BAB V

KESIMPULAN DAN SARAN

A. Kesimpulan

1. Ada perubahan kadar tembaga dan timbal pada limbah cair artifisial dengan penambahan ekstrak maupun serbuk kulit pisang ambon dan pisang kepok.
2. Serbuk kulit pisang kepok mempunyai penurunan kadar tembaga dan timbal paling optimum pada limbah cair artifisial pada variasi konsentrasi 2%.
3. Terdapat beda nyata antara ekstrak dan serbuk kulit pisang ambon dan pisang kepok terhadap penurunan kadar tembaga dan timbal pada limbah cair artifisial.

B. Saran

1. Perlu penelitian lebih lanjut menggunakan variasi konsentrasi yang lebih besar pada ekstrak dan serbuk kulit pisang ambon dan pisang kepok.
2. Perlu penelitian lebih lanjut dengan menggunakan parameter lain pada limbah untuk mengetahui berpengaruh atau tidak ekstrak dan serbuk kulit pisang ambon dan pisang kepok terhadap parameter tersebut.
3. Perlu dilakukan deadsorpsi logam yang terikat dalam ekstrak dan serbuk kulit pisang ambon dan pisang kepok.

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L A M P I R A N

Lampiran 1. Proses Pembuatan Serbuk dan Ekstrak

Pengeringan kulit pisang kepok

Pengeringan kulit pisang ambon

Kulit pisang kepok kering

Kulit pisang ambon kering

Penggilingan kulit pisang

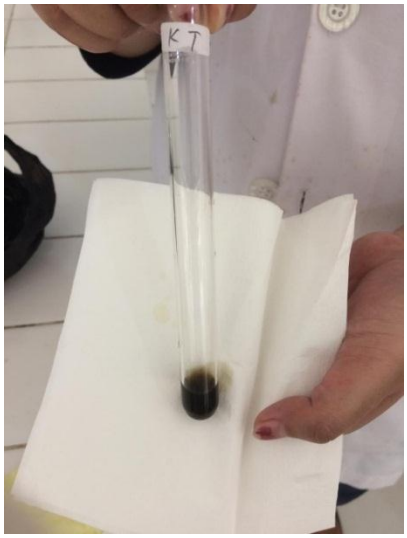
Pengayakan 40 mseh

Penyaringan ekstrak

Lampiran 2. Uji Kualitatif dan Kadar Air

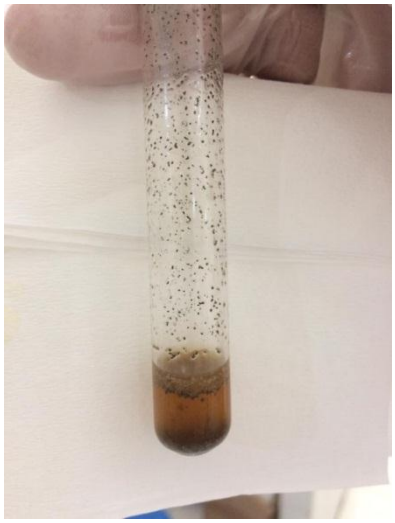
Uji Saponin kulit pisang kepok ambon

Uji Saponin kulit pisang

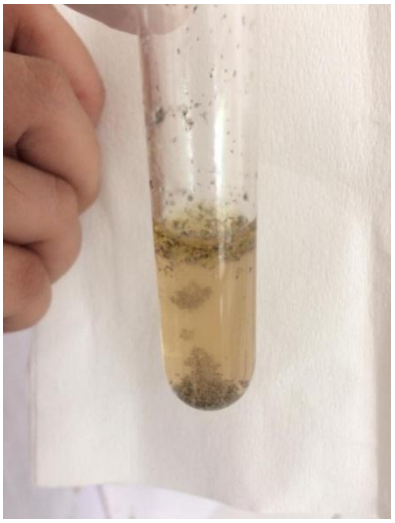


Uji Tanin kulit pisang kepok

Uji Tanin kulit pisang ambon



Uji Flavonoid kulit pisang kepok



Uji Flavonoid kulit pisang ambon

Kadar Air kulit pisang kepok

Kadar air kulit pisang kepok

Lampiran 3. Proses Pembuatan Reagen

1. Pembuatan Larutan Baku tembaga 200 ppm

   Kebutuhan larutan standar tembaga 200 ppm sebanyak 100 ml dengan perhitungan sebagai berikut

   $V_1 . N_1 = V_2 . N_2$

   X . 1000 ppm = 100 ml . 200 ppm

   $X = \frac{100 . 20}{1000}$

   X = 20 ml

   Sebanyak 2 ml larutan induk logam tembaga 1000 ppm dimasukan kedalam labu takar 100 ml lalu diencerkan dengan larutan pengencer (Akuabides + HNO_3 0,1 N) hingga tanda batas lalu dihomogenkan.

2. Pembuatan Larutan Baku timbal 20 ppm

   Kebutuhan larutan standar timbal 20 ppm sebanyak 100 ml dengan perhitungan sebagai berikut

   $V_1 . N_1 = V_2 . N_2$

   X . 1000 ppm = 100 ml . 20 ppm

   $X = \frac{100 . 20}{1000}$

   X = 2 ml

   Sebanyak 2 ml larutan induk logam timbal 1000 ppm dimasukan kedalam labu takar 1000 ml lalu diencerkan dengan larutan pengencer (Akuabides + HNO_3 0,1 N) hingga tanda batas lalu dihomogenkan.

3. Pembuatan Limbah Tembaga Artifisial

   Kebutuhan limbah tembaga artifisial 200 ppm sebanyak 100 ml dengan perhitungan sebagai berikut

   Berat bahan = $\frac{BM\ CuCl2}{BA\ Cu}$ x 200 ppm

   Berat bahan = $\frac{134,45}{63,546}$ x 200 ppm

   Berat bahan = 42,3158 mg

   Berat bahan = 0,0423 g

   Sebanyak 0,0423 gram $CuCl_2$ dimasukan kedalam labu takar 100 ml lalu diencerkan dengan larutan pengencer (Akuabides + HNO_3 0,1 N) hingga tanda batas lalu dihomogenkan.

4. Pembuatan Limbah Timbal Artifisial

   Kebutuhan limbah tembaga artifisial 20 ppm sebanyak 100 ml dengan perhitungan sebagai berikut

   Berat bahan = $\frac{BM\ Pb(NO3)2}{BA\ Pb}$ x 20 ppm

   Berat bahan = $\frac{331,2}{207,2}$ x 20 ppm

   Berat bahan = 31,9691 mg

   Berat bahan = 0,03197 g

   Sebanyak 0,03197 gram $Pb(NO_3)_2$ dimasukan kedalam labu takar 1000 ml lalu diencerkan dengan larutan pengencer (akuabides + HNO_3) hingga tanda batas lalu dihomogenkan.

Lampiran 4. Hasil Perhitungan Kadar Tembaga

Tabel 1. Kadar Tembaga Limbah Artifisial Dengan Penambahan Ekstrak dan Serbuk Kulit Pisang Ambon

Media	Konsentrasi	Berat Bahan (g)	Pengulangan	Absorbansi	Kadar Tembaga (ppm)
Kontrol	-	-	I	0,2073	112,87
			II	0,2132	116,23
			III	0.2208	120,55
			Rata-rata	**0.2138**	**116,55**
Ekstrak Ambon	0,5%	0,5006	I	0,1956	106,24
			II	0,1964	106,68
			III	0,1972	107,11
			Rata-rata	**0,1964**	**106,68**
	1%	1,0002	I	0,1761	95,14
			II	0,1769	95,60
			III	0,1783	96,42
			Rata-rata	**0,1789**	**96,72**
	1,5%	1,5006	I	0,1687	90,96
			II	0,1712	92,35
			III	0,1737	93,78
			Rata-rata	**0,1712**	**92,36**
	2%	2,0004	I	0,1658	89,27
			II	0,1681	90,59
			III	0,1677	90,36
			Rata-rata	**0,1672**	**90,07**
Serbuk Ambon	0,5%	0,5004	I	0,1827	98,88
			II	0,1837	99,45
			III	0,1730	98,42
			Rata-rata	**0,1827**	**98,91**
	1%	1,0008	I	0,1898	102,92
			II	0,1917	104,00
			III	0,1891	102,52
			Rata-rata	**0,1902**	**103,15**
	1,5%	1,5007	I	0,1935	105,02
			II	0,1860	105,82
			III	0,1976	107,36
			Rata-rata	**0,1953**	**106,07**
	2%	2,0008	I	0,2002	108,83
			II	0,1999	108,66
			III	0,1968	106,95
			Rata-rata	**0,1990**	**108,15**

