

DAFTAR PUSTAKA

- Adnan, J., Djabir, Y. Y., Mufidah, M., & Sartini, S. (2018). Pengaruh Pemberian Ekstrak Air Rosella (*Hibiscus Sabdariffa* L) Terenkapsulasi Maltodextrin Terhadap Peroksidasi Lipid Hati dan Ginjal Tikus Wistar Jantan yang Diinduksi Isoniazid-Rifampisin. *Majalah Farmasi Dan Farmakologi*, 22(1), 31–34.
- Arsyad, A. (2018). Adenosine and Lidocaine (AL) As A Vasodilator In Cardiac Procedures and A Storage For Vascular Banking. *PhD Thesis*, James Cook University, 54.
- Ayala A., Muñoz M., Argüelles S. (2014). Lipid Peroxidation: Production, Metabolism, and Signaling Mechanisms Of Malondialdehyde and 4-Hydroxy-2-Nonenal. *Oxid Med Cell Longev*, 1(6), 1-3.
- Babich, L.P., Elwy, A. and Parker, V.A., 2015. Can hospital accreditation fit in the developing world?: A study of two Southern African countries. *Annals of Global Health*, 81(1), 70.
- Bailey, L. E., & Ong, S. D. (1978). Krebs-Henseleit Solution As A Physiological Buffer In Perfused And Superfused Preparations. *Journal of Pharmacological Methods*, 1(2), 171–175.
- Borowiec, A., Lechward, K., Tkacz-Stachowska, K., and Składanowski, A. C. (2006). Adenosine As A Metabolic Regulator Of Tissue Function: Production Of Adenosine By Cytoplasmic 5'-Nucleotidases. *Acta Biochimica Polonica*, 53(2), 269–278.
- Braunwald, E. (1978). A Textbook of Cardiovascular Medicine (Heart fail)., ed. *Heart failure*, New York: McGraw-Hil, FishmanAP, 1(1), 1-20.
- Brink, J. G., & Hassoulas, J. (2009). The first human heart transplant and further advances in cardiac transplantation at Groote Schuur Hospital and the University of Cape Town - with reference to : the operation. A human cardiac transplant : an interim report of a successful operation performed at Groote Schuur Hospital, Cape Town. *Cardiovascular journal of Africa*, 20(1), 31–35.
- Brown Jr, P.S., Holland, F.W., Parenteau, G.L., and Clark, R.E. (1991). Magnesium ion is beneficial in hypothermic crystalloid cardioplegia. *The Annals of Thoracic Surgery*, 51(3), 359-367.
- Burgdorf, J., & Kroes, R. A. (2010). Uncovering the molecular basis of positive affect using rough-and-tumble play in rats: a role for insulin-like growth factor I. *Neuroscience*, 168, 769-777.

- Clark, R. (2005). *Anatomy and Physiology: Understanding the Human Body*. 1st ed. Sudbury, MA: Jones and Bartlett, 288-297.
- Collinsworth K. A., Kalman SM, and Harrison D. C. (1974). The clinical pharmacology of lidocaine as an antiarrhythmic drug. *Circulation*. 50(6):1217-30.
- Evans, D. E., Kobrine, A.I., LeGrys, D.C., and Bradley, M.E. (1984). Protective effect of lidocaine in acute cerebral ischemia induced by air embolism. *Journal of Neurosurgery*, 60(2): 257-263.
- Fathurrahman, D. (1995). *Metod Ijtihad Majelis Tarjih Muhammadiyah*, Jakarta: Logos Publishing House, (1), 112.
- Federer, W. T. (1967). *Experimental Design, Theory and Application*, NewDelhi : Oxford and IBH Publ. Co., 294-298.
- Fukuhiro, Y., Wowk, M., Ou, R., Rosenfeldt, F., and Pepe, S. (2000). Cardioplegic Strategies for Calcium Control: Low Ca²⁺, High Mg²⁺, Citrate, or Na⁺/H⁺ Exchange Inhibitor HOE-642. *Circulation*, 102 (3): 319-325.
- Goila, A. K., & Pawar, M. (2009). The diagnosis of brain death. *Indian journal of critical care medicine : peer-reviewed, official publication of Indian Society of Critical Care Medicine*, 13(1), 7–11.
- Greenberg, B. H. (2017). Heart Failure Epidemic. *Current Cardiology Reports*, 4(3), 185.
- Gupta, A., Lokhandwala, Y., Rai, N., and Malviya, A. (2021). Adenosine—A Drug With Myriad Utility In The Diagnosis And Treatment Of Arrhythmias. *Journal of Arrhythmia*, 37(1), 103–112.
- Hartawan D., Satoto H., dan Budiono U. (2012). Pemberian Lidokain 1,5 mg/Kg/Jam Intravena untuk Penatalaksanaan Nyeri Pasien Pasca Laparatomi. *JAI (Jurnal Anestesiologi Indonesia)*, (3),183-192.
- Halliwell, B., & Gutteridge, J. M. C. (2007). *Free radicals in biology and medicine*. 4th Edition, *Oxford University Press*, New York, 1
- Indonesia. (2009). *Undang-Undang Tentang Kesehatan*. Pemerintah Republik Indonesia : Dewan Perwakilan Rakyat Republik Indonesia Dan Presiden Republik Indonesia, 25-46.
- Jahania, M. S., Sanchez, J. A., Narayan, P., Lasley, R. D., and Mentzer, R. M. (1999). Heart Preservation For Transplantation: Principles and Strategies. *Annals of Thoracic Surgery*, 68(5), 1983–1987.

