BAB V
KESIMPULAN DAN SARAN

A. Kesimpulan

Berdasarkan penelitian yang dilakukan, maka dapat disimpulkan :

Pertama, ekstrak etanol dan fraksi *n-heksana* daun sirih merah (*Piper crocatum)* memiliki aktivitas analgesik *non perifer* yang sebanding dengan kontrol positif (tramadol) dengan metode *tail flick.*

Kedua, ekstrak etanol dan fraksi *n*-heksana, etil asetat daun sirih merah (*Piper crocatum)* memiliki aktivitas analgesik *perifer* yang sebanding dengan kontrol positif (asam mefenamat) dengan metode *Randall Selitt.*

Ketiga, golongan senyawa yang terdapat dalam fraksi aktif *n*-heksana adalah flavonoid, minyak atsiri, steroid.

B. Saran

Penelitian ini masih banyak kekurangan maka perlu penelitian lebih lanjut mengenai :

Pertama, perlu dilakukan penelitian lebih lanjut pada isolasi senyawa aktif yang berkhasiat sebagai analgesik.

Kedua, perlu dilakukan penelitian lebih lanjut mengenai keamanann dosis fraksi-fraksi sebagai analgesik.

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LAMPIRAN

Lampiran 1. Surat keterangan determinasi tanaman

KEMENTERIAN RISET, TEKNOLOGI DAN PENDIDIKAN TINGGI
UNIVERSITAS SEBELAS MARET
FAKULTAS MATEMATIKA DAN ILMU PENGETAHUAN ALAM
LAB. PROGRAM STUDI BIOLOGI
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http://www.biology.mipa.uns.ac.id, E-mail biologi @ mipa.uns.ac.id

Nomor : 038/UN27.9.6.4/Lab/2019
H a l : Hasil Determinasi Tumbuhan
Lampiran : -

Nama Pemesan : Rosa Selly Rahayu
NIM : 21154419A
Alamat : Program Studi S1 Farmasi Fakultas Farmasi Universitas Setia Budi Surakarta

HASIL DETERMINASI TUMBUHAN

Nama Sampel : ***Piper crocatum* Ruiz & Pav.**
Familia : **Piperaceae**

Hasil Determinasi menurut C.A. Backer & R.C. Bakhuizen van den Brink, Jr. (1963) dan Mangion, C.P. (2011):
1b-2b-3b-4b-12b-13b-14b-17b-18b-19b-20b-21b-22b-23b-24b-25b-26b-27b-799b-800b-801b-802a-803b-804b-805c-806b-807a-808c-809b-810b-811a-812b-815b-816b-818b-820b-821b-822a-823b_____ **23. Piperaceae**
1b-2b-3b_____ **3. *Piper***
1_____ ***Piper crocatum* Ruiz & Pav.**

Deskripsi Tumbuhan :
Habitus : terna semusim, memanjat atau menjalar, panjang tanaman dapat mencapai sekitar 5-10 m. Akar : akar serabut, tipe akar pelekat, melekat erat pada penunjang, keluar dari ruas-ruas batang, berwarna putih kotor atau putih kekuningan hingga coklat kekuningan. Batang : batang bulat, hijau merah keunguan, beruas-beruas dengan panjang ruas 3-8 cm, pada setiap buku tumbuh satu daun, permukaan licin. Daun : daun tunggal, berseling atau tersebar, bentuk daun jantung-bulat telur hingga bulat telur-lonjong, panjang daun 6.1–14.6 cm, lebar daun 4–9.4 cm, permukaan atas daun agak cembung dan mengkilat, permukaan bawah daun mencekung dengan pertulangan daun yang menonjol, pertulangan daun menyirip, permukaan atas daun licin mengkilat, permukaan bawah daun kusam, warna dasar daun hijau pada kedua permukaannya, bagian atas hijau dengan garis-garis merah jambu kemerahan, permukaan bagian bawah hijau merah tua keunguan, bila diremas menghasilkan lendir serta aromanya wangi; tangkai daun hijau merah keunguan, panjang 2.1–6.2 cm, pangkal tangkai daun pada helaian daun agak ke tengah sekitar 0.7–1 cm dari tepi daun bagian bawah. Bunga : bunga majemuk tipe bulir, di ketiak daun, bunga berkelamin satu, berumah satu, bersifat aktinomorf; pelindung bunga (braktea) berbentuk lingkaran, bulat telur atau bulat telur terbalik, panjang 1 mm; bulir bunga jantan panjangnya sekitar 1.5 - 3 cm, terdapat 2 benang sari yang pendek; bulir bunga betina panjangnya sekitar 1.5-6 cm, terdapat kepala putik 3-5 buah, berwarna putih hingga hijau kekuningan. Buah : buah buni bentuk bulat. Biji : berjumlah 1 tiap buah, bentuk bulat.

Surakarta, 1 Maret 2019

Kepala Lab. Program Studi Biologi

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Penanggungjawab
Determinasi Tumbuhan

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Mengetahui
Kepala Program Studi Biologi FMIPA UNS

Dr. Ratna Setyaningsih, M.Si.
NIP. 19660714 199903 2 001

Lampiran 2. *Ethical clearance*

7/2/2019 KEPK-RSDM

HEALTH RESEARCH ETHICS COMITTE
KOMISI ETIK PENELITIAN KESEHATAN

Dr. Moewardi General Hospital
RSUD Dr. Moewardi

ETHICAL CLEARANCE
KELAIKAN ETIK

Nomor : 848 / VII / HREC / 2019

The Health Research Ethics Committee Dr. Moewardi
Komisi Etik Penelitian Kesehatan RSUD Dr. Moewardi

after reviewing the proposal design, herewith to certify
setelah menilai rancangan penelitian yang diusulkan, dengan ini menyatakan

That the research proposal with topic :
Bahwa usulan penelitian dengan judul

UJI AKTIVITAS ANALGESIK FRAKSI-FRAKSI EKSTRAK ETANOL DAUN SIRIH MERAH (Piper crocatum) PADA TIKUS PUTIH METODE TAIL FLICK DAN RANDALL SELITTO

Principal investigator : Rosa Selly Rahayu
Peneliti Utama 21154419A

Laboratorium Farmakologi-Toksikologi Universitas Setia

Location of research : Budi
Lokasi Tempat Penelitian

Is ethically approved
Dinyatakan layak etik

Issued on : 02 Juli 2019

Chairman
Ketua

KOMISI ETIK PENELITIAN KESEHATAN
RSUD. Dr. MOEWARDI
KEP

Dr. Wahyu Dwi Atmoko., Sp.F
19770224 201001 1 004

Lampiran 3. Surat keterangan hewan uji

PEMERINTAH KOTA SURAKARTA
DINAS PERTANIAN,
KETAHANAN PANGAN DAN PERIKANAN
JL. Yap Tjwan Bing (Jagalan) No. 26 Telp. (0271) 656816 – Fax. (0271) 656816
Website www.dispertan.surakarta.co.id E-mail pertanian_ska@yahoo.co.id
SURAKARTA Kode Pos 57124

SURAT KETERANGAN KESEHATAN HEWAN

Nomor : 524.3/502.M /SKKH

Yang bertandatangan di bawah ini **drh. Abdul Aziz MK** Dokter Hewan yang berwenang di wilayah **Kota Surakarta**, menerangkan bahwa pada hari **Rabu** tanggal **24** bulan **April** tahun **2019** telah memeriksa hewan di bawah ini :

NO	JENIS HEWAN	SUB SPESIES/ TRAH	JUMLAH (ekor)			UMUR (bln)	Tanda / Warna
			Jtn	Btn	Total		
1	Tikus	Wistar	30	-	30	2 - 3	Putih

Menerangkan bahwa hewan-hewan tersebut di atas : **sehat** , atau saat pemeriksaan tidak menunjukan tanda klinis penyakit hewan menular.

KETERANGAN :

Nama pemilik/pengirim	:	Sdr. Yulianto Ratno Saputro
No KTP/SIM pemilik/pengirim	:	3372053007720003
No telp. Pemilik/pengirim	:	082133998945
Alamat pemilik/pengirim	:	Sumber RT 04 RW 03 Surakarta.
Daerah asal hewan	:	Pasar Burung Depok Manahan Surakarta.
Daerah tujuan	:	Universitas Setia Budi Surakarta
Nama dan alamat Penerima	:	Sdr. Rosa Selly Rahayu, Universitas Setia Budi Surakarta
Rencana dikirim	:	Rabu, 24 April 2019
Kendaraan	:	Mobil

Setelah sampai di daerah tujuan segera melaporkan ke dinas yang membidangi fungsi peternakan dan kesehatan hewan.

Surakarta,24 April 2019

Mengetahui
a.n. KEPALA DINAS PERTANIAN,
KETAHANAN PANGAN DAN PERIKANAN
KOTA SURAKARTA
Sekretaris

PEMERINTAH KOTA SURAKARTA
DINAS PERTANIAN KETAHANAN PANGAN DAN PERIKANAN

Drs. JOKO WASKITO RAHARJO,MM
Pembina Tk I
NIP. 19620822 198903 1 009

Dokter Hewan Berwenang,

drh. ABDUL AZIZ MK
NIP. 198102428 200501 1 006

Tembusan Yth. :
1. Walikota Surakarta (sebagai laporan);
2. Kepala Dinas Peternakan dan Kesehatan Hewan Provinsi Jawa Tengah;
3. Arsip.

Lampiran 4. Foto bahan

Gambar : daun sirih merah segar

Gambar : daun sirih merah kering

Gambar : serbuk daun merah sirih

Gambar : ekstrak etanol

Gambar : fraksi *n*-heksana, etil asetat, dan air

Lampiran 5. Perhitungan rendemen daun sirih merah

Rendemen berat daun basah terhadap berat daun kering

Berat daun basah (g)	Berat daun kering (g)	Rendemen (%) b/b
5.000	2.700	54

Rumus :

$$\text{Rendemen (\%)} = \frac{\text{berat kering}}{\text{berat basa}} \text{ x } 100\%$$

$$\text{Rendemen (\%)} = \frac{4.000}{5.000} \text{ x } 100\%$$

$$= 54\ \%$$

Rendemen berat serbuk terhadap berat daun kering

Berat daun kering (g)	Berat serbuk (g)	Rendemen (%) b/b
2.700	2.500	92,59

Rumus :

$$\text{Rendemen (\%)} = \frac{\text{berat serbuk}}{\text{berat daun kering}} \text{ x } 100\%$$

$$\text{Rendemen (\%)} = \frac{2.500}{2.700} \text{ x } 100\%$$

$$=92{,}59\ \%$$

Rendemen ekstrak etanol daun sirih merah

Berat Serbuk (g)	Ekstrak kental (g)	Rendemen (%) b/b
1.000	87,829	8,783

Rumus :

$$\text{Rendemen (\%)} = \frac{\text{berat ekstrak}}{\text{berat serbuk}} \text{ x } 100\%$$

$$\text{Rendemen (\%)} = \frac{87{,}829}{1000} \text{ x } 100\%$$

$$= 8{,}783\%$$

Rendemen fraksi-fraksi eksrak etanol daun sirih merah

Ekstrak daun sirih merah (g)	Fraksi	Berat fraksi (g)	Rendemen (%)	Total rendemen (%)
10 g	*N*-heksana	1,158	11,58	73,63
	Etil asetat	0,859	8,59	
	Air	5,345	53,46	

Rumus:

$$\text{Rendemen (\%)} = \frac{\text{berat fraksi}}{\text{berat ekstrak}} \times 100\%$$

Rendemen fraksi *n*-heksana (%) $= \frac{1,158}{10} \times 100\%$

$= 11,58\%$

Rendemen fraksi etil asetat (%) $= \frac{0,859}{10} \times 100\%$

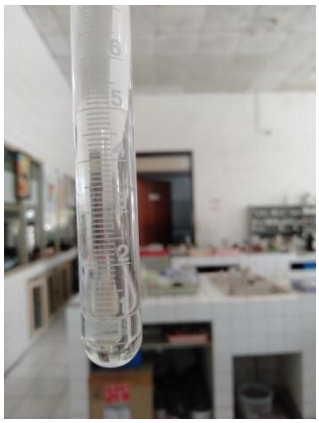
$= 8,59\%$

Rendemen fraksi *n*-heksanan (%) $= \frac{5,346}{10} \times 100\%$

$= 53,46\%$

Lampiran 6. Gambar penetapan kadar air

Gambar alat *sterling bidwell*



Replikasi 1

Replikasi 2

Replikasi 3

Lampiran 7. Perhitungan penetapan kadar air

No	Ekstrak (g)	Pelarut (toluen)	Kandungan air (ml)	Kadar (%)
Replikasi 1	10	100	1	10
Replikasi 2	10	100	0,9	9
Replikasi 3	10	100	0,8	8
Rata-rata				9