Tabel 2 Kadar Tembaga Limbah Artifisial Dengan Penambahan Ekstrak dan Serbuk Kulit Pisang Kepok

Media	Konsentrasi	Berat Bahan (g)	Pengulangan	Absorbansi	Kadar Tembaga (ppm)
Kontrol	-	-	I	0,2073	112,87
			II	0,2132	116,23
			III	0,2208	120,55
			Rata-rata	**0,2138**	**116,55**
Ekstrak Kepok	0,5%	0,5005	I	0,1942	105,47
			II	0,1939	105,25
			III	0,1959	106,44
			Rata-rata	**0,1947**	**105,72**
	1%	1,0003	I	0,1954	106,10
			II	0,1983	107,76
			III	0,1999	108,67
			Rata-rata	**0,1978**	**107,51**
	1,5%	1,5006	I	0,1868	101,21
			II	0,1885	102,19
			III	0,1888	102,40
			Rata-rata	**0,1880**	**101,93**
	2%	2,0002	I	0,1888	102,37
			II	0,1914	103,85
			III	0,1905	103,36
			Rata-rata	**0,1902**	**103,19**
Serbuk Kepok	0,5%	0,5001	I	0,2097	114,28
			II	0,2107	114,82
			III	0,2123	115,76
			Rata-rata	**0,2109**	**114,95**
	1%	1,0002	I	0,1794	97,00
			II	0,1805	97,63
			III	0,1821	98,59
			Rata-rata	**0,1807**	**97,74**
	1,5%	1,5005	I	0,2068	112,64
			II	0,2084	113,50
			III	0,2020	109,91
			Rata-rata	**0,2058**	**112,02**
	2%	2,0007	I	0,1516	81,19
			II	0,1516	81,24
			III	0,1509	80,84
			Rata-rata	**0,1514**	**81,09**

Lampiran 5. Hasil Perhitungan Kadar Timbal

Tabel 3 Kadar Timbal Limbah Artifisial Dengan Penambahan Ekstrak dan Serbuk Kulit Pisang Ambon

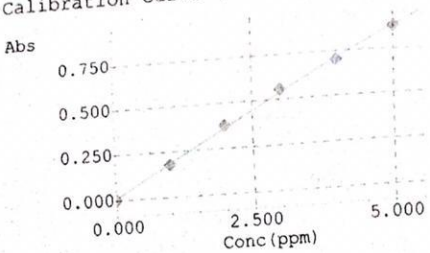
Media	Konsentrasi	Berat Bahan (g)	Pengulangan	Absorbansi	Kadar Timbal (ppm)
Kontrol	-	-	I	0,0025	9.96
			II	0,0018	6.23
			III	0,0028	11.56
			Rata-rata	0,0024	9.42
Ekstrak Ambon	0,5%	0,5003	I	0,0015	4.63
			II	0,0017	5.69
			III	0,0020	7.29
			Rata-rata	0,0017	5.69
	1%	1,0004	I	0,0012	3.03
			II	0,0014	4.10
			III	0,0015	4.63
			Rata-rata	0,0014	4.50
	1,5%	1,5002	I	0,0036	15.82
			II	0,0028	11.56
			III	0,0031	13.15
			Rata-rata	0,0032	13.69
	2%	2,0001	I	0,0017	5.69
			II	0,0019	3.56
			III	0,0023	8.89
			Rata-rata	0,0018	6.23
Serbuk Ambon	0,5%	0,5003	I	0,0018	6.23
			II	0,0013	3.56
			III	0,0015	4.63
			Rata-rata	0,0015	4.63
	1%	1,0002	I	0,0029	12.09
			II	0,0042	19.02
			III	0,0038	16.88
			Rata-rata	0,0036	15.82
	1,5%	1,5005	I	0,0010	1.96
			II	0,0015	4.63
			III	0,0007	0.37
			Rata-rata	0,0011	2.50
	2%	2,0004	I	0,0020	7.29
			II	0,0021	7.82
			III	0,0012	3.03
			Rata-rata	0,0018	6.23

Tabel 4 Kadar Timbal Limbah Artifisial Dengan Penambahan Ekstrak dan Serbuk Kulit Pisang Kepok

Media	Konsentrasi	Berat Bahan (g)	Pengulangan	Absorbansi	Kadar Timbal (ppm)
Kontrol	-	-	I	0,0025	9.96
			II	0,0018	6.23
			III	0,0028	11.56
			Rata-rata	0,0024	9.42
Ekstrak Kepok	0,5%	0,5006	I	0,0007	0.37
			II	0,0011	2.50
			III	0,0006	0
			Rata-rata	0,0009	1.43
	1%	1,0003	I	0,0009	1.43
			II	0,0014	4.10
			III	0,0010	1.96
			Rata-rata	0,0011	2.50
	1,5%	1,5007	I	0,0009	1.43
			II	0,0011	2.50
			III	0,0007	0.37
			Rata-rata	0,0009	1.43
	2%	2,0002	I	0,0010	1.96
			II	0,0009	1.43
			III	0,0011	2.50
			Rata-rata	0,0010	1.96
Serbuk Kepok	0,5%	0,5009	I	0,0010	1.96
			II	0,0013	3.56
			III	0,0007	0.37
			Rata-rata	0,0010	1.96
	1%	1,0006	I	0,0011	2.50
			II	0,0013	3.56
			III	0,0015	4.63
			Rata-rata	0,0013	3.56
	1,5%	1,5002	I	0,0012	3.03
			II	0,0015	4.63
			III	0,0016	5.16
			Rata-rata	0,0014	4.10
	2%	2,0006	I	0,0007	0.37
			II	0,0010	1.96
			III	0,0008	0.90
			Rata-rata	0,0008	0.90

Cu Friday, 5 July 2019

Calibration Curve (C# : 01)



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2.0000	0.3751
3.0000	0.5541
4.0000	0.6994
5.0000	0.8828

Abs=0.17580Conc+0.0088762

r=0.9992

Std 1 : STD

True Value	Conc.	Abs.	BG	C#
0.0000	-0.0465	0.0007	0.0003	01

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Std 2 : STD

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Std 3 : STD

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Std 4 : STD

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Std 5 : STD

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4.0000	3.9278	0.6994	0.0036	01

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Std 6 : STD

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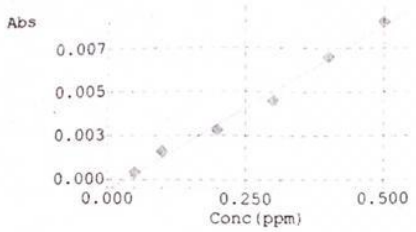
Pb Friday, 5 July 2019

Calibration Curve (C# : 01)



Conc (ppm)	Abs
0.0500	0.0004
0.1000	0.0016
0.2000	0.0028
0.3000	0.0045
0.4000	0.0070
0.5000	0.0090

Abs=0.018767Conc-0.00063151

r=0.9948

: STD

True Value	Conc.	Abs.	BG	Date	Time
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System Administrator	AA

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User Name	Device Name
System Administrator	AA

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User Name	Device Name
System Administrator	AA

: STD Average

True Value	Conc.	Abs.	BG	%RSD
0.0500	0.0550	0.0004	-0.0024	20.20

C#
01

: STD

True Value	Conc.	Abs.	BG	Date	Time
0.1000	0.1082	0.0014	-0.0034	16/08/2016	2:35:26 PM(+0700)

User Name	Device Name
System Administrator	AA

True Value	Conc.	Abs.	BG	Date	Time
0.1000	0.1189	0.0016	-0.0031	16/08/2016	2:35:41 PM(+0700)

User Name	Device Name
System Administrator	AA

True Value	Conc.	Abs.	BG	Date	Time
0.1000	0.1136	0.0015	-0.0030	16/08/2016	2:35:55 PM(+0700)

User Name	Device Name
System Administrator	AA

Pb Friday, 5 July 2019

: **STD Average**

True Value	Conc.	Abs.	BG	%RSD
0.1000	0.1189	0.0016	-0.0030	4.56

C#
01

: **STD**

True Value	Conc.	Abs.	BG	Date	Time
0.2000	0.2308	0.0037	-0.0030	16/08/2016	2:36:27 PM(+0700)

User Name	Device Name
System Administrator	AA

True Value	Conc.	Abs.	BG	Date	Time
0.2000	0.1935	0.0030	-0.0025	16/08/2016	2:36:41 PM(+0700)

