

DAFTAR PUSTAKA

- Akbas, S.H., Yegin, A., and Ozhen, T. 2005. Effect Of Pentylenetetrazol-Induced Epileptic Seizure on The Antioxidant Enzyme Activities, Glutathione And Lipid Peroxidation Levels In Rat Erythrocytes And Liver Tissues. *Clinical Biochemistry*. 38: 1009-1014. <https://doi.org/10.1016/j.clinbiochem.2005.07.012>
- Allameh, A., Mehr, R.N., Aliarab, A., Sebastiani, G., and Pantopoulus, K. 2023. Oxidative Stress in Liver Pathophysiology and Disease. *Journal Antioxidants*. 12: 1-23. <https://doi.org/10.3390/antiox12091653>.
- Brunton, L., Parker, K., Blumenthal, D., dan Buxton, L. 2008. *Goodman & Gilman's: Manual of Pharmacology and Therapeutics*. USA: McGraw-Hill Companies.
- Chaturvedi, S., Ayaz, S., and Shah, K. 2021. Validated UV Spektrophotometric Method for In-Vitro Dissolution Studies in Phosphate Buffer pH 7,4. *International Journal Pharmaceutical Science and Research*. 12(4): 2417-2421. [http://dx.doi.org/10.13040/IJPSR.0975-8232.12\(4\).2417-21](http://dx.doi.org/10.13040/IJPSR.0975-8232.12(4).2417-21)
- Costa & Vale. 2023. Understanding Lamotrigine's Role in the CNS and Possible Future Evolution. *International Journal of Molecular Sciences*. 24: 1-23. <https://doi.org/10.3390/ijms24076050>
- Da'I, M., Wulandari, R.R., dan Utami, W. 2021. Uji Aktivitas Penangkap Radikal Dpph Analog Kurkumin Siklik Dan N-Heterosiklik Monoketon. *Pharmacon*. 12(1): 19-25. <https://dx.doi.org/10.23917/pharmacon.v12i1.44>
- Darwadi, R.P., Aulanni'am., dan Mahdi, C. 2013. Pengaruh Terapi Kurkumin Terhadap Kadar Malondialdehid (Mda) Hasil Isolasi Parotis Dan Profil Protein Tikus Putih Yang Terpapar Lipopolisakarida (Lps). *Kimia Student Journal*. 1(1): 133-139.
- Deng, J., Fu, Z.R., Wang, L., Liu, J., Chen, C.H., Fang, F., and Wang, X.L. 2022. Acute Liver Failure Associated with Lamotrigine in Children with Rpilepsy: A Report of Two Cases and Thoughts on Pharmacogenomics. *Epilepsy & Behavior Reports*. 20: 2-5. <https://doi.org/10.1016/j.ebr.2022.100568>.
- Dhir, A. 2018. Curcumin in Epilepsy Disorders. *Phytotherapy Research*. 1-11. <https://doi.org/10.1002/ptr.6125>
- Dipiro, J.T., Talbert R.L., Matzke, G.R., Wells, B.G., and Posey, L.M. 2008. *Pharmacotherapy A Pathophysiologic Approach Seventh Edition*. New York: Mc Graw Hill.
- Engdhal., Schijndel, M.D.M.V., Voulgaris, D., Criscio, M.D., Ramsbottom, K.A., Rigden, D.J., Herland, A., and Ruegg, J. 2021. Bisphenol A Inhibits the Transporter Function of the Blood-Brain Barrier by Directly Interacting with the ABC Transporter Breast Cancer Resistance Protein (BCRP). *Int. J. Mol. Sci*. 22: 1-13. <https://doi.org/10.3390/ijms22115534>