- Janero D. R. (1990). Malondialdehyde and thiobarbituric acid-reactivity as diagnostic indices of lipid peroxidation and peroxidative tissue injury. *Free Radic Biol Med*, (9), 6.
- Johnson, M. (2012). Labome: Laboratory Mice and Rats. (<https://www.labome.com/method/Laboratory-Mice-and-Rats.html>, diakses April 2022).
- Kyo S, Laraia P. J., Magrassi P., Levine F.H. , Tsai C. H. , Austen W. G., and Buckley M. J. (1983). Myocardial protection by lidocaine during cardioplegia. *J Surg Res*, 34(6), 533-42.
- Layland, J., Carrick, D., Lee, M., Oldroyd, K., and Berry, C. (2014). Adenosine. *JACC: Cardiovascular Interventions*, 7(6), 581–591.
- Lewi, R., Suwarman, S., dan Sitanggang, R. H. (2016). Perbandingan Efek Lidokain dengan Magnesium Sulfat Intravena terhadap Nilai Numeric Rating Scale dan Kebutuhan Analgesik Pascabedah Kolesistektomi Perlaparoskopik. *Jurnal Anestesi Perioperatif*, 4(1), 14-20.
- Linden, J. (2001) Molecular approach to adenosine receptors: receptor mediated mechanisms of tissue protection. *Annual review of pharmacology and toxicology*, 41(1): 775-787.
- Liu, J., & Lv, X. (2014). The pharmacokinetics and pharmacodynamics of lidocaine- loaded biodegradable poly(lactic-co-glycolic acid) microspheres. *International journal of molecular sciences*, 15(10), 17469–17477.
- Liu, M., & Wood, J. N. (2011). The Roles of Sodium Channels in Nociception : Pain Medicine, 12 (1), 93–99.
- Maley, K., & Komasa, L. (2003). VET 120 Introduction To Lab Animal Laboratory Mice And Rats Mary Johnson. United States : Synatom Research, Princeton, New Jersey Science, Val Macer, 1-2.
- Malik A., Brito D., Vaqar S., and Chhabra L. (2022). Congestive Heart Failure. *StatPearls Journal Publishing*, 2(1), 1.
- McCord, J. M. (2000). The Evolution of Free Radicals and Oxidative Stress. *American Journal of Medicine*, 108(8), 652–659.
- Minasian, S. M., Galagudza, M. M., Dmitriev, Y. V., Kurapeev, D. I., and Vlasov, T. D. (2013). Myocardial Protection Against Global Ischemia With Krebs-Henseleit Buffer-Based Cardioplegic Solution. *Journal of Cardiothoracic Surgery*, 8(1), 1-3.
- Muhtadi, A., Leoni H. A., Suhendi T., Azizah S., dan Haryoto. (2014).

Pengujian Daya Antioksidan dari Beberapa Ekstrak Kulit Buah Asli Indonesia dengan Metode FTC. *Simposium Nasional RAPI XIII*. Surakarta: FT-UMS, 1 (1), 6-7.

