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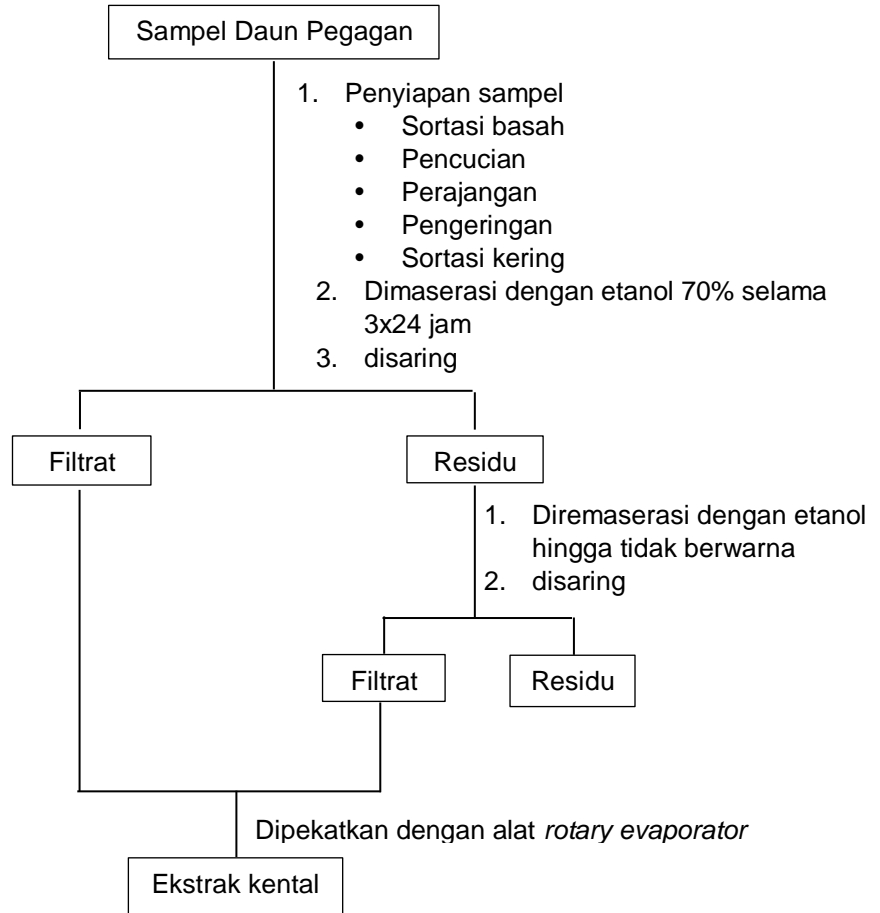
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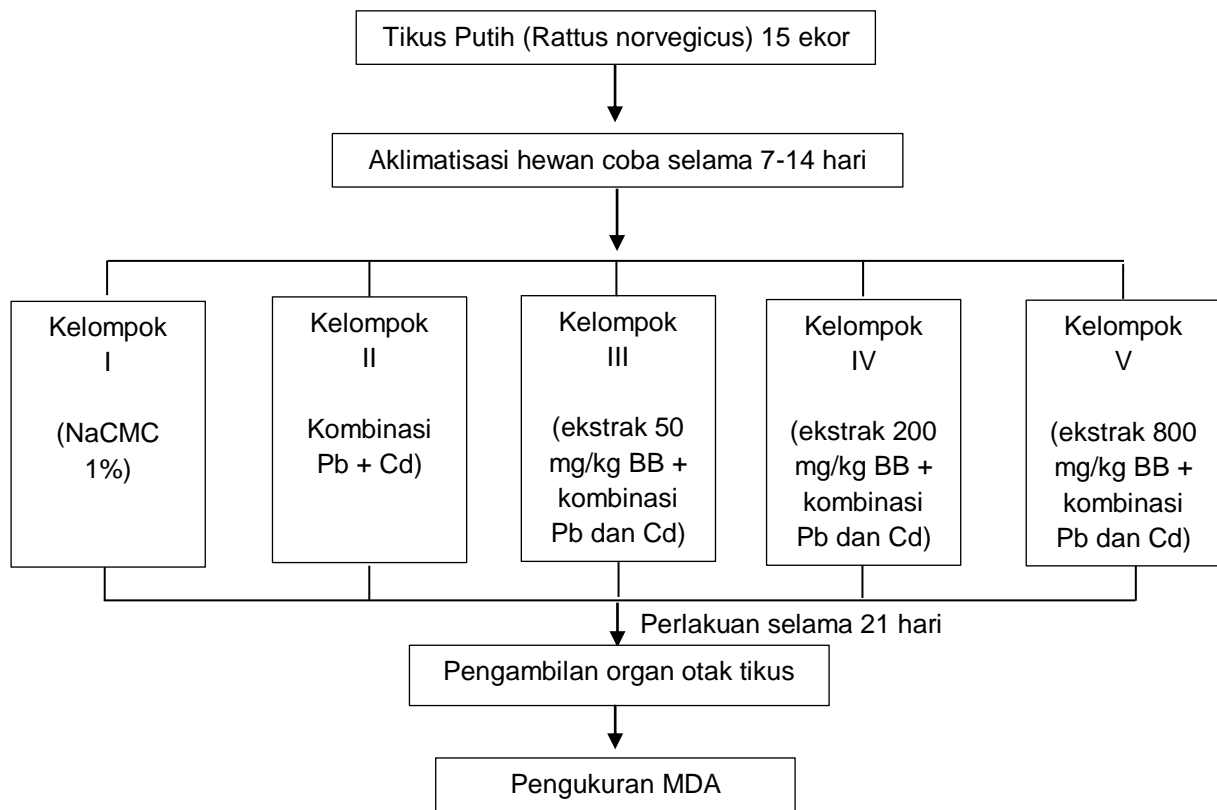
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LAMPIRAN