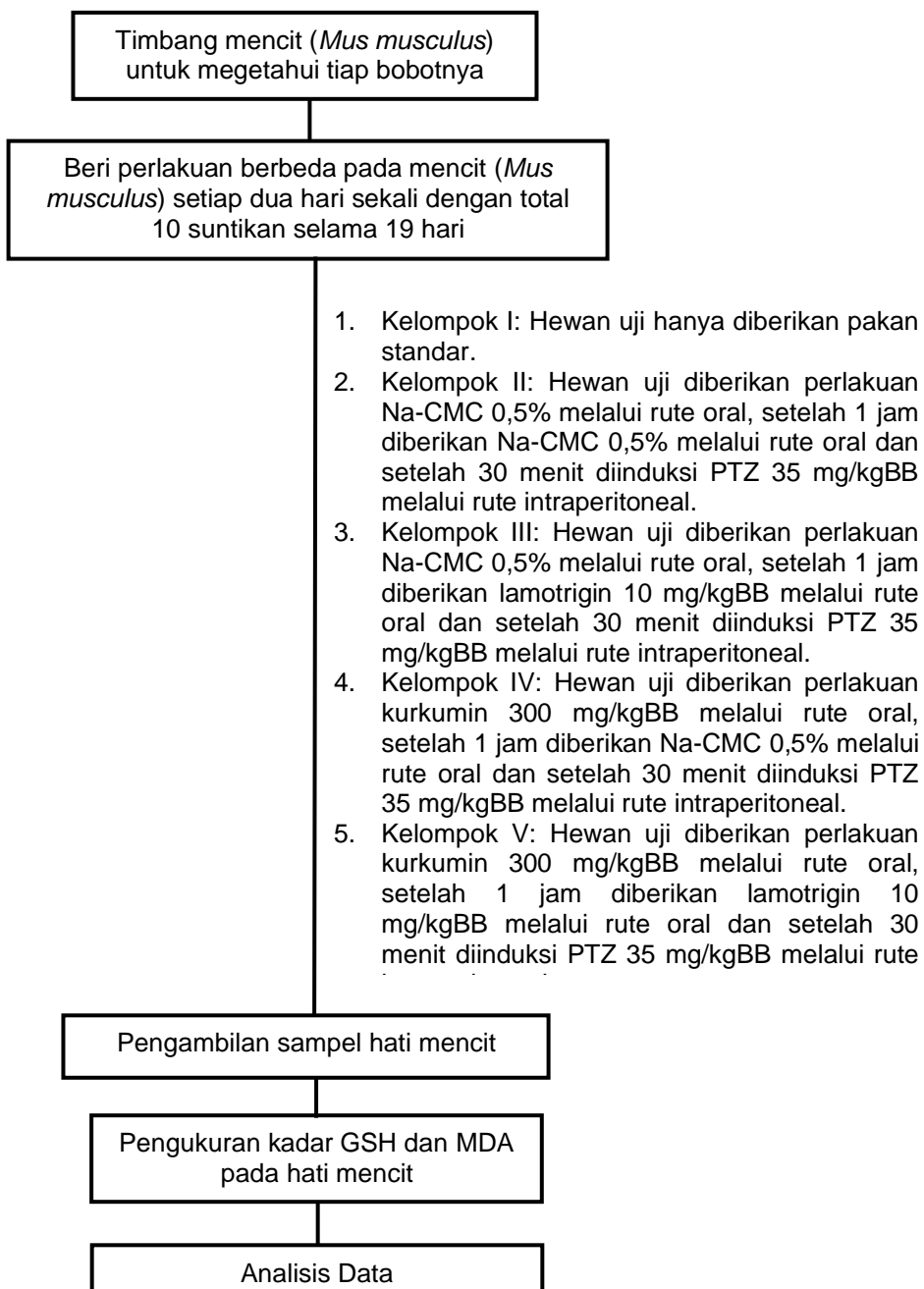
- Erkec, O.E., and Arihan, O. 2015. Pentylenetetrazole Kindling Epilepsy Model. *Journal Epilepsy*. 21(1): 6-12. <https://doi.org/10.10.5505/epilepsi.2015.08108>
- Esperanza, Y., Prabowo, S., dan Handajani, F. 2021. Efektivitas Pemberian Curcumin terhadap Perbaikan Fungsi Hepar Tikus Putih (*Rattus Novergicus*) yang diinduksi Parasetamol Dosis Tinggi: Studi Literatur. *Jurnal Ilmiah Kedokteran Wijaya Kusuma*. 10(2): 208-221. <http://dx.doi.org/10.30742/jikw.v10i2.1250>
- Febrina, L., Helmi., Rijal, L. 2016. Profile Kadar Malondialdehida Glukosa dan Kolesterol pada Tikus Putih yang Terpapar Asap Rokok. *J. Trop Pharmaceutical Chemical*. 3(4): 277-282. <https://doi.org/10.25026/jtpc.v3i4.115>
- Fitton, A., and Gowa, K.L. 1995. Lamotrigine An Update of its Pharmacology and Therapeutic Use in Epilepsy. *Drugs*. 50(4): 691-713. <https://doi.org/10.2165/00003495-199550040-00008>
- Ginsberg, L. 2008. *Lecture Notes: Neurologi*. Jakarta: Erlangga.
- Goncalves, J., et al. 2021. A Combo-Strategy to Improve Brain Delivery of Antiepileptic Drugs: Focus on BCRP and Intranasal Administration. *International Journal of Pharmaceutics*. 593: 1-9. <https://doi.org/10.1016/j.ijpharm.2020.120161>
- Harby, S. A., Khalil, N.A., El-sayed, N.S., Thabert, E.H., Saleh, S.R., and Fathelbab, M.H. 2023. Implications of BCRP Modulation on PTZ-induced Seizures in Mice: Role of ko143 and Metformin as Adjuvants to Lamotrigine. *Naunyn-Schmiedeberg's Archives of Pharmacology*. 396: 2627-2636. <https://doi.org/10.3389/fphar.2021.666502>
- Higazy, I.M. 2020. Brain Targeting Stealth Lipomers Of Combined Antiepileptic-Anti-Inflammatory Drugs As Alternative Therapy For Conventional Anti-Parkinson's. *Saudi Pharmaceutical Journal*. 28: 33-57. <https://doi.org/10.1016/j.isps.2019.11.004>
- Hossein, A.E., and Faridadin, E. The Effect of Lamotrigine on Epilepsy. *Irian Journal of Neurology*. 11(4): 162-163.
- Hu, Y. Meng, B., Yin, S., Yang, M., Li, Y., Liu, N., Li, S., Liu, Y., Sun, D., Wang, S., Wang, Y., Fu, Z., Wu, Y., Pang, A., Sun, J., Wang, Y., and Yang, W. 2022. Scorpion Venom Peptide HsTx2 Suppressed PTZ-Induced Seizures in Mice Via the Circ_0001293/miR-8114/TGF- β 2 Axis. *Journal of Neuroinflammation*. 19: 1-18. <https://doi.org/10.1177/01423312231157118>
- Hussein, S. A., Afaf, D., Mageid, A., Omnia, M., Hassan, S.A. 2014. Biochemical Role Of Curcumin On Kainic Acid-Induced Epilepsy In Male Swiss Albino Mice. *Benha Veterinary Medical Journal*. 27(2): 225-240.
- Katzung, B.M., Masters, S.B., dan Trevor, A.J. 2012. *Farmakologi Dasar & Klinik Edisi 12*. USA: McGraw-Hill Companies.

