# DAFTAR PUSTAKA


Aba, P.E., Asuzu, I.U. 2018. Mechanisms of actions of some bioactive anti-diabetic principles from phytochemicals of medicinal plants: A review. Indian Journal of Natural Products and Resources Vol. 9 (2) : 85-96.

Adewole,S.O.,Martins, E.A. 2006. Full Length Research Article: Morphological Changes and Hypoglycemic Effects of Annona Muricata Linn. (Annonaceae) Leaf Aqueous Extract on Pancreatic B-Cells of Streptozotocin-Treated Diabetic Rats. African Journal of Biomedical Research, Vol. 9 :173 – 187.

Altemimi, A., et al. 2017. Review Phytochemicals: Extraction, Isolation, and Identification of Bioactive Compounds from Plant Extracts. Journal Plants. Vol.6 (42) : 1 - 23.

American Diabetes Association. 2014. Diagnosis and Classification of Diabetes Mellitus. Volume 37, Supplement 1.

Agu KC., Okolie, PN. 2017. Proximate composition, phytochemical analysis, and in vitro antioxidant potentials of extracts of Annona muricata (Soursop). Food Sci Nutr. Vol. 5 :1029-1036.

Aziz, A. R., dkk. 2013. Efektifitas Air Rebusan Daun Sirsak (Annona muricata) Terhadap Kadar Gula Darah Pada Penderita Diabetes Melitus Tipe 2. Program Studi Ilmu Keperawatan, Universitas Riau.

Ayepola, OR, et al. 2014. Oxidative Stress and Diabetic Complications: The Role of Antioxidant Vitamins and Flavonoid. Intech Open. Vol.2 : 25-58

Brahmachari, G. 2011. Bio-flavonoids with promising anti- diabetic potentials: A critical survey. Opportunity, Challenge and Scope of Natural Products in Medicinal Chemistry. Vol. 37 : 187-212

Badan POM RI. 2015. Antidiabetik Oral; Biguanida. Pusat Informasi Obat Nasional.

Bhardwaj, R. et al. 2019. Bioactive Compounds of Annona. In: Bioactive Compounds in Underutilized Fruits and Nuts. Switzerland: Springer. P: 1-19

Campos, Carlos. 2012. Chronic Hyperglycemia and Glucose Toxicity: Pathology and Clinical Sequele, Post Graduate Medicine, Vol.124 (6): 1-8

Chen, J. et al. 2014. Natural Flavonoids as Potential Herbal Medication for the Treatment of Diabetes Mellitus and Its Complications. NPC. Vol.10 (1): 187-200

Damara, A., Sukohar, A. 2018. Efektivitas Infusa Daun Kersen sebagai Antidiabetik. J Agromedicine, Vol.5 (1) : 534-539

Decroli, E. 2019. Diabetes Mellitus Tipe 2. Pusat Penerbitan Bagian Ilmu Penyakit Dalam Fakultas Kedokteran Universitas Andalas Padang. Hal: 1-43

Departemen Kesehatan RI. 2008. Pedoman Pengendalian Diabetes Mellitus dan Penyakit Metabolik. Jakarta

Diani, A.,dkk. 2010. Tata laksana metformin DM tipe 2 pada anak. Sari Pediatri, Vol. 11 (6) : 395-400

Dinas Kesehatan Provinsi Sulawesi Selatan. 2015. Profil Kesehatan Provinsi Sulawesi Selatan Tahun 2014. Makassar

Engwa, G.A. 2018. Free Radicals and the Role of Plant Phytochemicals as Antioxidants Against Oxidative Stress-Related Diseases. Vol.4 : 49-65

Emilda. 2018. Efek Senyawa Bioaktif Kayu Manis *Cinnamon humanii* Terhadap Diabetes Mellitus. Jurnal Fitofarmaka Indonesia. Vol.5 (1): 246-252

Fibriana, R. 2011. Diabetes Mellitus Dan Terapi Insulin. Vol.1 (2) : 3-4

Florez, J.C. 2017. Pharmacogenetics in type 2 diabetes. Diabetologia. Vol.60: 800-807

Goud, B.J, et al. 2015. Review article: Streptozotocin-A Diabetogenic Agent in Animal Models. Human. Vol. 3 (1): 253-269

Gyesi,JN.,et al. 2019. Research Article: Chemical Composition, Total Phenolic Content, and Antioxidant Activities of the Essential Oils of the Leaves and Fruit Pulp of Annona muricata L. (Soursop) from Ghana. Biochemistry Research International. Vol 9 : 1-9

Gumelar, B., dkk. 2017. Potensi Ekstrak Etanol Daun Sirsak (Annona muricata) sebagai Agen Terapi Hiperglikemia pada Mencit yang Diinduksi Aloksan. Bandung Meeting on Global Medicine & Health. Vol.1(1) : 55-59

Hasmila, I., et al. 2019. Phytochemical analysis and antioxidant activity of soursop leaf extract (Annona muricata Linn.) Journal of Physics. Vol. (13): 1-6

Jaya,J.H., Basori, A., Sudarno. 2012. Blood Glucose Reduction in Mice (Mus musculus) Resulting From The Administration of Pare (Momordica charantia) Fruit Flesh Juice. Folia Medica Indonesiana. Vol. 48 (2) : 43-49.

