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Lampiran 1. Surat determinasi tanaman



KEMENTERIAN KESEHATAN REPUBLIK INDONESIA
BADAN KEBIJAKAN PEMBANGUNAN KESEHATAN
 BALAI BESAR PENELITIAN DAN PENGEMBANGAN
 TANAMAN OBAT DAN OBAT TRADISIONAL
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Nomor : KM.04.02/2/1197/2022
 Hal : Keterangan Determinasi

27 Juni 2022

Yth. Dekan Fakultas Farmasi Universitas Setia Budi
 Jalan Let. Jend. Sutoyo, Solo 57127

Merujuk surat Saudara nomor: 783/H6-04/14.06.2022 tanggal 14 Juni 2022 hal permohonan determinasi, dengan ini kami sampaikan bahwa hasil determinasi sampel tanaman sebagai berikut:

Nama Pemohon : Mimanara
 Nama Sampel : Brokoli
 Sampel : Tanaman Segar
 Spesies : *Brassica oleracea* var. *italica* Plenck
 Sinonim : -
 Familia : Brassicaceae
 Penanggung Jawab : Nina Kurnianingrum, S.Si.

Hasil determinasi tersebut hanya mencakup sampel tanaman yang telah dikirimkan ke dan/atau berasal dari B2P2TOOT.

Atas perhatian Saudara, kami sampaikan terima kasih.

Kepala Balai Besar Penelitian
 dan Pengembangan Tanaman Obat
 dan Obat Tradisional



**Akhmad Saikhu, S.K.M.,
 M.Sc.PH.**

Lampiran 2. Surat Ethical clearance

6/20/22, 4:25 PM

KEPK-RSDM



**HEALTH RESEARCH ETHICS COMMITTEE
KOMISI ETIK PENELITIAN KESEHATAN**

Dr. Moewardi General Hospital
RSUD Dr. Moewardi

ETHICAL CLEARANCE
KELAIKAN ETIK

Nomor : 794 / VI / HREC / 2022

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

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

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

Uji Aktivitas Antihiperpligkemi Ekstrak Brokoli (Brassica oleracea L. Var Italica) Terhadap Tikus Jantan Galur Wistar yang di Induksi Streptozotocin (STZ)

Principal investigator : MIMANARA
Peneliti Utama 24185504A

Location of research : KAMPUS SETIABUDI
Lokasi Tempat Penelitian

is ethically approved
Dinyatakan layak etik



Lampiran 3. Surat keterangan hewan

"ABIMANYU FARM"

✓ Mencit putih jantan ✓ Tikus Wistar ✓ Swis Webster ✓ Gacing
✓ Mencit Balb/C ✓ Kelinci New Zealand

Ngampon RT 04 / RW 04, Majasongo Kec. Jebres Surakarta. Phone 085 629 994 33 / Lab USB Ska

Yang bertanda tangan di bawah ini:

Nama : Sigit Pramono

Selaku pengelola Abimanyu Farm, menerangkan bahwa hewan uji yang digunakan untuk penelitian, oleh:

Nama : Mimanara
NIM : 24185504A
Institusi : Universitas Setia Budi Surakarta

Merupakan hewan uji dengan spesifikasi sebagai berikut:

Jenis hewan : Tikus Wistar
Umur : 2-3 bulan
Jumlah : 35 ekor
Jenis kelamin : Jantan
Keterangan : Sehat
Asal-usul : Unit Pengembangan Hewan Percobaan UGM, Yogyakarta

Yang pengembangan dan pengelolaannya disesuaikan standar baku penelitian. Demikian surat keterangan ini dibuat untuk digunakan sebagaimana mestinya.

Surakarta, 06 Desember 2022

Hormat kami



Sigit Pramono
"ABIMANYU FARM"

Lampiran 4. Penetapan susut pengeringan serbuk



Serbuk



Replikasi 1



Replikasi 2



Replikasi 3

Lampiran 5. Penetapan kadar air serbuk



Replikasi 1



Replikasi 2



Replikasi 3

Lampiran 6. Brokoli



Brokoli segar



serbuk kasar



serbuk halus

Lampiran 7. Uji fitokimia

Uji flavonoid (+)



Uji saponin (+)



Uji alkaloid (+)



Uji tannin (+)



Uji steroid (-)



Uji terpenoid (-)