- Khan, M. J., Mukhtiar, M., Qureshi, M.M., Jan, S.U., Ullah, I., Hussain, A., Khan, M.F., Gul, R., Shahwani, N.A., and Rabbani, I. 2018. Spectrophotometric Investigation of Glutathione Modulation by Thallium Chloride in Aqueous Medium. *J. Pharm.* 31(4): 1463-1467.
- Kusuhara, H., Furuie, H., Inano, A., Sunagawa, A., Yamada, S., Wu, C., Fukizawa, S., Morimoto, N., Ieiri, I., Morishita, M., Sumita, K., Mayahara, H., Fujita, T., Maeda, K., and Sugiyama, Y. 2012. Pharmacokinetic Interaction study of Sulphasalazine in Healthy Subjects and the Impact of Curcumin as an in Vivo Inhibitor of BCRP. *British Journal of Pharmacology*. 166: 1793-1803. <https://doi.org/10.1111/j.1476-5381.2012.01887.x>
- Mao, Q., and Unadkat, J. D. 2015. Role of the Breast Cancer Resistance Protein (BCRP/ABCG2) in Drug Transport Update. *The AAPS Journal*. 17(1): 65-82. <https://doi.org/10.1208/s12248-014-9668-6>
- Meadow, S.R., dan Newel, S.J. 2005. *Lecture Notes: Pediatrika*. Jakarta: Erlangga.
- Novinae L., dan Sumarno. 2020. Ligan SV2A sebagai Terapi Epilepsi. *Jurnal Farmasi Udayana*. 9(1): 1-12. <https://doi.org/10.24843/JFU.2020.v09.i01.p01>
- Nurhayati, D.R., dan Yusoff, S.F.B. 2022. *Herbal dan Rempah*. Surabaya: Scopindo Media Pustaka.
- Pallegrino, M., Rizza, P., Nigro, A., Ceraldi, R., Ricci, E., Perotta, I., Aquila, S., Lanzino, M., Ando, S., Morello, C., and Sisci, D. 2018. FoxO3a Mediates the Inhibitory Effects of the Antiepileptic Drug Lamotrigine on Breast Cancer Growth. *Molecular Cancer Research*. 16(6): 923-934. <https://doi.org/10.1158/1541-7786.mcr-17-0662>
- Porrostami, A., Farokhi, F., and Hendri, R. 2014. Effect Of Hydroalcoholic Extract Of Ginger On The Liver Of Epileptic Female Rats Treated With Lamotrigine. *Avicenna Journal of Phytomedicine*. 4(4): 276-286.
- Reeta., Mehla, J., Pahuja, M., and Gupta, Y.M. 2011. Pharmacokinetic and Pharmacodynamic Interactions of Valproate, Phenytoin, Phenobarbitone and Carbamazepine with Curcumin in Experimental Models of Epilepsy in Rats. *Pharmacology, Biochemistry, and Behavior*. 399-407. <https://doi.org/10.1016/j.pbb.2011.05.011>
- Rodriguez., Urrutia, E.C., Cruz, C.P., Correa., H.M., Espinosa, L.R., Sampieri, A., and Aparicio, L.C. 2014. Relevance of the Glutathione System in Temporal Lobe Epilepsy: Evidence in Human and Experimental Models. *Hindawi Publishing Corporation*. 1-12. <https://doi.org/10.1155/2014/759293>
- Romermann, K., Helmer, R., dan Loscher, W. 2015. The antiepileptic drug lamotrigine is a substrate of mouse and human breast cancer resistance protein (ABCG2). *Neuropharmacology*. 93: 7-14. <https://doi.org/10.1016/j.neuropharm.2015.01.015>