Muttaqin, A. (2009). Buku ajar Asuhan Keperawatan Klien Dengan Gangguan Sistem Kardiovaskular Dan Hematologi. Jakarta : Salemba Medika, 2-30.

Omer, L. & Ali, Rasul. (2017). Extraction-Spectrophotometric Determination of Lidocaine Hydrochloride in Pharmaceuticals. *International Journal of Chemistry*, 9 (49), 49.

Paul T., & Pfammatter. (1997). J-P. Adenosine: an effective and safe antiarrhythmic drug in pediatrics. *Pediatric Cardiology*, 18, 118-126.

Pelleg, A., & Porter R. S. (1990). The Pharmacology of Adenosine Pharmacotherapy. *Pharmacotherapy Publications, Inc.* ,10(3), 166.

Pérez O., Castro P., Díaz-Araya G., Nettle D., Moraga F., Chiong M., Jalil J., Zalaquett R., Morán S., Becker P., Corbalán R., and Lavandero S. (2002). Persistence of oxidative stress after heart transplantation: a comparative study of patients with heart transplant versus chronic stable heart failure. Spanish : *Rev Esp Cardiol*, 8 (83), 1-7.

Petrenko, A., Carnevale M., Somov A., Osorio J., Rodríguez J., Guibert E., Fuller B., and Froghi F. (2019). Organ Preservation into the 2020s: The Era of Dynamic Intervention. *Transfusion Medicine and Hemotherapy*, 46(3), 151–172.

Pieper, G. & Khanna A. (2010). Oxidative Stress in Cardiac Transplantation. Navy : Human Subject Protection Program, 349-371.

Rang, Dale., M.M Ritter J.M., and Moore P.K. (2003). Pharmacology. (5th ed). *The MCGraw-Hill Companies, Inc.*, Boston, 380-392.

Rimbach G., Hohler D., and Fischer A. (1999). Methods to assess free radicals and oxidative stress in biological systems. *Arch Tierernahr*, 52 (3), 203-2.

Rudd, D.M., & Dobson, G.P. (2011) Early reperfusion with warm, polarizing adenosine–lidocaine cardioplegia improves functional recovery after 6 hours of cold static storage. *The Journal of Thoracic and Cardiovascular Surgery*, 141(4), 1044-1055.

Sachdeva, S, & Gupta M. (2013). Adenosine and its receptors as therapeutic targets: An overview. *Saudi Pharm*, 21(3), 245-53.

Schmidt, T., Bjarnason-Wehrens, B., Predel, H. G., & Reiss, N. (2021).

Exercise after Heart Transplantation: Typical Alterations, Diagnostics and Interventions. *International Journal of Sports Medicine*, 42(2), 103–111.

Sharp, P., & Villano, J. (2012). *The Laboratory Rat*. U.S: CRC Press, 1.

Shneyvays, V., Safran, N., Halili-Rutman, I., and Shainberg, A. (2000) Insights into adenosine A1 and A3 receptors function: cardiotoxicity and cardioprotection. *Drug development research*, 50(3-4), 324-337.

Shryock J. C., & Belardinelli L. (1997). Adenosine and adenosine receptors in the cardiovascular system: biochemistry, physiology, and pharmacology. *Am J Cardiol*, 79(12A), 2-10.

Tan, Winston. (2015). Characterisation of Noise-Induced Cochlear Inflammation. Doctor of Philosophy in Biomedical Science, The University of Auckland, 46-61.

Weinhaus, A. J., & Roberts, K. P. (2005). *Anatomy Of The Human Heart. Handbook of Cardiac Anatomy, Physiology, and Devices: Second Edition*, Totowa, NJ : Humana Press, 51-52.

Williams, M. (2007). Adenosine. *xPharm: The Comprehensive Pharmacology Reference*, 1–7.

Wilson, C. N., and Mustafa, S.J. (2009). Adenosine Receptors in Health and Disease. *Springer Dordrecht Heidelberg*. London New York, (1), 1.

Wioletta Szczurek, Mariusz Gąsior, Ewa Romuk, Michał Skrzypek, Michał Zembala, and Bożena Szyguła-Jurkiewicz. (2020). Investigation of the Role of Oxidative Stress and Factors Associated with Cardiac Allograft Vasculopathy in Patients after Heart Transplantation. *Oxidative Medicine and Cellular Longevity*, (2), 1-9.