Rumus :

$$\% \text{ kadar air } = \frac{volume\ air}{berat\ awal} x100\%$$

Replikasi 1

$$\% \text{ kadar air } = \frac{1}{10} x100\%$$

$$= 10\%$$

Replikasi 2

$$\% \text{ kadar air } = \frac{0,9}{10} x100\%$$

$$= 9\%$$

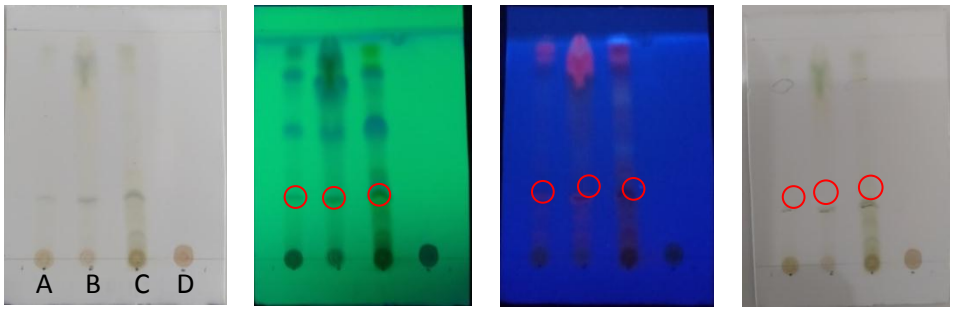
$$\% \text{ kadar air } = \frac{0,8}{10} x100\%$$

$$= 8\%$$

Rata-rata kadar air 9%

Lampiran 8. Hasil identifikasi kandungan senyawa kimia

A. Identifikasi KLT senyawa Flavonoid

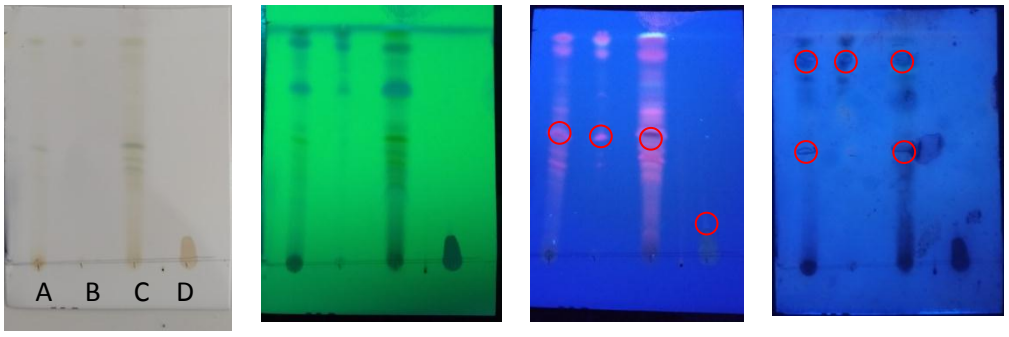


UV 254 **UV366** **uap ammonia**

Fase gerak : asam asetat glasial : butanol : air (1:4:5). Pereaksi uap ammonia. (A) ekstrak etanol, (B) fraksi *n*-heksana, (C) fraksi etil asetat, (D) fraksi air.

Sampel	Kode bercak	Rf	UV 254	UV 366	preaksi	Pustaka	Ket
A	A1	0,24	Coklat	Jingga	Coklat	Kuning-coklat	+
	A2	0,24	Coklat	Jingga	Coklat	Kuning-coklat	+
	A3	0,24	Coklat	Jingga	Coklat	Kuning-coklat	+
B	B1	0,24	Coklat	Jingga	Coklat	Kuning-coklat	+
	B2	0,24	Coklat	Jingga	Coklat	Kuning-coklat	+
	B3	0,24	Coklat	Jingga	Coklat	Kuning-coklat	+
C	C1	0,24	Coklat	Jingga	Coklat	Kuning-coklat	+
	C2	0,24	Coklat	Jingga	Coklat	Kuning-coklat	+
	C3	0,24	Coklat	Jingga	Coklat	Kuning-coklat	+
D	-	-	-	-	-	Kuning-coklat	-

B. Identifikasi KLT senyawa Steroid

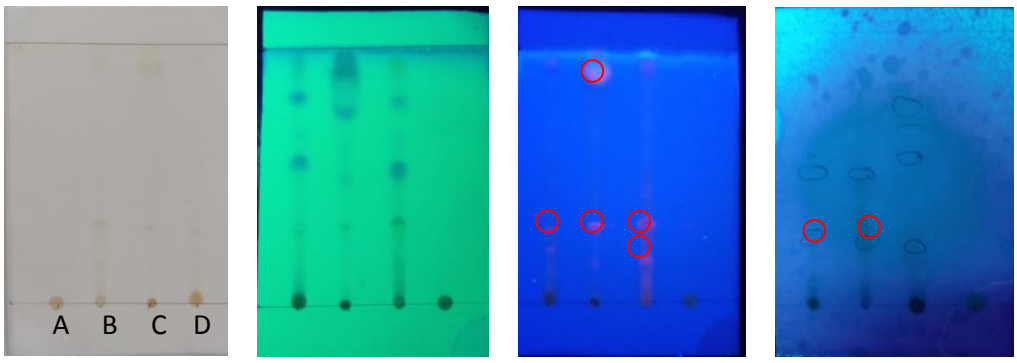


UV 254 **UV366** **Liberman Buchard**

Fase gerak : Kloroform : metanol (10:1). Pereaksi semprot Liberman Buchard. (A) ekstrak etanol, (B) fraksi *n*-heksana, (C) fraksi etil asetat, (D) fraksi air.

Sampel	Kode bercak	Rf	UV 254	UV 366	Preaksi	Pustaka	Ket
A	A1 A2 A3	0,5 0,8 0,5	Hijau Gelap Gelap	Biru - Jingga	Biru - Coklat	Hijau/biru Hijau/biru Hijau/biru	+ - +
B	B1 B2 B3	0,5 0,8 0,5	- Gelap Gelap	Jingga Jingga Jingga	Coklat Biru Biru	Hijau/biru Hijau/biru Hijau/biru	- + +
C	C1 C2 C3	0,5 0,8 0,5	Hijau Gelap Gelap	Biru - Jingga	Biru - Coklat	Hijau/biru Hijau/biru Hijau/biru	+ - +
D	D1	0,1	Gelap	Biru	Gelap	Hijau/biru	+

C. Identifikasi KLT senyawa Minyak Atsiri

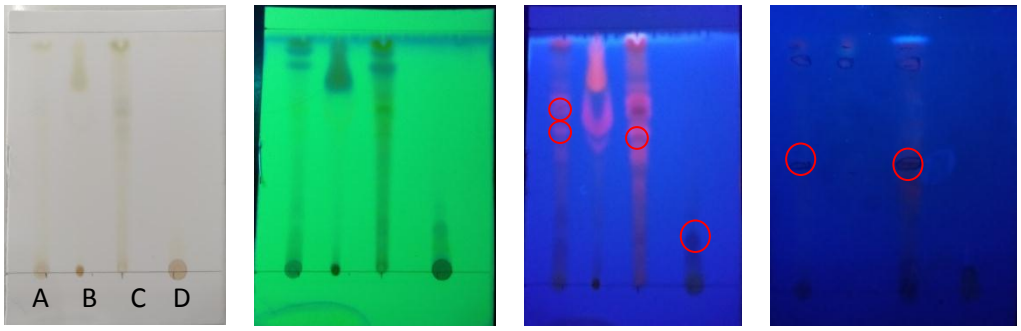


UV 254 **UV366** **Anisaldehid**

Fase gerak : Toluen : etil asetat (8:1). Pereaksi semprot Anisaldehid. (A) ekstrak etanol, (B) fraksi *n*-heksana, (C) fraksi etil asetat, (D) fraksi air.

Sampel	Kode bercak	Rf	UV 254	UV 366	preaksi	Pustaka	Ket
A	A1 A2 A3	0.26 0.5 0,8	Hijau Gelap Gelap	Biru - -	Biru - -	Biru/ungu Biru/ungu Biru/ungu	+ - -
B	B1 B2	0.26 0.8	Hijau Gelap	Biru Biru	Biru -	Biru/ungu Biru/ungu	+ -
C	C1 C2 C3	0.26 0.5 0,8	Hijau Gelap Gelap	Biru - -	Biru - -	Biru/ungu Biru/ungu Biru/ungu	+ - -
D	D1	-	-	-	-	Biru/ungu	-

D. Identifikasi KLT senyawa Alkaloid

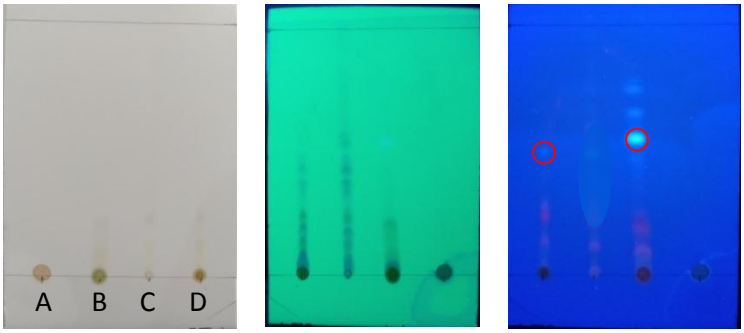


UV 254 **UV366** **Dragendrof**

Fase gerak kloroform : metanol (9:1). Peraksi semprot *Dragendrof*. (A) ekstrak etanol, (B) fraksi *n*-heksana, (C) fraksi etil asetat, (D) fraksi air.

Sampel	Kode bercak	Rf	UV 254	UV 366	Preaksi	Pustaka	Ket
A	A1 A2 A3	0.6 0.7 0,9	Gelap - -	Jingga Jingga Jingga	Coklat - -	Jingga Jingga Jingga	+ + -
B	B1	0.8	Gelap	Jingga	Biru	-	-
C	C1 C2 C3	0.6 0.7 0,9	Gelap - -	Jingga Jingga Jingga	Coklat - -	Jingga Jingga Jingga	+ + -
D	D1	0,2	Hijau	Coklat	Hitam	Coklat	+

E. Identifikasi KLT senyawa Tanin



UV 254 **UV366**

Fase gerak *n*-heksana : etil asetat (3:7). Peraksi semprot FeCl3 1%. (A) ekstrak etanol, (B) fraksi *n*-heksana, (C) fraksi etil asetat, (D) fraksi air.

Sampel	Kode bercak	Rf	UV 254	UV 366	preaksi	Pustaka	Ket
A	A1 A2	0.2 0.5	Gelap -	jingga jingga	Coklat -	Biru Biru	+ +
B	B1	0.2	Gelap	-	-	Biru	-
C	C1 C2	0.2 0.5	Gelap -	jingga jingga	Coklat -	Biru Biru	+ +
D	D1	-	-	-	-	-	-

Lampiran 9. Perhitungan dosis

1. Kontrol negatif (CMC 1%)

Suspensi CMC 1% dibuat dengan cara ditimbang 50 mg serbuk CMC dikembangkan dalam air panas digerus ad terbentuk mucilago ditambahkan air suling ad 50 ml. Volume pemberian CMC 1% pada tikus sebanyak 1 ml.

2. Kontrol positif (Asam Mefenamat)

Dosis asam mefenamat = 500 mg (dosis pada manusia 70 kg)

Faktor konversi manusia ke berat tikus 200 gram = 0,018

Dosis untuk tikus = 500 mg x 0,018

= 9 mg/200 gBB tikus

Larutan stok dibuat 1% = 1000 mg/ 100 ml

= 250 mg/ 25 ml

(Menggerus 1 tablet asam mefenamat dosis 500 mg dibuat suspensi CMC ad 50 ml).

Volume pemberian asam mefenamat untuk masing-masing tikus pada metode *Randall Selitto*:

Tikus 1 :

BB 170 gram = $\frac{170g}{200g}$ x 9mg = 7,65 mg

Volume oral = $\frac{7,65mg}{250mg}$ x 50ml = 0.76 ml

Tikus 2 :

BB 180 gram = $\frac{180g}{200g}$ x 9mg = 8,1 mg

Volume oral = $\frac{8,1mg}{250mg}$ x 25ml = 0,81 ml

Tikus 3 :

BB 180 gram = $\frac{170g}{200g}$ x 9mg = 7,65 mg

Volume oral = $\frac{7,65\ mg}{250mg}$ x 25ml = 0,76 ml

Tikus 4 :

BB 180 gram = $\frac{180g}{200g}$ x 9mg = 8,1 mg

Volume oral = $\frac{8,1mg}{250mg}$ x 25ml = 0,81 ml

Tikus 5 :

BB 180 gram = $\frac{180g}{200g}$ x 9mg = 8,1 mg

Volume oral $= \frac{8,1mg}{250mg} x\ 25ml = 0,81\ ml$

3. Kontrol positif (Tramadol)

Dosis tramadol = 50 mg (dosis pada manusia 70 kg)

Faktor konversi manusia ke berat tikus 200 gram = 0,018

Dosis untuk tikus = 50 mg x 0,018

= 0,9 mg/200 gBB tikus

Larutan stok dibuat 0,1% = 100 mg/ 100 ml

= 50 mg/ 50 ml

(Menggerus 1 tablet tramadol dosis 50 mg dibuat suspensi CMC ad 50 ml).