- Serwetman, R.C., Krikorian, S.A., and Houmen. 2008. Rash and Liver Dysfunction Related to Lamotrigine Therapy. *J Pharm Technol.* 24: 17-21. <https://doi.org/10.1177/875512250802400105>
- Sianipar, E. A., Louisa, M., dan Wanandi, S. I. 2018. Kurkumin Meningkatkan Sensitivitas Sel Kanker Payudara terhadap Tamoksifen Melalui Penghambatan Ekspresi P-glikoprotein dan *Breast Cancer Resistance Protein*. *Jurnal Farmasi Galenika.* 4(1): 1 – 11. <https://doi.org/10.22487/j24428744>.
- Spectrophotometric Investigation of Glutathione Modulation by Thallium Chloride in Aqueous Medium. *J. Pharm Sci.* 31(4): 1463-1467.
- Tambe, R., Jain, P., Patil, S., Ghumatkar, P., and Sathaye, S. 2015. Protective Effects of Diosgenin in *Pentylentetrazole* Induced Kindling Model of Epilepsy in Mice. *Neurochemistry & Neuropharmacology.* 1(1): 1-6. <https://doi.org/10.1007/s00210-016-1220-z>
- Taskar, K. S., Rudraraju, V., Mittapalli, R.K., Samala, R., Thorsheim, H.R., Lockman, J., Gril, B., Hua, E., Palmieri, D., Polli, J.W., Castellino, S., Rubin, S.D., Lockman, P.R., Steeg, P.S., and Smith, Q.R. 2012. Lapatinib Distribution in HER2 Overexpressing Experimental Brain Metastases of Breast Cancer. *Pharm Res.* 29: 770-781. <https://doi.org/10.1007/s11095-011-0601-8>
- Urosvevic, M., Nikolic, L., Gajic, I., Nikolic, V., Dinic, A., dan Miljkovic, V. 2022. Curcumin: Biological Activities and Modern Pharmaceutical Forms. *Jurnal Antibiotics.* 11(135): 1-27. <https://doi.org/10.3390/antibiotics11020135>

LAMPIRAN

Lampiran 1. Skema kerja perlakuan uji



Lampiran 2. Perhitungan dosis

Lampiran 2a. Perhitungan dosis kurkumin 300 mg/kgBB (0,30 mg/gramBB)

Berat rata-rata mencit	= 35 gram
Dosis yang diberikan	= $35 \times 0,30 \text{ mg} = 10,5 \text{ mg}$
Pemberian	= 1% dari bobot mencit = 0,35 mL
Jumlah mencit	= 10 ekor
Kurkumin ditimbang	= $(10,5 \text{ mg} \times 10 \text{ ekor})$ dalam $(0,35 \text{ mL} \times 10 \text{ ekor})$ = $(105 \text{ mg} \times 10 \text{ perlakuan})$ dalam $(3,5 \text{ mL} \times 10 \text{ perlakuan})$ = 1,05 g kurkumin dalam 35 mL Na-CMC 0,5%

Lampiran 2b. Perhitungan dosis lamotrigin 10 mg/kgBB (0,010 mg/gramBB)

Berat rata-rata mencit	= 35 gram
Dosis yang diberikan	= $35 \times 0,010 \text{ mg} = 0,35 \text{ mg}$
Pemberian	= 1% dari bobot mencit = 0,35 mL
Jumlah mencit	= 10 ekor
Lamotrigin ditimbang	= $(0,35 \text{ mg} \times 10 \text{ ekor})$ dalam $(0,35 \text{ mL} \times 10 \text{ ekor})$ = $(3,5 \text{ mg} \times 10 \text{ perlakuan})$ dalam $(3,5 \text{ mL} \times 10 \text{ perlakuan})$ = 35 mg lamotrigin dalam 35 mL Na-CMC 0,5%

Lampiran 2c. Perhitungan dosis PTZ 35 mg/kgBB (0,035 mg/gramBB)

Berat rata-rata mencit	= 35 gram
Dosis yang diberikan	= $35 \times 0,035 \text{ mg} = 1,225 \text{ mg}$
Pemberian	= 1% dari bobot mencit = 0,35 mL
Jumlah mencit	= 20 ekor
PTZ ditimbang	= $(1,225 \text{ mg} \times 20 \text{ ekor})$ dalam $(0,35 \text{ mL} \times 20 \text{ ekor})$ = $(24,5 \text{ mg} \times 10 \text{ perlakuan})$ dalam $(7 \text{ mL} \times 10 \text{ perlakuan})$ = 245 mg PTZ dalam 70 mL NaCl 0,9%

Lampiran 3. Data hasil analisis spektrofotometri UV-Vis

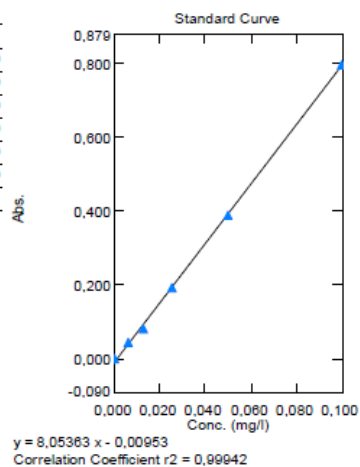
Lampiran 3a. Pengukuran kadar GSH

LABORATORIUM BIOFARMAKA FAKULTAS FARMASI UNIVERSITAS HASANUDDIN

Gedung Pusat Kegiatan Penelitian Lantai IV Wing B

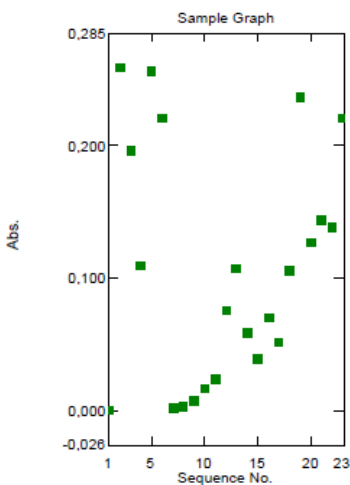
Standard Table

	Sample ID	Type	Ex	Conc	WL412,0	Wgt.Factor
1	blank	Standard		0,000	-0,000	1,000
2	GSH 1	Standard		0,008	0,044	1,000
3	GSH 2	Standard		0,013	0,079	1,000
4	GSH 3	Standard		0,025	0,192	1,000
5	GSH 4	Standard		0,050	0,390	1,000
6	GSH 5	Standard		0,100	0,799	1,000
7						



