan

b : jumlahfaktor k

$$\begin{aligned} S^{-d} &= \sqrt{\frac{2 \cdot KTGalat}{rb}} \\ &= \sqrt{\frac{2 \cdot (0003)}{(2)(3)}} \\ &= \sqrt{\frac{0,007}{6}} \\ &= \sqrt{0,001} \\ &= 0,033 \end{aligned}$$

$$Rp = \frac{(rp)(S^{-d})}{\sqrt{2}}$$

$$2 = \frac{(3,20)(0,033)}{\sqrt{2}}$$

$$= \frac{0,107}{\sqrt{2}}$$

$$= 0,075$$

$$Rp = \frac{(rp)(S^{-d})}{\sqrt{2}}$$

$$3 = \frac{(3,34)(0,033)}{\sqrt{2}}$$

$$= \frac{0,111}{\sqrt{2}}$$

$$= 0,079$$

### Daftar Uji Jarak Ganda Duncan Terhadap Rata – rata Faktor G

Perlakuan	Rataan hasil	Nilai UJGD 5%	Selisih rata-rata nilai tiap perlakuan		
			G2	G3	G1
G2	4,650	-	-	-	-
G3	4,417	0,075	0,233*	-	-
G1	4,400	0,079	0,250*	0,017ts	-

Keterangan :

ts : Tidak nyata (tidak signifikan) pada taraf 5%

\* : Beda nyata (signifikan) pada taraf 5%

**b. Perbandingan Dua Rata – rata Faktor B (Inokulum )**

p	rp (0,05)	rp (0,01)
2	3,20	4,60
3	3,34	4,86

$$R_p = \frac{(rp) \cdot (S^{-d})}{\sqrt{2}}, \text{ nilai } S^{-d} = \sqrt{\frac{2 \cdot KTGalat}{ra}}$$

Dimana :

r : Ulangan

a : jumlahfaktor a

$$S^{-d} = \sqrt{\frac{2 \cdot KTGalat}{ra}}$$

$$= \sqrt{\frac{2 \cdot (0,003)}{(2)(3)}}$$

$$= \sqrt{\frac{0,007}{6}}$$

$$= \sqrt{0,001}$$

$$= 0,033$$

$$R_p = \frac{(rp)(S^{-d})}{\sqrt{2}} = \frac{0,107}{\sqrt{2}}$$

$$2 = \frac{(3,20)(0033)}{\sqrt{2}} = 0,075$$



$$R_p = \frac{(rp)(S^{-d})}{\sqrt{2}} = \frac{0,111}{\sqrt{2}}$$

$$3 = \frac{(3,34)(0,033)}{\sqrt{2}} = 0,079$$

### Daftar Uji Jarak Ganda Duncan Terhadap Rata – rata Faktor F

Perlakuan	Rataan hasil	Nilai UJGD 5%	Selisih rata-rata nilai tiap perlakuan		
			F1	F2	F3
F1	4,533	-	-	-	-
F2	4,517	0,075	0,017ts	-	-
F3	4,417	0,079	0,117*	0,100*	-

Keterangan :

ts : Tidak nyata (tidak signifikan) pada taraf 5%

\* : Beda nyata (signifikan) pada taraf 5%

## LAMPIRAN 8

### PERHITUNGAN UJI JARAK GANDA DUNCAN TERHADAP KADAR ASAM LAKTAT KEFIR SUSU KACANG TANAH

#### a. Perbandingan Dua Rata – rata Faktor A (Variasi Bahan Baku)

p	rp (0,05)	rp (0,01)
2	3,20	4,60
3	3,34	4,86

$$R_p = \frac{(r_p) \cdot (S^{-d})}{\sqrt{2}}, \text{ nilai } S^{-d} = \sqrt{\frac{2 \cdot KTGalat}{rb}}$$