Lampiran 1. Skema Kerja Pembuatan Ekstrak



Lampiran 2. Skema Kerja Penelitian



Kelompok I (Kontrol sehat)

: Hewan uji hanya diberi pakan standar + larutan koloidal Natrium CMC 1% secara per oral (dimulai dari hari ke 1 hingga hari ke 21)

Kelompok II (Kontrol Negatif)

: Hewan uji hanya diberi pakan standar + larutan kombinasi timbal dan kadmium secara per oral (dimulai dari hari ke 1 hingga hari ke 21)

Kelompok III (50 mg/kg BB)

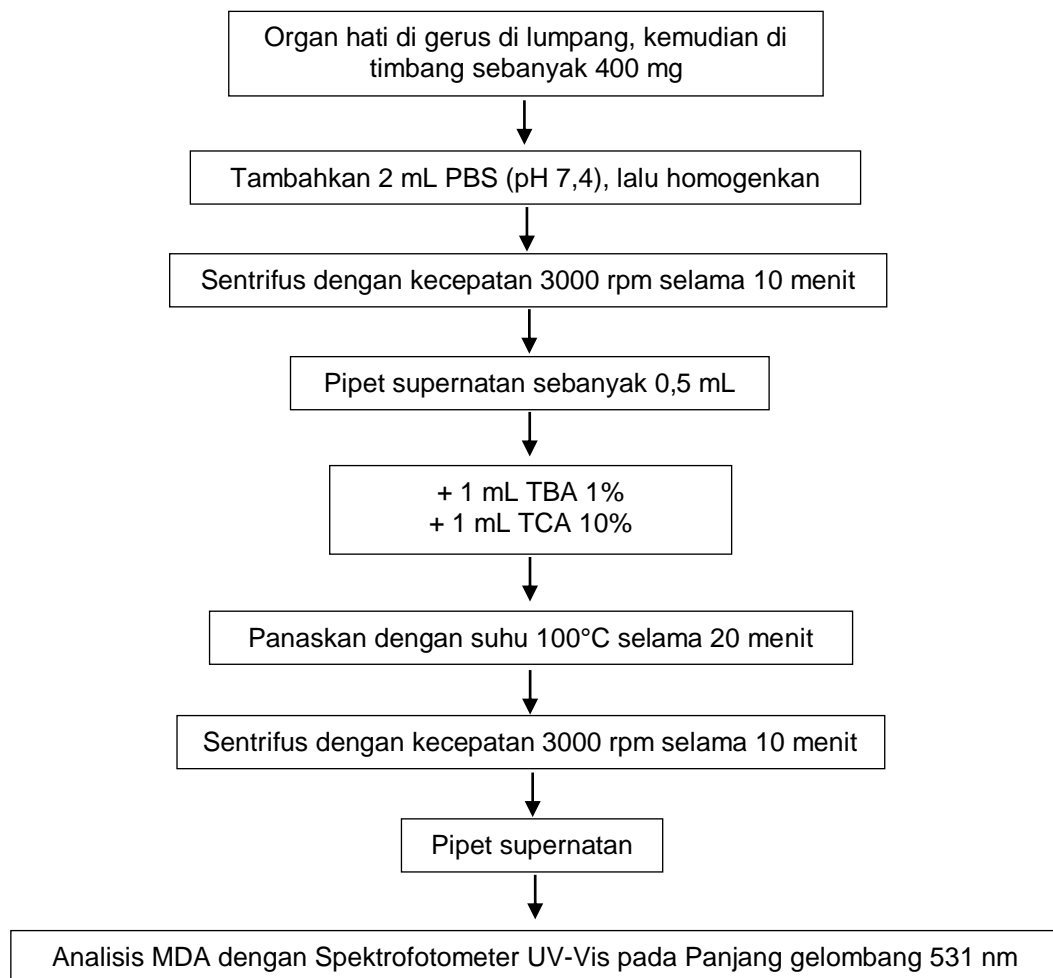
: Hewan uji diberi pakan standar + larutan kombinasi Pb & Cd + ekstrak 50 mg/kg BB secara per oral (dimulai hari ke 1 hingga hari ke 21)

