

LAMPIRAN

Lampiran 1. Surat Izin Determinasi



INSTITUT TEKNOLOGI BANDUNG

SEKOLAH ILMU DAN TEKNOLOGI HAYATI

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Nomor : 144/IT1.C11.2/TA.00/2023
Hal : Determinasi tumbuhan

06 Januari 2022

Kepada Yth.
Dekan
Fakultas Farmasi
Universitas Bhakti Kencana
Jalan Soekarno Hatta No. 754
Bandung

Memperhatikan surat permintaan Saudara dalam surat No. 1047/03.FF-03/UBK/XII/2022 tanggal 12 Desember 2022 mengenai determinasi tumbuhan, dengan ini kami sampaikan bahwa setelah dilakukan determinasi oleh staf kami, sampel tumbuhan yang dikirim oleh Sdr. apt. Aris Suhardiman, M.Si (NIK: 0216010091), Tiara Nuraeni (NPM: 191FF03049), dan Tati Maryanti (NPM: 211FF04005), yaitu:

No	Nama sampel	Hasil determinasi	Famili
1	Gaharu	<i>Aquilaria malaccensis</i> Lam.	Thymelaeaceae

Referensi:

- Hou, Ding. (1960). Thymelaeaceae. *Flora Malesiana - Series 1, Spermatophyta*, 6(1), 1-48.

Demikian yang kami sampaikan. Atas perhatian dan kerjasama yang diberikan, kami ucapkan terima kasih.



Dekan Bidang Sumber Daya,

Dr. Angga Dwiartama
NIP. 198302052012121002

Tembusan:
Dekan SITH ITB, sebagai laporan.

Terakreditasi oleh :



Lampiran 2. Pembuatan Simplisia

Gambar	Keterangan
	Simplisia daun gaharu di dikeringkan di dalam oven dengan suhu 40 °C.
	Setelah kering dan di sortasi kering kemudian di haluskan menggunakan grinder.

Lampiran 3. Proses Ekstraksi (Maserasi)

Gambar	Keterangan
	Simplisia halus ditimbang dan di masukkan kedalam wadah maserat
	Simplisia di maserasi menggunakan pelarut etanol 96% selama 3 hari dan di remaserasi setiap 1 x 24 jam dengan sesekali di aduk.
	Penyaringan hasil maserasi



Filtrat yang didapatkan dari hasil maserasi didapat ± 9 botol



Dilakukan pemekatan menggunakan rotary dan dilanjutkan penguapan pelarut dengan pemanasan agar didapatkan ekstrak kental.



Ditimbang cawan kosong dan cawan isi didapatkan 102,21 ekstrak kental dan dihitung rendemen

$$\text{Rendemen} = \left(\frac{\text{Massa produk yang dihasilkan}}{\text{Massa bahan baku yang digunakan}} \right) \times 100\%$$

$$= 102,21 \text{ gram} / 1000 \text{ gram} \times 100\%$$

$$= 10,221 \%$$

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Lampiran 4. Proses Fraksinasi (Ekstrak Cair-Cair)

Gambar	Keterangan
	Ekstrak di larutkan dengan etanol 20% (2:8), perbandingan ekstrak dan pelarut
	Ekstrak cair-cair dengan pelarut bertingkat n hexan, etil asetat dan etanol air
	Hasil fraksinasi ekstrak cair – cair

f 	Dilakukan pemekatan menggunakan rotary dan dilanjutkan penguapan pelarut dengan pemanasan agar didapatkan fraksi kental.
	Fraksi n hexan Ditimbang cawan kosong dan cawan isi didapatkan 3,11 gram fraksi kental dan dihitung rendemen
	Fraksi Etil asetat Ditimbang cawan kosong dan cawan isi didapatkan 4,26 gram fraksi kental dan dihitung rendemen
	Fraksi etanol air Ditimbang cawan kosong dan cawan isi didapatkan 2,12 gram fraksi kental dan dihitung rendemen
Rendemen = $\left(\frac{\text{Massa produk yang dihasilkan}}{\text{Massa bahan baku yang digunakan}} \right) \times 100\%$ • Rendemen Fraksi N-hexan	