Dimana :

r : Ulangan

b : jumlahfaktor k

$$S^{-d} = \sqrt{\frac{2 \cdot KTGalat}{rb}}$$

$$= \sqrt{\frac{2 \cdot (0,011)}{(2)(3)}}$$

$$= \sqrt{\frac{0,022}{6}}$$

$$= \sqrt{0,004}$$

$$= 0,060$$

$$R_p = \frac{(rp)(S^{-d})}{\sqrt{2}}$$

$$2 = \frac{(3,20)(0,060)}{\sqrt{2}}$$

$$= \frac{0,192}{\sqrt{2}}$$

$$= 0,136$$

$$R_p = \frac{(rp)(S^{-d})}{\sqrt{2}}$$

$$3 = \frac{(3,34)(0,060)}{\sqrt{2}}$$

$$= \frac{0,200}{\sqrt{2}}$$

$$= 0,14$$

### Daftar Uji Jarak Ganda Duncan Terhadap Rata – rata Faktor G

Perlakuan	Rataan hasil	Nilai UJGD 5%	Selisih rata-rata nilai tiap perlakuan		
			G1	G2	G3
G1	0,450	-	-	-	-
G2	0,315	0,136	0,135ts	-	-
G3	0,255	0,142	0,195*	0,060ts	-

Keterangan :

ts : Tidak nyata (tidak signifikan) pada taraf 5%

\* : Beda nyata (signifikan) pada taraf 5%

**b. Perbandingan Dua Rata – rata Faktor B (Inokulum )**

p	rp (0,05)	rp (0,01)
2	3,20	4,60
3	3,34	4,86

$$R_p = \frac{(rp) \cdot (S^{-d})}{\sqrt{2}}, \text{ nilai } S^{-d} = \sqrt{\frac{2 \cdot KTGalat}{ra}}$$

Dimana :

r : Ulangan

a : jumlahfaktor a

$$S^{-d} = \sqrt{\frac{2 \cdot KTGalat}{ra}}$$

$$= \sqrt{\frac{2 \cdot (0,011)}{(2)(3)}}$$

$$= \sqrt{\frac{0,022}{6}}$$

$$= \sqrt{0,004}$$

$$= 0,060$$

$$R_p = \frac{(rp)(S^{-d})}{\sqrt{2}} = \frac{0,192}{\sqrt{2}}$$

$$2 = \frac{(3,20)(0,060)}{\sqrt{2}} = 0,136$$

$$R_p = \frac{(rp)(S^{-d})}{\sqrt{2}} = \frac{0,200}{\sqrt{2}}$$

$$3 = \frac{(3,34)(0,060)}{\sqrt{2}} = 0,142$$

### Daftar Uji Jarak Ganda Duncan Terhadap Rata – rata Faktor F

Perlakuan	Rataan hasil	Nilai UJGD 5%	Selisih rata-rata nilai tiap perlakuan		
			F3	F1	F2
F3	0,375	-	-	-	-
F1	0,360	0,136	0,015ts	-	-
F2	0,285	0,142	0,090ts	0,075ts	-

Keterangan :

ts : Tidak nyata (tidak signifikan) pada taraf 5%

## LAMPIRAN 9

### PERHITUNGAN UJI JARAK GANDA DUNCAN TERHADAP KADAR ALKOHOL

#### a. Perbandingan Dua Rata – rata Faktor A (Variasi Bahan Baku)

p	rp (0,05)	rp (0,01)
2	3,20	4,60
3	3,34	4,86

$$R_p = \frac{(r_p) \cdot (S^{-d})}{\sqrt{2}}, \text{ nilai } S^{-d} = \sqrt{\frac{2 \cdot KTGalat}{rb}}$$

Dimana :

r : Ulangan

b : jumlahfaktor k

$$\begin{aligned} S^{-d} &= \sqrt{\frac{2 \cdot KTGalat}{rb}} \\ &= \sqrt{\frac{2 \cdot (0,016)}{(2)(3)}} \\ &= \sqrt{\frac{0,032}{6}} \\ &= \sqrt{0,016} \\ &= 0,126 \end{aligned}$$

$$\begin{aligned}
 R_p &= \frac{(rp)(S^{-d})}{\sqrt{2}} & R_p &= \frac{(rp)(S^{-d})}{\sqrt{2}} \\
 2 &= \frac{(3,20)(0,126)}{\sqrt{2}} & 3 &= \frac{(3,34)(0,126)}{\sqrt{2}} \\
 &= \frac{0,403}{\sqrt{2}} & &= \frac{0,420}{\sqrt{2}} \\
 &= 0,285 & &= 0,2
 \end{aligned}$$