Kementerian Kesehatan RI. 2014. Infodatin Pusat Data dan Informasi Jakarta Selatan

Kurniasih, N. 2015. Potensi Daun Sirsak (Annona muricata Linn), Daun Binahong (Anredera cordifolia), dan Daun Benalu Mangga (Dendrophthoe pentandra) Sebagai Antioksidan Pencegah Kanker. Vol. 9 (1) : 162-182

Kumari, M., Jain S. 2012. Tannins: An Antinutrient with Positive Effect to Manage Diabetes. Research Journal of Recent Sciences. Vol. 1(12) : 70-73

Lenzen, S. 2008. Review :The mechanisms of alloxan- and streptozotocin-induced diabetes. Diabetologia. Vol 51 : 216-226

Minamii, T., Nogami, M., Ogawa, W. 2018. Mechanisms of metformin action: In and out of the gut. J Diabetes Investig Vol.9 (4): 701-703

Ndraha, S. 2014. Diabetes Melitus Tipe 2 dan Tatalaksana Terkini. Medicinus. Vol. 27 (2): 9-17

Novrial,D. 2007. Kerusakan Sel β Pankreas Akibat Induksi Streptozotocin: Tinjauan Patologi Eksperimental. Mandala of Health. Vol 3 : 46-51.

Panche, A.N., Diwan, A.D., Chandra, S.R. 2016. Flavonoids: an overview. Review Article. Journal of Nutritional Science. Vol. 5 (47): 1-15.

Pandey, A., Tripathi, S. 2014. Concept of Standardization, Extraction and Pre Phytochemical Screening Strategies For Herbal Drug. Journal of Pharmacognosy and Phytochemistry. Vol 2 (5) : 115-119

Pratama, A. 2014. Uji Aktivitas Antidiabetes Ekstrak Etanol Daun Sirsak (*Annona muricata L*.) pada Mencit Diabetes yang diinduksi Aloksan. Fakultas Farmasi, Universitas Jember

Salempa, P. 2016. Uji Bioaktivitas Senyawa Metabolit Sekunder Ekstrak Kloroform Kulit Batang Sirsak (Annona muricata Linn). Jurnal Bionature. Vol. 17 (1) : 37-40.

Sani, U.M. 2015. Phytochemical screening and antidiabetic effect of extracts of the seeds of Citrullus lanatus in alloxan-induced

diabetic albino mice. Journal of Applied Pharmaceutical Science Vol. 5 (3) : 51-54.

Safithri, F. 2017. Potensi Biji Jintan Hitam (*Nigella sativa)* dalam Regenerasi Pankreas Secara Endogen pada Diabetes Mellitus Tipe-2. UMM. Vol.13 (2): 76-87.

Silva, G., et al. 2017. Extraction methods, qualitative and quantitative techniques for screening of phytochemicals from plants. American Journal of Essential Oils and Natural Products.Vol.5 (2) : 29-32.

Singh, A., et al. 2016. Role of Medicinal Plants for Health Perspective: Special Reference to Antioxidant Potential. Journal of Chemical Biology & Therapeutic. Vol.1 (2) : 1-5.

Soelistijo, S.A. 2015. Konsensus Pengelolaan dan Pencegahan Diabetes Melitus Tipe 2 Di Indonesia. PB PERKENI. Hal: 1-36.

Sovia et al. 2014. Hypoglycemic and Hypolipidemic Effects of Annona Muricata L. Leaf Ethanol Extract. Int J Pharm Pharm Sci. Vol. 9 (3) : 170-174

Sumantri, I., dkk. 2014. Ekstraksi Daun Sirsak (Annona muricata L) Menggunakan Pelarut Etanol. Momentum. Vol. 10 (1) : 34-37.

Sun, C.,et al. 2016. Original Article: Effect of fasting time on measuring mouse blood glucose level. Int J Clin Exp Med.Vol. 9 (2) : 4186-4189.

Szkudelski, T. 2001. Minireview :The Mechanism of Alloxan and Streptozotocin Action in B Cells of the Rat Pancreas. Vol. 50 : 536-546.

Ta'adi, et al. 2019. Effectiveness of Soursop Leaf Extracts on Decreasing Blood Sugar for Type-2 Diabetes Mellitus Patients. Indian Journal of Public Health Research & Development. Vol.10 (9) : 1317-1321

Vinayagam, R., Xu, B. 2015. Antidiabetic Properties of Dietary Flavonoids: a cellular mechanism review. Nutrition & Metabolism. Vol. 12 (60): 1-20.