Lampiran 8. Penetapan kadar air ekstrak brokoli



Oven dengan suhu 105°C



Desikator



Sebelum Pengeringan



Setelah pengeringan

Lampiran 9. Proses uji aktivitas diuretik terhadap hewan uji

Tikus putih jantan



Peroralan



Larutan stok

Lampiran 10. Perhitungan

$$\text{Kolom VI} = 800 \text{ mg/Kg BB tikus}$$

$$\text{BB tikus 200 g} = \frac{200 \text{ g}}{1000 \text{ g}} \times 800 \text{ g BB tikus}$$

$$= 160 \text{ mg/200 g BB tikus}$$

$$\text{V pemberian} = \frac{160 \text{ g}}{1.000 \text{ g}} \times 100 \text{ ml}$$

$$= 16 \text{ ml}$$

1. Perhitungan rendemen brokoli kering terhadap brokoli basah

$$\text{Rendemen \%} = \frac{\text{Bb kering (g)}}{\text{Bb basah (g)}} \times 100 \%$$

$$= \frac{2.000 \text{ (g)}}{10.000 \text{ (g)}} \times 100 \% = 20\%$$

2. Rendemen serbuk brokoli = $\frac{\text{BB serbuk (g)}}{\text{Berat serbuk kering (g)}} \times 100 \%$

$$= \frac{1.240 \text{ (g)}}{2.000 \text{ (g)}} \times 100 \%$$

$$= 62\%$$

3. Penetapan dan perhitungan susu pengering serbuk (3x) replikasi

| Replikasi | Bb awal (gr) | Susut pengeringan (%) |
|-----------|--------------|-----------------------|
| I | 2 gr | 6,5 |
| II | 2 gr | 6,5 |
| III | 2 gr | 5,0 |

$$\text{Hasil rata-rata} = \frac{6,5+6,5+5,0}{3} = 6\% \text{ FHI} \leq 10\%$$

Kadar air

$$\frac{0,2}{10 \text{ (g)}} \times 100 \% = 2\%$$

$$\frac{0,5}{10 \text{ (g)}} \times 100 \% = 5\%$$

$$\frac{0,2}{10 \text{ (g)}} \times 100 \% = 2\%$$

$$\text{Rata-rata} = 2\% + 5\% + 2\% = 3\%$$

Persen rendeman ekstrak 273

Larutan stok glibenklamid 0,005% dari 1 tablet

Glibenklamid (5mg) ditambah pelarut cmc ad 100ml

Larutan stok ekstrak brokoli : buatlah konsentrasi 5% - 5gram ekstrak ditambah pelarut ad 100ml

Perhitungan dosis

Kontrol positif : 5mg – 0,005%

BB 200gr : konversi manusia – tikus

$$: 5\text{mg} \times 0,018 = 0,09\text{mg}/200\text{gr}$$

$$\text{VP} : \frac{0,09\text{mg}}{5\text{mg}} \times 100\text{ml} \\ = 1,8\text{ml}$$

Estrak brokoli

1. 200mg/kg BB tikus – 5%

200gr ditanya maka akan dicari bobot (gramnya karena yang diketahui adalah 1 kg bb tikus caranya – 200mg = 0,2mg/gram

Bobot standar tikus adalah 200gr 1000

$$\text{Maka} = 200\text{gr} \times 0,2\text{mg} = 40\text{mg}/200\text{gr bb tikus}$$

Jadi dosis untuk tikus 200gr = 40mg

Berapa Vp dari larutan stok 5% (5000mg)

$$\frac{40\text{mg}}{5000\text{mg}} \times 100\text{ml} = 0,8\text{ml}$$

2. 400mg/kg bb tikus = $\frac{400\text{mg}}{1000\text{mg}} = 0,4\text{mg}/\text{gram}$

$$\text{Standar } 200\text{gr} = 200\text{gr} \times 0,4 \text{ mg} \\ = 80\text{mg}/200\text{gr}$$

$$\text{Vp} = \frac{80\text{mg}}{5000\text{mg}} \times 100\text{ml} = 1,6\text{ml}$$

$$800\text{mg}/\text{kg BB tikus} = \frac{800\text{mg}}{1000} = 0,8\text{mg}/\text{gr}$$