### Daftar Uji Jarak Ganda Duncan Terhadap Rata – rata Faktor G

Perlakuan	Rataan hasil	Nilai UJGD 5%	Selisih rata-rata nilai tiap perlakuan		
			G3	G1	G2
G3	0,984	-	-	-	-
G1	0,961	0,285	0,023ts	-	-
G2	0,919	0,297	0,066ts	0,042ts	-

Keterangan :

ts : Tidak nyata (tidak signifikan) pada taraf 5%

### b. Perbandingan Dua Rata – rata Faktor B (Inokulum )

p	rp (0,05)	rp (0,01)
2	3,20	4,60
3	3,34	4,86

$$R_p = \frac{(rp) \cdot (S^{-d})}{\sqrt{2}}, \text{ nilai } S^{-d} = \sqrt{\frac{2 \cdot KTGalat}{ra}}$$

Dimana :

r : Ulangan

a : jumlahfaktor a

$$S^{-d} = \sqrt{\frac{2 \cdot KTGalat}{ra}}$$

$$= \sqrt{\frac{2 \cdot (0,016)}{(2)(3)}}$$

$$= \sqrt{\frac{0,032}{6}}$$

$$= \sqrt{0,005}$$

$$= 0,073$$

$$R_p = \frac{(rp)(S^{-d})}{\sqrt{2}} \quad 3 = \frac{(3,34)(0,073)}{\sqrt{2}}$$

$$2 = \frac{(3,20)(0,073)}{\sqrt{2}} = \frac{0,243}{\sqrt{2}}$$

$$= \frac{0,232}{\sqrt{2}} = 0,172$$

$$= 0,164$$

$$R_p = \frac{(rp)(S^{-d})}{\sqrt{2}}$$



### Daftar Uji Jarak Ganda Duncan Terhadap Rata – rata Faktor F

Perlakuan	Rataan hasil	Nilai UJGD 5%	Selisih rata-rata nilai tiap perlakuan		
			F1	F2	F3
F1	1,009	-	-	-	-
F2	0,971	0,164	0,038ts	-	-
F3	0,883	0,172	0,126ts	0,087ts	-

Keterangan :

ts : Tidak nyata (tidak signifikan) pada taraf 5%

**Lampiran 10**  
**Surat Penunjukkan Pembimbing**



**KEMENTERIAN AGAMA  
UNIVERSITAS ISLAM NEGERI WALISONGO  
FAKULTAS SAINS DAN TEKNOLOGI**

Jl. Prof. Dr. Hamka (Kampus II) Ngaliyan (024) 7601295 Fax. 7615387 Semarang 50185

Semarang, 13 November 2015

Nomor : In.06.3/J.8/PP.00.9/ 5250 /2015

Hal : **Penunjukan Pembimbing Skripsi**

Kepada Yth. :

1. Dian Ayuning Tyas, M. Biotech
2. Dian Triastari Armanda, M.Si  
di Semarang

*Assalamu'alaikum Wr. Wb.*

Berdasarkan hasil pembahasan usulan judul penelitian di jurusan Pendidikan Biologi, maka Fakultas Ilmu Tarbiyah dan Keguruan menyetujui judul skripsi mahasiswa:

Nama : Nailly Hidayah

NIM : 123811003

Judul : **PENGARUH PEMBERIAN VARIASI DOSIS BAKTERI**

**ACETOBACTER XYLINUM TERHADAP KETEBALAN,**

**RENDEMEN DAN KADAR KARBOHIDRAT NATA DE MOON**

**SERTA IMPLEMENTASINYA PADA LKS MATERI**

**BIOTEKNOLOGI DI SMA**

dan menunjuk Saudara :

1. Dian Ayuning Tyas, M. Biotech sebagai pembimbing metode
2. Dian Triastari Armanda sebagai pembimbing materi

Demikian dan atas kerja sama yang diberikan kami ucapkan terima kasih.