Volume pemberian Tramadol untuk masing-masing tikus pada metode *tail flick* :

Tikus 1 :

BB 180 gram $= \frac{180g}{200g} x\ 0,9mg = 0,81\ mg$

Volume oral $= \frac{0,81mg}{50mg} x\ 50ml = 0,81\ ml$

Tikus 2 :

BB 190 gram $= \frac{180g}{200g} x\ 0,9mg = 0,85\ mg$

Volume oral $= \frac{0,85mg}{50mg} x\ 50ml = 0,85\ ml$

Tikus 3 :

BB 180 gram $= \frac{180g}{200g} x\ 0,9mg = 0,81\ mg$

Volume oral $= \frac{0,81mg}{50mg} x\ 50ml = 0,81\ ml$

Tikus 4 :

BB 170 gram $= \frac{170g}{200g} x\ 0,9mg = 0,76\ mg$

Volume oral $= \frac{0,76mg}{50mg} x\ 50ml = 0,76\ ml$

Tikus 5 :

BB 170 gram $= \frac{170g}{200g} x\ 0,9mg = 0,76\ mg$

Volume oral $= \frac{0,76mg}{50mg} x\ 50ml = 0,76\ ml$

4. Ekstrak etanol daun sirih merah

Dosis ekstrak etanol daun sirih merah dihitung berdasarkan jurnal sebelumnya yaitu 14,56 mg/20gbb mencit dikonversikan ke tikus 14,56 mg/20gbb x 7,0 adalah 101,92 mg/200gbb, dosis yang digunakan adalah 100 mg/200gbb tikus.

Larutan stok dibuat 2% = 2000 mg/ 100 ml

= 500 mg/25 ml

(Menimbang 500 mg ekstrak etanol daun sirih merah dibuat suspensi CMC ad 25 ml)

- Volume pemberian ekstrak untuk masing-masing tikus pada metode *tail flick* :

Tikus 1 :

BB 180 gram = $\frac{180g}{200g}$ x 100mg = 90 mg

Volume oral = $\frac{90mg}{500mg}$ x 25ml = 4,5 ml

Tikus 2 :

BB 190 gram = $\frac{190g}{200g}$ x 100mg = 95 mg

Volume oral = $\frac{95mg}{500mg}$ x 25ml = 4,75 ml

Tikus 3 :

BB 190 gram = $\frac{190g}{200g}$ x 100mg = 95 mg

Volume oral = $\frac{95mg}{500mg}$ x 25ml = 4,75 ml

Tikus 4 :

BB 170 gram = $\frac{170g}{200g}$ x 100mg = 85 mg

Volume oral = $\frac{85mg}{500mg}$ x 25ml = 4,25 ml

Tikus 5 :

BB 170 gram = $\frac{170g}{200g}$ x 100mg = 85 mg

Volume oral = $\frac{85mg}{500mg}$ x 25ml = 4,25 ml

- Volume pemberian ekstrak untuk masing-masing tikus pada metode *Randall Selitto*:

Tikus 1 :

BB 220 gram = $\frac{220g}{200g}$ x 100mg = 110 mg

Volume oral = $\frac{110mg}{1000mg}$ x 50ml = 5,5 ml

Tikus 2 :

BB 200 gram = $\frac{200g}{200g}$ x 100mg = 100 mg

Volume oral = $\frac{100mg}{1000mg}$ x 50ml = 5 ml

Tikus 3 :

BB 200 gram = $\frac{200g}{200g}$ x 100mg = 100 mg

Volume oral $= \frac{100\text{mg}}{1000\text{mg}} \text{x } 50\text{ml} = 5 \text{ ml}$

Tikus 4 :

BB 210 gram $= \frac{210\text{g}}{200\text{g}} \text{x } 100\text{mg} = 105 \text{ mg}$

Volume oral $= \frac{105\text{mg}}{1000\text{mg}} \text{x } 50\text{ml} = 5{,}25 \text{ ml}$

Tikus 5 :

BB 200 gram $= \frac{200\text{g}}{200\text{g}} \text{x } 100\text{mg} = 100 \text{ mg}$

Volume oral $= \frac{100\text{mg}}{1000\text{mg}} \text{x } 50\text{ml} = 5 \text{ ml}$

5. Fraksi *n*-heksana

Dosis efektif ekstrak etanol daun sirih merah pada tikus jantan putih 100 mg/200gbb, rendemen fraksi *n*-heksanan sebesar 2,4288%.

Larutan stok dibuat 1 % = 1000 mg/ 100 ml.

= 500 mg/ 50 ml

(Menimbang 500 mg fraksi *n*-heksana dibuat suspensi CMC ad 50 ml).

Perhitungan dosis $= \frac{\text{rendemen fraksi}}{\text{rendemen total fraksi}} \text{x dosis ekstrak}$

$= \frac{11.58}{73.63} \text{x } 100 \text{ mg/200gbb}$

= 15.727 mg/200gbb

- Volume pemberian *n*-heksana untuk masing-masing tikus pada metode *tail flick* :

Tikus 1 :

BB 130 gram $= \frac{130\text{g}}{200\text{g}} \text{x} 15{,}727\text{mg} = 10{,}22 \text{ mg}$

Volume oral $= \frac{10{,}22\text{mg}}{500\text{mg}} \text{x } 50\text{ml} = 1{,}02 \text{ ml}$

Tikus 2 :

BB 130 gram $= \frac{130\text{g}}{200\text{g}} \text{x} 15{,}727\text{mg} = 10{,}22 \text{ mg}$

Volume oral $= \frac{10{,}22\text{mg}}{500\text{mg}} \text{x } 50\text{ml} = 1{,}02 \text{ ml}$

Tikus 3 :

BB 100 gram $= \frac{100\text{g}}{200\text{g}} \text{x} 15{,}727\text{mg} = 7{,}86 \text{ mg}$

Volume oral $= \frac{7{,}86\text{mg}}{500\text{mg}} \text{x } 50\text{ml} = 0{,}78 \text{ ml}$

Tikus 4 :

BB 190 gram $= \frac{190\text{g}}{200\text{g}} \text{x} 15{,}727\text{mg} = 14{,}94 \text{ mg}$

Volume oral $= \frac{14{,}94\text{mg}}{500\text{mg}} \text{x } 50\text{ml} = 1{,}49 \text{ ml}$

Tikus 5 :

BB 130 gram $= \frac{130\text{g}}{200\text{g}} \text{x} 15{,}727\text{mg} = 10{,}22 \text{ mg}$

Volume oral $= \frac{10{,}22\text{mg}}{500\text{mg}} \text{x } 50\text{ml} = 1{,}02 \text{ ml}$

- Volume pemberian *n*-heksana untuk masing-masing tikus pada metode *Randall Selitto* :

Tikus 1 :

BB 170 gram $= \frac{170\text{g}}{200\text{g}} \text{x} 15{,}727\text{mg} = 13{,}367 \text{ mg}$

Volume oral $= \frac{13{,}367\text{mg}}{500\text{mg}} \text{x } 50\text{ml} = 1{,}33 \text{ ml}$

Tikus 2 :

BB 170 gram $= \frac{170\text{g}}{200\text{g}} \text{x} 15{,}727\text{mg} = 13{,}367 \text{ mg}$

Volume oral $= \frac{13{,}367\text{mg}}{500\text{mg}} \text{x } 50\text{ml} = 1{,}33 \text{ ml}$

Tikus 3 :

BB 170 gram $= \frac{170\text{g}}{200\text{g}} \text{x} 15{,}727\text{mg} = 13{,}367 \text{ mg}$

Volume oral $= \frac{13{,}367\text{mg}}{500\text{mg}} \text{x } 50\text{ml} = 1{,}33 \text{ ml}$

Tikus 4 :

BB 170 gram $= \frac{170\text{g}}{200\text{g}} \text{x} 15{,}727\text{mg} = 13{,}367 \text{ mg}$

Volume oral $= \frac{13{,}367\text{mg}}{500\text{mg}} \text{x } 50\text{ml} = 1{,}33 \text{ ml}$

Tikus 5 :

BB 170 gram $= \frac{170\text{g}}{200\text{g}} \text{x} 15{,}727\text{mg} = 13{,}367 \text{ mg}$

Volume oral $= \frac{13{,}367\text{mg}}{500\text{mg}} \text{x } 50\text{ml} = 1{,}33 \text{ ml}$

6. Fraksi etil asetat

Dosis efektif ekstrak etanol daun sirih merah pada tikus jantan putih 100 mg/200gbb . rendemen fraksi etil asetat sebesar 7,1899 %.

Larutan stok dibuat 1 % = 10000 mg/ 100 ml.

= 500 mg/ 50 ml

(Menimbang 500 mg fraksi etil asetat dibuat suspensi CMC ad 50 ml).

Perhitungan dosis $= \frac{\text{rendemen fraksi}}{\text{rendemen total fraksi}} \text{x dosis ekstrak}$

$= \frac{8{,}59}{73.63} \text{x } 100 \text{ mg/200gbb}$

= 11,666 mg/200gbb

- Volume pemberian fraksi etil asetat untuk masing-masing tikus pada metode *tail flick* :

Tikus 1 :

BB 110 gram = $\frac{110g}{200g}$x11,66mg = 6,41 mg

Volume oral = $\frac{6,41mg}{500mg}$x 50ml = 0,641 ml

Tikus 2 :

BB 130 gram = $\frac{130g}{200g}$x11,66mg = 7,58 mg

Volume oral = $\frac{7,58mg}{500mg}$x 50ml = 0,75 ml

Tikus 3 :

BB 130 gram = $\frac{130g}{200g}$x11,66mg = 7,58 mg

Volume oral = $\frac{7,58mg}{500mg}$x 50ml = 0,75 ml

Tikus 4 :

BB 100 gram = $\frac{100g}{200g}$x11,66mg = 5,83 mg

Volume oral = $\frac{5,83mg}{500mg}$x 50ml = 0,58 ml

Tikus 5 :

BB 110 gram = $\frac{110g}{200g}$x11,66mg = 6,41 mg

Volume oral = $\frac{6,41mg}{500mg}$x 50ml = 0,641 ml

- Volume pemberian fraksi etil asetat untuk masing-masing tikus pada metode *Randall Selitto* :

Tikus 1 :

BB 170 gram = $\frac{170g}{200g}$x11,66mg = 9,911 mg

Volume oral = $\frac{9,911mg}{500mg}$x 50ml = 0,99 ml

Tikus 2 :

BB 170 gram = $\frac{170g}{200g}$x11,66mg = 9,911 mg

Volume oral = $\frac{9,911mg}{500mg}$x 50ml = 0,99 ml

Tikus 3 :

BB 180 gram = $\frac{180g}{200g}$x11,66mg = 10.494 mg

Volume oral = $\frac{10.494mg}{500mg}$x 50ml = 1,04 ml

Tikus 4 :

BB 170 gram = $\frac{170g}{200g}$x11,66mg = 9,911 mg

Volume oral = $\frac{9,911mg}{500mg}$x 50ml = 0,99 ml

Tikus 5 :

BB 170 gram = $\frac{170g}{200g}$x11,66mg = 9,911 mg

Volume oral = $\frac{9,911mg}{500mg}$x 50ml = 0,99 ml

7. Fraksi air

Dosis efektif ekstrak etanol daun sirih merah pada tikus jantan putih 100 mg/200gbb . rendemen fraksi air sebesar 30,717 %.

Larutan stok dibuat 2 % = 2000 mg/ 100 ml.

= 1000 mg/ 50 ml

(Menimbang 1000 mg frakai air diencerkan dan ditambah suspensi CMC ad 50 ml).