Zhan E, McIntosh VJ, Lasley RD. (2011). Adenosine A₂A and A₂B receptors are both required for adenosine A₁ receptor-mediated cardioprotection. *Am J Physiol Heart Circ Physiol*, 1-3.

Zeb, A., & Ullah, F. (2016). A Simple Spectrophotometric Method for the Determination of Thiobarbituric Acid Reactive Substances in Fried Fast Foods. *Journal of Analytical Methods in Chemistry*, 1(1), 1-2.

Zhu, Y., Lingala, B., Baiocchi, M., Toro Arana, V., Williams, K. M., Shudo, Y., Oyer, P. E., and Woo, Y. J. (2021). The Stanford experience of heart transplantation over five decades. *European Heart Journal*, 3(1), 1.

Lampiran 1

Penentuan Kurva Baku

Larutan standar 1,1,3,3 tetrametoksiopropana
(Larutan stok 1000 bpj)

- Dipipet sebanyak 1 mL dalam
labu tentukur 10 mL

Larutan stok 100 bpj

- 0,5 μ L ad 5 mL (0,05 bpj)

- 5 μ L ad 5 mL (0,1 bpj)

- 10 μ L ad 5 mL (0,2 bpj)

- 15 μ L ad 5 mL (0,3 bpj)

- 20 μ L ad 5 mL (0,4 bpj)

- 25 μ L ad 5 mL (0,5 bpj)

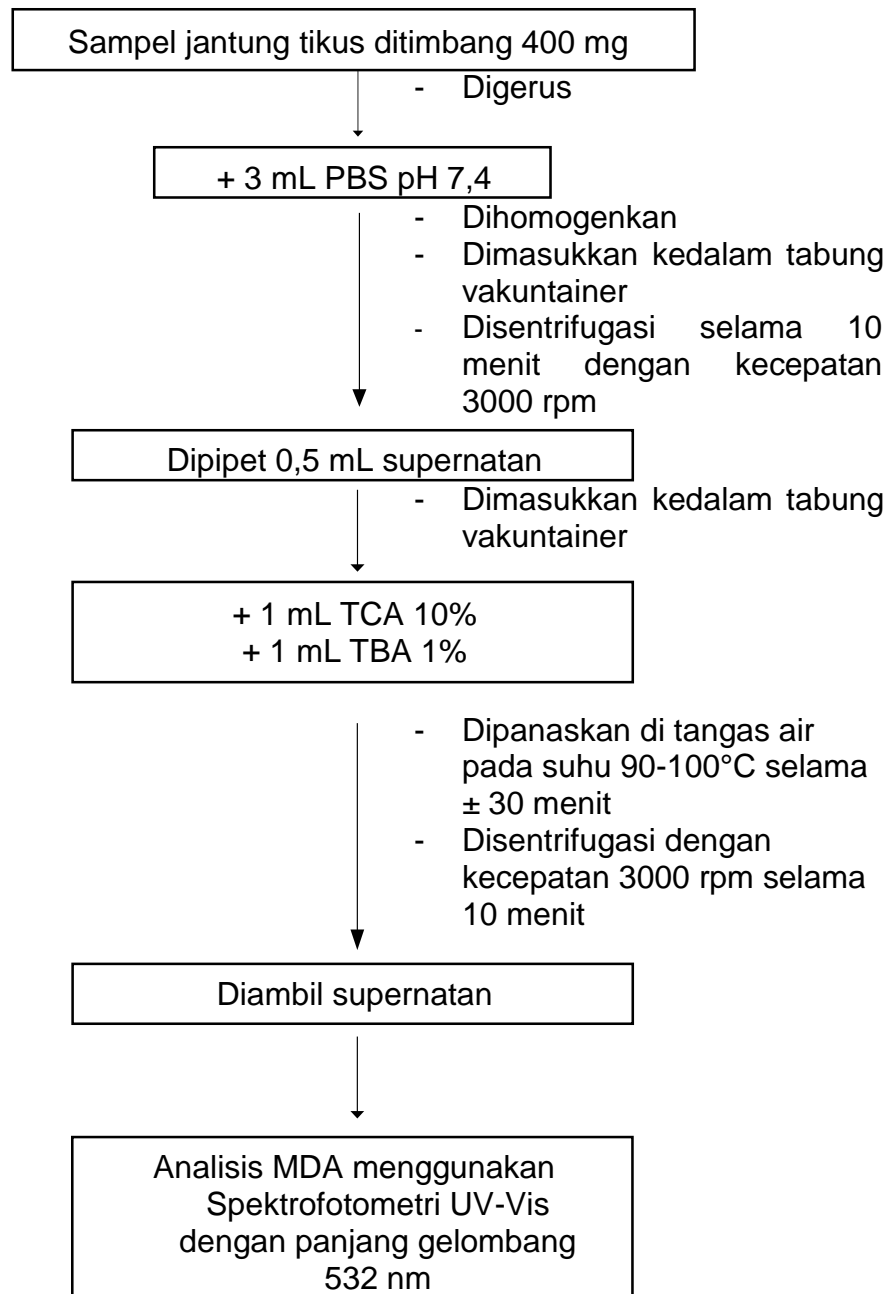
- 30 μ L ad 5 mL (0,6 bpj)