=3,11 gram 20 gram x 100%=15,55 %

- **Rendemen Fraksi Etil Asetat**

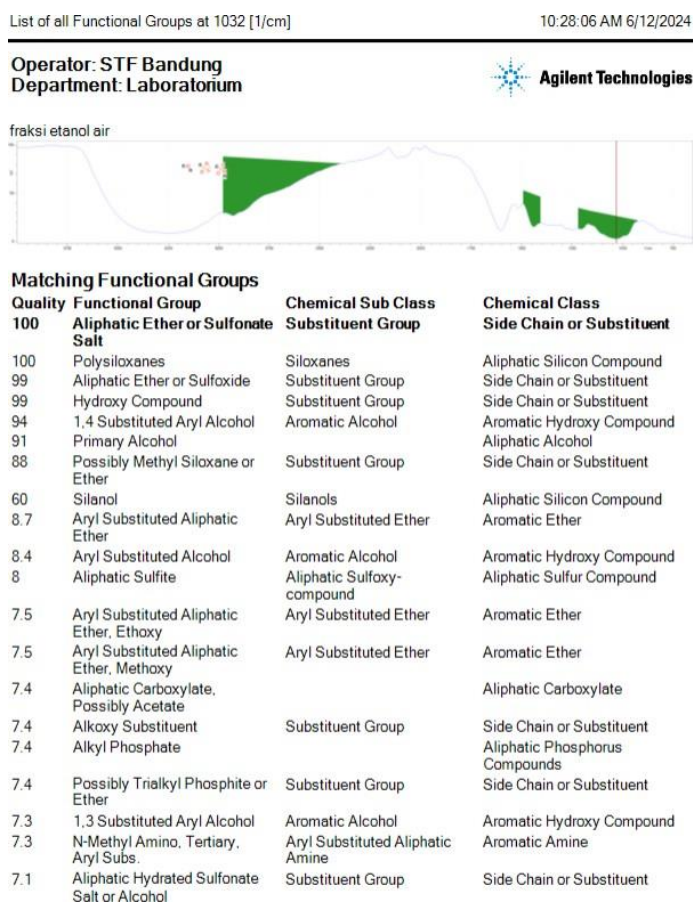
=4,26 gram 20 gram x 100%=21,3 %

- **Rendemen Fraksi air**

=2,12 gram 20 gram x 100%=10,6 %

Lampiran 5. Hasil identifikasi Fraksi etil asetat dan fraksi air menggunakan FTIR

1. Fraksi Air



7.1	Aromatic Sulfoxide or Ether	Aromatic Sulfoxy Compound	Aromatic Sulfur Compound
7.1	Aryl Ether, General, Methoxy	Phenoxy or Aryloxy Ether	Aromatic Ether
7.1	Dialkyl Phosphonate		Aliphatic Phosphorus Compounds
7.1	Phenyl Substituted Alcohol	Aromatic Alcohol	Aromatic Hydroxy Compound

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List of all Functional Groups at 1032 [1/cm]

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7.1	Possibly Primary Hydroxy	Substituent Group	Side Chain or Substituent
7	Aliphatic Sulphoxide	Aliphatic Sulfoxy-compound	Aliphatic Sulfur Compound
6.9	Aliphatic Hydroxy, 2-Amino		Aliphatic Amine
6.9	Alkyl-Aryl Phosphonate		Aromatic Phosphorus Compounds
6.8	Aliphatic Conjugated Acid Halide	Conjugated Acid Halide	Aromatic or Conjugated Acid Halide
6.8	Aromatic Substituted Acid Halide	Aromatic Acid Halide	Aromatic or Conjugated Acid Halide
6.7	Possibly Methoxy Substituted	Aryl Group	Aromatic Compound
6.3	Aliphatic Anhydride - Carbonyl Compound		Aliphatic Anhydride
6.3	Aromatic Amino Sulfonate	Aromatic Sulfoxy Compound	Aromatic Sulfur Compound
6.3	Hydroxy, Possibly 1,2-Diol		Aliphatic Alcohol
6.2	Aromatic Sulfonate, Classical	Aromatic Sulfoxy Compound	Aromatic Sulfur Compound
6.2	Aromatic, Nonconjugated Ester	Aryl Substituted Ester	Aromatic or Conjugated Ester
6.2	Aromatic, Nonconjugated Ester, Acetate	Aryl Substituted Ester	Aromatic or Conjugated Ester
6.1	N-Alkyl Amino, Tertiary		Aliphatic Amine
5.6	Morpholine		Aliphatic Amine