Perhitungan dosis = $\frac{\text{rendemen fraksi}}{\text{rendemen total fraksi}}$x dosis ekstrak

= $\frac{53,46}{73.63}$x 100 mg/200gbb

= 72.606 mg/200gbb

- Volume pemberian fraksi air untuk masing-masing tikus pada metode *tail flick*:

Tikus 1 :

BB 160 gram = $\frac{160g}{200g}$x72.606mg = 58,08 mg

Volume oral = $\frac{58,08mg}{1000mg}$x 50ml = 2,90 ml

Tikus 2 :

BB 140 gram = $\frac{140g}{200g}$x72.606mg = 50,82 mg

Volume oral = $\frac{50,82mg}{1000mg}$x 50ml = 2,54 ml

Tikus 3 :

BB 140 gram = $\frac{140g}{200g}$x72.606mg = 50,82 mg

Volume oral = $\frac{50,82mg}{1000mg}$x 50ml = 2,54 ml

Tikus 4 :

BB 120 gram = $\frac{120g}{200g}$x72.606mg = 43,56 mg

Volume oral $= \frac{43{,}56\text{mg}}{1000\text{mg}} \text{x } 50\text{ml} = 2{,}17 \text{ ml}$

Tikus 5 :

BB 80 gram $= \frac{140\text{g}}{200\text{g}} \text{x} 72.606\text{mg} = 29.04 \text{ mg}$

Volume oral $= \frac{29{,}04\text{mg}}{1000\text{mg}} \text{x } 50\text{ml} = 1{,}45 \text{ ml}$

- Volume pemberian fraksi air untuk masing-masing tikus pada metode *Randall Selitto*:

Tikus 1 :

BB 170 gram $= \frac{170\text{g}}{200\text{g}} \text{x} 72.606\text{mg} = 61{,}715 \text{ mg}$

Volume oral $= \frac{61{,}715\text{mg}}{1000\text{mg}} \text{x } 50\text{ml} = 3{,}08 \text{ ml}$

Tikus 2 :

BB 150 gram $= \frac{150\text{g}}{200\text{g}} \text{x} 72.606\text{mg} = 54{,}454 \text{ mg}$

Volume oral $= \frac{54{,}454\text{mg}}{1000\text{mg}} \text{x } 50\text{ml} = 2{,}722 \text{ ml}$

Tikus 3 :

BB 150 gram $= \frac{150\text{g}}{200\text{g}} \text{x} 72.606\text{mg} = 54{,}454 \text{ mg}$

Volume oral $= \frac{54{,}454\text{mg}}{1000\text{mg}} \text{x } 50\text{ml} = 2{,}722 \text{ ml}$

Tikus 4 :

BB 150 gram $= \frac{150\text{g}}{200\text{g}} \text{x} 72.606\text{mg} = 54{,}454 \text{ mg}$

Volume oral $= \frac{54{,}454\text{mg}}{1000\text{mg}} \text{x } 50\text{ml} = 2{,}722 \text{ ml}$

Tikus 5 :

BB 170 gram $= \frac{170\text{g}}{200\text{g}} \text{x} 72.606\text{mg} = 61{,}715 \text{ mg}$

Volume oral $= \frac{61{,}715\text{mg}}{1000\text{mg}} \text{x } 50\text{ml} = 3{,}08 \text{ ml}$

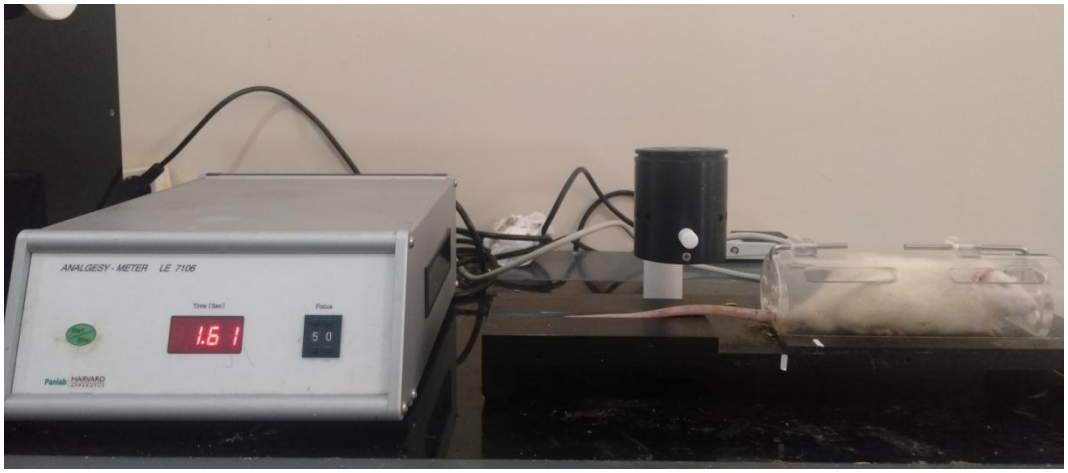
8. Induksi inflamasi secara subcutan

Dosis *Sacharomyces cereviciae* yang diinduksi secara subcutan pada permukaan plantar kaki belakang tikus adalah 0,1 ml dari 20% suspensi SC.

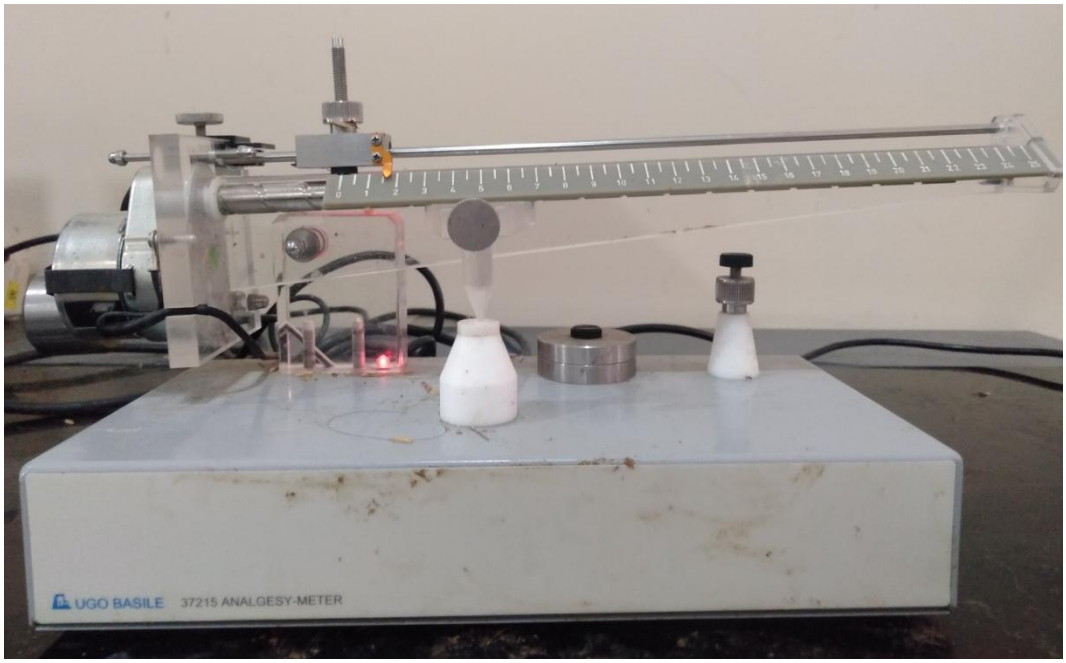
Suspensi *Sacharomyces cereviciae* 20% : 20000 mg / 100 ml

: 4000 mg/ 20 ml

Lampiran 10. Foto pengamatan



Gambar. Alat *Tail Flick analgesy-meter*



Gambar. Alat UGO BASILE 3721 ITALY *analgesy-meter*

Lampiran 11. Hasil uji analgesik metode *Tail flick* sebelum dikurangi T_0

Kel. Perlakuan	Tikus ke-	T0 (detik)	Waktu (detik)			
			30	60	90	120
CMC	1	9,5	13,26	12,05	12,44	7,84
	2	8,6	9,3	10,49	11,36	6,71
	3	8,57	10,25	12,23	11,43	10,33
	4	10,3	10,27	11,23	12,56	11,12
	5	9,35	11,13	10,21	10,46	8,45
Tramadol	1	6,09	9,56	17,09	15,39	14,94
	2	10,64	15,31	18,03	16,27	15,82
	3	5,23	12,3	15,1	14,23	9,68
	4	4,71	11,12	17,4	14,37	13,92
	5	5,45	9,57	14,1	13,27	13,18
Ekstrak etanol	1	9,85	15,5	19,51	17,21	15,24
	2	5,86	11,53	13,21	15,47	8,19
	3	4,78	10,15	13,58	9,38	10,49
	4	12,69	15,34	18,42	16,33	14,53
	5	8,1	14,22	17,18	18,24	16,15
Fraksi *n*-heksana	1	10,47	14,29	15,82	16,72	14,23
	2	9,68	12,75	16,45	13,56	12,16
	3	7,54	10,13	14,94	15,27	11,32
	4	9,7	14,98	17,65	15,24	11,84
	5	5,66	11,22	13,57	14,11	7,43
Fraksi etil asetat	1	11,96	15,33	15,27	13,1	13,34
	2	8,14	12,65	14,36	12,54	10,42
	3	7,53	11,54	13,31	12,74	9,11
	4	10,35	12,6	16,45	13,18	12,65
	5	4,8	9,53	12,2	13,42	12,53
Fraksi air	1	7,64	9,45	13,02	14,32	10,12
	2	6,65	9,22	11,41	13,41	9,32
	3	7,47	10,21	13,14	14,29	11,2
	4	10,21	14,27	12,45	13,13	10,16
	5	9,54	12,25	13,82	14,59	13,79

Lampiran 12. Hasil uji analgesik metode *tail flick* setelah dikurangi T_0

Kel perlakuan	Tikus ke-	Menit ke- (detik)			
		$\Delta T_1(T_{30}-T_0)$	$\Delta T_1(T_{30}-T_0)$	$\Delta T_1(T_{30}-T_0)$	$\Delta T_1(T_{30}-T_0)$
CMC	1	3,76	2,55	2,94	1,66
	2	0,7	1,89	2,76	1,89
	3	1,68	3,66	2,86	1,76
	4	0,03	0,93	2,26	0,82
	5	1,78	0,86	1,11	0,9
x±SD		1,59±1,41	1,97±1,17	2,38±0,76	1,4±0,5
Tramadol	1	3,47	11	9,3	8,85
	2	4,67	7,39	5,63	5,18
	3	7,07	9,87	9	4,45
	4	6,41	12,69	9,66	9,21
	5	4,12	8,65	7,82	7,73
x±SD		5,14±1,53	9,92±2	8,28±1,63	7,08±2,15
Ekstrak etanol	1	5,65	9,66	7,36	5,39
	2	5,67	7,35	9,61	2,33
	3	5,37	8,8	4,6	5,71
	4	2,65	5,73	3,64	1,84
	5	6,12	9,08	10,14	8,05
x±SD		5,09±1,39	8,12±1,58	7,07±2,9	4,66±2,57
Fraksi *n*-heksana	1	3,82	5,35	6,25	3,76
	2	3,07	6,77	3,88	2,48
	3	2,59	7,4	7,73	3,78
	4	5,28	7,95	5,54	2,14
	5	5,56	7,91	8,45	1,77
x±SD		4,06±1,31	7,07±1,07	6,37±1,8	2,78±0,93
Fraksi etil asetat	1	3,37	3,31	1,14	1,38
	2	4,51	6,22	4,4	2,28
	3	4,01	5,78	5,21	1,58
	4	2,25	6,1	2,83	2,3
	5	4,73	7,4	8,62	7,73
x±SD		3,77±0,99	5,76±1,5	4,44±2,8	3,0542,64
Fraksi air	1	1,81	5,38	6,68	2,48
	2	2,57	4,76	6,76	2,67
	3	2,74	5,67	6,82	3,73
	4	4,06	2,24	2,92	0,05
	5	2,71	4,28	5,05	4,25
x±SD		2,77±0,81	4,46±1,35	5,64±1,69	2,63±1,62

Lampiran 13. Hasil uji statistik berdasarkan waktu reaksi (detik) metode *tail flick*

- **Menit ke 30**

Uji *Shapiro-Wilk*

Kriteria uji

Sig,<0,05 maka Ho ditolak

Sig, >0,05 maka Ho diterima

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	Df	Sig,	Statistic	Df	Sig,
cmc	,246	5	,200*	,941	5	,672
tramadol	,222	5	,200*	,924	5	,557
ekstrak	,379	5	,018	,731	5	,020
n-heksana	,222	5	,200*	,906	5	,446
etil asetat	,193	5	,200*	,926	5	,567
air	,319	5	,108	,898	5	,397

*, This is a lower bound of the true significance,
a, Lilliefors Significance Correction

Kesimpulan : Sig, >0,05 maka Ho diterima, artinya data tidak terdistribusi normal

Uji *Levene*

Kriteria uji

Sig,<0,05 maka Ho ditolak

Sig, >0,05 maka Ho diterima

Test of Homogeneity of Variances

data

Levene Statistic	df1	df2	Sig,
,767	5	24	,582

Kesimpulan : Sig, >0,05 maka Ho diterima, artinya variasi data homogen

Non parametrik (*Mann witney*)

Kriteria uji

Sig,<0,05 maka Ho ditolak

Sig, >0,05 maka Ho diterima

Ranks

	Perlakuan	N	Mean Rank	Sum of Ranks
data	Cmc	5	3,20	16,00
	Tramadol	5	7,80	39,00
	Total	10		

Test Statistics[a]

	Data
Man*n*-Whitney U	1,000
Wilcoxon W	16,000
Z	-2,402
Asymp. Sig. (2-tailed)	,016
Exact Sig. [2*(1-tailed Sig.)]	,016[b]

a. Grouping Variable: perlakuan
b. Not corrected for ties.