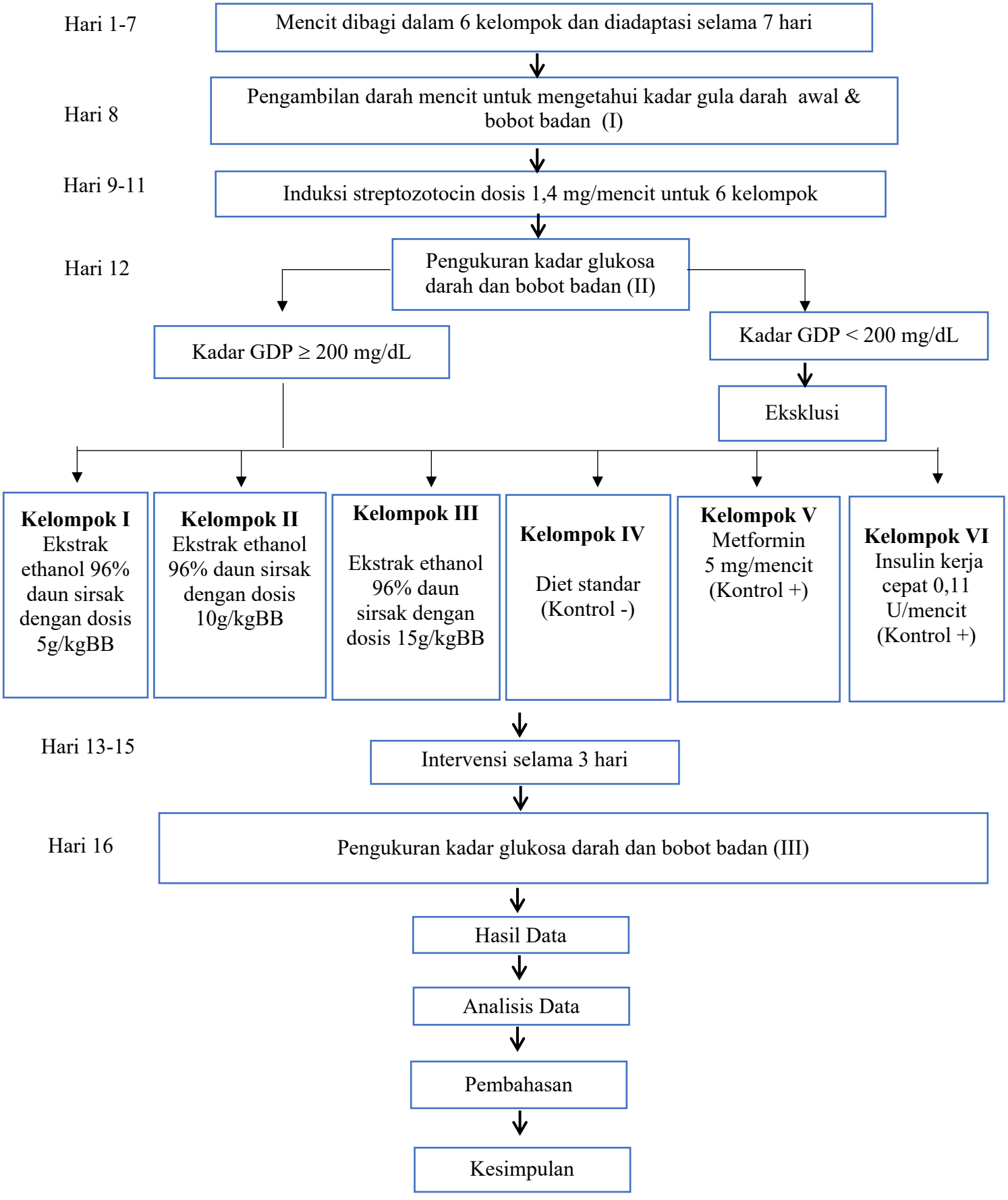
Wahyuni, dkk. 2016. Efek Antihiperglikemik Ekstrak Etanol Daun Sirsak (Annona muricata Linn.) dan Ekstrak Etanol Buah Belimbing Wuluh (Averrhoa bilimbi Linn.) serta Kombinasinya pada Mencit Jantan. Pharmauho. Vol.1 (1) : 16-19.

Wahab, A., et al. 2018. Exploring the Leaves of Annona muricata L. as a Source of Potential Anti-inflammatory and Anticancer Agents. Frontiers in Pharmacology Vol. 9 (661) : 1-20.

WHO. 2006. Definition and Diagnosis of Diabetes Mellitus and Intermediate Hyperglycemia. Switzerland

Yusuf, M.I, dkk. 2018. Antioxidant and Antidiabetic Potential of Galing Stem Extract (Cayratia trifolia Domin). Pharmacogn J. Vol.10 (4) : 686-689.

**Lampiran 1. Skema Kerja**



**Lampiran 2. Perhitungan Dosis**

1. Dosis Streptozotocin
   - STZ memiliki dosis 40 mg/kgBB pada tikus
   - Untuk tikus 200 g= 200 g/1000 g x 40 mg = 8 mg
   - Faktor konversi dari tikus 200 g ke mencit 20 g = 0,14
   - Pada mencit 20 g = 8 x 0,14 = 1,12 mg/ mencit
   - Rata-rata BB mencit = 25 g
   - Dosis streptozotocin untuk mencit 25 g = (25 g/ 20 g) x 1,12 mg = **1,4 mg**
   - Total kebutuhan = 1,4 mg x 24 ekor x 3 hari = 100,8 mg
   - Dosis pengenceran = 100,8 mg + 10 ml aquadest= ± 10 ml lalu dibagi 72 dosis = **0,14 ml (intra peritoneal)**

2. Dosis Ektrak Daun Sirsak
   - Berat mencit rata-rata 25 g
   - 25 g = 0,025 kg
   - Dosis 1 = 5 g/kg BB = 0,025 kg x 5 g/kg BB = **0,125 g (per oral)**
   - Dosis 2 = 10 g/kg BB = 0,025 kg x 10 g/kg BB = **0,250 g (per oral)**
   - Dosis 3 = 15 g/kg BB = 0,025 kg x 15 g/kg BB = **0,325 g (per oral)**
   - Total Kebutuhan =

     0,125 g x 4 ekor x 3 hari = 1,5 g
     0,250 g x 4 ekor x 3 hari = 3 g
     0,375 g x 4 ekor x 3 hari = 4,5 g

     **9 gram**

   Cara kerja yaitu 100 gram daun sirsak ditimbang setelah dihaluskan dan diencerkan dengan 1 liter ethanol 96%, lalu diolah menggunakan rotarory evaporator dan dipanaskan dengan waterbath hingga diperoleh ekstrak kental = ± 20 gram

3. Dosis Metformin
   - Dosis metformin untuk manusia = 1500 mg/ hari
   - Konversi dari manusia 70 kg ke mencit 20 g = 0,0026
   - Untuk mencit 20 g = 1500 mg x 0,0026 = 3,9 mg
   - Rata-rata BB mencit = 25 g
   - Dosis metformin untuk mencit 25 g= (25 g/20 g) x 3,9 mg = 4,875 mg = **5 mg**
   - Total kebutuhan = 5 mg x 4 ekor x 3 hari = 60 mg