Sample Table

	Sample ID	Type	Ex	Conc	WL412,0	Comment
1	blank	Unknown		0,001	0,000	
2	1.1.1	Unknown		0,033	0,259	
3	1.1.2	Unknown		0,026	0,196	
4	1.1.3	Unknown		0,015	0,110	
5	1.1.4	Unknown		0,033	0,257	
6	1.1.5	Unknown		0,029	0,221	
7	2.1.1	Unknown		0,001	0,002	
8	2.1.2	Unknown		0,002	0,003	
9	2.1.3	Unknown		0,002	0,007	
10	2.1.4	Unknown		0,003	0,016	
11	2.1.5	Unknown		0,004	0,024	
12	3.1.1	Unknown		0,011	0,076	
13	3.1.2	Unknown		0,015	0,108	
14	3.1.3	Unknown		0,009	0,059	
15	4.1.1	Unknown		0,006	0,039	
16	4.1.2	Unknown		0,010	0,070	
17	4.1.3	Unknown		0,008	0,052	
18	4.1.4	Unknown		0,014	0,106	
19	5.1.1	Unknown		0,031	0,237	
20	5.1.2	Unknown		0,017	0,127	
21	5.1.3	Unknown		0,019	0,143	
22	5.1.4	Unknown		0,018	0,138	
23	5.1.5	Unknown		0,029	0,222	
24						



Makassar, 22/04/2024
Analisis

Tabel 1. Hasil pengukuran kurva standar GSH

	Sample ID	Type	Ex	Conc	WL412,0	Wgt.Factor	Comments
1	Blank	Standard		0,000	-0,000	1,000	
2	0,00625 mM	Standard		0,006	0,044	1,000	
3	0,0125 Mm	Standard		0,013	0,079	1,000	
4	0,025 mM	Standard		0,025	0,192	1,000	
5	0,05 mM	Standard		0,050	0,390	1,000	
6	0,1 mM	Standard		0,100	0,799	1,000	

Tabel 2. Hasil pengukuran kadar GSH hati mencit

	Sample ID	Type	Ex	Conc	WL412,0	Comments
1	Blank	Unknown		0,001	0,000	
2	KI	Unknown		0,033	0,259	
3	KI	Unknown		0,026	0,196	
4	KI	Unknown		0,015	0,110	
5	KI	Unknown		0,033	0,257	
6	KI	Unknown		0,029	0,221	
7	KII	Unknown		0,001	0,002	
8	KII	Unknown		0,002	0,003	
9	KII	Unknown		0,002	0,007	
10	KII	Unknown		0,003	0,016	
11	KII	Unknown		0,004	0,024	
12	KIII	Unknown		0,011	0,076	
13	KIII	Unknown		0,015	0,108	
14	KIII	Unknown		0,009	0,059	
15	KIV	Unknown		0,006	0,039	
16	KIV	Unknown		0,010	0,070	
17	KIV	Unknown		0,008	0,052	
18	KIV	Unknown		0,014	0,106	
19	KV	Unknown		0,031	0,237	
20	KV	Unknown		0,017	0,127	
21	KV	Unknown		0,019	0,143	
22	KV	Unknown		0,018	0,138	
23	KV	Unknown		0,029	0,222	

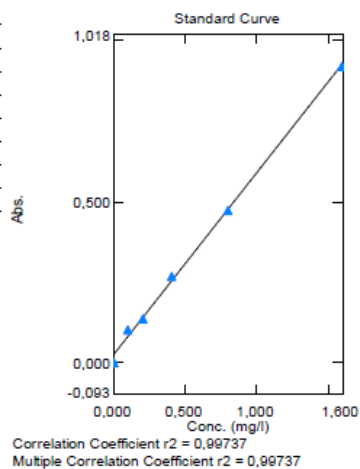
Lampiran 3b. Pengukuran kadar MDA

LABORATORIUM BIOFARMAKA FAKULTAS FARMASI UNIVERSITAS HASANUDDIN

Gedung Pusat Kegiatan Penelitian Lantai IV Wing B

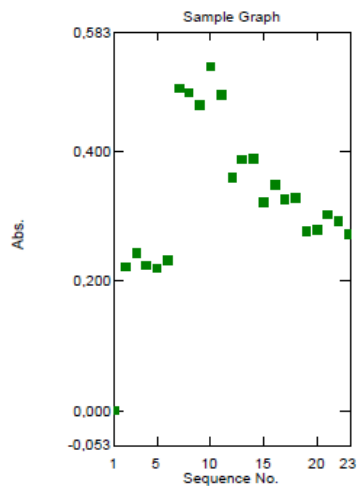
Standard Table

	Sample ID	Type	Ex	Conc	WL532,0	Wgt.Factor
1	blank	Standard		0,000	0,000	1,000
2	mda 1	Standard		0,100	0,103	1,000
3	mda 2	Standard		0,200	0,138	1,000
4	mda 3	Standard		0,400	0,271	1,000
5	mda 4	Standard		0,800	0,475	1,000
6	mda 5	Standard		1,600	0,923	1,000
7						



