

Lampiran 1. Determinasi Tanaman



KEMENTERIAN RISET, TEKNOLOGI DAN PENDIDIKAN TINGGI
UNIVERSITAS DIPONEGORO
FAKULTAS SAINS DAN MATEMATIKA
LABORATORIUM EKOLOGI DAN BIOSISTEMATIKA DEPARTEMEN BIOLOGI
 Jl. Prof. H. Soedarto SH Tembalang Semarang, 024 7474754. 024 76480923

SURAT KETERANGAN

Yang bertanda tangan dibawah ini, menyatakan bahwa mahasiswa sbb :

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 Judul Skripsi : "Pengaruh Suhu dan Lama Waktu Penyimpanan Terhadap Kandungan Vitamin C pada Umbi Bit (*Beta vulgaris* L.) dan Uji Aktifitas Antioksidannya Menggunakan Metode DPPH"
 Pembimbing :-

Telah melakukan determinasi / identifikasi sampel tumbuhan (satu jenis) di Laboratorium Ekologi dan Biosistemik Departemen Biologi Fakultas Sains dan Matematika Universitas Diponegoro. Hasil determinasi / identifikasi terlampir.

Demikian Surat Keterangan ini dibuat untuk dapat digunakan seperlunya.

Semarang, Maret 2017

Laboratorium Ekologi Dan Biosistemik

Kepala,



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Lanjutan Lampiran 1...



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merupakan tanaman liar yang tumbuh subur di Amerika utara dan Britania. Bit jarang digunakan dalam campuran masakan, tetapi masyarakat Eropa, Afrika Utara dan Asia banyak menggunakan bit dalam masakan mereka.

Bit yang berwarna kemerahan ini dihubungkan dengan warna darah manusia, karena bit dapat digunakan dalam mengatasi anemia dan berbagai penyakit yang berhubungan dengan pembentukan sel darah pada manusia. Bit kaya akan zat besi, ketika meminum jus ubi bit maka dapat mengaktifkan sel-sel darah merah dengan menyuplai oksigen ke seluruh tubuh dan membantu sistem pernafasan agar kembali normal.

Ubi bit merupakan umbi-umbian yang rendah kalori dan mengandung berbagai jenis vitamin dan mineral. Hasil penelitian yang dilakukan oleh Barts & London School of Medicine dan Peninsula Medical School, bahwa dengan meminum jus ubi bit dapat menurunkan tekanan darah yang tinggi. Menurut Prof. Amrita Ahluwalia dari Barts & London School of Medicine, ubi bit mengandung nitrat yang dapat memelihara kesehatan jantung. Hasil penelitian menunjukkan bahwa tekanan darah dapat menurun dalam waktu 1 jam setelah meminum jus bit. Tekanan darah terus menurun setelah 3-4 jam meminum jus bit dan hasilnya dapat dilihat dalam 24 jam dan seterusnya.

Kandungan nitrat yang terdapat dalam ubi bit menyebabkan ubi ini tidak dapat dikonsumsi oleh bayi berusia di bawah enam bulan. Baru-baru ini ubi bit dikatakan dapat berfungsi sebagai antikarsinogen dan antimutagenik yang dapat mencegah dan mengobati kanker.

Umbi yang berwarna merah keunguan dapat dimakan secara langsung sebagai bagian dari salad yang dicampur dengan sayuran lain, atau juga direbus dan dipanggang. Dalam skala industri umbinya direbus dan di sterilisasi seperti dengan cuka. Di Eropa Timur disajikan sebagai sup dan merupakan sajian yang populer. Ubi Bit Merah bisa juga digunakan untuk membuat Anggur/Wine.

Buah Bit gula (*Beta vulgaris*) adalah sebuah tanaman berbunga dalam familia Chenopodiaceae, yang berasal dari daerah pesisir barat dan selatan Benua Eropa, dari Swedia selatan dan Kepulauan Britania ke selatan Laut Mediterania.

Tanaman ini penting karena varitasnya yang dikembangkan, fodder beet, bit dan bit gula yang menghasilkan gula.

PUSTAKA :

Lanjutan Lampiran 1...



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Backer and van den Brink (1968) *Flora of Java*, Vol. I – III, Wolters – Noordhoff NV – Groningen – The Netherlands.

Van Steenis, CGGJ. (1985) *Flora untuk sekolah di Indonesia*, terjemahan Moesa Suryowinoto, dkk) PT. Pradnya Paramita Jakarta Pusat.



Lampiran 2. Data Perhitungan dan Penimbangan vitamin C

a. Data Penimbangan vitamin C

Berat kertas kosong = 0,3451 g

| Keterangan | Hasil Penimbangan |
|--------------------------|-------------------|
| Berat kertas | 345,1 mg |
| Berat kertas + vitamin C | 397,2 mg |
| Berat kertas + sisa | 347,1 mg |
| Berat vitamin C | 50,1 mg |

b. Pembuatan Larutan Stok Vitamin C 100 ppm

$$\text{Vitamin C 100 ppm} = \frac{50 \text{ mg}}{500 \text{ ml}} = 100 \text{ ppm}$$

Sebanyak 50 mg vitamin C dimasukkan dalam labu takar 500 ml kemudian ad dengan aquadest sampai tanda batas.

c. Pembuatan Kurva baku vitamin C

1. Pembuatan larutan konsentrasi 10 ppm sebanyak 50 ml

$$C_1 \times V_1 = C_2 \times V_2$$

$$100 \text{ ppm} \times V_1 = 10 \text{ ppm} \times 50 \text{ ml}$$

$$V_1 = 5 \text{ ml}$$

Sebanyak 5 ml larutan stok vitamin C 100 ppm diencerkan dalam aquadest ad 50 ml dalam labu takar.