- Cara kerja = Kadar diinginkan x Berat sediaan = 60 mg x 600 mg
  Kadar sediaan 500 mg
  = 72 mg
- Dosis pengenceran = 72 mg + 10 ml aquadest= ± 10 ml lalu dibagi 12 dosis = **0,8 ml (per oral)**

4. Dosis Insulin kerja cepat
   - Dosis insulin untuk manusia = 0,5 U/kgBB
   - Rata-rata berat manusia = 70 kg, Kebutuhan insulin = 0,5 U x 70 kg = 35 U
   - Konversi dari manusia ke mencit 20 g = 0,0026
   - Untuk mencit 20 g = 35 U x 0,0026 = 0,091 U
   - Rata-rata BB mencit = 25 g
   - Dosis insulin untuk mencit 25 g =(25 g/20 g) x 0,091 U= **0,11 U/mencit**
   - Total kebutuhan = 0,11 U x 4 ekor x 3 hari = 1,3 U
   - Dosis pengenceran = 1,3 U insulin + 3 ml aquadest= ± 3 ml lalu dibagi dalam 12 dosis = **0,25 ml (via sub cutan)**

## ALLOMETRI

| Diketahui / Dicari | Mencit 20 g | Tikus 200 g | Marmut 400 g | Kelinci 1,5 kg | Kucing 1,5 kg | Kera 4 kg | Anjing 12 kg | Manusia 70 kg |
|---|---|---|---|---|---|---|---|---|
| Mencit 20 g | 1,0 | 7,0 | 12,23 | 27,8 | 29,7 | 64,1 | 124,2 | 387,9 |
| Tikus 200 g | 0,14 | 1,0 | 1,74 | 3,9 | 4,2 | 9,2 | 17,8 | 56,0 |
| Marmut 400 g | 0,08 | 0,57 | 1,0 | 2,25 | 2,4 | 5,2 | 10,2 | 31,5 |
| Kelinci 1,5 kg | 0,04 | 0,25 | 0,44 | 1,0 | 1,08 | 2,4 | 4,5 | 14,2 |
| Kucing 1,5 kg | 0,03 | 0,23 | 0,41 | 0,92 | 1,0 | 2,2 | 4,1 | 13,0 |
| Kera 4 kg | 0,016 | 0,11 | 0,19 | 0,42 | 0,43 | 0,1 | 1,9 | 6,1 |
| Anjing 12 kg | 0,008 | 0,06 | 0,1 | 0,22 | 1,24 | 0,52 | 1,0 | 3,1 |
| Manusia 70 kg | 0,0026 | 0,018 | 0,031 | 0,07 | 0,076 | 0,16 | 0,32 | 1,0 |

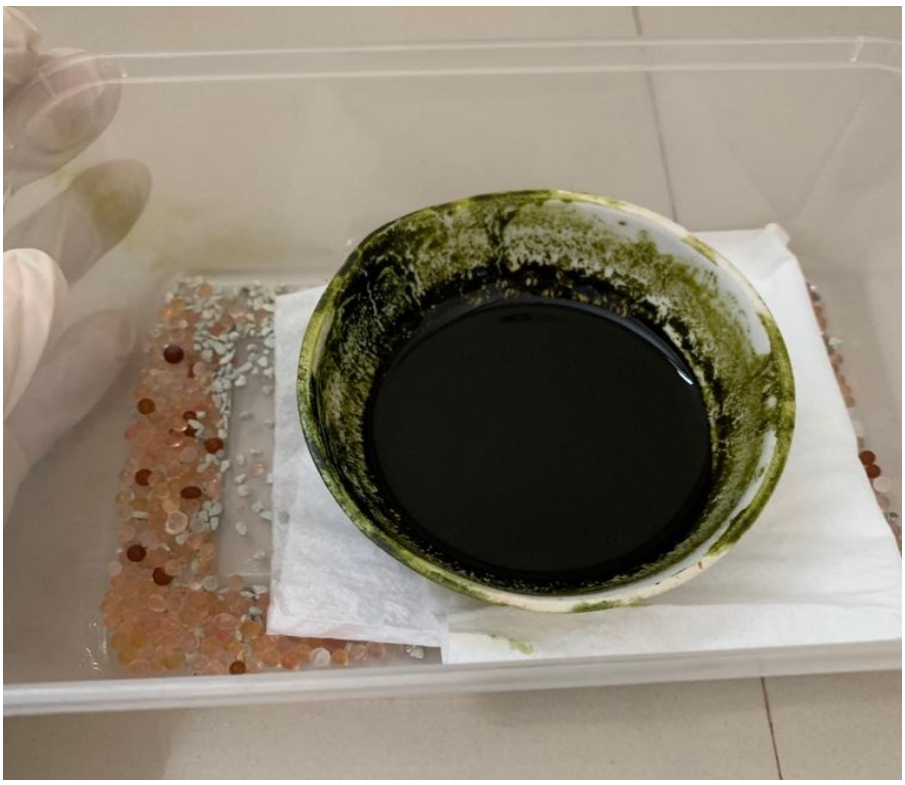
**Lampiran 3. Dokumentasi Penelitian**

Gambar 18. Daun sirsak *(Annona muricata L.*) yang sudah dicuci bersih dan siap untuk dikeringkan


Gambar 19. Proses penyaringan ekstrak ethanol 96% daun sirsak *(Annona muricata L.*)

Gambar 20. Proses pemisahan pelarut ethanol 96% dari ekstrak yang sudah terbentuk melalui alat rotarory evaporator.