Kelompok IV (200 mg/kg BB)

: Hewan uji diberi pakan standar + larutan kombinasi Pb & Cd + ekstrak 200 mg/kg BB secara per oral (dimulai hari ke 1 hingga hari ke 21)

Kelompok V (800 mg/kg BB)

: Hewan uji diberi pakan standar + larutan kombinasi Pb & Cd + ekstrak 800 mg/kg BB secara per oral (dimulai hari ke 1 hingga hari ke 21)

Lampiran 3. Pengukuran Kadar Malon dialdehid (MDA)

Lampiran 4. Perhitungan Persen Rendemen dan Volume Pemberian

1. Perhitungan Persen rendemen Ekstrak Daun Pegagan (*Centella asiatica*)

$$\begin{aligned} \% \text{ Rendemen} &= \frac{\text{Bobot ekstrak yang diperoleh (gram)}}{\text{Bobot simplisia (gram)}} \times 100\% \\ &= \frac{111,28 \text{ gram}}{500 \text{ gram}} \times 100\% \\ &= 22,25 \% \end{aligned}$$

2. Perhitungan Volume Pemberian

2.1 Dosis Larutan Kombinasi Timbal dan Kadmium

Dosis larutan kombinasi timbal dan kadmium yang digunakan yakni 150 mg/kg BB dan 15 mg/kg BB. Volume pemberian yakni 1 mL/0,2 kg BB tikus putih.

$$\begin{aligned} \text{Timbal (150 mg/kg BB)} &= \frac{150 \text{ mg/kgBB}}{1 \text{ ml}/0,2\text{kg}} \\ &= 150 \times 0,2 \text{ mg/mL} \\ &= 30 \text{ mg/mL} \end{aligned}$$

$$\begin{aligned} \text{Kadmium (15 mg/kg BB)} &= \frac{15 \text{ mg/kgBB}}{1 \text{ ml}/0,2\text{kg}} \\ &= 15 \times 0,2 \text{ mg/mL} \\ &= 3 \text{ mg/mL} \end{aligned}$$

Untuk membuat sediaan larutan 100 mL maka dibutuhkan timbal asetat sebanyak 3 g dan cadmium asetat sebanyak 0,3 g.

2.2 Dosis Ekstrak Daun Pegagan (*Centella asiatica*)

Dosis ekstrak duan pegagan yang digunakan ialah 50, 200 dan 800 mg/kg BB dengan volume pemberian yakni 1 mL/0,2 kg BB tikus putih.