User Name	Device Name
System Administrator	AA

True Value	Conc.	Abs.	BG	Date	Time
0.2000	0.1722	0.0026	-0.0030	16/08/2016	2:36:55 PM(+0700)

User Name	Device Name
System Administrator	AA

: **STD Average**

True Value	Conc.	Abs.	BG	%RSD
0.2000	0.1828	0.0028	-0.0028	10.10

C#
01

: **STD**

True Value	Conc.	Abs.	BG	Date	Time
0.3000	0.3054	0.0051	-0.0035	16/08/2016	2:37:25 PM(+0700)

User Name	Device Name
System Administrator	AA

True Value	Conc.	Abs.	BG	Date	Time
0.3000	0.2681	0.0044	-0.0032	16/08/2016	2:37:41 PM(+0700)

User Name	Device Name
System Administrator	AA

True Value	Conc.	Abs.	BG	Date	Time
0.3000	0.2788	0.0046	-0.0032	16/08/2016	2:37:56 PM(+0700)

User Name	Device Name
System Administrator	AA

: **STD Average**

True Value	Conc.	Abs.	BG	%RSD
0.3000	0.2734	0.0045	-0.0032	3.14

C#
01

: **STD**

True Value	Conc.	Abs.	BG	Date	Time
0.4000	0.4173	0.0072	-0.0029	16/08/2016	2:38:25 PM(+0700)

User Name	Device Name
System Administrator	AA

Pb Friday, 5 July 2019

True Value	Conc.	Abs.	BG		Date	Time
0.4000	0.4013	0.0069	-0.0028		16/08/2016	2:38:40 PM(+0700)

User Name	Device Name
System Administrator	AA

: STD Average

True Value	Conc.	Abs.	BG			%RSD
0.4000	0.4066	0.0070	-0.0028			3.01

C#
01

E : STD

True Value	Conc.	Abs.	BG		Date	Time
0.5000	0.5026	0.0088	-0.0030		16/08/2016	2:39:11 PM(+0700)

User Name	Device Name
System Administrator	AA

True Value	Conc.	Abs.	BG		Date	Time
0.5000	0.5239	0.0092	-0.0027		16/08/2016	2:39:26 PM(+0700)

User Name	Device Name
System Administrator	AA

E : STD Average

True Value	Conc.	Abs.	BG			%RSD
0.5000	0.5132	0.0090	-0.0028			3.14

Lampiran 6. Perhitungan Kadar Tembaga

Y = a + bx

a = 0.0088762

b = 0.17580

Pengenceran

Filtrat 0,5 dipindahkan secara kuantitatif ke labu takar 50 ml dan ditera hingga tanda batas. Perhitungan 0,5 ml 50 ml 100 kali

Kadar Cu (ppm) = C regresi x FP

Penurunan Kadar Tembaga

$$\%\text{Penurunan} = \frac{Kadar\ awal - Kadar\ setelah\ perlakuan}{Kadar\ Tembaga\ awal}\ x\ 100\%$$

a. Limbah Artifisial (Tanpa Perlakuan)