Sample Table

	Sample ID	Type	Ex	Conc	WL532,0	Comment
1	BLANKO	Unknown		-0,050	0,000	
2	1.1	Unknown		0,345	0,222	
3	1.2	Unknown		0,362	0,243	
4	1.3	Unknown		0,349	0,224	
5	1.4	Unknown		0,343	0,221	
6	1.5	Unknown		0,363	0,232	
7	2.1	Unknown		0,835	0,497	
8	2.2	Unknown		0,824	0,491	
9	2.3	Unknown		0,787	0,470	
10	2.4	Unknown		0,894	0,530	
11	2.5	Unknown		0,814	0,485	
12	3.1	Unknown		0,589	0,359	
13	3.2	Unknown		0,639	0,387	
14	3.3	Unknown		0,643	0,389	
15	4.1	Unknown		0,523	0,322	
16	4.2	Unknown		0,570	0,348	
17	4.3	Unknown		0,528	0,325	
18	4.4	Unknown		0,532	0,327	
19	5.1	Unknown		0,444	0,277	
20	5.2	Unknown		0,447	0,279	
21	5.3	Unknown		0,487	0,302	
22	5.4	Unknown		0,487	0,291	
23	5.5	Unknown		0,434	0,272	
24						



Makassar, 22/04/2024
Analisis

Tabel 3. Hasil pengukuran kurva standar MDA

	Sample ID	Type	Ex	Conc	WL412,0	Wgt.Factor	Comments
1	Blank	Standard		0,000	-0,000	1,000	
2	0,1 ppm	Standard		0,100	0,044	1,000	
3	0,2 ppm	Standard		0,200	0,079	1,000	
4	0,4 ppm	Standard		0,400	0,192	1,000	
5	0,8 ppm	Standard		0,800	0,390	1,000	
6	1,6 ppm	Standard		1,600	0,799	1,000	

Tabel 4. Hasil pengukuran kadar MDA hati mencit

	Sample ID	Type	Ex	Conc	WL412,0	Comments
1	Blank	Unknown		-0,050	0,000	
2	KI	Unknown		0,345	0,222	
3	KI	Unknown		0,382	0,243	
4	KI	Unknown		0,349	0,224	
5	KI	Unknown		0,343	0,221	
6	KI	Unknown		0,363	0,232	
7	KII	Unknown		0,835	0,497	
8	KII	Unknown		0,824	0,491	
9	KII	Unknown		0,787	0,470	
10	KII	Unknown		0,894	0,530	
11	KII	Unknown		0,814	0,485	
12	KIII	Unknown		0,589	0,359	
13	KIII	Unknown		0,639	0,387	
14	KIII	Unknown		0,643	0,389	
15	KIV	Unknown		0,523	0,322	
16	KIV	Unknown		0,570	0,348	
17	KIV	Unknown		0,528	0,325	
18	KIV	Unknown		0,532	0,327	
19	KV	Unknown		0,444	0,277	
20	KV	Unknown		0,447	0,279	
21	KV	Unknown		0,487	0,302	
22	KV	Unknown		0,467	0,291	
23	KV	Unknown		0,434	0,272	

Lampiran 4. Data statistik

Lampiran 4a. Data statistik pengukuran kadar GSH

Tabel 5. Hasil *One-Way ANOVA* pengukuran kadar GSH

<i>ANOVA Summary</i>	
F	18.58
P value	<0.0001
P value summary	****
Significant diff. among means (P <0.05)?	Yes
R squared	0.8138

Tabel 6. Hasil *Tukey's Multiple Comparisons Test* pengukuran kadar GSH

<i>Tukey's multiple comparisons test</i>	<i>Mean Diff,</i>	<i>95,00% CI of diff,</i>	<i>Below threshold?</i>	<i>Summary</i>	<i>Adjusted P Value</i>
KI vs. KII	0,02480	0,01483 to 0,03477	Yes	****	<0,0001
KI vs. KIII	0,01553	0,004020 to 0,02705	Yes	**	0,0058
KI vs. KIV	0,01770	0,007124 to 0,02828	Yes	***	0,0008
KI vs. KV	0,004400	-0,005571 to 0,01437	No	Ns	0,6699
KII vs. KIII	-0,009267	-0,02078 to 0,002247	No	Ns	0,1498
KII vs. KIV	-0,007100	-0,01768 to 0,003476	No	Ns	0,2886
KII vs. KV	-0,02040	-0,03037 to -0,01043	Yes	****	<0,0001
KIII vs. KIV	0,002167	-0,009874 to 0,01421	No	Ns	0,9808
KIII vs. KV	-0,01113	-0,02265 to 0,0003802	No	Ns	0,0607
KIV vs. KV	-0,01330	-0,02388 to -0,002724	Yes	****	0,0103