Lanjutan Lampiran 2...

2. Pembuatan larutan konsentrasi 2 ppm sebanyak 10 ml

$$C_1 \times V_1 = C_2 \times V_2$$

$$10 \text{ ppm} \times V_1 = 2 \text{ ppm} \times 10 \text{ ml}$$

$$V_1 = 2 \text{ ml}$$

Sebanyak 2 ml larutan stok vitamin C 10 ppm diencerkan dalam aquadest ad 10 ml dalam labu takar.

3. Pembuatan larutan konsentrasi 4 ppm sebanyak 10 ml

$$C_1 \times V_1 = C_2 \times V_2$$

$$10 \text{ ppm} \times V_1 = 4 \text{ ppm} \times 10 \text{ ml}$$

$$V_1 = 4 \text{ ml}$$

Sebanyak 4 ml larutan stok vitamin C 10 ppm diencerkan dalam aquadest ad 10 ml dalam labu takar.

4. Pembuatan larutan konsentrasi 6 ppm sebanyak 10 ml

$$C_1 \times V_1 = C_2 \times V_2$$

$$10 \text{ ppm} \times V_1 = 6 \text{ ppm} \times 10 \text{ ml}$$

$$V_1 = 6 \text{ ml}$$

Sebanyak 6 ml larutan stok vitamin C 10 ppm diencerkan dalam aquadest ad 10 ml dalam labu takar.

5. Pembuatan larutan konsentrasi 8 ppm sebanyak 10 ml

$$C_1 \times V_1 = C_2 \times V_2$$

$$10 \text{ ppm} \times V_1 = 8 \text{ ppm} \times 10 \text{ ml}$$

$$V_1 = 8 \text{ ml}$$

Lanjutan Lampiran 2...

Sebanyak 8 ml larutan stok vitamin C 10 ppm diencerkan dalam aquadest ad 10 ml dalam labu takar.

d. Data Penimbangan Umbi Bit

| Keterangan | Hasil | Hasil | Hasil |
|---------------------------------|------------------|-------------------|--------------------|
| | Penimbangan I | Penimbangan II | Penimbangan III |
| Berat kaca arloji | 35,478 g | 34,013 g | 33.115 g |
| Berat kaca arloji + umbi bit | 38,078 g | 36,617 g | 35,719 g |
| Berat kaca arloji + sisa | 35,576 g | 34,113 g | 33,218 g |
| Berat umbi bit | 2,502 g | 2,504 g | 2,501 g |

Lampiran 3. Data Perhitungan Kadar vitamin C

Persamaan kurva baku $Y = 0,0439 x + 0,0788$

| Perlakuan | | Absorbansi (y) | Kadar Vitamin C(mg) | Kadar vitamin C (%b/b) | kadar vitamin C (%b/b) rata-rata |
|-----------|------------|----------------|---------------------|------------------------|----------------------------------|
| 0 Hari | Suhu kamar | 0,374 | 67,244 | 2,689 | 2,71 |
| | | 0,375 | 67,472 | 2,699 | |
| | | 0,378 | 68,155 | 2,726 | |
| 3 Hari | 0°C | 0,363 | 64,738 | 2,589 | 2,59 |
| | | 0,365 | 65,194 | 2,608 | |
| | | 0,361 | 64,282 | 2,571 | |
| | 10°C | 0,349 | 61,459 | 2,462 | 2,45 |
| | | 0,348 | 61,321 | 2,453 | |
| | | 0,347 | 61,093 | 2,444 | |
| | Suhu kamar | 0,334 | 58,132 | 2,325 | 2,32 |
| | | 0,333 | 57,904 | 2,316 | |
| | | 0,332 | 57,676 | 2,307 | |
| 7 Hari | 0°C | 0,316 | 54,032 | 2,161 | 2,16 |
| | | 0,317 | 54,259 | 2,170 | |
| | | 0,315 | 53,804 | 2,152 | |
| | 10°C | 0,303 | 51,070 | 2,043 | 2,03 |
| | | 0,300 | 50,387 | 2,015 | |
| | | 0,301 | 50,615 | 2,025 | |
| | Suhu kamar | 0,287 | 47,426 | 1,897 | 1,87 |
| | | 0,285 | 46,970 | 1,879 | |
| | | 0,281 | 46,059 | 1,842 | |

Perhitungan

Kadar vitamin C 0 hari suhu kamar (Faktor Pengenceran = 10)

$(Y = 0,0439 x + 0,0788) \times FP$

$(0,374 = 0,0439X + 0,0788) \times 10$

$X = \frac{0,374 - 0,0788}{0,0439} \times 10$

0,0439

$X = 67,244 \text{ mg} / 2,5 \text{ g}$

$X = \frac{67,244 \text{ mg}}{2,5 \text{ g}} \times 100 \text{ g}$

2,5 g

$X = 2689 \text{ mg} = 2,689 \text{ g} / 100 \text{ g}$

Lampiran 4. Data Perhitungan dan penimbangan DPPH

a. Pembuatan larutan DPPH

Molaritas DPPH yang dibutuhkan = 0,5 mM

BM DPPH = 394,32 g/mol

Volume larutan = 100 ml

$$\begin{aligned} \text{Penimbangan DPPH} &= \text{BM DPPH} \times \text{Vol larutan} \times \text{Molaritas DPPH} \\ &= (394,32 \text{ g/mol} \times 100 \text{ ml} \times 0,5 \text{ mM}) / 1000 \\ &= 19,716 \text{ mg} = 19,7 \text{ mg} \end{aligned}$$