- 35 μ L ad 5 mL (0,7 bpj)

- 40 μ L ad 5 mL (0,8 bpj)

Analisis dengan spektrofotometri UV-Vis

Lampiran 2
Pengukuran Kadar Malondialdehid (MDA)



Lampiran 3

Hasil Analisis Statistik

7.1 Hasil Kadar MDA pada Perendaman Selama 4 jam

1. Analisis menggunakan *Shapiro-Wilk*

Tests of Normality

	Jenis Perlakuan	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Kadar MDA	Kontrol	,210	3	.	,991	3	,819
	KH 4 jam	,270	3	.	,949	3	,564
	KHM 4 jam	,323	3	.	,878	3	,320
	KHMAL 4 jam	,336	3	.	,856	3	,256

a. Lilliefors Significance Correction

2. Analisis menggunakan *oneway ANOVA*

Test of Homogeneity of Variances

		Levene			
		Statistic	df1	df2	Sig.
Kadar MDA	Based on Mean	,252	3	8	,858
	Based on Median	,143	3	8	,931
	Based on Median and with adjusted df	,143	3	7,633	,931
	Based on trimmed mean	,244	3	8	,864

ANOVA

Kadar MDA

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	,016	3	,005	11,670	,003
Within Groups	,004	8	,000		
Total	,020	11			

3. Hasil analisis statistik *Post Hoc Test*

Multiple Comparisons

Dependent Variable: Kadar MDA

Tukey HSD

(I) Jenis Perlakuan	(J) Jenis Perlakuan	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Kontrol	KH 4 jam	-,06862072*	,01768271	,020	-,1252470	-,0119945
	KHM 4 jam	-,02885617	,01768271	,415	-,0854824	,0277701
	KHMAL 4 jam	,03178876	,01768271	,341	-,0248375	,0884150
KH 4 jam	Kontrol	,06862072*	,01768271	,020	,0119945	,1252470
	KHM 4 jam	,03976455	,01768271	,190	-,0168617	,0963908
	KHMAL 4 jam	,10040948*	,01768271	,002	,0437832	,1570357
KHM 4 jam	Kontrol	,02885617	,01768271	,415	-,0277701	,0854824
	KH 4 jam	-,03976455	,01768271	,190	-,0963908	,0168617
	KHMAL 4 jam	,06064493*	,01768271	,036	,0040187	,1172712
KHMAL 4 jam	Kontrol	-,03178876	,01768271	,341	-,0884150	,0248375
	KH 4 jam	-,10040948*	,01768271	,002	-,1570357	-,0437832
	KHM 4 jam	-,06064493*	,01768271	,036	-,1172712	-,0040187

*. The mean difference is significant at the 0.05 level.