Lampiran 4b. Data statistik pengukuran kadar MDA

Tabel 7. Hasil *One-Way ANOVA* pengukuran kadar MDA

<i>ANOVA Summary</i>	
F	221.7
P value	<0.0001
P value summary	****
Significant diff. among means (P <0.05)?	Yes
R squared	0.9812

Tabel 8. Hasil *Tukey's Multiple Comparisons Test* pengukuran kadar MDA

<i>Tukey's multiple comparisons test</i>	<i>Mean Diff, 95,00% CI of diff,</i>	<i>Below threshold?</i>	<i>Summary</i>	<i>Adjusted P Value</i>
KI vs. KII	-0,4744 -0,5262 to -0,4226	Yes	****	<0,0001
KI vs. KIII	-0,2673 -0,3271 to -0,2075	Yes	****	<0,0001
KI vs. KIV	-0,1819 -0,2368 to -0,1269	Yes	****	<0,0001
KI vs. KV	-0,09940 -0,1512 to -0,04762	Yes	***	0,0002
KII vs. KIII	0,2071 0,1473 to 0,2669	Yes	****	<0,0001
KII vs. KIV	0,2926 0,2376 to 0,3475	Yes	****	<0,0001
KII vs. KV	0,3750 0,3232 to 0,4268	Yes	****	<0,0001
KIII vs. KIV	0,08542 0,02289 to 0,1479	Yes	**	0,0052
KIII vs. KV	0,1679 0,1081 to 0,2277	Yes	****	<0,0001
KIV vs. KV	0,08245 0,02753 to 0,1374	Yes	**	0,0022

Lampiran 5. Dokumentasi



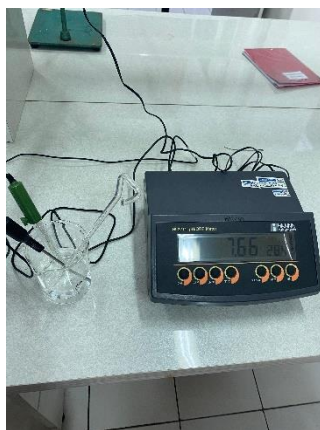
Gambar 5. Penyiapan hewan coba



Gambar 6. Perlakuan hewan coba



Gambar 7. Penimbangan organ hati



Gambar 8. Pengukuran PBS pH7.6



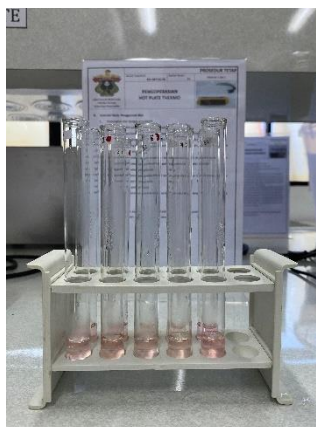
Gambar 9. Sentrifugasi pengukuran kadar MDA



Gambar 10. Sentrifugasi pengukuran kadar GSH



Gambar 11. Pemanasan menggunakan *hotplate*



Gambar 12. Setelah pemanasan menggunakan *hotplate*



Gambar 13. Gradasi warna pencampuran bahan pengukuran GSH



Gambar 14. Gradasi warna pencampuran bahan pengukuran MDA



Gambar 15. Pengukuran kadar GSH dan MDA menggunakan spektrofotometri UV-Vis

Lampiran 6. Rekomendasi persetujuan etik



KEMENTERIAN PENDIDIKAN, KEBUDAYAAN, RISET DAN TEKNOLOGI
 KOMITE ETIK PENELITIAN FARMASI DAN KESEHATAN
 FAKULTAS FARMASI
 UNIVERSITAS HASANUDDIN
 Sekretariat : Lantai 3 Fakultas Farmasi
 JL. PERINTIS KEMERDEKAAN KAMPUS UNHAS TAMALANREA KM.10 MAKASSAR 90245.
 CP: Nurhasni Hasan, Ph.D., Apt; No. Hp Sekretariat: 08517978835; email: kep.fakfarmasi@unhas.ac.id

LEMBAR KEPUTUSAN ETIK

Nomor : 1549/UN4.17.8/KP.06.07/2023
 Judul Penelitian : Pengaruh Pemberian Kurkumin dan Lamotrigin
 terhadap Kadar GSH Otak Mencit yang Diinduksi
 Pentylenetetrazole
 Nama Peneliti : Almiranda Shafira Subhan
 Nomor Registrasi : U H 0 1 2 3 1 1 0 1 0

A	Rangkuman penilaian oleh <i>reviewers</i>
B	Perlu <i>full board</i> : <input type="checkbox"/> Ya <input checked="" type="checkbox"/> Tidak a. Ya (terus ke C) b. Tidak (terus ke D)
C	Catatan Rapat Etik (<i>Full Board</i>) — Tgl/bulan/tahun Tindak lanjut/catatan rapat etik Dikirimkan kembali ke yang bersangkutan dengan tembusan kepimpinan instansi
D	Hasil Penilaian <input type="checkbox"/> a. Disetujui <input checked="" type="checkbox"/> b. Disetujui dengan revisi minor (lihat lembaran pertimbangan/saran /petunjuk) <input type="checkbox"/> c. Disetujui dengan revisi mayor (lihat lembaran pertimbangan/saran/petunjuk) <input type="checkbox"/> d. Ditunda untuk beberapa alasan (lihat lembaran pertimbangan/saran/petunjuk) <input type="checkbox"/> e. Ditolak/tidak dapat disetujui (lihat lembaran pertimbangan/saran/petunjuk)
E	Penugasan pengawasan jalannya penelitian di lapangan untuk yang berisiko sedang – berat, mengobservasi apakah ada penyimpangan etik (tuliskan nama anggota komisi etik yang ditunjuk oleh rapat): —