Cara pembuatan larutan DPPH :

Ditimbang DPPH 19,7 mg dilarutkan dengan metanol p.a 100 ml dan divortek homogen. Didapat konsentrasi 0,5 mM sebanyak 100 ml, kemudian diencerkan 10 x yaitu diambil 10 ml larutan DPPH 0,5 mM dan ditambahkan metanol p.a 90 ml sehingga diperoleh larutan DPPH 100 ml konsentrasi 0,05 mM.

b. Data Penimbangan DPPH

| Keterangan | Hasil Penimbangan |
|----------------------------|-------------------|
| Berat botol timbang | 10 710,8 mg |
| Berat botol timbang + DPPH | 10730,8 mg |
| Berat botol timbang + sisa | 10711,1mg |
| Berat DPPH | 19,7 mg |

Lampiran 5. Data Perhitungan aktivitas antioksidan

Aktivitas antioksidan dihitung menggunakan rumus :

$$\% \text{ Inhibisi} = \frac{\text{Abs. kontrol} - \text{Abs.Sampel}}{\text{Abs.kontrol}} \times 100 \%$$

Keterangan :

Abs.kontrol : Serapan radikal DPPH 0,05 mM kontrol pada panjang gelombang maksimum.

Abs.Sampel : Serapan radikal DPPH 0,05 mM sampel pada panjang gelombang maksimum.

| Perlakuan | | Absorbansi | Aktivitas Antioksidan | Rata-rata Aktivitas Antioksidan (%b/b) |
|-----------|------------|------------|-----------------------|--|
| 0 Hari | Suhu kamar | 0,169 | 53,699 | 53,97 |
| | | 0,168 | 53,973 | |
| | | 0,167 | 54,247 | |
| 3 Hari | 0°C | 0,190 | 47,945 | 47,67 |
| | | 0,191 | 47,671 | |
| | | 0,192 | 47,397 | |
| | 10°C | 0,223 | 38,904 | 39,18 |
| | | 0,221 | 39,452 | |
| | | 0,222 | 39,178 | |
| | Suhu kamar | 0,234 | 35,890 | 35,98 |
| | | 0,232 | 36,438 | |
| | | 0,235 | 35,616 | |
| 7 Hari | 0°C | 0,246 | 32,603 | 32,88 |
| | | 0,245 | 32,877 | |
| | | 0,244 | 33,151 | |
| | 10°C | 0,256 | 29,863 | 30,14 |
| | | 0,254 | 30,411 | |
| | | 0,255 | 30,137 | |
| | Suhu kamar | 0,306 | 16,164 | 16,44 |
| | | 0,305 | 16,438 | |
| | | 0,304 | 16,712 | |

Lampiran 6. Perhitungan Nilai IC 50

1.a. Pembuatan Larutan Stok 10.000 ppm

$$\begin{aligned} \text{Umbi bit 10.000 ppm} &= \underline{1 \text{ gram}} \\ &100 \text{ ml} \\ &= \underline{1000 \text{ mg}} \\ &0,1 \text{ l} \\ &= 10.000 \text{ ppm} \end{aligned}$$

Sebanyak 1000 mg umbi bit dimasukkan dalam labu takar 100 ml kemudian ad dengan aquadest sampai tanda batas.

b. Pembuatan Seri Konsentrasi Umbi Bit 50, 100, 150, 200, 250, 300 ppm

1. Pembuatan larutan konsentrasi 50 ppm sebanyak 100 ml

$$\begin{aligned} C_1 \times V_1 &= C_2 \times V_2 \\ 10.000 \text{ ppm} \times V_1 &= 50 \text{ ppm} \times 100 \text{ ml} \\ V_1 &= 0,5 \text{ ml} \end{aligned}$$

Sebanyak 0,5 ml larutan stok umbi bit 10.000 ppm diencerkan dalam metanol p.a ad 100 ml dalam labu takar.

2. Pembuatan larutan konsentrasi 100 ppm sebanyak 100 ml

$$\begin{aligned} C_1 \times V_1 &= C_2 \times V_2 \\ 10.000 \text{ ppm} \times V_1 &= 100 \text{ ppm} \times 100 \text{ ml} \\ V_1 &= 1 \text{ ml} \end{aligned}$$

Sebanyak 1 ml larutan stok umbi bit 10.000 ppm diencerkan dalam metanol p.a ad 100 ml dalam labu takar.

Lanjutan Lampiran 6...

3 .Pembuatan larutan konsentrasi 150 ppm sebanyak 100 ml

$$C_1 \times V_1 = C_2 \times V_2$$

$$10.000 \text{ ppm} \times V_1 = 150 \text{ ppm} \times 100 \text{ ml}$$

$$V_1 = 1,5 \text{ ml}$$

Sebanyak 1,5 ml larutan stok umbi bit 10.000 ppm diencerkan dalam metanol p.a ad 100 ml dalam labu takar.