1) Pengulangan I

Y = a + bx

$$X = \frac{y-a}{b}$$

$$X = \frac{0.20730-0.0088762}{0.17580}$$

X = 1.1287 ppm

Kadar Cu (ppm) = 1.1287 x 100 = 112.87 ppm

2) Pengulangan II

Y = a + bx

X $= \frac{y-a}{b}$

X = $\frac{0.21321-0.0088762}{0.17580}$

X = 1.1623 ppm

Kadar Cu (ppm) = 1.1623 x 100 = 116.23 ppm

3) Pengulangan III

Y = a + bx

X $= \frac{y-a}{b}$

X = $\frac{0.22080-0.0088762}{0.17580}$

X = 1.2055 ppm

Kadar Cu (ppm) = 1.2055 x 100 = 120.55 ppm

Rata-rata hasil kadar = $\frac{112,87+116,23+120,55}{3}$ = 116,55

1. Perhitungan Limbah Artifisial dengan penambahan ekstrak

a. Limbah Artifisial dengan penambahan ekstrak kulit pisang ambon 0,5%

1) Pengulangan I

Y = a + bx

$X = \frac{y-a}{b}$

$X = \frac{0.19565-0.0088762}{0.17580}$

X = 1.0624 ppm

Kadar Cu (ppm) = 1.0624 x 100 = 106.24 ppm

2) Pengulangan II

Y = a + bx

$X = \frac{y-a}{b}$

$X = \frac{0.19641-0.0088762}{0.17580}$

X = 1.0668 ppm

Kadar Cu (ppm) = 1.0668 x 100 = 106.68 ppm

3) Pengulangan III

Y = a + bx

$X = \frac{y-a}{b}$

$X = \frac{0.19717-0.0088762}{0.17580}$

X = 1.0711 ppm

Kadar Cu (ppm) = 1.0711 x 100 = 107.11 ppm

Rata-rata hasil kadar = $\frac{106,24+106,68+107,11}{3}$ = 106,68 ppm

b. Limbah Artifisial dengan penambahan ekstrak kulit pisang ambon 1%

1) Pengulangan I

Y = a + bx

X = $\frac{y-a}{b}$

X = $\frac{0.17613-0.0088762}{0.17580}$

X = 0.9514 ppm

Kadar Cu (ppm) = 0.9104 x 100 = 91,04 ppm

2) Pengulangan II

Y = a + bx

X = $\frac{y-a}{b}$

X = $\frac{0.17694-0.0088762}{0.17580}$

X = 0.9560 ppm

Kadar Cu (ppm) = 0.9560 x 100 = 95,60 ppm

3) Pengulangan III

Y = a + bx

X $= \frac{y-a}{b}$

X = $\frac{0.17838-0.0088762}{0.17580}$

X = 0.9642 ppm

Kadar Cu (ppm) = 0.9642 x 100 = 96.42 ppm

Rata-rata hasil kadar = $\frac{95,14+95,60+96,42}{3}$ = 96,72 ppm

c. Limbah Artifisial dengan penambahan ekstrak kulit pisang ambon 1,5%

1) Pengulangan I

Y = a + bx

X $= \frac{y-a}{b}$

X = $\frac{0.16878-0.0088762}{0.17580}$

X = 0.9096 ppm

Kadar Cu (ppm) = 0.9096 x 100 = 90,96 ppm

2) Pengulangan II

Y = a + bx

X $= \frac{y-a}{b}$

X = $\frac{0.17122-0.0088762}{0.17580}$

X = 0.9235 ppm

Kadar Cu (ppm) = 0.9235 x 100 = 92,35 ppm

3) Pengulangan III

Y = a + bx

$X = \frac{y-a}{b}$

$X = \frac{0.17374-0.0088762}{0.17580}$

X = 0.9378 ppm

Kadar Cu (ppm) = 0.9378 x 100 = 93,78 ppm

Rata-rata hasil kadar = $\frac{90,96+92,35+93,78}{3}$ = 92,36 ppm

d. Limbah Artifisial dengan penambahan ekstrak kulit pisang ambon 2%

1) Pengulangan I

Y = a + bx

$X = \frac{y-a}{b}$

$X = \frac{0.16581-0.0088762}{0.17580}$

X = 0.8927 ppm

Kadar Cu (ppm) = 0.8927 x 100 = 89,27 ppm

2) Pengulangan II

Y = a + bx

X $= \frac{y-a}{b}$

X = $\frac{0.16813-0.0088762}{0.17580}$

X = 0.9059 ppm

Kadar Cu (ppm) = 0.9059 x 100 = 90,59 ppm

3) Pengulangan III

Y = a + bx

X $= \frac{y-a}{b}$

X = $\frac{0.16772-0.0088762}{0.17580}$

X = 0.9036 ppm

Kadar Cu (ppm) = 0.9036 x 100 = 90,36 ppm

Rata-rata hasil kadar = $\frac{89,27+90,59+90,36}{3}$ = 90,07 ppm

e. Limbah Artifisial dengan penambahan ekstrak kulit pisang kepok 0,5%

1) Pengulangan I

Y = a + bx

X $= \frac{y-a}{b}$

X = $\frac{0.19429-0.0088762}{0.17580}$

X = 1.0547 ppm

Kadar Cu (ppm) = 1.0547 x 100 = 105,47 ppm

2) Pengulangan II

Y = a + bx

X $= \frac{y-a}{b}$

X = $\frac{0.19390-0.0088762}{0.17580}$

X = 1.0525 ppm

Kadar Cu (ppm) = 1.0525 x 100 = 105,25 ppm

3) Pengulangan III

Y = a + bx

X $= \frac{y-a}{b}$

X = $\frac{0.19599-0.0088762}{0.17580}$

X = 1.0644 ppm

Kadar Cu (ppm) = 1.0644 x 100 = 106,44 ppm

Rata-rata hasil kadar = $\frac{105,47+105,25+106,44}{3}$ = 105,72

f. Limbah Artifisial dengan penambahan ekstrak kulit pisang kepok 1%

1) Pengulangan I

Y = a + bx

X $= \frac{y-a}{b}$

X = $\frac{0.19540-0.0088762}{0.17580}$

X = 1.0610 ppm

Kadar Cu (ppm) = 1.0610 x 100 = 106,10 ppm

2) Pengulangan II

Y = a + bx

X $= \frac{y-a}{b}$

X = $\frac{0.19831-0.0088762}{0.17580}$

X = 1.0776 ppm

Kadar Cu (ppm) = 1.0776 x 100 = 107,66 ppm

3) Pengulangan III

Y = a + bx

X $= \frac{y-a}{b}$

X = $\frac{0.19991-0.0088762}{0.17580}$

X = 1.0867 ppm

Kadar Cu (ppm) = 1.0867 x 100 = 108,67 ppm

Rata-rata hasil kadar = $\frac{106,10+107,78+108,67}{3}$ = 107,51 ppm

g. Limbah Artifisial dengan penambahan ekstrak kulit pisang kepok 1,5%

1) Pengulangan I

Y = a + bx

X = $\frac{y-a}{b}$

X = $\frac{0.18680-0.0088762}{0.17580}$

X = 1.0121 ppm

Kadar Cu (ppm) = 1.0121 x 100 = 101,21 ppm

2) Pengulangan II

Y = a + bx

X = $\frac{y-a}{b}$

X = $\frac{0.18852-0.0088762}{0.17580}$

X = 1.0219 ppm

Kadar Cu (ppm) = 1.0219 x 100 = 102,19 ppm

3) Pengulangan III

Y = a + bx

X = $\frac{y-a}{b}$

X = $\frac{0.18889-0.0088762}{0.17580}$

X = 1.0240 ppm

Kadar Cu (ppm) = 1.0240 x 100 = 102,40 ppm

Rata-rata hasil kadar = $\frac{101,20+102,19+102,40}{3}$ = 101,93 ppm

h. Limbah Artifisial dengan penambahan ekstrak kulit pisang kepok 2%

1) Pengulangan I

Y = a + bx

X = $\frac{y-a}{b}$

X = $\frac{0.18884-0.0088762}{0.17580}$

X = 1.0237 ppm

Kadar Cu (ppm) = 1.0237 x 100 = 102,37 ppm

2) Pengulangan II

Y = a + bx

X = $\frac{y-a}{b}$

X = $\frac{0.19144-0.0088762}{0.17580}$

X = 1.0385 ppm

Kadar Cu (ppm) = 1.0385 x 100 = 103,85 ppm

3) Pengulangan III

Y = a + bx

X $= \frac{y-a}{b}$

X = $\frac{0.19058-0.0088762}{0.17580}$

X = 1.0336 ppm

Kadar Cu (ppm) = 1.0336 x 100 = 103,36 ppm