- Dosis 50 mg/kg BB $= \frac{50 \text{ mg/kgBB}}{1 \text{ ml}/0,2\text{kg}}$
 $= 50 \times 0,2 \text{ mg/mL}$
 $= 10 \text{ mg/mL}$

Suspensi ekstrak dibuat sebanyak 50 mL, dengan cara ditimbang 0,5 g ekstrak kental daun pegagan dan didispersikan ke dalam 50 mL larutan koloidal Natrium CMC 1%

- Dosis 200 mg/kg BB $= \frac{200 \text{ mg/kgBB}}{1 \text{ ml}/0,2\text{kg}}$
 $= 200 \times 0,2 \text{ mg/mL}$
 $= 40 \text{ mg/mL}$

Suspensi ekstrak dibuat sebanyak 50 mL, dengan cara ditimbang 2 g ekstrak kental daun pegagan dan didispersikan ke dalam 50 mL larutan koloidal Natrium CMC 1%

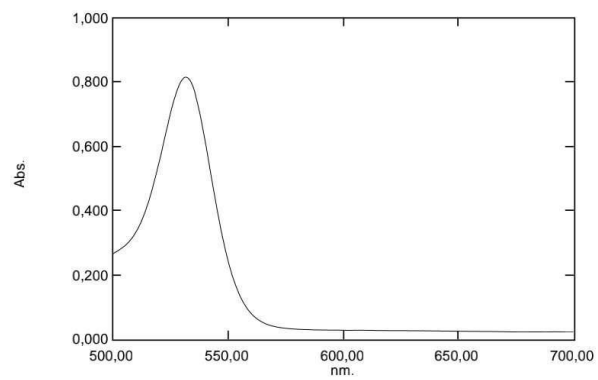
- Dosis 800 mg/kg BB $= \frac{800 \text{ mg/kgBB}}{1 \text{ ml}/0,2\text{kg}}$
 $= 800 \times 0,2 \text{ mg/mL}$
 $= 160 \text{ mg/mL}$

Suspensi ekstrak dibuat sebanyak 50 mL, dengan cara ditimbang 8 g ekstrak kental daun pegagan dan didispersikan ke dalam 50 mL larutan koloidal Natrium CMC 1%

Lampiran 5. Hasil Pengukuran Panjang Gelombang Maksimum

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Gedung Pusat Kegiatan Penelitian Lantai IV Wing B



No.	P/V	Wavelength	Abs.	Description
1	●	531,80	0,815	

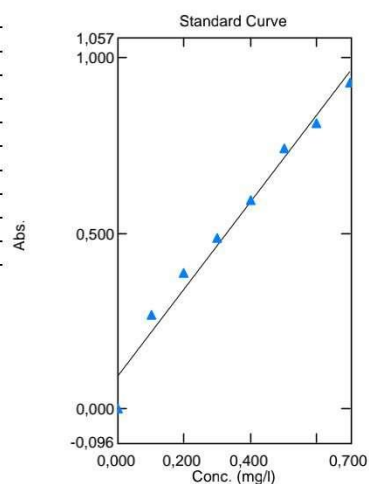
Lampiran 6. Hasil Pengukuran Absorbansi Kurva Baku dan Hewan Coba

LABORATORIUM BIOFARMAKA FAKULTAS FARMASI UNIVERSITAS HASANUDDIN

Gedung Pusat Kegiatan Penelitian Lantai IV Wing B

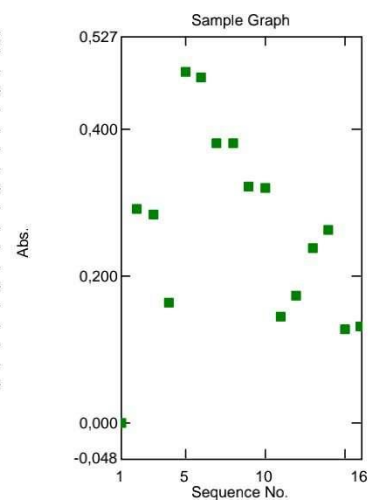
Standard Table

	Sample ID	Type	Ex	Conc	WL531,8	Wgt.Factor
1	blanko	Standard		0,000	0,000	1,000
2	TMP 1	Standard		0,100	0,267	1,000
3	TMP 2	Standard		0,200	0,386	1,000
4	TMP 3	Standard		0,300	0,487	1,000
5	TMP 4	Standard		0,400	0,596	1,000
6	TMP 5	Standard		0,500	0,742	1,000
7	TMP 6	Standard		0,600	0,814	1,000
8	TMP 7	Standard		0,700	0,930	1,000
9						