Ranks

	Perlakuan	N	Mean Rank	Sum of Ranks
Data	cmc	5	3,20	16,00
	Ekstrak	5	7,80	39,00
	Total	10		

Test Statistics[a]

	Data
Man*n*-Whitney U	1,000
Wilcoxon W	16,000
Z	-2,402
Asymp. Sig. (2-tailed)	,016
Exact Sig. [2*(1-tailed Sig.)]	,016[b]

a. Grouping Variable: perlakuan
b. Not corrected for ties.

Ranks

	Perlakuan	N	Mean Rank	Sum of Ranks
data	Tramadol	5	5,60	28,00
	Ekstrak	5	5,40	27,00
	Total	10		

Test Statistics[a]

	Data
Man*n*-Whitney U	12,000
Wilcoxon W	27,000
Z	-,104
Asymp. Sig. (2-tailed)	,917
Exact Sig. [2*(1-tailed Sig.)]	1,000[b]

a. Grouping Variable: perlakuan
b. Not corrected for ties.

Ranks

	perlakuan	N	Mean Rank	Sum of Ranks
data	cmc	5	3,40	17,00
	n-heksana	5	7,60	38,00
	Total	10		

Test Statistics[a]

	Data
Man*n*-Whitney U	2,000
Wilcoxon W	17,000
Z	-2,193
Asymp. Sig. (2-tailed)	,028
Exact Sig. [2*(1-tailed Sig.)]	,032[b]

a. Grouping Variable: perlakuan
b. Not corrected for ties.

Ranks

	perlakuan	N	Mean Rank	Sum of Ranks
data	Tramadol	5	6,60	33,00
	n-heksana	5	4,40	22,00
	Total	10		

Test Statistics[a]

	data
Man*n*-Whitney U	7,000
Wilcoxon W	22,000
Z	-1,149
Asymp. Sig. (2-tailed)	,251
Exact Sig. [2*(1-tailed Sig.)]	,310[b]

a. Grouping Variable: perlakuan
b. Not corrected for ties.

Ranks

	Perlakuan	N	Mean Rank	Sum of Ranks
data	cmc	5	3,40	17,00
	etil asetat	5	7,60	38,00
	Total	10		

Test Statistics[a]

	data
Mann-Whitney U	2,000
Wilcoxon W	17,000
Z	-2,193
Asymp. Sig. (2-tailed)	,028
Exact Sig. [2*(1-tailed Sig.)]	,032[b]

a. Grouping Variable: perlakuan
b. Not corrected for ties.

Ranks

	Perlakuan	N	Mean Rank	Sum of Ranks
data	Tramadol	5	6,80	34,00
	etil asetat	5	4,20	21,00
	Total	10		

Test Statistics[a]

	data
Mann-Whitney U	6,000
Wilcoxon W	21,000
Z	-1,358
Asymp. Sig. (2-tailed)	,175
Exact Sig. [2*(1-tailed Sig.)]	,222[b]

a. Grouping Variable: perlakuan
b. Not corrected for ties.

Ranks

	Perlakuan	N	Mean Rank	Sum of Ranks
data	cmc	5	3,80	19,00
	Air	5	7,20	36,00
	Total	10		

Test Statistics[a]

	data
Mann-Whitney U	4,000
Wilcoxon W	19,000
Z	-1,776
Asymp. Sig. (2-tailed)	,076
Exact Sig. [2*(1-tailed Sig.)]	,095[b]

a. Grouping Variable: perlakuan
b. Not corrected for ties.

Ranks

	Perlakuan	N	Mean Rank	Sum of Ranks
data	Tramadol	5	7,80	39,00
	Air	5	3,20	16,00
	Total	10		

Test Statistics[a]

	data
Mann-Whitney U	1,000
Wilcoxon W	16,000
Z	-2,402
Asymp. Sig. (2-tailed)	,016
Exact Sig. [2*(1-tailed Sig.)]	,016[b]

a. Grouping Variable: perlakuan
b. Not corrected for ties.

- **Menit ke- 60**

Uji Shapiro-Wilk

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	Df	Sig,	Statistic	Df	Sig,
cmc	,214	5	,200*	,920	5	,530
tramadol	,132	5	,200*	,992	5	,987
ekstrak	,265	5	,200*	,912	5	,482
n-heksana	,218	5	,200*	,865	5	,248
etil asetat	,305	5	,145	,885	5	,330
Air	,245	5	,200*	,880	5	,309

*, This is a lower bound of the true significance,
a, Lilliefors Significance Correction

Kesimpulan : Sig, >0,05 maka Ho diterima, artinya data terdistribusi normal

Uji *Levene*

Test of Homogeneity of Variances

data

Levene Statistic	df1	df2	Sig,
,535	5	24	,748

Kesimpulan : Sig, >0,05 maka Ho diterima, artinya variasi data homogen

Uji *ANOVA*

ANOVA

data

	Sum of Squares	Df	Mean Square	F	Sig,
Between Groups	196,644	5	39,329	17,661	,000
Within Groups	53,446	24	2,227		
Total	250,090	29			

Kesimpulan : Sig, <0,05 maka Ho ditolak artinya terdapat perbedaan rata-rata selisih respons hambat nyeri

Uji *Post Hoc*

Multiple Comparisons

Dependent Variable: data

LSD

(I) perlakuan	(J) perlakuan	Mean Difference (I-J)	Std, Error	Sig,	95% Confidence Interval	
					Lower Bound	Upper Bound
cmc	tramadol	-7,94200*	,94381	,000	-9,8899	-5,9941
	ekstrak	-6,14600*	,94381	,000	-8,0939	-4,1981
	n-heksana	-5,09800*	,94381	,000	-7,0459	-3,1501
	etil asetat	-3,78400*	,94381	,001	-5,7319	-1,8361
	Air	-2,48800*	,94381	,014	-4,4359	-,5401
tramadol	cmc	7,94200*	,94381	,000	5,9941	9,8899
	ekstrak	1,79600	,94381	,069	-,1519	3,7439
	n-heksana	2,84400*	,94381	,006	,8961	4,7919
	etil asetat	4,15800*	,94381	,000	2,2101	6,1059
	Air	5,45400*	,94381	,000	3,5061	7,4019
ekstrak	cmc	6,14600*	,94381	,000	4,1981	8,0939
	tramadol	-1,79600	,94381	,069	-3,7439	,1519
	n-heksana	1,04800	,94381	,278	-,8999	2,9959
	etil asetat	2,36200*	,94381	,020	,4141	4,3099
	Air	3,65800*	,94381	,001	1,7101	5,6059

	cmc	5,09800*	,94381	,000	3,1501	7,0459
	tramadol	-2,84400*	,94381	,006	-4,7919	-,8961
n-heksana	ekstrak	-1,04800	,94381	,278	-2,9959	,8999
	etil asetat	1,31400	,94381	,177	-,6339	3,2619
	air	2,61000*	,94381	,011	,6621	4,5579
	cmc	3,78400*	,94381	,001	1,8361	5,7319
	tramadol	-4,15800*	,94381	,000	-6,1059	-2,2101
etil asetat	ekstrak	-2,36200*	,94381	,020	-4,3099	-,4141
	n-heksana	-1,31400	,94381	,177	-3,2619	,6339
	air	1,29600	,94381	,182	-,6519	3,2439
	cmc	2,48800*	,94381	,014	,5401	4,4359
	tramadol	-5,45400*	,94381	,000	-7,4019	-3,5061
air	ekstrak	-3,65800*	,94381	,001	-5,6059	-1,7101
	n-heksana	-2,61000*	,94381	,011	-4,5579	-,6621
	etil asetat	-1,29600	,94381	,182	-3,2439	,6519

*, The mean difference is significant at the 0,05 level,

- **Menit ke- 90**

Uji Shapiro-Wilk

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	Df	Sig,	Statistic	Df	Sig,
cmc	,288	5	,200*	,800	5	,081
tramadol	,270	5	,200*	,861	5	,234
ekstrak	,209	5	,200*	,904	5	,432
n-heksana	,174	5	,200*	,972	5	,889
etil asetat	,192	5	,200*	,975	5	,906
Air	,329	5	,081	,787	5	,063

*, This is a lower bound of the true significance,
a, Lilliefors Significance Correction

Kesimpulan : Sig, >0,05 maka Ho diterima, artinya data terdistribusi normal

Uji *Levene*

Test of Homogeneity of Variances

data

Levene Statistic	df1	df2	Sig,
1,686	5	24	,176

Kesimpulan : Sig, >0,05 maka Ho diterima, artinya variasi data homogen

Uji *ANOVA*

ANOVA

data

	Sum of Squares	Df	Mean Square	F	Sig,
Between Groups	107,828	5	21,566	5,028	,003
Within Groups	102,942	24	4,289		
Total	210,770	29			

Kesimpulan : Sig, <0,05 maka Ho ditolak artinya terdapat perbedaan rata-rata selisih respon hambat nyeri

Uji *Post Hoc*

Multiple Comparisons

Dependent Variable: data

LSD

(I] perlakuan	(J] perlakuan	Mean Difference (I-J]	Std, Error	Sig,	95% Confidence Interval	
					Lower Bound	Upper Bound
	tramadol	-5,89600*	1,30985	,000	-8,5994	-3,1926
	ekstrak	-4,68400*	1,30985	,002	-7,3874	-1,9806
cmc	*n*-heksana	-3,98400*	1,30985	,006	-6,6874	-1,2806
	etil asetat	-2,05400	1,30985	,130	-4,7574	,6494
	air	-3,26000*	1,30985	,020	-5,9634	-,5566
	cmc	5,89600*	1,30985	,000	3,1926	8,5994
	ekstrak	1,21200	1,30985	,364	-1,4914	3,9154
tramadol	*n*-heksana	1,91200	1,30985	,157	-,7914	4,6154
	etil asetat	3,84200*	1,30985	,007	1,1386	6,5454
	air	2,63600	1,30985	,056	-,0674	5,3394
	cmc	4,68400*	1,30985	,002	1,9806	7,3874
	tramadol	-1,21200	1,30985	,364	-3,9154	1,4914
Ekstrak	*n*-heksana	,70000	1,30985	,598	-2,0034	3,4034
	etil asetat	2,63000	1,30985	,056	-,0734	5,3334
	air	1,42400	1,30985	,288	-1,2794	4,1274
	cmc	3,98400*	1,30985	,006	1,2806	6,6874
	tramadol	-1,91200	1,30985	,157	-4,6154	,7914
n-heksana	ekstrak	-,70000	1,30985	,598	-3,4034	2,0034
	etil asetat	1,93000	1,30985	,154	-,7734	4,6334
	air	,72400	1,30985	,586	-1,9794	3,4274
	cmc	2,05400	1,30985	,130	-,6494	4,7574
	tramadol	-3,84200*	1,30985	,007	-6,5454	-1,1386
etil asetat	ekstrak	-2,63000	1,30985	,056	-5,3334	,0734
	n-heksana	-1,93000	1,30985	,154	-4,6334	,7734
	Air	-1,20600	1,30985	,366	-3,9094	1,4974

	cmc	3,26000*	1,30985	,020	,5566	5,9634
	tramadol	-2,63600	1,30985	,056	-5,3394	,0674
Air	Ekstrak	-1,42400	1,30985	,288	-4,1274	1,2794
	n-heksana	-,72400	1,30985	,586	-3,4274	1,9794
	etil asetat	1,20600	1,30985	,366	-1,4974	3,9094

*, The mean difference is significant at the 0,05 level,

- **Menit ke-120**

Uji *Uji Shapiro-Wilk*

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	Df	Sig,	Statistic	Df	Sig,
cmc	,292	5	,189	,825	5	,127
Tramadol	,218	5	,200*	,881	5	,313
Ekstrak	,218	5	,200*	,922	5	,542
n-heksana	,252	5	,200*	,857	5	,218
etil asetat	,412	5	,006	,689	5	,007
Air	,262	5	,200*	,910	5	,467

*, This is a lower bound of the true significance,
a, Lilliefors Significance Correction

Kesimpulan : Sig, >0,05 maka Ho diterima, artinya data tidak terdistribusi normal

Uji *leavene*

Test of Homogeneity of Variances

data

Levene Statistic	df1	df2	Sig,
2,323	5	24	,074

Kesimpulan **:** Sig, >0,05 maka Ho diterima, artinya variasi data homogen

Uji non parametrik (Mann Witney)

Ranks

	Perlakuan	N	Mean Rank	Sum of Ranks
data	cmc	5	3,00	15,00
	Tramadol	5	8,00	40,00
	Total	10		

Test Statistics[a]

	data
Man*n*-Whitney U	,000
Wilcoxon W	15,000
Z	-2,611
Asymp. Sig. (2-tailed)	,009
Exact Sig. [2*(1-tailed Sig.)]	,008[b]

a. Grouping Variable: perlakuan
b. Not corrected for ties.