Rata-rata hasil kadar = $\frac{102,37+103,85+103,36}{3}$ = 103,19 ppm

2. Perhitungan Limbah Artifisial dengan penambahan serbuk

a. Limbah Artifisial dengan penambahan serbuk kulit pisang ambon 0,5%

1) Pengulangan I

Y = a + bx

X $= \frac{y-a}{b}$

X = $\frac{0.18270-0.0088762}{0.17580}$

X = 0.9888 ppm

Kadar Cu (ppm) = 0.9888 x 100 = 98,88 ppm

2) Pengulangan II

Y = a + bx

X $= \frac{y-a}{b}$

X = $\frac{0.18370-0.0088762}{0.17580}$

X = 0.9945 ppm

Kadar Cu (ppm) = 0.9945 x 100 = 99,45 ppm

3) Pengulangan III

Y = a + bx

X $= \frac{y-a}{b}$

X = $\frac{0.18189-0.0088762}{0.17580}$

X = 0.9842 ppm

Kadar Cu (ppm) = 0.9842 x 100 = 98,42 ppm

Rata-rata hasil kadar = $\frac{98,88+99,45+98,42}{3}$ = 98,91 ppm

b. Limbah Artifisial dengan penambahan serbuk kulit pisang ambon 1%

1) Pengulangan I

Y = a + bx

X $= \frac{y-a}{b}$

X = $\frac{0.18980-0.0088762}{0.17580}$

X = 1.0292 ppm

Kadar Cu (ppm) = 1.0292 x 100 = 102,92 ppm

2) Pengulangan II

Y = a + bx

$X = \frac{y-a}{b}$

$X = \frac{0.19170-0.0088762}{0.17580}$

X = 1.0400 ppm

Kadar Cu (ppm) = 1.0400 x 100 = 104,00 ppm

3) Pengulangan III

Y = a + bx

$X = \frac{y-a}{b}$

$X = \frac{0.18910-0.0088762}{0.17580}$

X = 1.0252 ppm

Kadar Cu (ppm) = 1.0252 x 100 = 102,52 ppm

Rata-rata hasil kadar = $\frac{102,92+104,00+102,52}{3}$ = 103,15 ppm

c. Limbah Artifisial dengan penambahan serbuk kulit pisang ambon 1,5%

1) Pengulangan I

Y = a + bx

$X = \frac{y-a}{b}$

$X = \frac{0.19350-0.0088762}{0.17580}$

X = 1.0502 ppm

Kadar Cu (ppm) = 1.0502 x 100 = 105,02 ppm

2) Pengulangan II

Y = a + bx

X $= \frac{y-a}{b}$

X = $\frac{0.19490-0.0088762}{0.17580}$

X = 1.0582 ppm

Kadar Cu (ppm) = 1.0582 x 100 = 105,82 ppm

3) Pengulangan III

Y = a + bx

X $= \frac{y-a}{b}$

X = $\frac{0.19761-0.0088762}{0.17580}$

X = 1.0736 ppm

Kadar Cu (ppm) = 1.0736 x 100 = 107,36 ppm

Rata-rata hasil kadar = $\frac{105,02+105,82+107,36}{3}$ = 106,07 ppm

d. Limbah Artifisial dengan penambahan serbuk kulit pisang ambon 2%

1) Pengulangan I

Y = a + bx

X $= \frac{y-a}{b}$

X $= \frac{0.20019-0.0088762}{0.17580}$

X = 1.0883 ppm

Kadar Cu (ppm) = 1.0883 x 100 = 103,83 ppm

2) Pengulangan II

Y = a + bx

X $= \frac{y-a}{b}$

X $= \frac{0.19990-0.0088762}{0.17580}$

X = 1.0866 ppm

Kadar Cu (ppm) = 1.0866 x 100 = 108,86 ppm

3) Pengulangan III

Y = a + bx

X $= \frac{y-a}{b}$

X $= \frac{0.19689-0.0088762}{0.17580}$

X = 1.0695 ppm

Kadar Cu (ppm) = 1.0695 x 100 = 106,95 ppm

Rata-rata hasil kadar = $\frac{108.83+108.66+106,95}{3}$ = 108,15 ppm

e. Limbah Artifisial dengan penambahan serbuk kulit pisang kepok 0,5%

1) Pengulangan I

Y = a + bx

X = $\frac{y-a}{b}$

X = $\frac{0.20978-0.0088762}{0.17580}$

X = 1.1428 ppm

Kadar Cu (ppm) = 1.1428 x 100 = 114,28 ppm

2) Pengulangan II

Y = a + bx

X = $\frac{y-a}{b}$

X = $\frac{0.21072-0.0088762}{0.17580}$

X = 1.1482 ppm

Kadar Cu (ppm) = 1.1482 x 100 = 114,82 ppm

3) Pengulangan III

Y = a + bx

X = $\frac{y-a}{b}$

X = $\frac{0.21238-0.0088762}{0.17580}$

X = 1.1576 ppm

Kadar Cu (ppm) = 1.1576 x 100 = 115,76 ppm

Rata-rata hasil kadar = $\frac{114,28+114,82+115,76}{3}$ = 114,95 ppm

f. Limbah Artifisial dengan penambahan serbuk kulit pisang kepok 1%

1) Pengulangan I

Y = a + bx

X = $\frac{y-a}{b}$

X = $\frac{0.17940-0.0088762}{0.17580}$

X = 0.9700 ppm

Kadar Cu (ppm) = 0.9700 x 100 = 97,00 ppm

2) Pengulangan I

Y = a + bx

X = $\frac{y-a}{b}$

X = $\frac{0.18050-0.0088762}{0.17580}$

X = 0.9763 ppm

Kadar Cu (ppm) = 0.9763 x 100 = 97,63 ppm

3) Pengulangan III

Y = a + bx

$X = \frac{y-a}{b}$

$X = \frac{0.18219-0.0088762}{0.17580}$

X = 0.9859 ppm

Kadar Cu (ppm) = 0.9859 x 100 = 98,59 ppm

Rata-rata hasil kadar = $\frac{97,00+97,63+98,59}{3}$ = 97,74 ppm

g. Limbah Artifisial dengan penambahan serbuk kulit pisang kepok 1,5%

1) Pengulangan I

Y = a + bx

$X = \frac{y-a}{b}$

$X = \frac{0.20689-0.0088762}{0.17580}$

X = 1.1264 ppm

Kadar Cu (ppm) = 1.1264 x 100 = 112,64 ppm

2) Pengulangan II

Y = a + bx

$X = \frac{y-a}{b}$

$X = \frac{0.20840-0.0088762}{0.17580}$

X = 1.1350 ppm

Kadar Cu (ppm) = 1.1350 x 100 = 113,50 ppm

3) Pengulangan III

Y = a + bx

X $= \frac{y-a}{b}$

X = $\frac{0.20209-0.0088762}{0.17580}$

X = 1.0991 ppm

Kadar Cu (ppm) = 1.0991 x 100 = 109,91 ppm

Rata-rata hasil kadar = $\frac{112,64+113,50+109,91}{3}$ = 112,02 ppm

h. Limbah Artifisial dengan penambahan serbuk kulit pisang kepok 2%

1) Pengulangan I

Y = a + bx

X $= \frac{y-a}{b}$

X = $\frac{0.15160-0.0088762}{0.17580}$

X = 0.8119 ppm

Kadar Cu (ppm) = 0.8119 x 100 = 81,19 ppm

2) Pengulangan II

Y = a + bx

X $= \frac{y-a}{b}$

X = $\frac{0.15169-0.0088762}{0.17580}$

X = 0.8124 ppm

Kadar Cu (ppm) = 0.8124 x 100 = 81,24 ppm

3) Pengulangan III

Y = a + bx

X $= \frac{y-a}{b}$

X = $\frac{0.15099-0.0088762}{0.17580}$

X = 0.8084 ppm

Kadar Cu (ppm) = 0.8084 x 100 = 80,84 ppm

Rata-rata hasil kadar = $\frac{81,19+81,24+80,84}{3}$ = 81,09 ppm

Lampiran 7. Perhitungan Kadar Timbal

Y = bx + a

a = 0.00063151

b = 0.018767

X = y-a/b 0.00063151 / 0.018767

Pengenceran

Filtrat 0,5 dipindahkan secara kuantitatif ke labu takar 50 ml dan ditera hingga tanda batas. Perhitungan 0,5 ml $\longrightarrow$ 50 ml = 100 kali

Kadar Pb (ppm) = C regresi x FP

%Penurunan = $\frac{Kadar\ awal - Kadar\ setelah\ perlakuan}{Kadar\ Tembaga\ awal}\ x\ 100\%$

a. Limbah Artifisial (Tanpa Perlakuan)