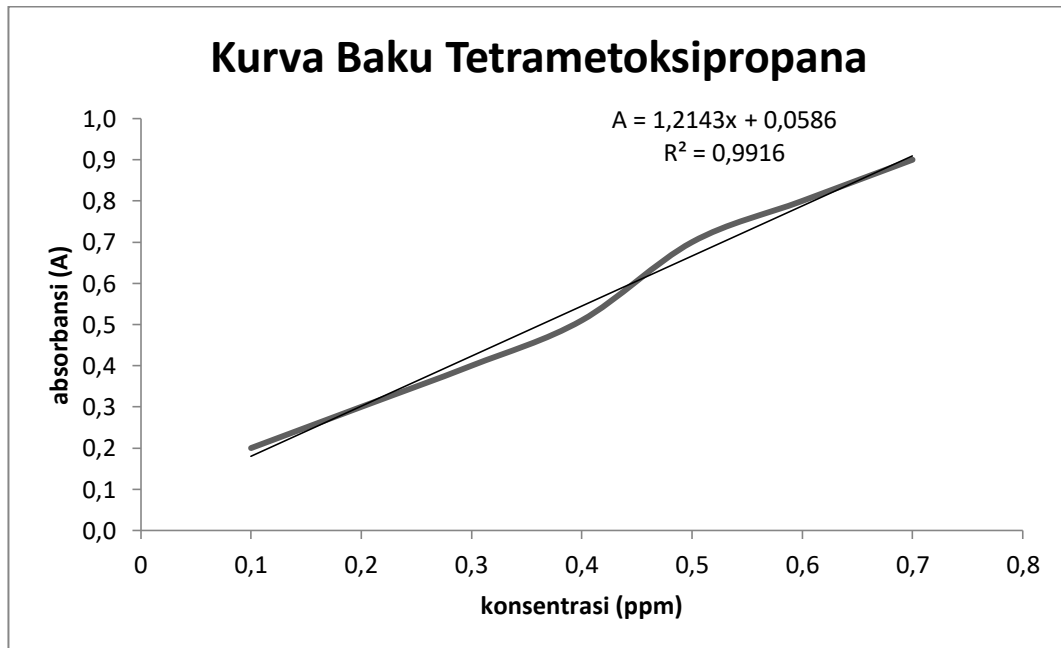
Sample Table

	Sample ID	Type	Ex	Conc	WL531,8	Comment
1	BLANKO	Unknown		-0,075	-0,000	
2	NORMAL 1	Unknown		0,160	0,292	
3	NORMAL 2	Unknown		0,154	0,284	
4	NORMAL 3	Unknown		0,057	0,164	
5	POSITIF 1	Unknown		0,310	0,479	
6	POSITIF 2	Unknown		0,304	0,471	
7	POSITIF 3	Unknown		0,232	0,382	
8	EKSTRAK 50.2	Unknown		0,232	0,381	
9	EKSTRAK 50.3	Unknown		0,184	0,322	
10	EKSTRAK 50.1	Unknown		0,184	0,321	
11	EKSTRAK 200.1	Unknown		0,042	0,146	
12	EKSTRAK 200.2	Unknown		0,065	0,174	
13	EKSTRAK 200.3	Unknown		0,116	0,238	
14	EKSTRAK 800.1	Unknown		0,137	0,263	
15	EKSTRAK 800.2	Unknown		0,027	0,127	
16	EKSTRAK 800.3	Unknown		0,031	0,132	
17						



Makassar, 30/03/2022
Analisis

Lampiran 7. Grafik Kurva Baku Tetrametoksipropana (TMP)



Lampiran 8. Perhitungan Kadar Malon dialdehid (MDA)

Persamaan garis kurva baku:

$$Y = 1,2143x + 0,0586$$

Kelompok I (Kontrol sehat: NaCMC 1%)

K1A

$$0,292 = 1,2143x + 0,0586$$

$$X = 0,292 - 0,0586$$

$$X = 0,192 \mu\text{g/ml}$$

K1B

$$0,284 = 1,2143x + 0,0586$$

$$X = 0,284 - 0,0586$$

$$X = 0,186 \mu\text{g/ml}$$

K1C

$$0,164 = 1,2143x + 0,0586$$

$$X = 0,164 - 0,0586$$

$$X = 0,087 \mu\text{g/ml}$$

Kelompok II (Larutan kombinasi Pb dan Cd)