$$= 200\text{gr} \times 0,8\text{mg}$$

$$= 160\text{mg}/200\text{gr}/\text{bb tikus}$$

$$\text{Vp} = \frac{160\text{mg}}{5000} \times 100\text{m} = 3,2\text{ml}$$

Control negatif

Volume pemberian loading dosis= 4 ml / 200 g BB tikus

Kontrol negatif CMC-Na 1%

$$\text{Dosis CMC-Na } 1\% = 5 \text{ mg/ml}$$

$$\text{Volume pemberian} = \frac{1}{2} \times \text{volume maksimal}$$

$$= \frac{1}{2} \times 5 \text{ ml} = 2,5 \text{ ml}$$

Streptozotocin

Pembuatan aloksan sebagai penginduksi diabetes dibuat dengan konsentrasi 1% dengan cara :

$$\begin{aligned}\text{Streptozotocin 1\%} &= 1 \text{ g}/100 \text{ mL} \\ &= 1000 \text{ mg}/100 \text{ mL} \\ &= 10 \text{ mg}/\text{mL}\end{aligned}$$

Larutan streptozotocin 1% sebagai penginduksi dibuat dengan cara ditimbang sebanyak 1 g kemudian dilarutkan ke dalam 100 mL larutan CMC. Dosis streptozotocin untuk tikus adalah 45 mg/kgBB secara intraperitoneal.

$$\begin{aligned}45 \text{ mg/g BB tikus} &= (200 \text{ g})/(1000 \text{ g}) \times 45 \text{ mg} \\ &= 9 \text{ mg}/200 \text{ g BB tikus}\end{aligned}$$

Perhitungan dosis**Estrak 200mg/kg BB= 40mg/200 gr BB tikus**

$$\text{➤ untuk 190gr} = \frac{190\text{gr}}{200\text{gr}} \times 40\text{mg} = 38\text{mg}/190\text{gr BB tikus}$$

$$V_p 5\% = \frac{38\text{mg}}{5000\text{mg}} \times 100\text{ml} = 0,76 \text{ ml}$$

$$\text{➤ untuk 210gr} = \frac{210\text{gr}}{200\text{gr}} \times 40\text{mg} = 42\text{mg}/210\text{gr bb tikus}$$

$$V_p 5\% = \frac{42\text{mg}}{5000\text{mg}} \times 100\text{ml} = 0,84\text{ml}$$

$$\text{➤ untuk 200gr} = \frac{200\text{gr}}{200\text{gr}} \times 40\text{mg} = 40\text{mg}/200\text{gr bb tikus}$$

$$V_p 5\% = \frac{40\text{mg}}{5000\text{mg}} \times 100\text{ml} = 0,8\text{ml}$$

$$\text{➤ untuk 185gr} = \frac{185\text{gr}}{200\text{gr}} \times 40\text{mg} = 37\text{mg}/185\text{gr bb tikus}$$

$$V_p = 5\% = \frac{37\text{mg}}{5000} \times 100\text{ml} = 0,74\text{ml}$$

$$\text{➤ untuk 146gr} = \frac{146\text{gr}}{200\text{gr}} \times 40\text{mg} = 29,2\text{mg}/\text{gr BB tikus}$$

$$V_p 5\% = \frac{29,2\text{mg}}{5000\text{mg}} \times 100\text{ml} = 0,584\text{ml}$$

Ekstrak 400/kgBB = 80mg/200gr BB tikus

$$\text{➤ untuk 1720gr} = \frac{170\text{gr}}{200\text{gr}} \times 80\text{mg} = 68\text{mg}/170\text{gr BB tikus}$$

$$V_p 5\% = \frac{68\text{mg}}{5000\text{mg}} \times 100\text{ml} = 1,36\text{ml}$$

$$\text{➤ untuk 195gr} = \frac{195\text{gr}}{200\text{gr}} \times 80\text{mg} = 78\text{mg}/195\text{gr bb tikus}$$

$$V_p 5\% = \frac{78\text{mg}}{5000\text{mg}} \times 100\text{ml} = 1,56\text{ml}$$

$$\text{➤ untuk } 200\text{gr} = \frac{200\text{gr}}{200\text{gr}} \times 80\text{mg} = 80\text{mg}/200\text{gr bb tikus}$$

$$\text{Vp } 5\% = \frac{80\text{mg}}{5000} \times 100\text{ml} = 1,6\text{ml}$$

$$\text{➤ untuk } 200\text{gr} = \frac{200\text{gr}}{200\text{gr}} \times 80\text{mg} = 80\text{mg}/200\text{gr bb tikus}$$

$$\text{VP } 5\% = \frac{80\text{mg}}{5000\text{mg}} \times 100\text{ml} = 1,6\text{ml}$$