4 .Pembuatan larutan konsentrasi 200 ppm sebanyak 100 ml

$$C_1 \times V_1 = C_2 \times V_2$$

$$10.000 \text{ ppm} \times V_1 = 200 \text{ ppm} \times 100 \text{ ml}$$

$$V_1 = 2 \text{ ml}$$

Sebanyak 2 ml larutan stok umbi bit 10.000 ppm diencerkan dalam metanol p.a ad 100 ml dalam labu takar.

5 .Pembuatan larutan konsentrasi 250 ppm sebanyak 100 ml

$$C_1 \times V_1 = C_2 \times V_2$$

$$10.000 \text{ ppm} \times V_1 = 250 \text{ ppm} \times 100 \text{ ml}$$

$$V_1 = 2,5 \text{ ml}$$

Sebanyak 2,5 ml larutan stok umbi bit 10.000 ppm diencerkan dalam metanol p.a ad 100 ml dalam labu takar.

6 .Pembuatan larutan konsentrasi 300 ppm sebanyak 100 ml

$$C_1 \times V_1 = C_2 \times V_2$$

$$10.000 \text{ ppm} \times V_1 = 300 \text{ ppm} \times 100 \text{ ml}$$

Lanjutan Lampiran 6...

$$V1 = 3 \text{ ml}$$

Sebanyak 3 ml larutan stok umbi bit 10.000 ppm diencerkan dalam metanol p.a ad 100 ml dalam labu takar.

2. Perhitungan Nilai IC 50

Nilai IC 50 diperoleh dari persamaan regresi linier $Y = bx + a$ antara seri konsentrasi larutan uji dengan % inhibisi.

| Sampel | Seri Konsentrasi (ppm) | Aktivitas Antioksidan (% inhibisi) | Nilai IC 50 (ppm) |
|----------|------------------------|------------------------------------|-------------------|
| Umbi Bit | 50 | 26,99 | 92,64 |
| | 100 | 53,97 | |
| | 150 | 80,96 | |
| | 200 | 107,95 | |
| | 250 | 134,94 | |
| | 300 | 161,93 | |

Hasil Perhitungan regresi linier $Y = bx + a$ seri konsentrasi umbi bit (x) dengan % inhibisi (Y)

diperoleh nilai $a = -0,0026$ $b = 0,5397$ $r = 0,999$

Lampiran 7. Analisis Data Secara Statistik

Reliability Statistics

| Cronbach's Alpha | N of Items |
|------------------|------------|
| .047 | 2 |

ANOVA with Tukey's Test for Nonadditivity

| | Sum of Squares | df | Mean Square | F | Sig | |
|----------------|------------------------|-----------------------|-------------|-----------|---------|------|
| Between People | 1373.735 | 20 | 68.687 | | | |
| Within People | Between Items | 13189.492 | 1 | 13189.492 | 201.582 | .000 |
| | Residual Nonadditivity | 1308.551 ^a | 1 | 1308.551 | 5.376E5 | .000 |
| | Balance | .046 | 19 | .002 | | |
| | Total | 1308.597 | 20 | 65.430 | | |
| Total | 14498.090 | 21 | 690.385 | | | |
| Total | 15871.824 | 41 | 387.118 | | | |

Grand Mean = 18,88686

- a. Tukey's estimate of power to which observations must be raised to achieve additivity = -,040.

One-Sample Kolmogorov-Smirnov Test

| | kadar vitamin c | % inhibisi |
|---------------------------------|-----------------|--------------------|
| N | 21 | 21 |
| Normal Parameters ^a | Mean | 1.16581 36.60790 |
| | Std. Deviation | .144775 1.157997E1 |
| Most Extreme Differences | Absolute | .117 .137 |
| | Positive | .109 .117 |
| | Negative | -.117 -.137 |
| Kolmogorov-Smirnov Z | .537 | .629 |
| Asymp. Sig. (2-tailed) | .936 | .824 |
| a. Test distribution is Normal. | | |

Sig > 0,05 data normal

Lanjutan Lampiran 7...

SUHU DAN LAMA PENYIMPANAN TERHADAP KADAR VITAMIN C

Univariate Analysis of Variance

Between-Subjects Factors

| | | Value Label | N |
|------------------|---|-------------|---|
| suhu | 1 | suhu kamar | 9 |
| | 2 | suhu 0 | 6 |
| | 3 | suhu 10 | 6 |
| lama penyimpanan | 1 | 0 hari | 3 |
| | 2 | 3 hari | 9 |
| | 3 | 7 hari | 9 |

Descriptive Statistics

Dependent Variable:kadar vitamin c

| | | Mean | Std. Deviation | N |
|---------|------------------|---------|----------------|----|
| suhu | lama penyimpanan | | | |
| | suhu kamar | 2.70467 | .019140 | 3 |
| | 3 hari | 2.31600 | .009000 | 3 |
| | 7 hari | 1.87267 | .028042 | 3 |
| | Total | 2.29778 | .360953 | 9 |
| suhu 0 | 3 hari | 2.58933 | .018502 | 3 |
| | 7 hari | 2.16100 | .009000 | 3 |
| | Total | 2.37517 | .234968 | 6 |
| suhu 10 | 3 hari | 2.45300 | .009000 | 3 |
| | 7 hari | 2.02767 | .014189 | 3 |
| | Total | 2.24033 | .233207 | 6 |
| Total | 0 hari | 2.70467 | .019140 | 3 |
| | 3 hari | 2.45278 | .118888 | 9 |
| | 7 hari | 2.02044 | .126034 | 9 |
| | Total | 2.30348 | .286821 | 21 |

Lanjutan Lampiran 7...