K2A

$$0,479 = 1,2143x + 0,0586$$

$$X = 0,479 - 0,0586$$

$$X = 0,346 \mu\text{g/ml}$$

K2B

$$0,471 = 1,2143x + 0,0586$$

$$X = 0,471 - 0,0586$$

$$X = 0,340 \mu\text{g/ml}$$

K2C

$$0,382 = 1,2143x + 0,0586$$

$$X = 0,382 - 0,0586$$

$$X = 0,266 \mu\text{g/ml}$$

Kelompok III (Ekstrak 50 mg/kg BB + kombinasi Pb dan Cd)

K3A

$$0,321 = 1,2143x + 0,0586$$

$$X = 0,321 - 0,0586$$

$$X = 0,216 \mu\text{g/ml}$$

K3B

$$0,381 = 1,2143x + 0,0586$$

$$X = 0,381 - 0,0586$$

$$X = 0,266 \mu\text{g/ml}$$

K3C

$$0,322 = 1,2143x + 0,0586$$

$$X = 0,322 - 0,0586$$

$$X = 0,217 \mu\text{g/ml}$$

Kelompok IV (Ekstrak 200 mg/kg BB + kombinasi Pb dan Cd)

K4A

$$0,146 = 1,2143x + 0,0586$$

$$X = 0,146 - 0,0586$$

$$X = 0,072 \mu\text{g/ml}$$

K4B

$$0,174 = 1,2143x + 0,0586$$

$$X = 0,174 - 0,0586$$

$$X = 0,095 \mu\text{g/ml}$$

K4C

$$0,238 = 1,2143x + 0,0586$$

$$X = 0,238 - 0,0586$$

$$X = 0,148 \mu\text{g/ml}$$

Kelompok V (Ekstrak 800 mg/kg BB + kombinasi Pb dan Cd)

K5A

$$0,263 = 1,2143x + 0,0586$$

$$X = 0,263 - 0,0586$$

$$X = 0,168 \mu\text{g/ml}$$

K5B

$$0,127 = 1,2143x + 0,0586$$

$$X = 0,127 - 0,0586$$

$$X = 0,056 \mu\text{g/ml}$$

K5C

$$0,132 = 1,2143x + 0,0586$$

$$X = 0,132 - 0,0586$$

$$X = 0,060 \mu\text{g/ml}$$

Lampiran 9. Kadar Malon dialdehid (MDA) pada Otak Tikus Putih

Kelompok	Perlakuan	Kadar MDA ($\mu\text{g/ml}$)	Rata-rata kadar MDA \pm SD ($\mu\text{g/ml}$)
I	Kontrol Sehat (Suspensi NaCMC 1%)		
	N1	0,192	0,155 \pm 0,034
	N2	0,186	
	N3	0,087	
II	Kontrol negatif (Larutan kombinasi Pb dan Cd)		
	N1	0,346	0,317 \pm 0,025
	N2	0,340	
	N3	0,266	
III	Ekstrak daun pegagan 50 mg/kg BB + Larutan kombinasi Pb dan Cd		
	N1	0,216	0,233 \pm 0,016
	N2	0,266	
	N3	0,217	
IV	Ekstrak daun pegagan 200 mg/kg BB + Larutan kombinasi Pb dan Cd		
	N1	0,072	0,105 \pm 0,022
	N2	0,095	
	N3	0,148	
V	Ekstrak daun pegagan 800 mg/kg BB + Larutan kombinasi Pb dan Cd		
	N1	0,168	0,095 \pm 0,030
	N2	0,056	
	N3	0,060	

Lampiran 10. Hasil Analisis Statistika (One-way ANOVA)

Tabel 3. Uji Normalitas Sampel Kadar MDA

		Tests of Normality					
Kelompok_Perlakuan		Kolmogorov-Smirnov ^a			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
MDA	kontrol sehat	.367	3	.	.793	3	.097
	kontrol negatif	.361	3	.	.806	3	.129
	ekstrak 50 mg/kgBB	.373	3	.	.780	3	.067
	ekstrak 200 mg/kgBB	.268	3	.	.951	3	.572
	ekstrak 800 mg/kgBB	.374	3	.	.777	3	.060

a. Lilliefors Significance Correction

Tabel 4. Uji Homogenitas Sampel Kadar MDA

Test of Homogeneity of Variances

MDA

Levene Statistic	df1	df2	Sig.
1.306	4	10	.332

Tabel 5. Data Statistik Kadar MDA menggunakan One Way ANOVA

ANOVA

MDA

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.106	4	.026	11.152	.001
Within Groups	.024	10	.002		
Total	.129	14			