Gambar 21. Proses pemanasan ekstrak cair daun sirsak menjadi ekstrak kental melalui alat waterbath



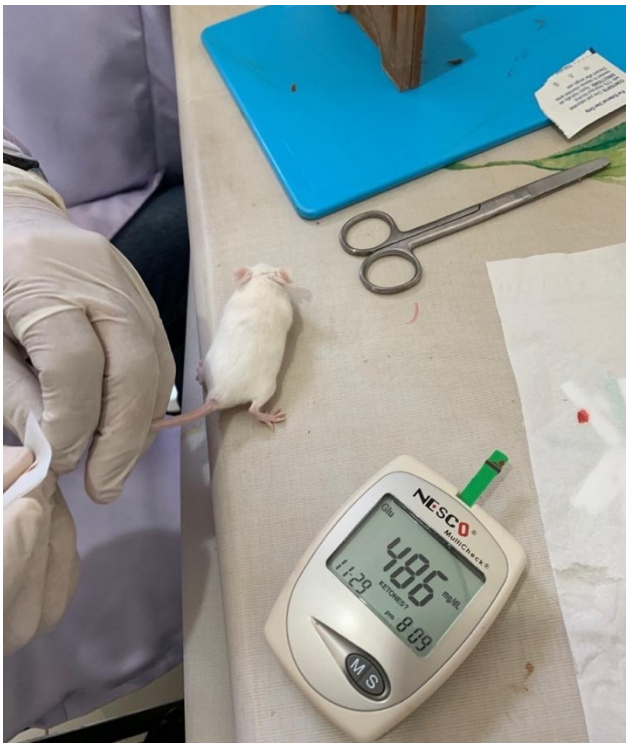
Gambar 22. Ekstrak kental ethanol 96% daun sirsak *(Annona muricata L.*)


Gambar 23. Proses adaptasi hewan uji *(Mus musculus)*


Gambar 24. Penimbangan berat badan hewan uji *(Mus musculus)*


Gambar 25. Pengukuran glukosa darah hewan uji *(Mus musculus)* sebelum intervensi

Gambar 26. Penyuntikan streptozotocin pada hewan uji *(Mus musculus)* via intraperitoneal




Gambar 27. Pengukuran glukosa darah hewan uji *(Mus musculus)* setelah induksi streptozotocin agar menjadi hiperglikemia

Gambar 28. Persiapan intervensi menggunakan ekstrak kental daun sirsak, metformin dan insulin aspart.

Gambar 29. Pemberian ekstrak kental daun sirsak via oral menggunakan sonde lambung

Gambar 30. Pemberian insulin aspart via injeksi subkutan

# Lampiran 4. Analisis Data

## 1. Analisis Data GDP (gula darah puasa)

### General Linear Model

[DataSet0]

**Within-Subjects Factors**

Measure: GDP

| time | Dependent Variable |
|---|---|
| 1 | GDP1 |
| 2 | GDP2 |
| 3 | GDP3 |

**Between-Subjects Factors**

| | | N |
|---|---|---|
| Kelompok | K- | 4 |
| | K+1 | 3 |
| | K+2 | 3 |
| | P1 | 3 |
| | P2 | 4 |
| | P3 | 3 |

**Descriptive Statistics**

| | Kelompok | Mean | Std. Deviation | N |
|---|---|---|---|---|
| GDP1 | K- | 137.25 | 35.650 | 4 |
| | K+1 | 122.33 | 8.737 | 3 |
| | K+2 | 135.33 | 45.960 | 3 |
| | P1 | 144.67 | 11.150 | 3 |
| | P2 | 143.50 | 15.759 | 4 |
| | P3 | 140.33 | 8.505 | 3 |
| | Total | 137.55 | 23.345 | 20 |
| GDP2 | K- | 310.75 | 74.554 | 4 |
| | K+1 | 310.33 | 36.910 | 3 |
| | K+2 | 321.00 | 54.672 | 3 |
| | P1 | 433.00 | 176.570 | 3 |
| | P2 | 327.75 | 91.584 | 4 |
| | P3 | 275.00 | 38.575 | 3 |
| | Total | 328.60 | 91.663 | 20 |
| GDP3 | K- | 341.50 | 56.347 | 4 |
| | K+1 | 70.67 | 23.587 | 3 |
| | K+2 | 473.00 | 106.972 | 3 |
| | P1 | 128.67 | 22.679 | 3 |
| | P2 | 114.00 | 9.487 | 4 |
| | P3 | 98.67 | 5.508 | 3 |
| | Total | 206.75 | 156.185 | 20 |

### Multivariate Tests[a]

| Effect | | Value | F | Hypothesis df | Error df | Sig. | Partial Eta Squared |
|---|---|---|---|---|---|---|---|
| time | Pillai's Trace | .850 | 36.741[b] | 2.000 | 13.000 | .000 | .850 |
| | Wilks' Lambda | .150 | 36.741[b] | 2.000 | 13.000 | .000 | .850 |
| | Hotelling's Trace | 5.653 | 36.741[b] | 2.000 | 13.000 | .000 | .850 |
| | Roy's Largest Root | 5.653 | 36.741[b] | 2.000 | 13.000 | .000 | .850 |
| time * Kelompok | Pillai's Trace | 1.152 | 3.801 | 10.000 | 28.000 | .003 | .576 |
| | Wilks' Lambda | .057 | 8.281[b] | 10.000 | 26.000 | .000 | .761 |
| | Hotelling's Trace | 12.857 | 15.429 | 10.000 | 24.000 | .000 | .865 |
| | Roy's Largest Root | 12.567 | 35.186[c] | 5.000 | 14.000 | .000 | .926 |

a. Design: Intercept + Kelompok
Within Subjects Design: time

b. Exact statistic

c. The statistic is an upper bound on F that yields a lower bound on the significance level.