Levene's Test of Equality of Error Variances^a

Dependent Variable:kadar vitamin c

| F | df1 | df2 | Sig. |
|-------|-----|-----|------|
| 1.352 | 6 | 14 | .299 |

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

a. Design: Intercept + SUHU + LP + SUHU * LP



Tests of Between-Subjects Effects

Dependent Variable:kadar vitamin c

| Source | Type III Sum of Squares | df | Mean Square | F | Sig. |
|-----------------|-------------------------|----|-------------|---------|------|
| Corrected Model | 1.641 ^a | 6 | .274 | 987.465 | .000 |
| Intercept | 105.163 | 1 | 105.163 | 3.796E5 | .000 |
| SUHU | .237 | 2 | .118 | 427.231 | .000 |
| LP | 1.586 | 2 | .793 | 2.863E3 | .000 |
| SUHU * LP | .000 | 2 | .000 | .504 | .615 |
| Error | .004 | 14 | .000 | | |
| Total | 113.071 | 21 | | | |
| Corrected Total | 1.645 | 20 | | | |

a. R Squared = ,998 (Adjusted R Squared = ,997)

Lanjutan Lampiran 7...

Estimated Marginal Means

1. Grand Mean

Dependent Variable:kadar vitamin c

| Mean | Std. Error | 95% Confidence Interval | |
|--------------------|------------|-------------------------|-------------|
| | | Lower Bound | Upper Bound |
| 2.303 ^a | .004 | 2.296 | 2.311 |

a. Based on modified population marginal mean.

2. suhu

Dependent Variable:kadar vitamin c

| suhu | Mean | Std. Error | 95% Confidence Interval | |
|------------|--------------------|------------|-------------------------|-------------|
| | | | Lower Bound | Upper Bound |
| suhu kamar | 2.298 | .006 | 2.286 | 2.310 |
| suhu 0 | 2.375 ^a | .007 | 2.361 | 2.390 |
| suhu 10 | 2.240 ^a | .007 | 2.226 | 2.255 |

a. Based on modified population marginal mean.

3. lama penyimpanan

Dependent Variable:kadar vitamin c

| lama penyimpanan | Mean | Std. Error | 95% Confidence Interval | |
|------------------|--------------------|------------|-------------------------|-------------|
| | | | Lower Bound | Upper Bound |
| 0 hari | 2.705 ^a | .010 | 2.684 | 2.725 |
| 3 hari | 2.453 | .006 | 2.441 | 2.465 |
| 7 hari | 2.020 | .006 | 2.009 | 2.032 |

a. Based on modified population marginal mean.

Lanjutan Lampiran 7...

Post Hoc Tests

suhu

Multiple Comparisons

kadar vitamin c

Tukey HSD

| (I) suhu | (J) suhu | Mean Difference (I-J) | Std. Error | Sig. | 95% Confidence Interval | |
|------------|------------|--------------------------|------------|------|-------------------------|-------------|
| | | | | | Lower Bound | Upper Bound |
| suhu kamar | suhu 0 | -.07739* | .008773 | .000 | -.10035 | -.05443 |
| | suhu 10 | .05744* | .008773 | .000 | .03448 | .08040 |
| suhu 0 | suhu kamar | .07739* | .008773 | .000 | .05443 | .10035 |
| | suhu 10 | .13483* | .009610 | .000 | .10968 | .15999 |
| suhu 10 | suhu kamar | -.05744* | .008773 | .000 | -.08040 | -.03448 |
| | suhu 0 | -.13483* | .009610 | .000 | -.15999 | -.10968 |

Based on observed means.

The error term is Mean Square(Error) = ,000.

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

Homogeneous Subsets

kadar vitamin c

Tukey HSD

| suhu | N | Subset | | |
|------------|---|---------|---------|---------|
| | | 1 | 2 | 3 |
| suhu 10 | 6 | 2.24033 | | |
| suhu kamar | 9 | | 2.29778 | |
| suhu 0 | 6 | | | 2.37517 |
| Sig. | | 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) = ,000.

Lanjutan Lampiran 7...

Lama penyimpanan

Multiple Comparisons

kadar vitamin c

Tukey HSD

| (I) lama penyimpanan | (J) lama penyimpanan | Mean Difference (I-J) | Std. Error | Sig. | 95% Confidence Interval | |
|-------------------------|-------------------------|--------------------------|------------|------|-------------------------|-------------|
| | | | | | Lower Bound | Upper Bound |
| 0 hari | 3 hari | .25189* | .011096 | .000 | .22285 | .28093 |
| | 7 hari | .68422* | .011096 | .000 | .65518 | .71326 |
| 3 hari | 0 hari | -.25189* | .011096 | .000 | -.28093 | -.22285 |
| | 7 hari | .43233* | .007846 | .000 | .41180 | .45287 |
| 7 hari | 0 hari | -.68422* | .011096 | .000 | -.71326 | -.65518 |
| | 3 hari | -.43233* | .007846 | .000 | -.45287 | -.41180 |

Based on observed means.

The error term is Mean Square(Error) = ,000.

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

Homogeneous Subsets

kadar vitamin c

Tukey HSD

| lama penyimpanan | N | Subset | | |
|---------------------|---|---------|---------|---------|
| | | 1 | 2 | 3 |
| 7 hari | 9 | 2.02044 | | |
| 3 hari | 9 | | 2.45278 | |
| 0 hari | 3 | | | 2.70467 |
| Sig. | | 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) = ,000.