Tabel 6. Data Statistik Kadar MDA dengan LSD**Multiple Comparisons**

Dependent Variable: MDA

LSD

(I) Kelompok_Perlakuan	(J) Kelompok_Perlakuan	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
kontrol sehat	kontrol negatif	-.162333 [*]	.039725	.002	-.25085	-.07382
	ekstrak 50 mg/kgBB	-.078000	.039725	.078	-.16651	.01051
	ekstrak 200 mg/kgBB	.050000	.039725	.237	-.03851	.13851
	ekstrak 800 mg/kgBB	.060333	.039725	.160	-.02818	.14885
kontrol negatif	kontrol sehat	.162333 [*]	.039725	.002	.07382	.25085
	ekstrak 50 mg/kgBB	.084333	.039725	.060	-.00418	.17285
	ekstrak 200 mg/kgBB	.212333 [*]	.039725	.000	.12382	.30085
	ekstrak 800 mg/kgBB	.222667 [*]	.039725	.000	.13415	.31118
ekstrak 50 mg/kgBB	kontrol sehat	.078000	.039725	.078	-.01051	.16651
	kontrol negatif	-.084333	.039725	.060	-.17285	.00418
	ekstrak 200 mg/kgBB	.128000 [*]	.039725	.009	.03949	.21651
	ekstrak 800 mg/kgBB	.138333 [*]	.039725	.006	.04982	.22685
ekstrak 200 mg/kgBB	kontrol sehat	-.050000	.039725	.237	-.13851	.03851
	kontrol negatif	-.212333 [*]	.039725	.000	-.30085	-.12382
	ekstrak 50 mg/kgBB	-.128000 [*]	.039725	.009	-.21651	-.03949
	ekstrak 800 mg/kgBB	.010333	.039725	.800	-.07818	.09885
ekstrak 800 mg/kgBB	kontrol sehat	-.060333	.039725	.160	-.14885	.02818
	kontrol negatif	-.222667 [*]	.039725	.000	-.31118	-.13415
	ekstrak 50 mg/kgBB	-.138333 [*]	.039725	.006	-.22685	-.04982
	ekstrak 200 mg/kgBB	-.010333	.039725	.800	-.09885	.07818

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

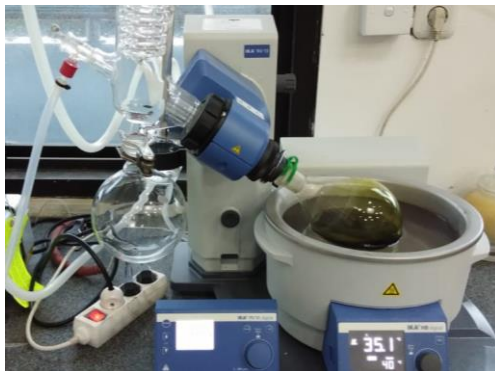
Lampiran 11. Dokumentasi Penelitian



Gambar 6. Sampel daun pegagan (*Centella asiatica*)



Gambar 7. Ekstraksi daun pegagan (*Centella asiatica*)



Gambar 8. Penguapan ekstrak daun pegagan (*Centella asiatica*)



Gambar 9. Ekstrak kental daun pegagan (*Centella asiatica*)



Gambar 10. Pengelompokan Hewan coba



Gambar 11. Pembuatan suspensi ekstrak daun pegagan



Gambar 12. Pemberian secara per oral terhadap hewan coba



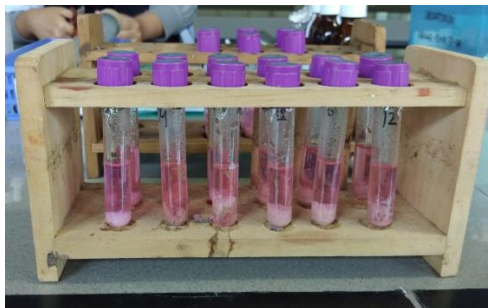
Gambar 13. Pembedahan dan pengambilan organ otak tikus