4. Analisis menggunakan *Tukey HSD*

Kadar MDA

Tukey HSD^a

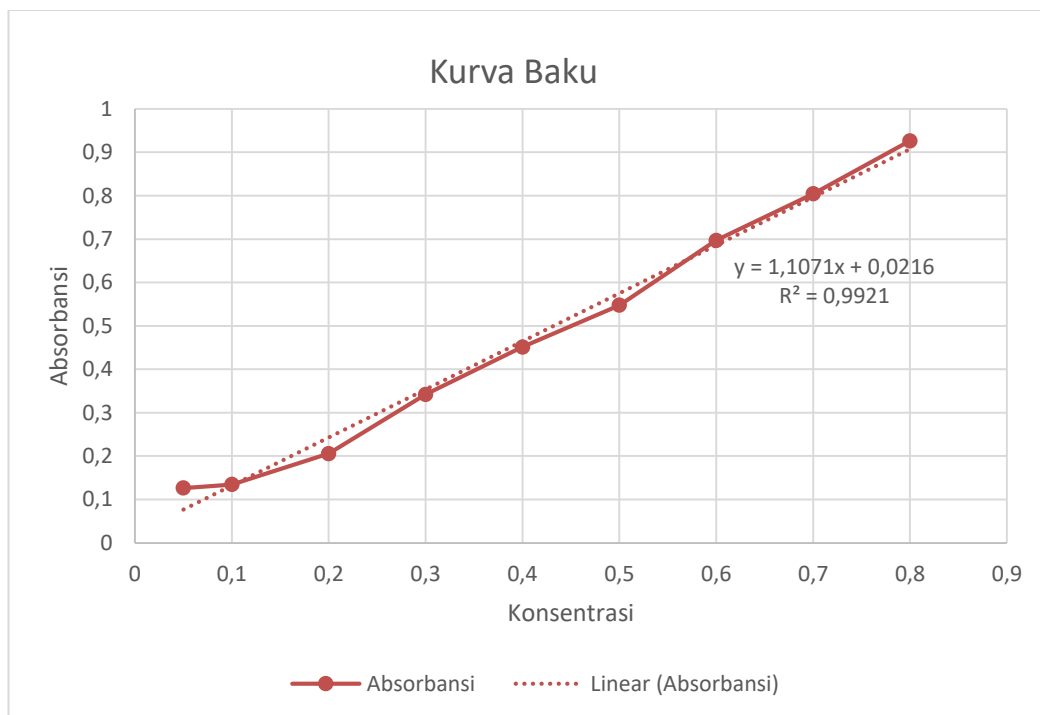
Jenis Perlakuan	N	Subset for alpha = 0.05		
		1	2	3
KHMAL 4 jam	3	,0871014		
Kontrol	3	,1188902	,1188902	
KHM 4 jam	3		,1477464	,1477464
KH 4 jam	3			,1875109
Sig.		,341	,415	,190

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 3,000.

Lampiran 4
Grafik Kurva Standar

Nama	Konsentrasi	Absorbansi
TMP	0,05	0,12649
TMP	0,1	0,13439
TMP	0,2	0,20567
TMP	0,3	0,34226
TMP	0,4	0,4514
TMP	0,5	0,54758
TMP	0,6	0,69703
TMP	0,7	0,80429
TMP	0,8	0,92618



Lampiran 5
Perhitungan Kadar MDA

Larutan KH 4 jam

$$\begin{aligned} \text{a) } y &= 1,1071x + 0,0216 \\ 0,20564 &= 1,1071x + 0,0216 \\ x &= (0,20564 - 0,0216) / 1,1071 \\ x &= 0,166 \end{aligned}$$

$$\begin{aligned} \text{b) } y &= 1,1071x + 0,0216 \\ 0,24718 &= 1,1071x + 0,0216 \\ x &= (0,24718 - 0,0216) / 1,1071 \\ x &= 0,203 \end{aligned}$$

$$\begin{aligned} \text{c) } y &= 1,1071x + 0,0216 \\ 0,23476 &= 1,1071x + 0,0216 \\ x &= (0,23476 - 0,0216) / 1,1071 \\ x &= 0,192 \end{aligned}$$

Larutan KHM 4 jam

$$\begin{aligned} \text{a) } y &= 1,1071x + 0,0216 \\ 0,19296 &= 1,1071x + 0,0216 \\ x &= (0,19296 - 0,0216) / 1,1071 \\ x &= 0,154 \end{aligned}$$

$$\begin{aligned} \text{b) } y &= 1,1071x + 0,0216 \\ 0,19941 &= 1,1071x + 0,0216 \\ x &= (0,19941 - 0,0216) / 1,1071 \\ x &= 0,160 \end{aligned}$$

$$\begin{aligned} \text{c) } y &= 1,1071x + 0,0216 \\ 0,16314 &= 1,1071x + 0,0216 \\ x &= (0,16314 - 0,0216) / 1,1071 \\ x &= 0,127 \end{aligned}$$