1) Pengulangan I

Y = a + bx

X = $\frac{y-a}{b}$

X = $\frac{0.0025-0.00063151}{0.018767}$

X = 0.0996 ppm

Kadar Pb (ppm) = 0.0996 x 100 = 9,96 ppm

2) Pengulangan II

Y = a + bx

$X = \frac{y-a}{b}$

$X = \frac{0.0018-0.00063151}{0.018767}$

X = 0.0623 ppm

Kadar Pb (ppm) = 0.0623 x 100 = 6,23 ppm

3) Pengulangan III

Y = a + bx

$X = \frac{y-a}{b}$

$X = \frac{0.0028-0.00063151}{0.018767}$

X = 0.11555 ppm

Kadar Pb (ppm) = 0,11555 x 100 = 11,56 ppm

Rata-rata hasil kadar = $\frac{9,96+6,23+11,56}{3}$ = 9,42 ppm

1. Perhitungan Limbah Artifisial dengan penambahan ekstrak

a. Limbah Artifisial dengan penambahan ekstrak kulit pisang kepok 0,5%

1) Pengulangan I

Y = a + bx

$X = \frac{y-a}{b}$

$X = \frac{0.0007-0.00063151}{0.018767}$

X = 0.00365 ppm

Kadar Pb (ppm) = 0.00365 x 100 = 0,37 ppm

2) Pengulangan II

Y = a + bx

X $= \frac{y-a}{b}$

X = $\frac{0.0011-0.00063151}{0.018767}$

X = 0.02496 ppm

Kadar Pb (ppm) = 0.02496 x 100 = 2,50 ppm

3) Pengulangan III

Y = a + bx

X $= \frac{y-a}{b}$

X = $\frac{0.0006-0.0006131}{0.018767}$

X = 0 ppm

Kadar Pb (ppm) = 0 x 100 = 0 ppm

Rata-rata kadar hasil = $\frac{0,37+2.50+0}{3}$ = 1,43 ppm

b. Limbah Artifisial dengan penambahan ekstrak kulit pisang kepok 1%

1) Pengulangan I

Y = a + bx

X $= \frac{y-a}{b}$

$X = \frac{0.0009-0.00063151}{0.018767}$

X = 0.01431 ppm

Kadar Pb (ppm) = 0.01431 x 100 = 1,43 ppm

2) Pengulangan II

Y = a + bx

$X = \frac{y-a}{b}$

$X = \frac{0.00014-0.00063151}{0.018767}$

X = 0.04095 ppm

Kadar Pb (ppm) = 0.04095 x 100 = 4,10 ppm

3) Pengulangan III

Y = a + bx

$X = \frac{y-a}{b}$

$X = \frac{0.0010-0.00063151}{0.018767}$

X = 0.01964 ppm

Kadar Pb (ppm) = 0.01964 x 100 = 1,96 ppm

Rata-rata kadar hasil = $\frac{1,43+4,10+1,96}{3}$ = 2,50

c. Limbah Artifisial dengan penambahan ekstrak kulit pisang kepok 1,5%

1) Pengulangan I

Y = a + bx

$X = \frac{y-a}{b}$

$X = \frac{0.0009-0.00063151}{0.018767}$

X = 0.01431 ppm

Kadar Pb (ppm) = 0.01431 x 100 = 1,43 ppm

2) Pengulangan II

Y = a + bx

$X = \frac{y-a}{b}$

$X = \frac{0.0011-0.00063151}{0.018767}$

X = 0.02496 ppm

Kadar Pb (ppm) = 0.02496 x 100 = 2,50 ppm

3) Pengulangan III

Y = a + bx

$X = \frac{y-a}{b}$

$X = \frac{0.0007-0.00063151}{0.018767}$

X = 0.00365 ppm

Kadar Pb (ppm) = 0.00365 x 100 = 0,37 ppm

Rata-rata kadar hasil = $\frac{1,43+2,50+0,37}{3}$ = 1,43 ppm

d. Limbah Artifisial dengan penambahan ekstrak kulit pisang kepok 2%

1) Pengulangan I

Y = a + bx

X = $\frac{y-a}{b}$

X = $\frac{0.0010-0.00063151}{0.018767}$

X = 0.01964 ppm

Kadar Pb (ppm) = 0.01964 x 100 = 1,96 ppm

2) Pengulangan II

Y = a + bx

X = $\frac{y-a}{b}$

X = $\frac{0.0009-0.00063151}{0.018767}$

X = 0.01431 ppm

Kadar Pb (ppm) = 0.01431 x 100 = 1,43 ppm

3) Pengulangan III

Y = a + bx

X = $\frac{y-a}{b}$

X = $\frac{0.0011-0.00063151}{0.018767}$

X = 0.02496 ppm

Kadar Pb (ppm) = 0.02496 x 100 = 2,50 ppm

Rata-rata hasil kadar = $\frac{1,96+1,43+2,50}{3}$ = 1,96 ppm

e. Limbah Artifisial dengan penambahan ekstrak kulit pisang ambon 0,5%

1) Pengulangan I

Y = a + bx

X = $\frac{y-a}{b}$

X = $\frac{0.0015-0.00063151}{0.018767}$

X = 0.04627 ppm

Kadar Pb (ppm) = 0.04627x 100 = 4,63 ppm

2) Pengulangan II

Y = a + bx

X = $\frac{y-a}{b}$

X = $\frac{0.0017-0.00063151}{0.018767}$

X = 0.05693 ppm

Kadar Pb (ppm) = 0.05693 x 100 = 5,69 ppm

3) Pengulangan III

Y = a + bx

X $= \frac{y-a}{b}$

X = $\frac{0.0020-0.00063151}{0.018767}$

X = 0.07292 ppm

Kadar Pb (ppm) = 0.07292 x 100 = 7,29 ppm

Rata-rata hasil kadar = $\frac{4,63+5,69+7,29}{3}$ = 5,69 ppm

f. Limbah Artifisial dengan penambahan ekstrak kulit pisang ambon 1%

1) Pengulangan I

Y = a + bx

X $= \frac{y-a}{b}$

X = $\frac{0.0012-0.00063151}{0.018767}$

X = 0.03029 ppm

Kadar Pb (ppm) = 0.03029 x 100 = 3,03 ppm

2) Pengulangan II

Y = a + bx

X $= \frac{y-a}{b}$

X = $\frac{0.0014-0.00063151}{0.018767}$

X = 0.04095 ppm

Kadar Pb (ppm) = 0.04095 x 100 = 4,10 ppm

3) Pengulangan III

Y = a + bx

X = $\frac{y-a}{b}$

X = $\frac{0.0015-0.00063151}{0.018767}$

X = 0.04627 ppm

Kadar Pb (ppm) = 0.04627 x 100 = 4,63 ppm

Rata-rata hasil kadar = $\frac{3,03+4,10+4,63}{3}$ = 4,10 ppm

g. Limbah Artifisial dengan penambahan ekstrak kulit pisang ambon 1,5%

1) Pengulangan I

Y = a + bx

X = $\frac{y-a}{b}$

X = $\frac{0.0036-0.00063151}{0.018767}$

X = 0.15818 ppm

Kadar Pb (ppm) = 0.15818 x 100 = 15,82 ppm

2) Pengulangan II

Y = a + bx

X $= \frac{y-a}{b}$

X = $\frac{0.0028-0.00063151}{0.018767}$

X = 0.11555 ppm

Kadar Pb (ppm) = 0.11555 x 100 = 11,56 ppm

3) Pengulangan III

Y = a + bx

X $= \frac{y-a}{b}$

X = $\frac{0.0031-0.00063151}{0.018767}$

X = 0.13153 ppm

Kadar Pb (ppm) = 0.13153 x 100 = 13,15 ppm

Rata-rata hasil kadar = $\frac{15,82+11,56+13,15}{3}$ = 13,69 ppm

h. Limbah Artifisial dengan penambahan ekstrak kulit pisang ambon 2%

1) Pengulangan I

Y = a + bx

X $= \frac{y-a}{b}$

X = $\frac{0.0017-0.00063151}{0.018767}$

X = 0.05694 ppm

Kadar Pb (ppm) = 0.05694 x 100 = 5,69 ppm

2) Pengulangan II

Y = a + bx

X = $\frac{y-a}{b}$

X = $\frac{0.0013-0.00063151}{0.018767}$

X = 0.03562 ppm

Kadar Pb (ppm) = 0.03562 x 100 = 3,56 ppm

3) Pengulangan III

Y = a + bx

X = $\frac{y-a}{b}$

X = $\frac{0.0023-0.00063151}{0.018767}$

X = 0.08891 ppm

Kadar Pb (ppm) = 0.08891 x 100 = 8,89 ppm

Rata-rata hasil kadar = $\frac{5,69+3,56+8,89}{3}$ = 6,23 ppm

2. Perhitungan Limbah Artifisial dengan penambahan serbuk

a. Limbah Artifisial dengan penambahan serbuk kulit pisang kepok 0,5%

1) Pengulangan I

Y = a + bx

$X = \frac{y-a}{b}$

$X = \frac{0.0010-0.00063151}{0.018767}$

X = 0.01964 ppm

Kadar Pb (ppm) = 0.01964 x 100 = 1,96 ppm

2) Pengulangan II

Y = a + bx

$X = \frac{y-a}{b}$

$X = \frac{0.0013-0.00063151}{0.018767}$

X = 0.03562 ppm

Kadar Pb (ppm) = 0.03562 x 100 = 3,56 ppm

3) Pengulangan III

Y = a + bx

$X = \frac{y-a}{b}$

$X = \frac{0.0007-0.00063151}{0.018767}$

X = 0.00365 ppm

Kadar Pb (ppm) = 0.00365 x 100 = 0,37 ppm

Rata-rata hasil kadar = $\frac{1,96+3,56+0,37}{3}$ = 1,96 ppm

b. Limbah Artifisial dengan penambahan serbuk kulit pisang kepok 1%

1) Pengulangan I

Y = a + bx

$X = \frac{y-a}{b}$

$X = \frac{0.0011-0.00063151}{0.018767}$

X = 0.02496 ppm

Kadar Pb (ppm) = 0.02496 x 100 = 2,50 ppm

2) Pengulangan II

Y = a + bx

$X = \frac{y-a}{b}$

$X = \frac{0.0013-0.00063151}{0.018767}$

X = 0.03562 ppm

Kadar Pb (ppm) = 0.03562 x 100 = 3,56 ppm

3) Pengulangan III

Y = a + bx

X $= \frac{y-a}{b}$

X = $\frac{0.0015-0.00063151}{0.018767}$

X = 0.04628 ppm

Kadar Pb (ppm) = 0.04628 x 100 = 4,63 ppm

Rata-rata hasil kadar = $\frac{2,50+3,56+4,63}{3}$ = 3,56 ppm

c. Limbah Artifisial dengan penambahan serbuk kulit pisang kepok 1,5%

1) Pengulangan I

Y = a + bx

X $= \frac{y-a}{b}$

X = $\frac{0.0012-0.00063151}{0.018767}$

X = 0.03029 ppm

Kadar Pb (ppm) = 0.03029 x 100 = 3,03 ppm

2) Pengulangan II