Ekstrak 800mg/kgBB = 160mg/200gr BB tikus

$$\text{➤ untuk } 190\text{gr} = \frac{190\text{gr}}{200\text{gr}} \times 160\text{mg} = 152\text{mg}/190\text{gr bb tikus}$$

$$\text{Vp } 5\% = \frac{152\text{mg}}{5000\text{mg}} \times 100\text{ml} = 3,04\text{ml}$$

$$\text{➤ untuk } 181\text{gr} = \frac{181\text{gr}}{200\text{gr}} \times 160\text{mg} = 144,8\text{mg}/181\text{ge BB tikus}$$

$$\text{vp } 5\% = \frac{144,8}{5000} \times 100\text{ml} = 2,896 \text{ ml}$$

$$\text{➤ untuk } 199\text{gr} = \frac{199\text{gr}}{200\text{gr}} \times 160\text{mg} = 159,2\text{mg}/199\text{gr BB tikus}$$

$$\text{Vp } 5\% = \frac{159,2 \text{ mg}}{5000\text{mg}} \times 100\text{ml} = 3,184 \text{ ml}$$

$$\text{➤ untuk } 200\text{gr} = \frac{200\text{gr}}{200\text{gr}} \times 160\text{mg} = 160\text{mg}/200\text{gr BB tikus}$$

$$\text{Vp } 5\% = \frac{160\text{mg}}{5000\text{mg}} \times 100\text{ml} = 3,2\text{ml}$$

$$\text{➤ untuk } 170\text{gr} = \frac{170\text{gr}}{200\text{gr}} \times 160\text{mg} = 136\text{mg}/170\text{gr BB tikus}$$

$$\text{Vp } 5\% = \frac{136\text{mg}}{5000\text{mg}} \times 100\text{ml} = 2,72\text{ml}$$

Kontrol Positif glibenklamid 0,09mg

$$\text{➤ untuk } 200\text{gr} = \frac{200\text{gr}}{200\text{gr}} \times 0,09\text{mg} = 0,09\text{mg}/200\text{gr BB tikus}$$

$$\text{Vp } 0,005\% = \frac{0,09\text{mg}}{5\text{mg}} \times 100\text{ml} = 1,8\text{ml}$$

$$\text{➤ untuk } 190\text{gr} = \frac{190\text{gr}}{200\text{gr}} \times 0,09\text{mg} = 0,0855\text{mg}/190\text{gr BB tikus}$$

$$\text{Vp } 0,005\% = \frac{0,0855\text{mg}}{5\text{mg}} \times 100\text{ml} = 1,71\text{ml}$$

$$\text{➤ untuk } 187\text{gr} = \frac{187\text{gr}}{200} \times 0,09\text{mg} = 0,08415\text{mg}/187\text{gr BB tikus}$$

$$\text{Vp } 0,005\% = \frac{0,08415\text{mg}}{5\text{mg}} \times 100\text{ml} = 1,683\text{ml}$$

$$\text{➤ untuk } 205\text{gr} = \frac{205\text{gr}}{200\text{gr}} \times 0,09\text{mg} = 0,09225\text{mg}/205\text{gr BB tikus}$$

$$\text{Vp } 0,005\% = \frac{0,09225\text{mg}}{5\text{mg}} \times 100\text{ml} = 1,845\text{ml}$$

$$\text{➤ untuk } 200\text{gr} = \frac{200\text{gr}}{200\text{gr}} \times 0,09\text{mg} = 0,09\text{mg}/200\text{gr BB tikus}$$

$$\text{Vp } 0,005\% = \frac{0,09\text{mg}}{5\text{mg}} \times 100\text{ml} = 1,8\text{ml}$$

12. Data Kadar Gula Darah

| Tests of Normality | | | | | | | |
|--------------------|-------------------|---------------------------------|----|-------|--------------|----|------|
| | Perlakuan | Kolmogorov-Smirnov ^a | | | Shapiro-Wilk | | |
| | | Statistic | df | Sig. | Statistic | df | Sig. |
| Kadar Gula Darah | Kontrol Normal | .213 | 5 | .200* | .963 | 5 | .826 |
| | Kontrol Negatif | .246 | 5 | .200* | .956 | 5 | .777 |
| | Kontrol Positif | .198 | 5 | .200* | .957 | 5 | .787 |
| | Dosis I Brokoli | .254 | 5 | .200* | .893 | 5 | .374 |
| | Dosis II Brokoli | .184 | 5 | .200* | .944 | 5 | .692 |
| | Dosis III Brokoli | .253 | 5 | .200* | .925 | 5 | .560 |