*Wassalamu'alaikum Wr. Wb.*

  
 A.n. Dekan  
 Ketua Jurusan Pendidikan Biologi  
**Dr. Lianah, M. Pd**  
 NIP. 19590313 198103 2 007

Tembusan:

1. Dekan FITK UIN Walisongo sebagai laporan
2. Mahasiswa yang bersangkutan
3. Arsip

**Lampiran 11  
Surat Pengesahan Proposal Penelitian**



**KEMENTERIAN AGAMA**  
**UNIVERSITAS ISLAM NEGERI WALISONGO SEMARANG**  
**FAKULTAS SAINS DAN TEKNOLOGI**  
 Alamat: Jl. Prof. DR. HamkaNgaliyan Semarang (Kampus II) Telp. 024-7601295,7615387



### PENGESAHAN PROPOSAL PENELITIAN

Proposal penelitian skripsi yang ditulis oleh:

Namalengkap : **Naily Hidayah**  
 NIM : 123811003  
 Program Studi : Pendidikan Biologi  
 Judul Penelitian : **“OPTIMALISASI MUTU KIMIA KEFIR KACANG  
 TANAH DENGAN VARIASI KADAR SUSU SKIM  
 DAN INOKULUM SERTA IMPLEMENTASINYA  
 PADA LKS MATERI BIOTEKNOLOGI DI SMA”**

Telah disetujui dan dapat dijadikan dasar dalam melaksanakan penelitian untuk penulisan skripsi.

Disahkan oleh:

1. Pembimbing Metode : **Dian Ayuning Tyas, M. Biotech**  
 NIP : 19841218 201101 2 004  
 Tanggal : 22 Agustus 2016  
 Tanda tangan : 
2. Pembimbing Materi : **Dian Triastari Armanda, M. Si**  
 NIP : 19831221201101 2 004  
 Tanggal : 22 Agustus 2016  
 Tanda tangan : 

Semarang, 23 Agustus 2016

Pengusul,



Naily Hidayah  
 NIM. 123811003

**Lampiran 12**  
**Surat Permohonan Izin Riset di Laboratorium**



**KEMENTERIAN AGAMA**  
**UNIVERSITAS ISLAM NEGERI WALISONGO SEMARANG**  
**FAKULTAS SAINS DAN TEKNOLOGI**  
 Alamat: Jl. Prof. DR. Hamka Ngaliyan Semarang (Kampus II) Telp. 024-7601295,7615387

Nomor : Un.10.8/D1 /PP.009/1347/2016

Semarang, 23 Agustus 2016

Lamp : -

Hal : Mohon Izin Riset

a.n. : Nailly Hidayah

NIM : 123811003

Yth :

**Kepala Laboratorium Pendidikan Kimia**  
**Universitas Islam Negeri Walisongo Semarang**

*Assalamu'alaikum Wr. Wb.*

Diberitahukan dengan hormat dalam rangka penulisan skripsi, bersama ini kami sampaikan mahasiswa a.n :

Nama : Nailly Hidayah

NIM : 123811003

Alamat : Jetak, Rt I Rw IV Wedung Demak

Judul : **“OPTIMALISASI MUTU KIMIA KEFIR KACANG  
 TANAH DENGAN VARIASI KADAR SUSU SKIM  
 DAN INOKULUM SERTA IMPLEMENTASINYA  
 PADA LKS MATERI BIOTEKNOLOGI DI SMA”**

Pembimbing : Dian Ayuning Tyas, M. Biotech (Pembimbing Metode)

Dian Triastari Armanda, M. Si (Pembimbing Materi)

Mahasiswa tersebut membutuhkan data untuk penulisan skripsi yang sedang disusunnya, Oleh karena itu kami mohon diberi ijin riset serta peminjaman Laboratorium dan alat destilasi. Selama kurang lebih 5 hari, pada tanggal 29 Agustus 2016 sampai 2 September 2016.

Demikian atas perhatian dan kerjasama Bapak/Ibu/Sdr. Disampaikan terima kasih.

*Wassalamu'alaikum Wr. Wb.*

a.n Dekan

Wakil Dekan I Bidang Akademik



Dr. L. Hidayah, M. Pd.

NIP. 1963031 198103 2 007

Tembusan:

Dekan Fakultas Sains dan Teknologi UIN Walisongo Semarang (sebagai laporan)

## Lampiran 13

### Surat Peminjaman Alat dan Bahan di Laboratorium

Semarang, 23 Agustus 2016

Kepada Yth:  
Kepala Laboratorium Pendidikan Biologi  
UIN Walisongo Semarang  
ditempat

Assalamu'alaikum wr. Wb.