Y = a + bx

X $= \frac{y-a}{b}$

$X = \frac{0.0015-0.00063151}{0.018767}$

X = 0.04628 ppm

Kadar Pb (ppm) = 0.04628 x 100 = 4,63 ppm

3) Pengulangan III

Y = a + bx

$X = \frac{y-a}{b}$

$X = \frac{0.0016-0.00063151}{0.018767}$

X = 0.05160 ppm

Kadar Pb (ppm) = 0.05160 x 100 = 5,16 ppm

Rata-rata hasil kadar = $\frac{3,03+4,63+5,16}{3}$ = 4,09 ppm

d. Limbah Artifisial dengan penambahan serbuk kulit pisang kepok 2%

1) Pengulangan I

Y = a + bx

$X = \frac{y-a}{b}$

$X = \frac{0.0007-0.00063151}{0.018767}$

X = 0.00365 ppm

Kadar Pb (ppm) = 0.00365 x 100 = 0,37 ppm

2) Pengulangan II

Y = a + bx

X $= \frac{y-a}{b}$

X = $\frac{0.0010-0.00063151}{0.018767}$

X = 0.01964 ppm

Kadar Pb (ppm) = 0.01964 x 100 = 1,96 ppm

3) Pengulangan III

Y = a + bx

X $= \frac{y-a}{b}$

X = $\frac{0.0008-0.00063151}{0.018767}$

X = 0.00898ppm

Kadar Pb (ppm) = 0.00898 x 100 = 0,90 ppm

Rata-rata hasil kadar = $\frac{0,37+1,96+0,90}{3}$ = 0,90 ppm

e. Limbah Artifisial dengan penambahan serbuk kulit pisang ambon 0,5%

1) Pengulangan I

Y = a + bx

X $= \frac{y-a}{b}$

X = $\frac{0.0018-0.00063151}{0.018767}$

X = 0.06226ppm

Kadar Pb (ppm) = 0.06226 x 100 = 6,23 ppm

2) Pengulangan II

Y = a + bx

X = $\frac{y-a}{b}$

X = $\frac{0.0013-0.00063151}{0.018767}$

X = 0.03562ppm

Kadar Pb (ppm) = 0.03562 x 100 = 3,56 ppm

3) Pengulangan III

Y = a + bx

X = $\frac{y-a}{b}$

X = $\frac{0.0015-0.00063151}{0.018767}$

X = 0.04627ppm

Kadar Pb (ppm) = 0.04627 x 100 = 4,63 ppm

Rata-rata hasil kadar = $\frac{6,23+3,56+4,63}{3}$ = 4,63 ppm

f. Limbah Artifisial dengan penambahan serbuk kulit pisang ambon 1%

1) Pengulangan I

Y = a + bx

$X = \frac{y-a}{b}$

$X = \frac{0.0029-0.00063151}{0.018767}$

X = 0.12088ppm

Kadar Pb (ppm) = 0.12088 x 100 = 12,09 ppm

2) Pengulangan II

Y = a + bx

$X = \frac{y-a}{b}$

$X = \frac{0.0042-0.00063151}{0.018767}$

X = 0.19015ppm

Kadar Pb (ppm) = 0.19015 x 100 = 19,02 ppm

3) Pengulangan III

Y = a + bx

$X = \frac{y-a}{b}$

$X = \frac{0.0038-0.00063151}{0.018767}$

X = 0.16883ppm

Kadar Pb (ppm) = 0.16883 x 100 = 16,88 ppm

Rata-rata hasil kadar = $\frac{12,09+19,02+16,88}{3}$ = 15,82 ppm

g. Limbah Artifisial dengan penambahan serbuk kulit pisang ambon 1,5%

1) Pengulangan I

Y = a + bx

X = $\frac{y-a}{b}$

X = $\frac{0.0010-0.00063151}{0.018767}$

X = 0.04627ppm

Kadar Pb (ppm) = 0.01964 x 100 = 1,96 ppm

2) Pengulangan II

Y = a + bx

X = $\frac{y-a}{b}$

X = $\frac{0.0015-0.00063151}{0.018767}$

X = 0.04627ppm

Kadar Pb (ppm) = 0.04627 x 100 = 4,63 ppm

3) Pengulangan III

Y = a + bx

X $= \frac{y-a}{b}$

X = $\frac{0.0007-0.00063151}{0.018767}$

X = 0.00365ppm

Kadar Pb (ppm) = 0.00365 x 100 = 0,37 ppm

Rata-rata hasil kadar = $\frac{1,96+4,63+0,37}{3}$ = 2,50 ppm

h. Limbah Artifisial dengan penambahan serbuk kulit pisang ambon 2%

1) Pengulangan I

Y = a + bx

X $= \frac{y-a}{b}$

X = $\frac{0.0020-0.00063151}{0.018767}$

X = 0.07292ppm

Kadar Pb (ppm) = 0.07292 x 100 = 7,29 ppm

2) Pengulangan II

Y = a + bx

X $= \frac{y-a}{b}$

X = 0.07824ppm

Kadar Pb (ppm) = 0.07824 x 100 = 7,82 ppm

3) Pengulangan III

Y = a + bx

X $= \frac{y-a}{b}$

X = $\frac{0.0012-0.00063151}{0.018767}$

X = 0.03029 ppm

Kadar Pb (ppm) = 0.03029 x 100 = 3,03 ppm

Rata-rata hasil kadar = $\frac{7,29+7,82+3,03}{3}$ = 6,23 ppm

Lampiran 8. Hasil Uji Statistik

NPar Tests

One-Sample Kolmogorov-Smirnov Test

		Media	Konsentrasi	Kadar Tembaga Kulit Pisang Ambon
N		30	30	30
Normal Parameters[a]	Mean	1.50	2.00	103.4210
	Std. Deviation	.509	1.438	9.03346
Most Extreme Differences	Absolute	.337	.157	.081
	Positive	.337	.157	.081
	Negative	-.337	-.157	-.071
Kolmogorov-Smirnov Z		1.847	.857	.443
Asymp. Sig. (2-tailed)		.002	.454	.990

a. Test distribution is Normal.

NPar Tests

One-Sample Kolmogorov-Smirnov Test

		Media	Konsentrasi	Kadar Tembaga Kulit Pisang Kepok
N		30	30	30
Normal Parameters[a]	Mean	1.50	2.00	105.7057
	Std. Deviation	.509	1.438	10.61284
Most Extreme Differences	Absolute	.337	.157	.137
	Positive	.337	.157	.094
	Negative	-.337	-.157	-.137
Kolmogorov-Smirnov Z		1.847	.857	.750
Asymp. Sig. (2-tailed)		.002	.454	.628

a. Test distribution is Normal.

NPar Tests

One-Sample Kolmogorov-Smirnov Test

		Media	Konsentrasi	Kadar Timbal Kulit Pisang Ambon
N		30	30	30
Normal Parameters[a]	Mean	1.50	2.00	7.2980
	Std. Deviation	.509	1.438	4.94161
Most Extreme Differences	Absolute	.337	.157	.140
	Positive	.337	.157	.140
	Negative	-.337	-.157	-.080
Kolmogorov-Smirnov Z		1.847	.857	.764
Asymp. Sig. (2-tailed)		.002	.454	.603

a. Test distribution is Normal.

NPar Tests

One-Sample Kolmogorov-Smirnov Test

		Media	Konsentrasi	Kadar Timbal Kulit Pisang Kepok
N		30	30	30
Normal Parameters[a]	Mean	1.50	2.00	4.9647
	Std. Deviation	.509	1.438	3.68101
Most Extreme Differences	Absolute	.337	.157	.148
	Positive	.337	.157	.148
	Negative	-.337	-.157	-.090
Kolmogorov-Smirnov Z		1.847	.857	.813
Asymp. Sig. (2-tailed)		.002	.454	.523

a. Test distribution is Normal.

Kriteria Hasil Uji :

1. Bila nilai signifikansinya lebih besar dari 0,05 maka data tersebut terdistribusi normal
2. Bila nilai signifikansinya lebih kecil dari 0,05 maka data tersebut terdistribusi tidak normal

Descriptive Statistics

Dependent Variable:Kadar Tembaga Kulit Pisang Ambon

Media	Konsentrasi	Mean	Std. Deviation	N
Ekstrak Ambon	0%	1.1655E2	3.84999	3
	0,5%	1.0668E2	.43501	3
	1%	95.7200	.64838	3
	1,5%	92.3633	1.41005	3
	2%	90.0733	.70515	3
	Total	1.0028E2	10.40486	15
Serbuk Ambon	0%	1.1655E2	3.84999	3
	0,5%	98.9167	.51598	3
	1%	1.0315E2	.76559	3
	1,5%	1.0607E2	1.18934	3
	2%	1.0815E2	1.03982	3
	Total	1.0657E2	6.29193	15
Total	0%	1.1655E2	3.44353	6
	0,5%	1.0280E2	4.27171	6
	1%	99.4333	4.11694	6
	1,5%	99.2150	7.59576	6
	2%	99.1100	9.93101	6
	Total	1.0342E2	9.03346	30

Descriptive Statistics

Dependent Variable:Kadar Tembaga Kulit Pisang Kepok

Media	Konsentrasi	Mean	Std. Deviation	N
Ekstrak	0%	1.1655E2	3.84999	3
	0,5%	1.0572E2	.63317	3
	1%	1.0751E2	1.30311	3
	1,5%	1.0193E2	.63516	3
	2%	1.0319E2	.75395	3
	Total	1.0698E2	5.57782	15
Serbuk	0%	1.1655E2	3.84999	3
	0,5%	1.1495E2	.74895	3
	1%	97.7400	.80069	3
	1,5%	1.1202E2	1.87442	3
	2%	80.8900	.56347	3
	Total	1.0443E2	14.09648	15
Total	0%	1.1655E2	3.44353	6
	0,5%	1.1034E2	5.09520	6
	1%	1.0262E2	5.43797	6
	1,5%	1.0698E2	5.66293	6
	2%	92.0417	12.23053	6
	Total	1.0571E2	10.61284	30

Descriptive Statistics

Dependent Variable:Kadar Timbal Kulit Pisang Ambon

Media	Konsentrasi	Mean	Std. Deviation	N
Ekstrak	0%	9.2500	2.73501	3
	0,5%	3.4733	2.57205	3
	1%	3.3900	1.21503	3
	1,5%	13.5100	2.15270	3
	2%	6.0467	2.68284	3
	Total	7.1340	4.44008	15
Serbuk	0%	9.2500	2.73501	3
	0,5%	3.6967	2.46784	3
	1%	15.9967	3.54844	3
	1,5%	2.3200	2.15270	3
	2%	6.0467	2.62592	3
	Total	7.4620	5.55080	15
Total	0%	9.2500	2.44627	6
	0,5%	3.5850	2.25770	6
	1%	9.6933	7.30106	6
	1,5%	7.9150	6.42434	6
	2%	6.0467	2.37428	6
	Total	7.2980	4.94161	30