### Mauchly's Test of Sphericity[a]

Measure: GDP

| Within Subjects Effect | Mauchly's W | Approx. Chi-Square | df | Sig. | Epsilon[b] | | |
|---|---|---|---|---|---|---|---|
| | | | | | Greenhouse-Geisser | Huynh-Feldt | Lower-bound |
| time | .732 | 4.051 | 2 | .132 | .789 | 1.000 | .500 |

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. Design: Intercept + Kelompok
Within Subjects Design: time

b. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

### Tests of Within-Subjects Effects

Measure: GDP

| Source | | Type III Sum of Squares | df | Mean Square | F | Sig. | Partial Eta Squared |
|---|---|---|---|---|---|---|---|
| time | Sphericity Assumed | 374482.871 | 2 | 187241.436 | 57.425 | .000 | .804 |
| | Greenhouse-Geisser | 374482.871 | 1.578 | 237376.676 | 57.425 | .000 | .804 |
| | Huynh-Feldt | 374482.871 | 2.000 | 187241.436 | 57.425 | .000 | .804 |
| | Lower-bound | 374482.871 | 1.000 | 374482.871 | 57.425 | .000 | .804 |
| time * Kelompok | Sphericity Assumed | 324147.233 | 10 | 32414.723 | 9.941 | .000 | .780 |
| | Greenhouse-Geisser | 324147.233 | 7.888 | 41093.999 | 9.941 | .000 | .780 |
| | Huynh-Feldt | 324147.233 | 10.000 | 32414.723 | 9.941 | .000 | .780 |
| | Lower-bound | 324147.233 | 5.000 | 64829.447 | 9.941 | .000 | .780 |
| Error(time) | Sphericity Assumed | 91297.667 | 28 | 3260.631 | | | |
| | Greenhouse-Geisser | 91297.667 | 22.086 | 4133.688 | | | |
| | Huynh-Feldt | 91297.667 | 28.000 | 3260.631 | | | |
| | Lower-bound | 91297.667 | 14.000 | 6521.262 | | | |

### Tests of Within-Subjects Contrasts

Measure: GDP

| Source | time | Type III Sum of Squares | df | Mean Square | F | Sig. | Partial Eta Squared |
|---|---|---|---|---|---|---|---|
| time | Linear | 44311.684 | 1 | 44311.684 | 25.867 | .000 | .649 |
| | Quadratic | 330171.187 | 1 | 330171.187 | 68.668 | .000 | .831 |
| time * Kelompok | Linear | 215310.725 | 5 | 43062.145 | 25.138 | .000 | .900 |
| | Quadratic | 108836.508 | 5 | 21767.302 | 4.527 | .012 | .618 |
| Error(time) | Linear | 23982.875 | 14 | 1713.062 | | | |
| | Quadratic | 67314.792 | 14 | 4808.199 | | | |

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

| | | Levene Statistic | df1 | df2 | Sig. |
|---|---|---|---|---|---|
| GDP1 | Based on Mean | 6.649 | 5 | 14 | .002 |
| | Based on Median | 1.971 | 5 | 14 | .146 |
| | Based on Median and with adjusted df | 1.971 | 5 | 4.012 | .265 |
| | Based on trimmed mean | 6.059 | 5 | 14 | .003 |
| GDP2 | Based on Mean | 2.675 | 5 | 14 | .067 |
| | Based on Median | .948 | 5 | 14 | .481 |
| | Based on Median and with adjusted df | .948 | 5 | 5.082 | .522 |
| | Based on trimmed mean | 2.529 | 5 | 14 | .078 |
| GDP3 | Based on Mean | 5.240 | 5 | 14 | .006 |
| | Based on Median | 1.449 | 5 | 14 | .268 |
| | Based on Median and with adjusted df | 1.449 | 5 | 3.494 | .386 |
| | Based on trimmed mean | 4.882 | 5 | 14 | .009 |

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

a. Design: Intercept + Kelompok
Within Subjects Design: time

### Tests of Between-Subjects Effects

Measure: GDP

Transformed Variable: Average

| Source | Type III Sum of Squares | df | Mean Square | F | Sig. | Partial Eta Squared |
|---|---|---|---|---|---|---|
| Intercept | 2949594.56 | 1 | 2949594.56 | 600.349 | .000 | .977 |
| Kelompok | 149248.683 | 5 | 29849.737 | 6.075 | .003 | .685 |
| Error | 68783.917 | 14 | 4913.137 | | | |