Ranks

	Perlakuan	N	Mean Rank	Sum of Ranks
data	cmc	5	3,20	16,00
	Ekstrak	5	7,80	39,00
	Total	10		

Test Statistics[a]

	Data
Man*n*-Whitney U	1,000
Wilcoxon W	16,000
Z	-2,402
Asymp. Sig. (2-tailed)	,016
Exact Sig. [2*(1-tailed Sig.)]	,016[b]

a. Grouping Variable: perlakuan
b. Not corrected for ties.

Ranks

	Perlakuan	N	Mean Rank	Sum of Ranks
data	Tramadol	5	6,60	33,00
	Ekstrak	5	4,40	22,00
	Total	10		

Test Statistics[a]

	data
Man*n*-Whitney U	7,000
Wilcoxon W	22,000
Z	-1,149
Asymp. Sig. (2-tailed)	,251
Exact Sig. [2*(1-tailed Sig.)]	,310[b]

a. Grouping Variable: perlakuan
b. Not corrected for ties.

Ranks

	perlakuan	N	Mean Rank	Sum of Ranks
Data	cmc	5	3,20	16,00
	n-heksana	5	7,80	39,00
	Total	10		

Test Statistics[a]

	data
Man*n*-Whitney U	1,000
Wilcoxon W	16,000
Z	-2,402
Asymp. Sig. (2-tailed)	,016
Exact Sig. [2*(1-tailed Sig.)]	,016[b]

a. Grouping Variable: perlakuan
b. Not corrected for ties.

Ranks

	perlakuan	N	Mean Rank	Sum of Ranks
data	tramadol	5	8,00	40,00
	n-heksana	5	3,00	15,00
	Total	10		

Test Statistics[a]

	data
Man*n*-Whitney U	,000
Wilcoxon W	15,000
Z	-2,611
Asymp. Sig. (2-tailed)	,009
Exact Sig. [2*(1-tailed Sig.)]	,008[b]

a. Grouping Variable: perlakuan
b. Not corrected for ties.

Ranks

	perlakuan	N	Mean Rank	Sum of Ranks
Data	cmc	5	4,20	21,00
	etil asetat	5	6,80	34,00
	Total	10		

Test Statistics[a]

	data
Man*n*-Whitney U	6,000
Wilcoxon W	21,000
Z	-1,358
Asymp. Sig. (2-tailed)	,175
Exact Sig. [2*(1-tailed Sig.)]	,222[b]

a. Grouping Variable: perlakuan
b. Not corrected for ties.

Ranks

	perlakuan	N	Mean Rank	Sum of Ranks
data	tramadol	5	7,50	37,50
	etil asetat	5	3,50	17,50
	Total	10		

Test Statistics[a]

	data
Man*n*-Whitney U	2,500
Wilcoxon W	17,500
Z	-2,095
Asymp. Sig. (2-tailed)	,036
Exact Sig. [2*(1-tailed Sig.)]	,032[b]

a. Grouping Variable: perlakuan
b. Not corrected for ties.

Ranks

	perlakuan	N	Mean Rank	Sum of Ranks
Data	cmc	5	4,00	20,00
	air	5	7,00	35,00
	Total	10		

Test Statistics[a]

	Data
Man*n*-Whitney U	5,000
Wilcoxon W	20,000
Z	-1,567
Asymp. Sig. (2-tailed)	,117
Exact Sig. [2*(1-tailed Sig.)]	,151[b]

a. Grouping Variable: perlakuan
b. Not corrected for ties.

Ranks

	perlakuan	N	Mean Rank	Sum of Ranks
data	tramadol	5	8,00	40,00
	air	5	3,00	15,00
	Total	10		

Test Statistics[a]

	Data
Man*n*-Whitney U	,000
Wilcoxon W	15,000
Z	-2,611
Asymp. Sig. (2-tailed)	,009
Exact Sig. [2*(1-tailed Sig.)]	,008[b]

a. Grouping Variable: perlakuan
b. Not corrected for ties.

Lampiran 14. Perhitungan AUC metode *Tail flick*

$$AUC_n^n = \frac{(Ft_n\text{-}1)+Ftn}{2}[t_n\text{-}(t_n\text{-}1)]$$

Kontrol negatif (CMC 1%)

$AUC_0^{30} = \frac{0+3,76}{2}[30\text{-}0] = 56,4$

$AUC_{30}^{60} = \frac{3,76+2,55}{2}[60\text{-}30] = 94,65$

$AUC_{60}^{90} = \frac{2,55+2,94}{2}[90\text{-}60] = 82,3$

$AUC_{90}^{120} = \frac{2,94+1,66}{2}[120\text{-}90] = 69$

AUC total replikasi 1 = 302,4

$AUC_0^{30} = \frac{0+0,7}{2}[30\text{-}0] = 10,5$

$AUC_{30}^{60} = \frac{0,7+1,89}{2}[60\text{-}30] = 38,85$

$AUC_{60}^{90} = \frac{1,89+2,76}{2}[90\text{-}60] = 69,75$

$AUC_{90}^{120} = \frac{2,76+1,89}{2}[120\text{-}90] = 69,75$

AUC total replikasi 2 = 188,85

Kontrol positif (Tramadol)

$AUC_0^{30} = \frac{0+3,47}{2}[30\text{-}0] = 52,05$

$AUC_{30}^{60} = \frac{3,47+11}{2}[60\text{-}30] = 217,05$

$AUC_{60}^{90} = \frac{11+9,3}{2}[90\text{-}60] = 304,5$

$AUC_{90}^{120} = \frac{9,3+8,85}{2}[120\text{-}90] = 272,25$

AUC total replikasi 1 = 845,85

$AUC_0^{30} = \frac{0+4,67}{2}[30\text{-}0] = 70,05$

$AUC_{30}^{60} = \frac{4,67+7,39}{2}[60\text{-}30] = 180,9$

$AUC_{60}^{90} = \frac{7,39+5,63}{2}[90\text{-}60] = 195,3$

$AUC_{90}^{120} = \frac{5,63+5,18}{2}[120\text{-}90] = 162,15$

AUC total replikasi 2 = 608,4

Lampiran 15. Perhitungan % peningkatan hambat nyeri metode *Tail flick*

$$\% \text{ Peningkatan hambat nyeri} = \frac{\text{AUCp-AUCk}}{\text{AUCp}} \times 100\%$$

Kontrol positif (Tramadol)

Rep 1= $\frac{845,85\text{-}199,71}{845,85}$ x 100% = 76,38

Rep 2= $\frac{608,4\text{-}199,71}{608,4}$ x 100% = 67,17

Rep 3= $\frac{844,95\text{-}199,71}{844,95}$ x 100% = 76,36

Rep 4= $\frac{1000,95\text{-}199,71}{1000,95}$ x 100% = 80,04

Rep 5= $\frac{733,65\text{-}199,71}{733,65}$ x 100% = 72,77

Rata-rata % PHN = 74,583%

Ekstrak daun sirih merah

Rep 1= $\frac{190,237\text{-}199,71}{190,237}$ x 100% = 73,75

Rep 2= $\frac{178,462\text{-}199,71}{178,462}$ x 100% = 72,02

Rep 3= $\frac{162,187\text{-}199,71}{162,187}$ x 100% = 69,21

Rep 4= $\frac{97,05\text{-}199,71}{97,05}$ x 100% = 48,55

Rep 5= $\frac{220,237\text{-}199,71}{220,237}$ x 100% = 77,33

Rata-rata % PHN =68,17%

Fraksi *n*-Heksana

Rep 1= $\frac{519\text{-}199,71}{519}$ x 100% = 61,52

Rep 2= $\frac{448,8\text{-}199,71}{448,8}$ x 100% = 55,5

Rep 3= $\frac{588,3\text{-}199,71}{588,3}$ x 100% = 66,05

Rep 4= $\frac{595,2\text{-}199,71}{595,2}$ x 100% = 64,44

Rep 5= $\frac{684,15\text{-}199,71}{684,15}$ x 100% = 70,80

Rata-rata % PHN = 64,06%

Fraksi etil asetat

Rep 1= $\frac{255,3\text{-}199,71}{255,3}$ x 100% = 15,575

Rep 2= $\frac{488,1\text{-}199,71}{488,1}$ x 100% = 61,309

Rep 3= $\frac{473,7-199,71}{473,7}$ x 100% = 42,495

Rep 4= $\frac{369,9\text{-}199,71}{369,9}$ x 100% = 70,559

Rep 5= $\frac{738,45\text{-}199,71}{738,45}$ x 100% = 72,95

Rata-rata % PHN =51,53%

Fraksi air

Rep 1= $\frac{453,3\text{-}199,71}{453,3}$ x 100% = 33,289

Rep 2= $\frac{462,75\text{-}199,71}{462,75}$ x 100% = 56,84

Rep 3= $\frac{512,85\text{-}199,71}{512,85}$ x 100% = 61,05

Rep 4= $\frac{277,35\text{-}199,71}{277,35}$ x 100% = 27,99

Rep 5= $\frac{424,95\text{-}199,71}{424,95}$ x 100% = 53,003

Rata-rata % PHN =50,96%

Lampiran 16. Hasil statistik % peningkatan hambat nyeri metode *tail flick*

Uji *Shapiro-Wilk*

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	df	Sig.
Perlakuan	,245	5	,200*	,941	5	,674
Ekstrak	,336	5	,066	,793	5	,071
fraksi *n*-heksana	,234	5	,200*	,957	5	,787
fraksi etil asetat	,229	5	,200*	,939	5	,658
fraksi air	,361	5	,032	,757	5	,054

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Kesimpulan : Sig, >0,05 maka Ho diterima, artinya data terdistribusi normal

Uji *Levene*

Test of Homogeneity of Variances

data

Levene Statistic	df1	df2	Sig.
1,723	4	20	,184

Kesimpulan : Sig, >0,05 maka Ho diterima, artinya variasi data homogen

Uji *ANOVA*

ANOVA

data

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	2155,477	4	538,869	3,704	,021
Within Groups	2910,027	20	145,501		
Total	5065,	24			

Kesimpulan : Sig, <0,05 maka Ho ditolak artinya terdapat perbedaan bermakna AUC antar kelompok perlakuan

Uji *Post Hoc*

Multiple Comparisons

Dependent Variable: data

LSD

(I) perlakuan	(J) perlakuan	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
tramaol	Ekstrak	6,37498	7,62893	,413	-9,5387	22,2886
	n-heksana	10,48492	7,62893	,185	-5,4287	26,3986
	etil asetat	23,01811*	7,62893	,007	7,1044	38,9318
	Air	23,58255*	7,62893	,006	7,6689	39,4962
ekstrak	Tramaol	-6,37498	7,62893	,413	-22,2886	9,5387
	n-heksana	4,10994	7,62893	,596	-11,8037	20,0236
	etil asetat	16,64314*	7,62893	,041	,7295	32,5568
	Air	17,20757*	7,62893	,035	1,2939	33,1212
n-heksana	Tramaol	-10,48492	7,62893	,185	-26,3986	5,4287
	Ekstrak	-4,10994	7,62893	,596	-20,0236	11,8037
	etil asetat	12,53319	7,62893	,116	-3,3805	28,4469
	Air	13,09763	7,62893	,101	-2,8160	29,0113
etil asetat	Tramaol	-23,01811*	7,62893	,007	-38,9318	-7,1044
	Ekstrak	-16,64314*	7,62893	,041	-32,5568	-,7295
	n-heksana	-12,53319	7,62893	,116	-28,4469	3,3805
	Air	,56444	7,62893	,942	-15,3492	16,4781
air	Tramaol	-23,58255*	7,62893	,006	-39,4962	-7,6689
	Ekstrak	-17,20757*	7,62893	,035	-33,1212	-1,2939
	n-heksana	-13,09763	7,62893	,101	-29,0113	2,8160
	etil asetat	-,56444	7,62893	,942	-16,4781	15,3492

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

Lampiran 17. Hasil uji analgesik metode *Randall Selitto* sebelum dikurangi T_0

Kel perlakuan	Tikus ke-	Berat beban menit ke (gram)					
		T0	**30**	**60**	**120**	**180**	**240**
CMC	1	15	50	30	30	20	20
	2	25	40	75	60	50	25
	3	70	60	45	30	40	50
	4	55	60	90	90	40	70
	5	40	70	50	20	10	35
Asmet	1	25	100	180	165	65	35
	2	22	50	120	145	65	40
	3	35	145	150	60	90	50
	4	25	125	140	125	25	10
	5	30	115	140	100	50	30
Ekstrak	1	50	130	185	130	115	50
	2	20	65	110	125	35	20
	3	15	85	175	80	55	30
	4	32	95	95	150	80	40
	5	40	120	100	130	60	20
Fraksi *n*-heksana	1	15	90	140	65	85	35
	2	20	80	95	60	20	30
	3	22	110	130	150	95	45
	4	55	130	150	75	70	30
	5	45	100	120	90	50	30
Fraksi etil astat	1	45	135	85	90	25	15
	2	10	80	95	170	15	20
	3	30	85	90	75	85	40
	4	20	145	110	80	40	30
	5	30	90	100	70	40	25
Fraksi air	1	20	90	65	150	50	20
	2	55	85	63	130	80	30
	3	25	90	100	30	55	40
	4	45	95	170	130	30	25
	5	50	100	150	140	50	30