Lanjutan Lampiran 7...

**SUHU DAN LAMA PENYIMPANAN TERHADAP % INHIBISI
(AKTIVITAS ANTIOKSIDAN)
Univariate Analysis of Variance**

Between-Subjects Factors

| | | Value Label | N |
|------------------|---|-------------|---|
| suhu | 1 | suhu kamar | 9 |
| | 2 | suhu 0 | 6 |
| | 3 | suhu 10 | 6 |
| lama penyimpanan | 1 | 0 hari | 3 |
| | 2 | 3 hari | 9 |
| | 3 | 7 hari | 9 |

Descriptive Statistics

Dependent Variable:% inhibisi

| suhu | lama penyimpanan | Mean | Std. Deviation | N |
|------------|------------------|-----------|----------------|----|
| suhu kamar | 0 hari | 5.39730E1 | .274000 | 3 |
| | 3 hari | 3.59813E1 | .418542 | 3 |
| | 7 hari | 1.64380E1 | .274000 | 3 |
| | Total | 3.54641E1 | 16.260261 | 9 |
| suhu 0 | 3 hari | 4.76710E1 | .274000 | 3 |
| | 7 hari | 3.28770E1 | .274000 | 3 |
| | Total | 4.02740E1 | 8.106713 | 6 |
| suhu 10 | 3 hari | 3.91780E1 | .274000 | 3 |
| | 7 hari | 3.01370E1 | .274000 | 3 |
| | Total | 3.46575E1 | 4.958020 | 6 |
| Total | 0 hari | 5.39730E1 | .274000 | 3 |
| | 3 hari | 4.09434E1 | 5.239856 | 9 |
| | 7 hari | 2.64840E1 | 7.631033 | 9 |
| | Total | 3.66079E1 | 11.579968 | 21 |

Lanjutan Lampiran 7...

Levene's Test of Equality of Error Variances^a

Dependent Variable: % inhibisi

| F | df1 | df2 | Sig. |
|------|-----|-----|------|
| .239 | 6 | 14 | .956 |

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

a. Design: Intercept + SUHU + LP + SUHU * LP



Tests of Between-Subjects Effects

Dependent Variable: % inhibisi

| Source | Type III Sum of Squares | df | Mean Square | F | Sig. |
|-----------------|-------------------------|----|-------------|---------|------|
| Corrected Model | 2680.662 ^a | 6 | 446.777 | 4.999E3 | .000 |
| Intercept | 29362.460 | 1 | 29362.460 | 3.285E5 | .000 |
| SUHU | 601.433 | 2 | 300.716 | 3.365E3 | .000 |
| LP | 2482.445 | 2 | 1241.223 | 1.389E4 | .000 |
| SUHU * LP | 82.976 | 2 | 41.488 | 464.196 | .000 |
| Error | 1.251 | 14 | .089 | | |
| Total | 30824.826 | 21 | | | |
| Corrected Total | 2681.913 | 20 | | | |

a. R Squared = 1,000 (Adjusted R Squared = ,999)

Lanjutan Lampiran 7...

Estimated Marginal Means

1. Grand Mean

Dependent Variable:% inhibisi

| Mean | Std. Error | 95% Confidence Interval | |
|---------------------|------------|-------------------------|-------------|
| | | Lower Bound | Upper Bound |
| 36.608 ^a | .065 | 36.468 | 36.748 |

a. Based on modified population marginal mean.

2. suhu

Dependent Variable:% inhibisi

| suhu | Mean | Std. Error | 95% Confidence Interval | |
|------------|---------------------|------------|-------------------------|-------------|
| | | | Lower Bound | Upper Bound |
| suhu kamar | 35.464 | .100 | 35.250 | 35.678 |
| suhu 0 | 40.274 ^a | .122 | 40.012 | 40.536 |
| suhu 10 | 34.657 ^a | .122 | 34.396 | 34.919 |

a. Based on modified population marginal mean.

3. lama penyimpanan

Dependent Variable:% inhibisi

| lama penyimpanan | Mean | Std. Error | 95% Confidence Interval | |
|------------------|---------------------|------------|-------------------------|-------------|
| | | | Lower Bound | Upper Bound |
| 0 hari | 53.973 ^a | .173 | 53.603 | 54.343 |
| 3 hari | 40.943 | .100 | 40.730 | 41.157 |
| 7 hari | 26.484 | .100 | 26.270 | 26.698 |

a. Based on modified population marginal mean.

Lanjutan Lampiran 7...

Post Hoc Tests

suhu

Multiple Comparisons

% inhibisi
Tukey HSD

| (I) suhu | (J) suhu | Mean Difference (I-J) | Std. Error | Sig. | 95% Confidence Interval | |
|------------|------------|--------------------------|------------|------|-------------------------|-------------|
| | | | | | Lower Bound | Upper Bound |
| suhu kamar | suhu 0 | -4.80989* | .157565 | .000 | -5.22228 | -4.39750 |
| | suhu 10 | .80661* | .157565 | .000 | .39422 | 1.21900 |
| suhu 0 | suhu kamar | 4.80989* | .157565 | .000 | 4.39750 | 5.22228 |
| | suhu 10 | 5.61650* | .172604 | .000 | 5.16475 | 6.06825 |
| suhu 10 | suhu kamar | -.80661* | .157565 | .000 | -1.21900 | -.39422 |
| | suhu 0 | -5.61650* | .172604 | .000 | -6.06825 | -5.16475 |

Based on observed means.