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

| Test of Homogeneity of Variances | | | | | |
|----------------------------------|--------------------------------------|------------------|-----|-------|------|
| | | Levene Statistic | df1 | df2 | Sig. |
| Kadar Gula Darah | Based on Mean | 8.939 | 5 | 24 | .000 |
| | Based on Median | 2.894 | 5 | 24 | .035 |
| | Based on Median and with adjusted df | 2.894 | 5 | 5.287 | .128 |
| | Based on trimmed mean | 8.237 | 5 | 24 | .000 |

| ANOVA | | | | | |
|------------------|----------------|----|-------------|---------|------|
| Kadar Gula Darah | | | | | |
| | Sum of Squares | df | Mean Square | F | Sig. |
| Between Groups | 33759.767 | 5 | 6751.953 | 230.442 | .000 |
| Within Groups | 703.200 | 24 | 29.300 | | |
| Total | 34462.967 | 29 | | | |

| Kadar Gula Darah | | | | | | |
|------------------------|-------------------|---|-------------------------|---------|---------|----------|
| | Perlakuan | N | Subset for alpha = 0.05 | | | |
| | | | 1 | 2 | 3 | 4 |
| Tukey HSD ^a | Dosis III Brokoli | 5 | 59.4000 | | | |
| | Kontrol Negatif | 5 | | 79.8000 | | |
| | Kontrol Normal | 5 | | 82.4000 | | |
| | Dosis I Brokoli | 5 | | | 93.2000 | |
| | Dosis II Brokoli | 5 | | | 95.0000 | |
| | Kontrol Positif | 5 | | | | 166.4000 |
| | Sig. | | | 1.000 | .972 | .995 |

Means for groups in homogeneous subsets are displayed.
a. Uses Harmonic Mean Sample Size = 5.000.

Berat Badan

| Tests of Normality | | | | | | | |
|--------------------|-------------------|---------------------------------|----|-------|--------------|----|------|
| | Perlakuan | Kolmogorov-Smirnov ^a | | | Shapiro-Wilk | | |
| | | Statistic | df | Sig. | Statistic | df | Sig. |
| Berat Badan | Kontrol Normal | .160 | 5 | .200* | .976 | 5 | .911 |
| | Kontrol Negatif | .219 | 5 | .200* | .974 | 5 | .901 |
| | Kontrol Positif | .213 | 5 | .200* | .935 | 5 | .634 |
| | Dosis I Brokoli | .332 | 5 | .075 | .872 | 5 | .276 |
| | Dosis II Brokoli | .177 | 5 | .200* | .970 | 5 | .876 |
| | Dosis III Brokoli | .300 | 5 | .161 | .893 | 5 | .375 |

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

| Test of Homogeneity of Variances | | | | | |
|----------------------------------|--------------------------------------|------------------|-----|--------|------|
| | | Levene Statistic | df1 | df2 | Sig. |
| Berat Badan | Based on Mean | .931 | 5 | 24 | .478 |
| | Based on Median | .815 | 5 | 24 | .551 |
| | Based on Median and with adjusted df | .815 | 5 | 19.986 | .553 |
| | Based on trimmed mean | .932 | 5 | 24 | .478 |

| ANOVA | | | | | |
|----------------|----------------|----|-------------|-------|------|
| Berat Badan | | | | | |
| | Sum of Squares | df | Mean Square | F | Sig. |
| Between Groups | 1611.100 | 5 | 322.220 | 5.792 | .001 |
| Within Groups | 1335.200 | 24 | 55.633 | | |
| Total | 2946.300 | 29 | | | |

| Berat Badan | | | | |
|------------------------|---|-------------------------|--------|--------|
| Tukey HSD ^a | | | | |
| Perlakuan | N | Subset for alpha = 0.05 | | |
| | | 1 | 2 | 3 |
| Dosis I Brokoli | 5 | 187.40 | | |
| Kontrol Normal | 5 | 190.60 | 190.60 | |
| Kontrol Negatif | 5 | 198.80 | 198.80 | 198.80 |
| Dosis II Brokoli | 5 | 201.00 | 201.00 | 201.00 |
| Kontrol Positif | 5 | | 203.00 | 203.00 |
| Dosis III Brokoli | 5 | | | 209.00 |
| Sig. | | .078 | .129 | .291 |

Means for groups in homogeneous subsets are displayed.
a. Uses Harmonic Mean Sample Size = 5.000.