Lampiran 18. Hasil uji analgesik metode *Randall Selitto* setelah dikurangi T_0

Kelompok Perlakuan	Tikus Ke-	Menit Ke-(gram)				
		$\Delta T_1(T_{30}-T_0)$	$\Delta T_2(T_{60}-T_0)$	$\Delta T_3(T_{120}-T_0)$	$\Delta T_4(T_{180}-T_0)$	$\Delta T_5(T_{240}-T_0)$
CMC	1	35	15	15	5	5
	2	15	50	35	25	0
	3	10	25	40	30	20
	4	5	35	35	15	15
	5	30	10	20	30	5
	X±SD	19±12,94	27±16,04	29±10,83	21±10,83	9±8,21
Asam mefenamat	1	75	155	140	40	10
	2	28	98	123	43	18
	3	110	115	25	55	15
	4	100	115	100	0	15
	5	85	110	70	20	0
	X±SD	79,6±31,83	118,6±21,50	91,6±45,55	31,6±21,68	11,6±7,09
Ekstrak etanol	1	80	135	80	65	0
	2	45	90	105	15	0
	3	70	160	65	40	15
	4	63	63	118	48	8
	5	80	60	90	20	20
	X±SD	67,6±14,53	101,6±44,38	91,6±20,74	37,6±20,52	8,6±8,93
Fraksi *n*-heksana	1	75	125	50	70	20
	2	60	75	40	0	10
	3	88	108	128	73	23
	4	75	95	20	15	25
	5	55	75	45	5	15
	X±SD	70,6±13,3	95,6±21,6	56,6±41,5	32,6±35,93	18,6±6,1
Fraksi etil asetat	1	90	40	45	20	30
	2	70	85	160	5	10
	3	55	60	45	55	3
	4	125	90	60	20	1,5
	5	60	70	40	10	1,5
	X±SD	80±28,5	69±20,12	70±50,86	22±19,55	9,2±12,14
Fraksi air	1	70	45	130	30	0
	2	30	8	75	25	25
	3	65	75	5	30	15
	4	50	125	85	15	20
	5	50	100	90	0	20
	X±SD	53±15,65	70,6±45,87	77±45,35	20±12,74	16±9,61

Lampiran 19. Hasil uji statistik berdasarkan waktu reaksi (detik) metode *Randall Selitto*

- **Menit ke-30**

Uji Shapiro-Wilk

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
cmc	,237	5	,200*	,961	5	,814
Asmet	,223	5	,200*	,933	5	,615
Ekstrak	,188	5	,200*	,963	5	,829
fraksi *n*-heksana	,141	5	,200*	,979	5	,928
fraksi etil asetat	,311	5	,128	,819	5	,115
fraksi air	,237	5	,200*	,961	5	,814

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Kesimpulan : Sig, >0,05 maka Ho diterima, artinya data terdistribusi normal

Uji *Levene*

Test of Homogeneity of Variances

data

Levene Statistic	df1	df2	Sig.
1,302	5	24	,296

Kesimpulan : Sig, >0,05 maka Ho diterima, artinya variasi data homogen

Uji *ANOVA*

ANOVA

data

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	13341,367	5	2668,273	6,101	,001
Within Groups	10495,600	24	437,317		
Total	23836,967	29			

Kesimpulan : Sig, <0,05 maka Ho ditolak artinya terdapat perbedaan rata-rata selisih respon hambat nyeri

Uji *Post Hoc*

Multiple Comparisons

Dependent Variable: data

LSD

(I) kel	(J) kel	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
cmc	Asmet	-60,60000*	13,22598	,000	-87,8971	-33,3029
	ekstrak	-48,60000*	13,22598	,001	-75,8971	-21,3029
	n-heksana	-51,60000*	13,22598	,001	-78,8971	-24,3029
	etil asetat	-61,00000*	13,22598	,000	-88,2971	-33,7029
	Air	-34,00000*	13,22598	,017	-61,2971	-6,7029
asmet	cmc	60,60000*	13,22598	,000	33,3029	87,8971
	ekstrak	12,00000	13,22598	,373	-15,2971	39,2971
	n-heksana	9,00000	13,22598	,503	-18,2971	36,2971
	etil asetat	-,40000	13,22598	,976	-27,6971	26,8971
	Air	26,60000	13,22598	,056	-,6971	53,8971
ekstrak	cmc	48,60000*	13,22598	,001	21,3029	75,8971
	asmet	-12,00000	13,22598	,373	-39,2971	15,2971
	n-heksana	-3,00000	13,22598	,822	-30,2971	24,2971
	etil asetat	-12,40000	13,22598	,358	-39,6971	14,8971
	Air	14,60000	13,22598	,281	-12,6971	41,8971
n-heksana	cmc	51,60000*	13,22598	,001	24,3029	78,8971
	asmet	-9,00000	13,22598	,503	-36,2971	18,2971
	ekstrak	3,00000	13,22598	,822	-24,2971	30,2971
	etil asetat	-9,40000	13,22598	,484	-36,6971	17,8971
	Air	17,60000	13,22598	,196	-9,6971	44,8971
etil asetat	cmc	61,00000*	13,22598	,000	33,7029	88,2971
	asmet	,40000	13,22598	,976	-26,8971	27,6971
	ekstrak	12,40000	13,22598	,358	-14,8971	39,6971
	n-heksana	9,40000	13,22598	,484	-17,8971	36,6971
	Air	27,00000	13,22598	,052	-,2971	54,2971
air	cmc	34,00000*	13,22598	,017	6,7029	61,2971
	asmet	-26,60000	13,22598	,056	-53,8971	,6971
	ekstrak	-14,60000	13,22598	,281	-41,8971	12,6971
	n-heksana	-17,60000	13,22598	,196	-44,8971	9,6971
	etil asetat	-27,00000	13,22598	,052	-54,2971	,2971

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

- **Menit ke-60**

Uji Shapiro-Wilk

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	df	Sig.
cmc	,230	5	,200*	,953	5	,758
Asmet	,228	5	,200*	,932	5	,607
Ekstrak	,302	5	,154	,806	5	,091
fraksi *n*-heksana	,170	5	,200*	,962	5	,822
fraksi etil asetat	,141	5	,200*	,979	5	,928
fraksi air	,220	5	,200*	,881	5	,313

*. This is a lower bound of the true significance.
a. Lilliefors Significance Correction

Kesimpulan : Sig, >0,05 maka Ho diterima, artinya data terdistribusi normal

Uji *Levene*

test of homogeneity of variances

data

levene statistic	df1	df2	sig.
2,773	5	24	,041

Kesimpulan : Sig, <0,05 maka Ho ditolak, artinya variasi data tidak homogen

Uji non parametrik (Mann witney)

Ranks

	kel	N	Mean Rank	Sum of Ranks
Data	cmc	5	3,00	15,00
	asmet	5	8,00	40,00
	Total	10		

Test Statistics[a]

	data
Man*n*-Whitney U	,000
Wilcoxon W	15,000
Z	-2,619
Asymp. Sig. (2-tailed)	,009
Exact Sig. [2*(1-tailed Sig.)]	,008[b]

a. Grouping Variable: kel
b. Not corrected for ties.

Ranks

	Kel	N	Mean Rank	Sum of Ranks
data	cmc	5	3,00	15,00
	ekstrak	5	8,00	40,00
	Total	10		

Test Statistics[a]

	data
Man*n*-Whitney U	,000
Wilcoxon W	15,000
Z	-2,611
Asymp. Sig. (2-tailed)	,009
Exact Sig. [2*(1-tailed Sig.)]	,008[b]

a. Grouping Variable: kel

b. Not corrected for ties.

Ranks

	Kel	N	Mean Rank	Sum of Ranks
data	asmet	5	6,20	31,00
	ekstrak	5	4,80	24,00
	Total	10		

Test Statistics[a]

	data
Man*n*-Whitney U	9,000
Wilcoxon W	24,000
Z	-,733
Asymp. Sig. (2-tailed)	,463
Exact Sig. [2*(1-tailed Sig.)]	,548[b]

a. Grouping Variable: kel

b. Not corrected for ties.

Ranks

	kel	N	Mean Rank	Sum of Ranks
data	cmc	5	3,00	15,00
	fraksi *n*-heksana	5	8,00	40,00
	Total	10		

Test Statistics[a]

	data
Mann-Whitney U	,000
Wilcoxon W	15,000
Z	-2,619
Asymp. Sig. (2-tailed)	,009
Exact Sig. [2*(1-tailed Sig.)]	,008[b]

a. Grouping Variable: kel
b. Not corrected for ties.

Ranks

	kel	N	Mean Rank	Sum of Ranks
data	asmet	5	7,00	35,00
	fraksi *n*-heksana	5	4,00	20,00
	Total	10		

Test Statistics[a]

	data
Mann-Whitney U	5,000
Wilcoxon W	20,000
Z	-1,576
Asymp. Sig. (2-tailed)	,115
Exact Sig. [2*(1-tailed Sig.)]	,151[b]

a. Grouping Variable: kel
b. Not corrected for ties.

Ranks

	Kel	N	Mean Rank	Sum of Ranks
data	cmc	5	3,20	16,00
	fraksi etil asetat	5	7,80	39,00
	Total	10		

Test Statistics[a]

	data
Mann-Whitney U	1,000
Wilcoxon W	16,000
Z	-2,402
Asymp. Sig. (2-tailed)	,016
Exact Sig. [2*(1-tailed Sig.)]	,016[b]

a. Grouping Variable: kel
b. Not corrected for ties.

Ranks

	Kel	N	Mean Rank	Sum of Ranks
data	asmet	5	8,00	40,00
	fraksi etil asetat	5	3,00	15,00
	Total	10		

Test Statistics[a]

	data
Mann-Whitney U	,000
Wilcoxon W	15,000
Z	-2,619
Asymp. Sig. (2-tailed)	,009
Exact Sig. [2*(1-tailed Sig.)]	,008[b]

a. Grouping Variable: kel
b. Not corrected for ties.

Ranks

	Kel	N	Mean Rank	Sum of Ranks
data	cmc	5	4,20	21,00
	fraksi air	5	6,80	34,00
	Total	10		

Test Statistics[a]

	Data
Mann-Whitney U	6,000
Wilcoxon W	21,000
Z	-1,358
Asymp. Sig. (2-tailed)	,175
Exact Sig. [2*(1-tailed Sig.)]	,222[b]

a. Grouping Variable: kel
b. Not corrected for ties.

Ranks

	Kel	N	Mean Rank	Sum of Ranks
data	asmet	5	7,00	35,00
	fraksi air	5	4,00	20,00
	Total	10		

Test Statistics[a]

	Data
Mann-Whitney U	5,000
Wilcoxon W	20,000
Z	-1,571
Asymp. Sig. (2-tailed)	,116
Exact Sig. [2*(1-tailed Sig.)]	,151[b]

a. Grouping Variable: kel
b. Not corrected for ties.

- **Menit ke-120**

Uji Shapiro-Wilk

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	Df	Sig.
cmc	,311	5	,129	,871	5	,269
asmet	,158	5	,200*	,975	5	,907
ekstrak	,331	5	,078	,850	5	,195
fraksi *n*-heksana	,278	5	,200*	,814	5	,104
fraksi etil asetat	,367	5	,026	,714	5	,013
fraksi air	,413	5	,006	,709	5	,012

*. This is a lower bound of the true significance.
a. Lilliefors Significance Correction

Kesimpulan : Sig, <0,05 maka Ho ditolak, artinya data tidak terdistribusi normal

Uji *Levene*

test of homogeneity of variances

data

levene statistic	df1	df2	sig.
1,078	5	24	,397

Kesimpulan : Sig, >0,05 maka Ho diterima, artinya variasi data homogen

Uji non parametrik (Mann witney)

Ranks

	kel	N	Mean Rank	Sum of Ranks
data	cmc	5	3,60	18,00
	asmet	5	7,40	37,00
	Total	10		

Test Statistics[a]

	data
Mann-Whitney U	3,000
Wilcoxon W	18,000
Z	-1,991
Asymp. Sig. (2-tailed)	,047
Exact Sig. [2*(1-tailed Sig.)]	,056[b]

a. Grouping Variable: kel
b. Not corrected for ties.

Ranks

	kel	N	Mean Rank	Sum of Ranks
data	cmc	5	3,00	15,00
	ekstrak	5	8,00	40,00
	Total	10		

Test Statistics[a]

	data
Mann-Whitney U	,000
Wilcoxon W	15,000
Z	-2,619
Asymp. Sig. (2-tailed)	,009
Exact Sig. [2*(1-tailed Sig.)]	,008[b]

a. Grouping Variable: kel
b. Not corrected for ties.