## Post Hoc Tests

## Kelompok

### Multiple Comparisons

Measure: GDP

Bonferroni

| (I) Kelompok | (J) Kelompok | Mean Difference (I-J) | Std. Error | Sig. | 95% Confidence Interval | |
|---|---|---|---|---|---|---|
| | | | | | Lower Bound | Upper Bound |
| K- | K+1 | 95.39 | 30.908 | .121 | -13.71 | 204.48 |
| | K+2 | -46.61 | 30.908 | 1.000 | -155.71 | 62.48 |
| | P1 | 27.72 | 30.908 | 1.000 | -81.37 | 136.82 |
| | P2 | 68.08 | 28.616 | .482 | -32.92 | 169.08 |
| | P3 | 91.83 | 30.908 | .152 | -17.26 | 200.93 |
| K+1 | K- | -95.39 | 30.908 | .121 | -204.48 | 13.71 |
| | K+2 | -142.00* | 33.043 | .011 | -258.63 | -25.37 |
| | P1 | -67.67 | 33.043 | .897 | -184.29 | 48.96 |
| | P2 | -27.31 | 30.908 | 1.000 | -136.40 | 81.79 |
| | P3 | -3.56 | 33.043 | 1.000 | -120.18 | 113.07 |
| K+2 | K- | 46.61 | 30.908 | 1.000 | -62.48 | 155.71 |
| | K+1 | 142.00* | 33.043 | .011 | 25.37 | 258.63 |
| | P1 | 74.33 | 33.043 | .616 | -42.29 | 190.96 |
| | P2 | 114.69* | 30.908 | .035 | 5.60 | 223.79 |
| | P3 | 138.44* | 33.043 | .014 | 21.82 | 255.07 |
| P1 | K- | -27.72 | 30.908 | 1.000 | -136.82 | 81.37 |
| | K+1 | 67.67 | 33.043 | .897 | -48.96 | 184.29 |
| | K+2 | -74.33 | 33.043 | .616 | -190.96 | 42.29 |
| | P2 | 40.36 | 30.908 | 1.000 | -68.73 | 149.46 |
| | P3 | 64.11 | 33.043 | 1.000 | -52.52 | 180.74 |
| P2 | K- | -68.08 | 28.616 | .482 | -169.08 | 32.92 |
| | K+1 | 27.31 | 30.908 | 1.000 | -81.79 | 136.40 |
| | K+2 | -114.69* | 30.908 | .035 | -223.79 | -5.60 |
| | P1 | -40.36 | 30.908 | 1.000 | -149.46 | 68.73 |
| | P3 | 23.75 | 30.908 | 1.000 | -85.34 | 132.84 |
| P3 | K- | -91.83 | 30.908 | .152 | -200.93 | 17.26 |
| | K+1 | 3.56 | 33.043 | 1.000 | -113.07 | 120.18 |
| | K+2 | -138.44* | 33.043 | .014 | -255.07 | -21.82 |
| | P1 | -64.11 | 33.043 | 1.000 | -180.74 | 52.52 |
| | P2 | -23.75 | 30.908 | 1.000 | -132.84 | 85.34 |

## 2. Analisis Data BB (berat badan)

### General Linear Model

**Within-Subjects Factors**

Measure: BB

| time | Dependent Variable |
|---|---|
| 1 | BB1 |
| 2 | BB2 |
| 3 | BB3 |

**Between-Subjects Factors**

| | | N |
|---|---|---|
| Kelompok | K- | 4 |
| | K+1 | 4 |
| | K+2 | 4 |
| | P1 | 4 |
| | P2 | 4 |
| | P3 | 4 |

**Descriptive Statistics**

| | Kelompok | Mean | Std. Deviation | N |
|---|---|---|---|---|
| BB1 | K- | 27.650 | 1.3026 | 4 |
| | K+1 | 26.125 | 2.0662 | 4 |
| | K+2 | 29.550 | 1.4434 | 4 |
| | P1 | 27.925 | 1.6958 | 4 |
| | P2 | 27.875 | 1.9602 | 4 |
| | P3 | 28.150 | 1.1561 | 4 |
| | Total | 27.879 | 1.7730 | 24 |
| BB2 | K- | 24.250 | 2.0599 | 4 |
| | K+1 | 23.500 | 3.1038 | 4 |
| | K+2 | 26.250 | 2.9000 | 4 |
| | P1 | 26.025 | 2.1975 | 4 |
| | P2 | 26.900 | 1.7029 | 4 |
| | P3 | 24.875 | 2.5863 | 4 |
| | Total | 25.300 | 2.5036 | 24 |
| BB3 | K- | 23.200 | 2.4993 | 4 |
| | K+1 | 25.775 | 1.2997 | 4 |
| | K+2 | 25.025 | 2.4798 | 4 |
| | P1 | 25.550 | 2.0091 | 4 |
| | P2 | 25.075 | 2.6235 | 4 |
| | P3 | 27.700 | 1.5427 | 4 |
| | Total | 25.388 | 2.3248 | 24 |

## Multivariate Tests[a]

| Effect | | Value | F | Hypothesis df | Error df | Sig. | Partial Eta Squared |
|---|---|---|---|---|---|---|---|
| time | Pillai's Trace | .836 | 43.261[b] | 2.000 | 17.000 | .000 | .836 |
| | Wilks' Lambda | .164 | 43.261[b] | 2.000 | 17.000 | .000 | .836 |
| | Hotelling's Trace | 5.089 | 43.261[b] | 2.000 | 17.000 | .000 | .836 |
| | Roy's Largest Root | 5.089 | 43.261[b] | 2.000 | 17.000 | .000 | .836 |
| time * Kelompok | Pillai's Trace | .804 | 2.419 | 10.000 | 36.000 | .025 | .402 |
| | Wilks' Lambda | .350 | 2.345[b] | 10.000 | 34.000 | .031 | .408 |
| | Hotelling's Trace | 1.415 | 2.264 | 10.000 | 32.000 | .039 | .414 |
| | Roy's Largest Root | .953 | 3.431[c] | 5.000 | 18.000 | .024 | .488 |

a. Design: Intercept + Kelompok
Within Subjects Design: time

b. Exact statistic

c. The statistic is an upper bound on F that yields a lower bound on the significance level.