The error term is Mean Square(Error) = ,089.

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

Homogeneous Subsets

% inhibisi

Tukey HSD

| suhu | N | Subset | | |
|------------|---|-----------|-----------|-----------|
| | | 1 | 2 | 3 |
| suhu 10 | 6 | 3.46575E1 | | |
| suhu kamar | 9 | | 3.54641E1 | |
| suhu 0 | 6 | | | 4.02740E1 |
| Sig. | | 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) = ,089.

Lanjutan Lampiran 7...

lama penyimpanan

Multiple Comparisons

% inhibisi

Tukey HSD

| (I) lama penyimp anan | (J) lama penyimp anan | Mean Difference (I-J) | Std. Error | Sig. | 95% Confidence Interval | |
|-----------------------------|-----------------------------|--------------------------|------------|------|-------------------------|-------------|
| | | | | | Lower Bound | Upper Bound |
| 0 hari | 3 hari | 13.02956* | .199306 | .000 | 12.50792 | 13.55119 |
| | 7 hari | 27.48900* | .199306 | .000 | 26.96736 | 28.01064 |
| 3 hari | 0 hari | -13.02956* | .199306 | .000 | -13.55119 | -12.50792 |
| | 7 hari | 14.45944* | .140930 | .000 | 14.09059 | 14.82830 |
| 7 hari | 0 hari | -27.48900* | .199306 | .000 | -28.01064 | -26.96736 |
| | 3 hari | -14.45944* | .140930 | .000 | -14.82830 | -14.09059 |

Based on observed means.

The error term is Mean Square(Error) = ,089.

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

Homogeneous Subsets

% inhibisi

Tukey HSD

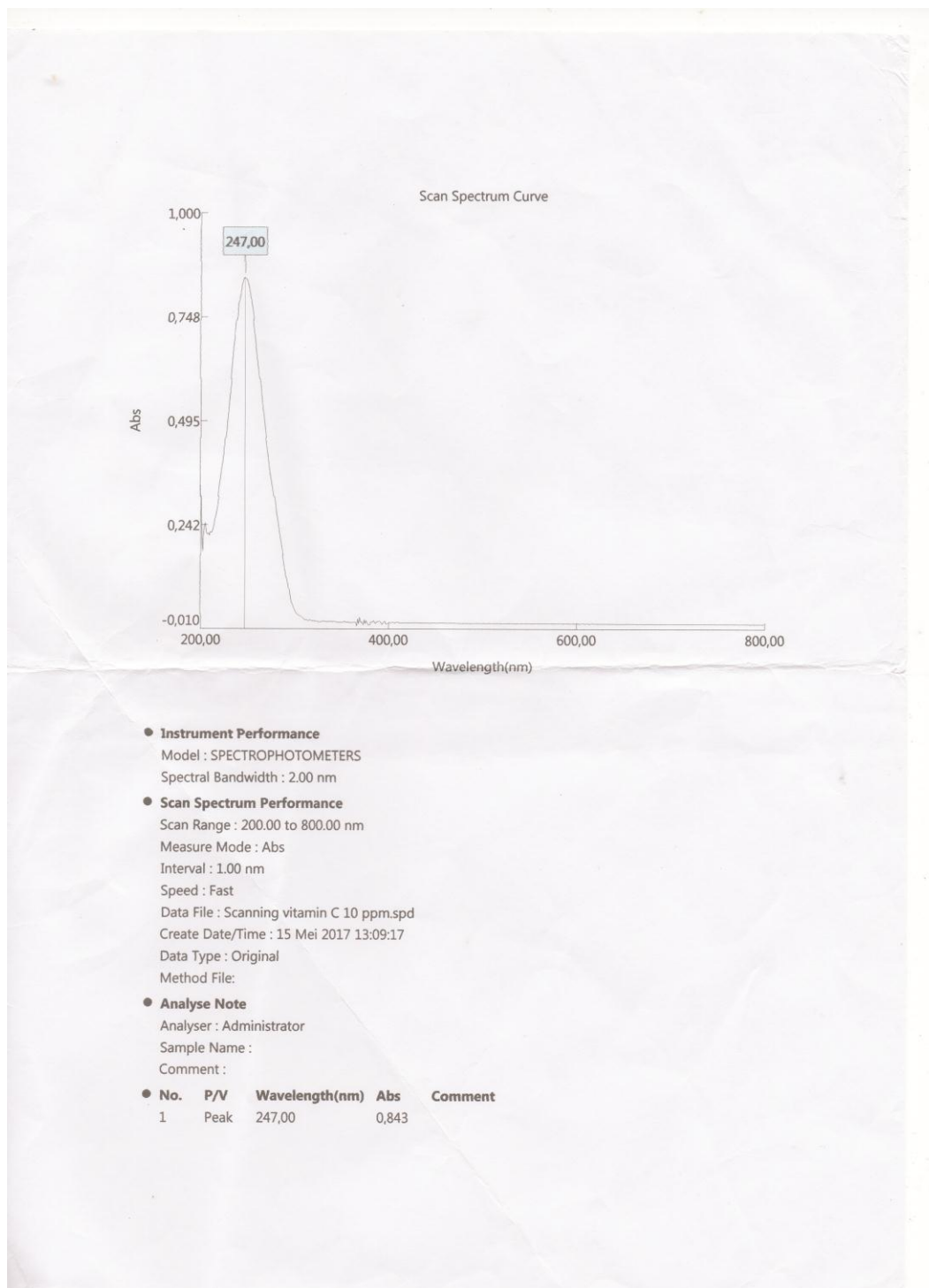
| lama penyimp anan | N | Subset | | |
|-------------------------|---|-----------|-----------|-----------|
| | | 1 | 2 | 3 |
| 7 hari | 9 | 2.64840E1 | | |
| 3 hari | 9 | | 4.09434E1 | |
| 0 hari | 3 | | | 5.39730E1 |
| Sig. | | 1.000 | 1.000 | 1.000 |