Larutan KHMAL 4 jam

$$\begin{aligned} \text{a) } y &= 1,1071x + 0,0216 \\ 0,14389 &= 1,1071x + 0,0216 \\ x &= (0,14389 - 0,0216) / 1,1071 \\ x &= 0,110 \end{aligned}$$

$$\begin{aligned} \text{b) } y &= 1,1071x + 0,0216 \\ 0,10812 &= 1,1071x + 0,0216 \\ x &= (0,10812 - 0,0216) / 1,1071 \\ x &= 0,078 \end{aligned}$$

$$\begin{aligned} \text{c) } y &= 1,1071x + 0,0216 \\ 0,10208 &= 1,1071x + 0,0216 \\ x &= (0,10208 - 0,0216) / 1,1071 \\ x &= 0,072 \end{aligned}$$

Lampiran 6

Dokumentasi Penelitian



Gambar 5. Proses adaptasi hewan coba



Gambar 6. Proses pembuatan larutan preservasi



Gambar 7. Proses pembedahan dan pengambilan organ hewan coba



Gambar 8. Proses penimbangan organ jantung tikus



Gambar 9. Proses pengukuran kadar MDA jantung tikus

Lampiran 7

Persetujuan Etik



KEMENTERIAN PENDIDIKAN, KEBUDAYAAN, RISET DAN TEKNOLOGI
UNIVERSITAS HASANUDDIN FAKULTAS KEDOKTERAN
KOMITE ETIK PENELITIAN UNIVERSITAS HASANUDDIN
RSPTN UNIVERSITAS HASANUDDIN
RSUP Dr. WAHIDIN SUDIROHUSODO MAKASSAR
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REKOMENDASI PERSETUJUAN ETIK

Nomor : 224/UN4.6.4.5.31/ PP36/ 2022

Tanggal: 17 Mei 2022

Dengan ini Menyatakan bahwa Protokol dan Dokumen yang Berhubungan Dengan Protokol berikut ini telah mendapatkan Persetujuan Etik :

No Protokol	UH22030139	No Sponsor	
Peneliti Utama	Geni Kurnia Rante Lembang	Sponsor	
Judul Peneliti	Uji Efek Penambahan Adenosin-Lidokain (AL) Dalam Larutan Krebs Henseleit Terhadap Aktivitas Peroksidasi Lipid Selama Preservasi Organ Jantung Tikus		
No Versi Protokol	1	Tanggal Versi	26 Maret 2022
No Versi PSP		Tanggal Versi	
Tempat Penelitian	Fakultas Farmasi Universitas Hasanuddin Makassar		
Jenis Review	<input type="checkbox"/> Exempted <input checked="" type="checkbox"/> Expedited <input type="checkbox"/> Fullboard Tanggal	Masa Berlaku 17 Mei 2022 sampai 17 Mei 2023	Frekuensi review lanjutan
Ketua KEP Universitas Hasanuddin	Nama Prof.Dr.dr. Suryani As'ad, M.Sc.,Sp.GK (K)	Tanda tangan 	
Sekretaris KEP Universitas Hasanuddin	Nama dr. Agussalim Bukhari, M.Med.,Ph.D.,Sp.GK (K)	Tanda tangan 	

Kewajiban Peneliti Utama:

- Menyerahkan Amandemen Protokol untuk persetujuan sebelum di implementasikan
- Menyerahkan Laporan SAE ke Komisi Etik dalam 24 Jam dan dilengkapi dalam 7 hari dan Laporan SUSAR dalam 72 Jam setelah Peneliti Utama menerima laporan
- Menyerahkan Laporan Kemajuan (progress report) setiap 6 bulan untuk penelitian resiko tinggi dan setiap setahun untuk penelitian resiko rendah
- Menyerahkan laporan akhir setelah Penelitian berakhir
- Melaporkan penyimpangan dari prokol yang disetujui (protocol deviation / violation)
- Mematuhi semua peraturan yang ditentukan