Sehubungan dengan akan dilakukannya penelitian untuk skripsi dengan judul **“OPTIMALISASI MUTU KIMIA KEFIR KACANG TANAH DENGAN VARIASI KADAR SUSU SKIM DAN INOKULUM SERTA IMPLEMENTASINYA PADA LKS MATERI BIOTEKNOLOGI DI SMA”** pada:

Tanggal : 29 Agustus – 2 September 2016

Tempat : Laboratorium Biologi Fakultas Sains dan Teknologi UIN Walisongo Semarang

Maka, saya bermaksud meminjam alat dan bahan laboratorium berupa:

No.	Nama Alat	Jumlah	No.	Nama Alat	Jumlah
1.	Blender	1	12.	Labu Ukur (100 ml)	18
2.	Toples Plastik	3	13.	Tabung Reaksi	18
3.	Pengaduk Plastik	1	14.	Erlenmeyer (250)	18
4.	Kompor	1	15.	Termometer	1
5.	Panci	1	16.	Biuret	9
6.	Beaker Glass	18	17.	pH meter	1
7.	Corong	1	18.	Timbangan Digital	1
8.	Pipet Ukur 10 ml	1	19.	PP	60 Tetes
9.	Pipet Tetes	1	20.	NaOH	1.8 N
10.	Saringan	1	21.	Aluminium Foil	36
11.	Autoklaf	1			

Demikian surat permohonan ijin peminjaman saya sampaikan. Atas ijin yang diberikan saya ucapkan terimakasih.

Wassalamu'alaikum wr. wb.

Hormat saya,

Naily Hidayah

NIM: 123811049

## Lampiran 14 Surat Peminjaman Tempat di Laboratorium

Semarang, 23 Agustus 2016

Kepada Yth:  
Kepala Laboratorium Pendidikan Biologi  
UIN Walisongo Semarang  
ditempat

Assalamu'alaikum wr. Wb.

Sehubungan dengan akan dilakukannya penelitian untuk skripsi dengan judul  
**“OPTIMALISASI MUTU KIMIA KEFIR KACANG TANAH DENGAN  
VARIASI KADAR SUSU SKIM DAN INOKULUM SERTA  
IMPLEMENTASINYA PADA LKS MATERI BIOTEKNOLOGI DI  
SMA”** pada:

Tanggal : 29 Agustus – 2 September 2016

Tempat : Laboratorium Biologi Fakultas Sains dan Teknologi UIN Walisongo  
Semarang

Maka, saya bermaksud meminjam tempat Laboratorium Biologi Fakultas Sains dan Teknologi  
UIN Walisongo Semarang.

Demikian surat permohonan ijin peminjaman saya sampaikan. Atas ijin yang diberikan saya  
ucapkan terimakasih.

Wassalamu'alaikum wr. wb.

Hormat saya,

Naily Hidayah

NIM: 123811003

**Lampiran 15**  
**Sertifikat Lisensi Produksi Kefir**



Lampiran 16  
Dokumentasi Hasil Penelitian





Gambar 1. Inokulasi ke dalam Subtrat Fermentasi Kacang Tanah



Gambar 2. Inokulum Kefir Kacang Tanah



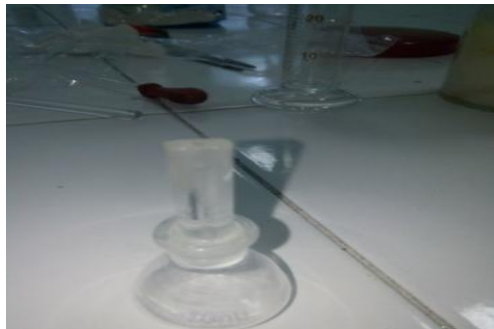
Gambar 3. Pengukuran Kadar Asam Laktat Kefir Kacang Tanah (Titrasi)



Gambar 4. Perubahan Warna Hasil Titrasi



Gambar 4. Pengukuran Kadar Alkohol Kefir Kacang Tanah (Destilasi)



Gambar 5. Piknometer



Gambar 6. Penimbangan Piknometer



Gambar 7. Pengukuran pH