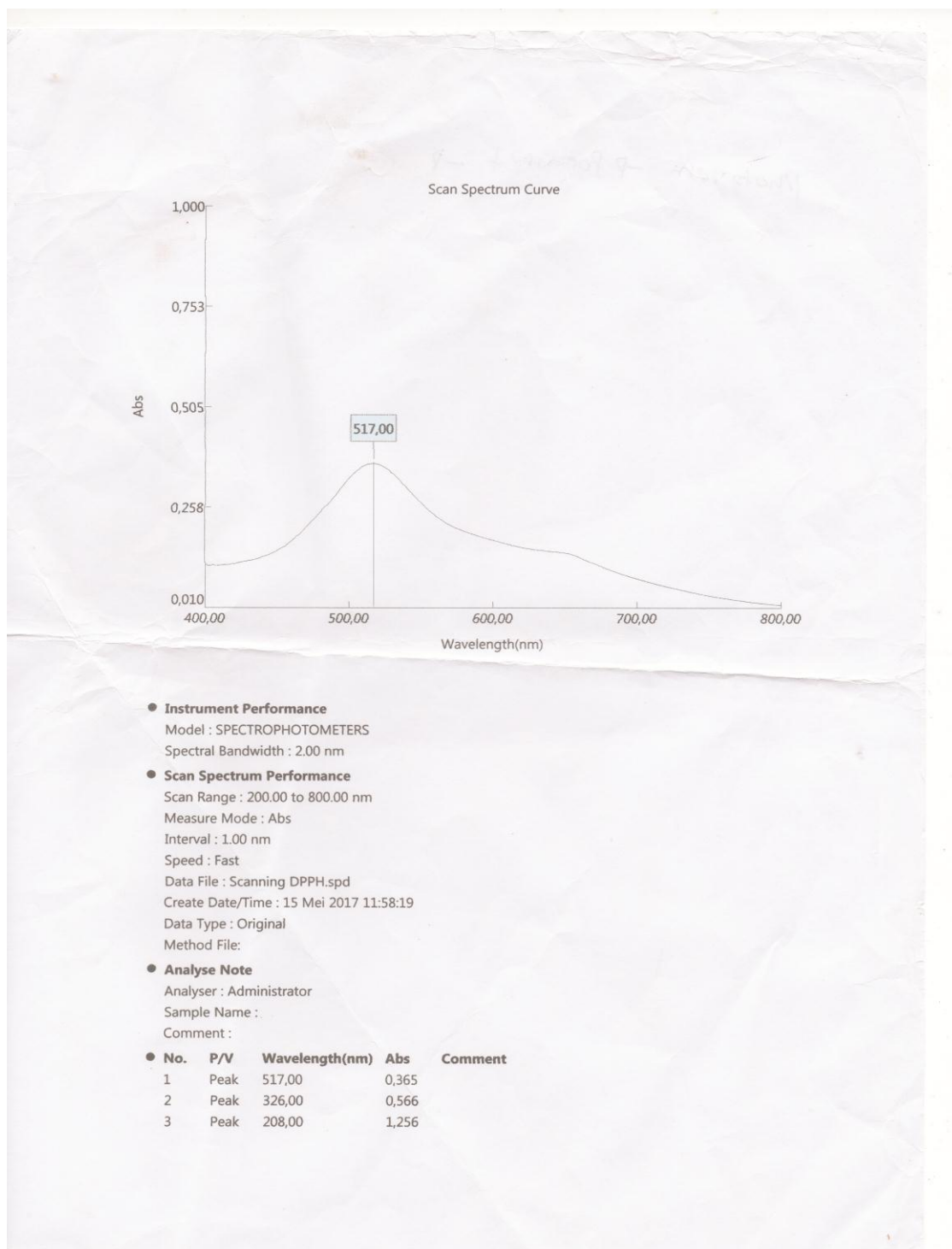
Means for groups in homogeneous subsets are displayed.

Based on observed means.

The error term is Mean Square(Error) = ,089.

Lampiran 8. Data Penentuan Panjang Gelombang dan *Operating Time*
a. Panjang Gelombang Vitamin C



Lanjutan Lampiran 8...

Lanjutan Lampiran 8...**c. Data *Operating Time* DPPH**

| Waktu inkubasi (menit) | Absorbansi $\lambda = 517 \text{ nm}$ |
|----------------------------|--|
| 0 | 0,151 |
| 5 | 0,145 |
| 10 | 0,142 |
| 15 | 0,139 |
| 20 | 0,137 |
| 25 | 0,135 |
| 30 | 0.134 |
| 35 | 0.133 |
| 40 | 0.132 |
| 45 | 0.131 |
| 50 | 0.130 |
| 55 | 0.129 |
| 60 | 0.128 |