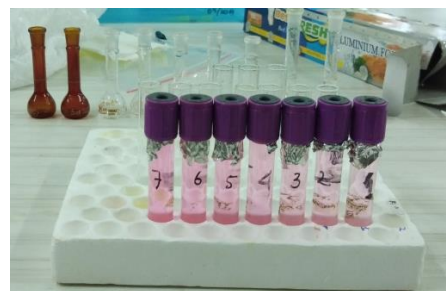
Gambar 14. Penggerusan organ otak tikus



Gambar 15. Sentrifugasi sampel organ otak tikus



Gambar 16. Preparasi sampel untuk di analisis



Gambar 17. Penyiapan larutan standar TMP untuk pengukuran kurva baku



Gambar 18. Pengukuran kadar MDA dengan spektrofotometer UV-Vis

Lampiran 12. Determinasi Tumbuhan Pegagan (*Centella asiatica*)



LABORATORIUM BOTANI DEPARTEMEN BIOLOGI
FAKULTAS MATEMATIKA DAN ILMU PENGETAHUAN ALAM
UNIVERSITAS HASANUDDIN, KAMPUS TAMALANREA
 JL. PERINTIS KEMERDEKAAN KM. 10 Tl.P. (0411) 585466, Fax: 620411 MAKASSAR 90915

Nomor : 578/UN4.11.9/BIO-BOT/PL-03/2021
 Lampiran : -
 Hal : Hasil Identifikasi dan Determinasi Tanaman

Kepada Yth,
Sari Rofiqoh
 Di-
 Tempat

Dengan hormat,

Bersama ini, kami sampaikan hasil identifikasi dan determinasi tanaman Pegagan (*Centella asiatica* (L.) Urb.) yang saudara (i) kirimkan. Identifikasi dilakukan oleh staff peneliti Laboratorium Botani Departemen Biologi FMIPA Unhas dengan hasil sebagai berikut :

Regnum : Plantae
 Divisio : Spermatophyta
 Subdivisio : Angiospermeae
 Classis : Dicotyledoneae
 Subclassis : Dialypetalae
 Ordo : Umbelliflorae
 Familia : Umbelliferae
 Genus : *Centella*
 Species : *Centella asiatica* (L.) Urb.
 Sinonim : *Hydrocotyle asiatica* L.

Nama Lokal : Pegagan, Kaki kuda, Panigowang, Pegago, Bebile (Indonesia), Takip-Kohot (Filipina), India Penny Wort (Inggris), Bevilaque (Perancis).

Kunci Determinasi:

Familia : Umbelliferae
 1b...2b...3b...4b...6b...7b...9b...10b...11b...12b...13b...14b...16a
 ...239b...243b...244b...248b...249b...250b...266b...267a...268a
 ...269a...
 Genus : *Centella*
 1b...2b...

1. b. Tumbuh-tumbuhan dengan buah sejati, sedikit-dikitnya dengan benang sari dan atau putik. Tumbuh-tumbuhan berbunga 2

Lampiran 13. Persetujuan Etik Penelitian

KEMENTERIAN PENDIDIKAN, KEBUDAYAAN, RISET DAN TEKNOLOGI
UNIVERSITAS HASANUDDIN FAKULTAS KEDOKTERAN
KOMITE ETIK PENELITIAN UNIVERSITAS HASANUDDIN
RSPTN UNIVERSITAS HASANUDDIN
RSUP Dr. WAHIDIN SUDIROHUSODO MAKASSAR
Sekretariat : Lantai 2 Gedung Laboratorium Terpadu
JL.PERINTIS KEMERDEKAAN KAMPUS TAMALANREA KM.10 MAKASSAR 90245.
Contact Person: dr. Agussalim Bukhari, MMed,PhD, SpGK TELP. 081241850858, 0411 5780103, Fax : 0411-581431



REKOMENDASI PERSETUJUAN ETIK

Nomor : 184/UN4.6.4.5.31/ PP36/ 2022

Tanggal: 19 April 2022

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

No Protokol	UH22030112	No Sponsor Protokol	
Peneliti Utama	Sari Rofiqoh	Sponsor	
Judul Peneliti	Pengaruh Pemberian Ekstrak Daun Pegagan (<i>Centella asiatica</i>) terhadap Kadar Malondialdehid (MDA) pada Otak Tikus Putih (<i>Rattus norvegicus</i>) yang di Induksi Kombinasi Timbal (Pb) dan Kadmium (Cd)		
No Versi Protokol	1	Tanggal Versi	14 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 19 April 2022 sampai 19 April 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