Descriptive Statistics

Dependent Variable:Kadar Timbal Kulit Pisang Kepok

Media	Konsentrasi	Mean	Std. Deviation	N
Ekstrak	0%	9.2500	2.73501	3
	0,5%	1.0767	3.25800	3
	1%	2.4967	1.41359	3
	1,5%	1.4333	1.06500	3
	2%	2.7067	.70117	3
	Total	3.3927	3.56362	15
Serbuk	0%	9.2500	2.73501	3
	0,5%	4.6633	4.61262	3
	1%	4.2800	2.03723	3
	1,5%	8.4433	.80339	3
	2%	6.0467	2.68284	3
	Total	6.5367	3.17376	15
Total	0%	9.2500	2.44627	6
	0,5%	2.8700	4.07622	6
	1%	3.3883	1.84757	6
	1,5%	4.9383	3.93114	6
	2%	4.3767	2.53424	6
	Total	4.9647	3.68101	30

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

Dependent Variable:Kadar Tembaga Kulit Pisang Ambon

F	df1	df2	Sig.
2.459	9	20	.045

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

a. Design: Intercept + Media + Konsentrasi + Media * Konsentrasi

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

Dependent Variable:Kadar Tembaga Kulit Pisang Kepok

F	df1	df2	Sig.
2.430	9	20	.047

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

a. Design: Intercept + Media + Konsentrasi + Media * Konsentrasi

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

Dependent Variable:Kadar Timbal Kulit Pisang Ambon

F	df1	df2	Sig.
.463	9	20	.883

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

a. Design: Intercept + Media + Konsentrasi + Media * Konsentrasi

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

Dependent Variable:Kadar Timbal Kulit Pisang Kepok

F	df1	df2	Sig.
2.330	9	20	.055

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

a. Design: Intercept + Media + Konsentrasi + Media * Konsentrasi

Kriteria Ujinya :

1. Varian dikatakan sama (homogen) bila nilai signifikasinya lebih besar dari 0,05
2. Varian dikatakan tidak sama bila nilai signifikasinya lebih kecil dari 0,05

Tests of Between-Subjects Effects

Dependent Variable:Kadar Tembaga Kulit Pisang Ambon

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	2294.322[a]	9	254.925	70.640	.000
Intercept	320877.097	1	320877.097	8.892E4	.000
Media	296.605	1	296.605	82.189	.000
Konsentrasi	1349.622	4	337.406	93.495	.000
Media * Konsentrasi	648.095	4	162.024	44.897	.000
Error	72.176	20	3.609		
Total	323243.595	30			
Corrected Total	2366.498	29			

a. R Squared = .970 (Adjusted R Squared = .956)

Tests of Between-Subjects Effects

Dependent Variable:Kadar Tembaga Kulit Pisang Kepok

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	3190.843[a]	9	354.538	93.921	.000
Intercept	335210.639	1	335210.639	8.880E4	.000
Media	48.820	1	48.820	12.933	.002
Konsentrasi	2021.114	4	505.279	133.853	.000
Media * Konsentrasi	1120.910	4	280.227	74.235	.000
Error	75.497	20	3.775		
Total	338476.980	30			
Corrected Total	3266.341	29			

a. R Squared = .977 (Adjusted R Squared = .966)

Tests of Between-Subjects Effects

Dependent Variable:Kadar Timbal Kulit Pisang Ambon

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	577.976[a]	9	64.220	9.865	.000
Intercept	1597.824	1	1597.824	245.459	.000
Media	.807	1	.807	.124	.728
Konsentrasi	151.685	4	37.921	5.825	.003
Media * Konsentrasi	425.484	4	106.371	16.341	.000
Error	130.191	20	6.510		
Total	2305.991	30			
Corrected Total	708.166	29			

a. R Squared = .816 (Adjusted R Squared = .733)

Tests of Between-Subjects Effects

Dependent Variable:Kadar Timbal Kulit Pisang Kepok

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	268.008[a]	9	29.779	4.767	.002
Intercept	739.437	1	739.437	118.369	.000
Media	74.136	1	74.136	11.868	.003
Konsentrasi	153.498	4	38.374	6.143	.002
Media * Konsentrasi	40.375	4	10.094	1.616	.209
Error	124.938	20	6.247		
Total	1132.383	30			
Corrected Total	392.946	29			

a. R Squared = .682 (Adjusted R Squared = .539)

Kriteria Ujinya :

1. Bila nilai signifikasinya lebih besar dari 0,05 maka dapat dikatakan varian antar grup tidak berpengaruh secara signifikan.
2. Bila nilai signifikasinya lebih kecil dari 0,05 maka dapat dikatakan varian antar grup berpengaruh secara signifikan.

Konsentrasi

Kadar Tembaga Kulit Pisang Ambon

Tukey HSD

Konsentrasi	N	Subset 1	Subset 2	Subset 3
2%	6	99.1100		
1,5%	6	99.2150		
1%	6	99.4333		
0,5%	6		1.0280E2	
0%	6			1.1655E2
Sig.		.998	1.000	1.000

Means for groups in homogeneous subsets are displayed.

Based on observed means.

The error term is Mean Square(Error) = 3.609.

Kadar Tembaga Kulit Pisang Kepok

Tukey HSD

Konsentrasi	N	Subset 1	2	3	4	5
2%	6	92.0417				
1%	6		1.0262E2			
1,5%	6			1.0698E2		
0,5%	6				1.1034E2	
0%	6					1.1655E2
Sig.		1.000	1.000	1.000	1.000	1.000

Means for groups in homogeneous subsets are displayed.
Based on observed means.
The error term is Mean Square(Error) = 3.775.

Kadar Timbal Kulit Pisang Ambon

Tukey HSD

Konsentrasi	N	Subset 1	2
0,5%	6	3.5850	
2%	6	6.0467	6.0467
1,5%	6	7.9150	7.9150
0%	6		9.2500
1%	6		9.6933
Sig.		.056	.136

Means for groups in homogeneous subsets are displayed.

Based on observed means.

The error term is Mean Square(Error) = 6.510.

Kadar Timbal Kulit Pisang Kepok

Tukey HSD

Konsentrasi	N	Subset 1	Subset 2
0,5%	6	2.8700	
1%	6	3.3883	
2%	6	4.3767	
1,5%	6	4.9383	4.9383
0%	6		9.2500
Sig.		.615	.050

Means for groups in homogeneous subsets are displayed.

Based on observed means.

The error term is Mean Square(Error) = 6.247.

Lampiran 9. Surat Keterangan Penelitian

UNIVERSITAS NEGERI YOGYAKARTA
FAKULTAS MATEMATIKA DAN ILMU PENGETAHUAN ALAM
JURUSAN PENDIDIKAN KIMIA
LABORATORIUM KIMIA TERPADU
Alamat: Karangmalang Yogyakarta, Tlp. 586168

SURAT KETERANGAN TELAH SELESAI PENELITIAN

Kami yang bertanda tangan di bawah ini :

Nama	: Ali Murtono, ST
NIP	: 19761224 200003 1 001
Pangkat/Jabatan	: Penata/ IIId

Menerangkan bahwa saudara dibawah ini :

1. Nama : Maria Fransiska Utami Bungis
   NIM : 08150387N
   Fakultas : Ilmu Kesehatan
   Prodi : D-IV Analisis Kesehatan
   Jenis Analisis : Logam Krom dan Kadmium

2. Nama : Sulindra Aghya N
   NIM : 08150384N
   Fakultas : Ilmu Kesehatan
   Prodi : D-IV Analisis Kesehatan
   Jenis Analisis : Logam Tembaga dan Timbal

Mahasiswa tersebut telah benar-benar menyelesaikan penelitian di Laboratorium Kimia terpadu dengan menggunakan alat AAS Shimadzu AA 7000 dan sudah menyelesaikan semua tanggungan baik administrasi maupun peralatan.
Demikian surat ini kami buat semoga dapat dipergunakan sebagai mana mestinya.

Yogyakarta, 23 Juli 2019
Hormat Kami

Ali Murtono, ST
NIP. 19761224200003 1001

Lampiran 10. Proses Pemeriksaan SSA

Penimbangan Serbuk kulit pisang pisang

Penimbangan Ekstrak kulit

Penimbangan Kristal $CuCl_2$

Penimbangan Kristal $Pb(NO_3)_2$

Penyaringan Sampel

Pembacaan pada alat SSA