Ranks

	kel	N	Mean Rank	Sum of Ranks
data	asmet	5	5,80	29,00
	ekstrak	5	5,20	26,00
	Total	10		

Test Statistics[a]

	data
Mann-Whitney U	11,000
Wilcoxon W	26,000
Z	-,313
Asymp. Sig. (2-tailed)	,754
Exact Sig. [2*(1-tailed Sig.)]	,841[b]

a. Grouping Variable: kel
. Not corrected for ties.

Ranks

	Kel	N	Mean Rank	Sum of Ranks
data	cmc	5	3,80	19,00
	fraksi *n*-heksana	5	7,20	36,00
	Total	10		

Test Statistics[a]

	data
Man*n*-Whitney U	4,000
Wilcoxon W	19,000
Z	-1,792
Asymp. Sig. (2-tailed)	,073
Exact Sig. [2*(1-tailed Sig.)]	,095[b]

a. Grouping Variable: kel
b. Not corrected for ties.

Ranks

	kel	N	Mean Rank	Sum of Ranks
data	asmet	5	6,60	33,00
	fraksi *n*-heksana	5	4,40	22,00
	Total	10		

Test Statistics[a]

	Data
Man*n*-Whitney U	7,000
Wilcoxon W	22,000
Z	-1,149
Asymp. Sig. (2-tailed)	,251
Exact Sig. [2*(1-tailed Sig.)]	,310[b]

a. Grouping Variable: kel
b. Not corrected for ties.

Ranks

	kel	N	Mean Rank	Sum of Ranks
data	cmc	5	3,10	15,50
	fraksi etil asetat	5	7,90	39,50
	Total	10		

Test Statistics[a]

	Data
Man*n*-Whitney U	,500
Wilcoxon W	15,500
Z	-2,530
Asymp. Sig. (2-tailed)	,011
Exact Sig. [2*(1-tailed Sig.)]	,008[b]

a. Grouping Variable: kel

b. Not corrected for ties.

Ranks

	kel	N	Mean Rank	Sum of Ranks
data	asmet	5	6,20	31,00
	fraksi etil asetat	5	4,80	24,00
	Total	10		

Test Statistics[a]

	Data
Man*n*-Whitney U	9,000
Wilcoxon W	24,000
Z	-,733
Asymp. Sig. (2-tailed)	,463
Exact Sig. [2*(1-tailed Sig.)]	,548[b]

a. Grouping Variable: kel

b. Not corrected for ties.

Rnks

	kel	N	Mean Rank	Sum of Ranks
data	cmc	5	4,00	20,00
	fraksi air	5	7,00	35,00
	Total	10		

Test Statistics[a]

	data
Man*n*-Whitney U	5,000
Wilcoxon W	20,000
Z	-1,571
Asymp. Sig. (2-tailed)	,116
Exact Sig. [2*(1-tailed Sig.)]	,151[b]

a. Grouping Variable: kel

b. Not corrected for ties.

Ranks

	kel	N	Mean Rank	Sum of Ranks
data	asmet	5	6,00	30,00
	fraksi air	5	5,00	25,00
	Total	10		

Test Statistics[a]

	Data
Mann-Whitney U	10,000
Wilcoxon W	25,000
Z	-,522
Asymp. Sig. (2-tailed)	,602
Exact Sig. [2*(1-tailed Sig.)]	,690[b]

a. Grouping Variable: kel
b. Not corrected for ties.

- **Menit ke-180**

Uji Shapiro-Wilk

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	df	Sig.
cmc	,287	5	,200*	,914	5	,490
Asmet	,201	5	,200*	,966	5	,847
Ekstrak	,217	5	,200*	,955	5	,774
fraksi *n*-heksana	,180	5	,200*	,952	5	,751
fraksi etil asetat	,315	5	,118	,876	5	,292
fraksi air	,255	5	,200*	,927	5	,573

*. This is a lower bound of the true significance.
a. Lilliefors Significance Correction

Kesimulan : Sig, >0,05 maka Ho diterima, artinya data terdistribusi normal

Uji *Levene*

Test of Homogeneity of Variances

data

levene statistic	df1	df2	sig.
3,920	5	24	,010

Kesimpulan : Sig, >0,05 maka Ho diterima, artinya variasi data tidak homogen

Test of Homogeneity of Variances

tr_b

Levene Statistic		df2	Sig.
2,567	5	21	,058

ANOVA

tr_b

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	,145	4	,036	2,607	,067
Within Groups	,279	20	,014		
Total	,424	24			

- **Menit ke-240**

Uji *Kolmogorov-Smirnov*

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
cmc	,197	5	,200*	,934	5	,627
Asmet	,220	5	,200*	,956	5	,777
ekstrak	,221	5	,200*	,902	5	,421
fraksi *n*-heksana	,330	5	,079	,735	5	,021
fraksi etil asetat	,141	5	,200*	,979	5	,928
fraksi air	,246	5	,200*	,956	5	,777

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Kesimulan : Sig, >0,05 maka Ho diterima, artinya data terdistribusi normal

Uji *Levene*

Test of Homogeneity of Variances

data

Levene Statistic	df1	df2	Sig.
,400	5	24	,844

Kesimpulan : Sig, >0,05 maka Ho diterima, artinya variasi data homogen

Uji *ANOVA*

ANOVA

Data

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	439,767	5	87,953	1,111	,381
Within Groups	1899,900	24	79,163		
Total	2339,667	29			

Kesimpulan : Sig, >0,05 maka Ho diterima artinya tidak terdapat perbedaan rata-rata selisih respon hambat nyeri

Lampiran 20. Perhitungan AUC metode *Randall Selitto*

$$AUC_n^n = \frac{(Ftn-1)+Ftn}{2}[tn-(tn-1)]$$

Kontrol negatif (CMC 1%]	**Kontrol positif (Tramadol]**
$AUC_0^{30} = \frac{0+35}{2}[30-0] = 525$	$AUC_0^{30} = \frac{0+75}{2}[30-0] = 1125$
$AUC_{30}^{60} = \frac{35+15}{2}[60-30] = 750$	$AUC_{30}^{60} = \frac{75+155}{2}[60-30] = 3450$
$AUC_{60}^{120} = \frac{15+15}{2}[120-60] = 900$	$AUC_{60}^{120} = \frac{155+140}{2}[120-60] = 8850$
$AUC_{120}^{180} = \frac{15+5}{2}[180-120] = 600$	$AUC_{120}^{180} = \frac{140+40}{2}[180-120] = 5400$
$AUC_{180}^{240} = \frac{5+5}{2}[240-180] = 300$	$AUC_{180}^{240} = \frac{40+10}{2}[240-180] = 1500$
AUC total replikasi 1 = 3075	AUC total replikasi 1 = 20325
$AUC_0^{30} = \frac{0+15}{2}[30-0] = 225$	$AUC_0^{30} = \frac{0+28}{2}[30-0] = 420$
$AUC_{30}^{60} = \frac{15+50}{2}[60-30] = 975$	$AUC_{30}^{60} = \frac{28+98}{2}[60-30] = 1890$
$AUC_{60}^{120} = \frac{50+35}{2}[120-60] = 2550$	$AUC_{60}^{120} = \frac{98+123}{2}[120-60] = 6630$
$AUC_{120}^{180} = \frac{35+25}{2}[180-120] = 1800$	$AUC_{120}^{180} = \frac{123+43}{2}[180-120] = 4890$
$AUC_{180}^{240} = \frac{25+0}{2}[240-180] = 750$	$AUC_{180}^{240} = \frac{43+18}{2}[240-180] = 1830$
AUC total replikasi 1 = 6300	AUC total replikasi 1 = 15750

Lampiran 21. Perhitungan % peningkatan hambat nyeri metode *Randall Selitto*

$$\%\ \text{Peningkatan hambat nyeri} = \frac{\text{AUCp-AUCk}}{\text{AUCp}} \times 100\%$$

Kontrol positif (Asam mefenamat)

Rep 1= $\frac{20325-5055}{20325}$ x 100% = 75,12

Rep 2= $\frac{15750-5055}{15750}$ x 100% = 67,9

Rep 3= $\frac{13725-50555}{13725}$ x 100% = 63,16

Rep 4= $\frac{14625-5055}{14625}$ x 100% = 65,43

Rep 5= $\frac{12900-5055}{12900}$ x 100% = 60,81

Rata-rata % PHN =66,49%

Ekstrak daun sirih merah

Rep 1= $\frac{17175-5055}{17175}$ x 100% = 70,56

Rep 2= $\frac{12600-5055}{12600}$ x 100% = 59,88

Rep 3= $\frac{16050-5055}{16050}$ x 100% = 68,5

Rep 4= $\frac{14925-5055}{14925}$ x 100% = 66,13

Rep 5= $\frac{12300-5055}{12300}$ x 100% = 58,9

Rata-rata % PHN =64,79%

Fraksi *n*-Heksana

Rep 1= $\frac{15675-5055}{15675}$ x 100% = 67,75

Rep 2= $\frac{7875-5055}{7875}$ x 100% = 35,8

Rep 3= $\frac{20250-5055}{20250}$ x 100% = 75,03

Rep 4= $\frac{9375-5055}{9375}$ x 100% = 46,08

Rep 5= $\frac{8475-5055}{8475}$ x 100% = 40,35

Rata-rata % PHN =53%

Fraksi etil asetat

Rep 1= $\frac{9300-5055}{9300}$ x 100% = 45,64

Rep 2= $\frac{16125-5055}{16125}$ x 100% = 68,65

Rep 3= $\frac{10440-5055}{10440}$ x 100% = 51,58

Rep 4= $\frac{12645-5055}{12645}$ x 100% = 60,02

Rep 5= $\frac{7995-5055}{7995}$ x 100% = 36,77

Rata-rata % PHN =52,53%

Fraksi air

Rep 1= $\frac{13725-5055}{13725}$ x 100% =63,16

Rep 2= $\frac{8010-5055}{8010}$ x 100% = 36,89

Rep 3= $\frac{7875-5055}{7875.5}$ x 100% = 35,8

Rep 4= $\frac{13725-5055}{13725}$ x 100% = 63,16

Rep 5= $\frac{12000\text{-}90}{12000}$ x 100% = 57,87

Rata-rata % PHN = 51,38%

Lampiran 22. Hasil statistik % peningkatan hambat nyeri metode *Randall Selitto*

Uji *Shapiro-Wilk*

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Asmet	,199	5	,200*	,939	5	,657
Ekstrak	,228	5	,200*	,898	5	,397
fraksi *n*-heksana	,255	5	,200*	,885	5	,335
fraksi etil asetat	,131	5	,200*	,992	5	,988
fraksi air	,280	5	,200*	,779	5	,054

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Kesimpulan : Sig, >0,05 maka Ho diterima, artinya data terdistribusi normal

Uji *Levene*

Test of Homogeneity of Variances

data

Levene Statistic	df1	df2	Sig.
5,602	4	20	,003

Kesimpulan : Sig, <0,05 maka Ho ditolak, artinya variasi data tidak homogen

Uji *Mann withney*

Ranks

	perlakuan	N	Mean Rank	Sum of Ranks
data	asam mefenamat	5	5,80	29,00
	ekstrak	5	5,20	26,00
	Total	10		

Test Statistics[a]

	data
Man*n*-Whitney U	11,000
Wilcoxon W	26,000
Z	-,313
Asymp. Sig. (2-tailed)	,754
Exact Sig. [2*(1-tailed Sig.)]	,841[b]

a. Grouping Variable: perlakuan

b. Not corrected for ties.

Ranks

	perlakuan	N	Mean Rank	Sum of Ranks
data	asam mefenamat	5	6,60	33,00
	n-heksana	5	4,40	22,00
	Total	10		

Test Statistics[a]

	data
Man*n*-Whitney U	7,000
Wilcoxon W	22,000
Z	-1,149
Asymp. Sig. (2-tailed)	,251
Exact Sig. [2*(1-tailed Sig.)]	,310[b]

a. Grouping Variable: perlakuan

b. Not corrected for ties.

Ranks

	perlakuan	N	Mean Rank	Sum of Ranks
data	asam mefenamat	5	7,20	36,00
	etil asetat	5	3,80	19,00
	Total	10		

Test Statistics[a]

	data
Man*n*-Whitney U	4,000
Wilcoxon W	19,000
Z	-1,776
Asymp. Sig. (2-tailed)	,076
Exact Sig. [2*(1-tailed Sig.)]	,095[b]

a. Grouping Variable: perlakuan

b. Not corrected for ties.

Ranks

	perlakuan	N	Mean Rank	Sum of Ranks
data	asam mefenamat	5	7,40	37,00
	air	5	3,60	18,00
	Total	10		

Test Statistics[a]

	Data
Man*n*-Whitney U	3,000
Wilcoxon W	18,000
Z	-2,009
Asymp. Sig. (2-tailed)	,045
Exact Sig. [2*(1-tailed Sig.)]	,056[b]

a. Grouping Variable: perlakuan

b. Not corrected for ties.