## Mauchly's Test of Sphericity[a]

Measure: BB

| Within Subjects Effect | Mauchly's W | Approx. Chi-Square | df | Sig. | Epsilon[b] | | |
|---|---|---|---|---|---|---|---|
| | | | | | Greenhouse-Geisser | Huynh-Feldt | Lower-bound |
| time | .807 | 3.636 | 2 | .162 | .839 | 1.000 | .500 |

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. Design: Intercept + Kelompok
Within Subjects Design: time

b. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

## Tests of Within-Subjects Effects

Measure: BB

| Source | | Type III Sum of Squares | df | Mean Square | F | Sig. | Partial Eta Squared |
|---|---|---|---|---|---|---|---|
| time | Sphericity Assumed | 102.945 | 2 | 51.473 | 27.068 | .000 | .601 |
| | Greenhouse-Geisser | 102.945 | 1.677 | 61.385 | 27.068 | .000 | .601 |
| | Huynh-Feldt | 102.945 | 2.000 | 51.473 | 27.068 | .000 | .601 |
| | Lower-bound | 102.945 | 1.000 | 102.945 | 27.068 | .000 | .601 |
| time * Kelompok | Sphericity Assumed | 54.423 | 10 | 5.442 | 2.862 | .010 | .443 |
| | Greenhouse-Geisser | 54.423 | 8.385 | 6.490 | 2.862 | .016 | .443 |
| | Huynh-Feldt | 54.423 | 10.000 | 5.442 | 2.862 | .010 | .443 |
| | Lower-bound | 54.423 | 5.000 | 10.885 | 2.862 | .045 | .443 |
| Error(time) | Sphericity Assumed | 68.458 | 36 | 1.902 | | | |
| | Greenhouse-Geisser | 68.458 | 30.187 | 2.268 | | | |
| | Huynh-Feldt | 68.458 | 36.000 | 1.902 | | | |
| | Lower-bound | 68.458 | 18.000 | 3.803 | | | |

## Tests of Within-Subjects Contrasts

Measure: BB

| Source | time | Type III Sum of Squares | df | Mean Square | F | Sig. | Partial Eta Squared |
|---|---|---|---|---|---|---|---|
| time | Linear | 74.501 | 1 | 74.501 | 37.237 | .000 | .674 |
| | Quadratic | 28.444 | 1 | 28.444 | 15.780 | .001 | .467 |
| time * Kelompok | Linear | 33.667 | 5 | 6.733 | 3.365 | .025 | .483 |
| | Quadratic | 20.756 | 5 | 4.151 | 2.303 | .088 | .390 |
| Error(time) | Linear | 36.013 | 18 | 2.001 | | | |
| | Quadratic | 32.446 | 18 | 1.803 | | | |

## Post Hoc Tests

## Kelompok

**Multiple Comparisons**

Measure: BB
Bonferroni

| (I) Kelompok | (J) Kelompok | Mean Difference (I-J) | Std. Error | Sig. | 95% Confidence Interval | |
|---|---|---|---|---|---|---|
| | | | | | Lower Bound | Upper Bound |
| K- | K+1 | -.100 | 1.2624 | 1.000 | -4.367 | 4.167 |
| | K+2 | -1.908 | 1.2624 | 1.000 | -6.176 | 2.359 |
| | P1 | -1.467 | 1.2624 | 1.000 | -5.734 | 2.801 |
| | P2 | -1.583 | 1.2624 | 1.000 | -5.851 | 2.684 |
| | P3 | -1.875 | 1.2624 | 1.000 | -6.142 | 2.392 |
| K+1 | K- | .100 | 1.2624 | 1.000 | -4.167 | 4.367 |
| | K+2 | -1.808 | 1.2624 | 1.000 | -6.076 | 2.459 |
| | P1 | -1.367 | 1.2624 | 1.000 | -5.634 | 2.901 |
| | P2 | -1.483 | 1.2624 | 1.000 | -5.751 | 2.784 |
| | P3 | -1.775 | 1.2624 | 1.000 | -6.042 | 2.492 |
| K+2 | K- | 1.908 | 1.2624 | 1.000 | -2.359 | 6.176 |
| | K+1 | 1.808 | 1.2624 | 1.000 | -2.459 | 6.076 |
| | P1 | .442 | 1.2624 | 1.000 | -3.826 | 4.709 |
| | P2 | .325 | 1.2624 | 1.000 | -3.942 | 4.592 |
| | P3 | .033 | 1.2624 | 1.000 | -4.234 | 4.301 |
| P1 | K- | 1.467 | 1.2624 | 1.000 | -2.801 | 5.734 |
| | K+1 | 1.367 | 1.2624 | 1.000 | -2.901 | 5.634 |
| | K+2 | -.442 | 1.2624 | 1.000 | -4.709 | 3.826 |
| | P2 | -.117 | 1.2624 | 1.000 | -4.384 | 4.151 |
| | P3 | -.408 | 1.2624 | 1.000 | -4.676 | 3.859 |
| P2 | K- | 1.583 | 1.2624 | 1.000 | -2.684 | 5.851 |
| | K+1 | 1.483 | 1.2624 | 1.000 | -2.784 | 5.751 |
| | K+2 | -.325 | 1.2624 | 1.000 | -4.592 | 3.942 |
| | P1 | .117 | 1.2624 | 1.000 | -4.151 | 4.384 |
| | P3 | -.292 | 1.2624 | 1.000 | -4.559 | 3.976 |
| P3 | K- | 1.875 | 1.2624 | 1.000 | -2.392 | 6.142 |
| | K+1 | 1.775 | 1.2624 | 1.000 | -2.492 | 6.042 |
| | K+2 | -.033 | 1.2624 | 1.000 | -4.301 | 4.234 |
| | P1 | .408 | 1.2624 | 1.000 | -3.859 | 4.676 |
| | P2 | .292 | 1.2624 | 1.000 | -3.976 | 4.559 |

Based on observed means.

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Nomor : 132/UN6.C9/TU/MKB/2020 October 30, 2020
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Subject : Letter of Acceptance

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