Makassar, 20 Desember 2023
 Sekretaris



Prof. Dr. Elly Wahyudin, DEA., Apt
 NIP.195601141986012001

Nurhasni Hasan M.Sc., M.Pharm.Sc., Ph.D.Apt.,
 NIP. 198601162010122009



**KEMENTERIAN PENDIDIKAN, KEBUDAYAAN, RISET DAN TEKNOLOGI
KOMITE ETIK PENELITIAN FARMASI DAN KESEHATAN
FAKULTAS FARMASI
UNIVERSITAS HASANUDDIN**



Sekretariat : Lantai 3 Fakultas Farmasi
JL. PERINTIS KEMERDEKAAN KAMPUS UNHAS TAMALANREA KM.10 MAKASSAR 90245.
CP: Nurhasni Hasan, Ph.D., Apt; No. Hp Sekretariat: 08317978835; email: kep.fakfarmasi@unhas.ac.id

REKOMENDASI PERSETUJUAN ETIK

Nomor : 1549/UN4.17.8/KP.06.07/2023

Tanggal : 20 Desember 2023

Dengan ini menyatakan bahwa protokol dan dokumen yang berhubungan dengan protokol berikut ini telah mendapatkan persetujuan etik:

No Protokol	UH012311010	No Sponsor	-
Peneliti Utama	Almiranda Shafira Subhan	Sponsor	-
Judul Peneliti	Pengaruh Pemberian Kurkumin dan Lamotrigin terhadap Kadar GSH Otak Mencit yang Diinduksi Pentylenetetrazole		
No Versi Protokol	UH012311010	Tanggal Versi	-
No Versi PSP	-	Tanggal Versi	-
Tempat Penelitian	Laboratorium Biofarmasi Fakultas Farmasi Universitas Hasanuddin		
Jenis Review	<input type="checkbox"/> <i>Exempted</i> <input checked="" type="checkbox"/> <i>Expedited</i> <input type="checkbox"/> <i>Full Board</i>	Masa Berlaku Sampai	Frekuensi review lanjutan
Ketua Komisi Etik Penelitian	Nama Prof. Dr. Elly Wahyudin, DEA., Apt	Tanda tangan 	Tanggal 27-12-2023
Sekretaris Komisi Etik Penelitian	Nama Nurhasni Hasan, M.Si., M.Pharm., Ph.D., Apt	Tanda tangan 	Tanggal 22-12-2023

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 lapor 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 protokol yang disetujui (*protocol deviation/violation*)
- Mematuhi semua peraturan yang ditentukan.

Lampiran 7. Sertifikat analisis

Lampiran 7a. Lamotrigin



QualityAssurance@aladdinsci.com

ALADDIN SCIENTIFIC CORPORATION

14078 Meridian Parkway, Riverside, CA. 92518

Certificate of Analysis

Date of Testing: 2022-08-20 15:38:49

Date of Next Testing: 2024-08-19 15:38:49

Product Name: **Lamotrigine**

CAS Number: 84057-84-1

Specifications & Purity: $\geq 98\%$

Lot #: H2217428

SKU #: L129555

Analysis: **121813**

Storage Temperature: Store at 2-8°C, Argon charged

Parameter	Limit Values	Result
Purity(HPLC)	98-100 (%)	99.93800%
Carbon by Elemental Analysis	41-43.1 (%)	41.97%
Nitrogen by Elemental Analysis	26.7-27.9 (%)	27.53%
Melting point	216-220 (°C)	219.98000 °C
Appearance (L129555)	White powder	White powder
Solubility in DMSO , Colorless to Faint Yellow Clear(C=20mg/ml)	Conforms	Conforms

John Su
QA & QC Manager

Lampiran 7b. Kurkumin

Product Information	
CAS number	458-37-7
EC number	207-280-5
Hill Formula	$C_{21}H_{20}O_6$
Chemical formula	$[4-(OH)-3-(CH_3O)C_6H_3CH=CHCO]_2CH_2$
Molar Mass	368.39 g/mol
HS Code	<u>3212 90 90</u>
Structure formula Image	
Quality Level	<u>MQ200</u>

Applications	
Application	Curcumin for synthesis. CAS 458-37-7, chemical formula $4-(OH)-3-(CH_3O)C_6H_3CH=CHCO_2CH_3$.

Physicochemical Information	
Melting Point	170 - 175 °C

Toxicological Information	
LD 50 oral	LD50 Tikus > 5000 mg/kg

Safety Information according to GHS	
RTECS	MI5230000
Storage class	10 - 13 Cairan dan padatan lain