5.6	Morpholine		Aliphatic Amine
5.4	Aryl Fused 6-Membered Cyclic Anhydride	Aromatic Acid Anhydride	Aromatic or Conjugated Acid Anhydride
5.3	Aromatic Sulfonate	Aromatic Sulfoxy Compound	Aromatic Sulfur Compound
5.1	Possibly Primary Alcohol, Long Chain		Aliphatic Alcohol
5	Aliphatic Mercapto, Alcohol	Aliphatic Thiol	Aliphatic Thiocompound
5	Aryl Subst. Acid Anhydride, General	Aromatic Acid Anhydride	Aromatic or Conjugated Acid Anhydride
5	Highly Branched Hydrocarbon	Alkyl Group	Aliphatic Compound
4.9	Aliphatic Amine Salt, Secondary		Aliphatic Amine
4.8	Methyl Siloxane	Silyl Ethers	Aliphatic Silicon Compound
4.7	iso-Propoxy Substituent	Substituent Group	Side Chain or Substituent
4.4	1,2 Substituted Aryl Alcohol	Aromatic Alcohol	Aromatic Hydroxy Compound
4.4	Aliphatic Amine Salt, Primary, Hydrochloride		Aliphatic Amine
4.3	Aliphatic Linear Acyl Anhydride		Aliphatic Anhydride
4.2	Aryl Subst., 6-Membered Cyclic Anhydride	Aromatic Acid Anhydride	Aromatic or Conjugated Acid Anhydride
4.2	Tertiary Amine Hydrochloride, Aryl Subs.	Aryl Substituted Aliphatic Amine	Aromatic Amine
4.1	Tetrapropyl Ammonium Salt		Aliphatic Amine
3.8	Cyclic Anhydride, Six Membered		Aliphatic Anhydride

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3.6	Aromatic Sulfonic Acid	Aromatic Sulfoxy Compound	Aromatic Sulfur Compound
3.5	Branched Hydrocarbon	Alkyl Group	Aliphatic Compound
3.4	CH ₂ F	Fluorine compounds	Organic Halogen Compounds
3.4	Tetrabutyl Ammonium Salt		Aliphatic Amine
3.3	Aliphatic Carboxylate, Possibly 2-Keto Substituted		Aliphatic Carboxylate
2.6	Aliphatic Ester - Carbonyl Compound		Aliphatic Ester
2.4	Branched Hydrocarbon, Multiple Methyl I	Alkyl Group	Aliphatic Compound
2.3	Aliphatic Amine Salt, Tertiary, Hydrochloride		Aliphatic Amine
1.8	Large Ring or Long Chain	Alkyl Group	Aliphatic Compound
1.2	Alkyl Chain Length more than C4	Alkyl Group	Aliphatic Compound
1.2	Branched Hydrocarbon, Methyl	Alkyl Group	Aliphatic Compound
0	Aliphatic Thiocyanate	Aliphatic Thiocyanate	Aliphatic Nitrile or Multiple Bonded Nitrogen

Corresponding Chemical Classification RulesFunctional Group: 'Aliphatic Ether or Sulfonate Salt', Chemical Class: 'Side Chain or Substituent',
Chemical Sub Class: 'Substituent Group'

Vibration	Start WN	End WN	Threshold	Priority
C-H Stretch, Alkyl	3000	2855	Variable	Mandatory
C-H Bend, CH ₂	1470	1415	Variable	Mandatory
SO ₂ Sulfoxy Stretch	1205	1160	Strong	Mandatory
SO ₂ Sulfoxy Stretch	1065	1030	Variable	Mandatory

Missing Chemical Classification RulesFunctional Group: 'Aliphatic Ether or Sulfonate Salt', Chemical Class: 'Side Chain or Substituent',
Chemical Sub Class: 'Substituent Group'

Vibration	Start WN	End WN	Threshold	Priority
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2.Fraksi Etil Asetat

List of all Functional Groups at 2916 [1/cm]

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Operator: STF Bandung
Department: Laboratorium



Fraksi etil asetat



Matching Functional Groups

Quality	Functional Group	Chemical Sub Class	Chemical Class
100	Aliphatic Ether or Sulfonate Salt	Substituent Group	Side Chain or Substituent
100	Aliphatic Ether or Sulfoxide	Substituent Group	Side Chain or Substituent
100	Hydroxy Compound	Substituent Group	Side Chain or Substituent
100	Hydroxy, Possibly 1,2-Diol		Aliphatic Alcohol
100	Possibly Primary Alcohol, Long Chain		Aliphatic Alcohol
100	Possibly Primary Hydroxy	Substituent Group	Side Chain or Substituent
99	Polysiloxanes	Siloxanes	Aliphatic Silicon Compound
95	Long Chain Substituent	Alkyl Group	Aliphatic Compound
94	1,4 Substituted Aryl Alcohol	Aromatic Alcohol	Aromatic Hydroxy Compound
91	Aliphatic Sulphoxide	Aliphatic Sulfoxy-compound	Aliphatic Sulfur Compound
87	N-Alkyl Amino, Secondary		Aliphatic Amine
85	Aliphatic Ester - Carbonyl Compound		Aliphatic Ester
76	Methyl Mercapto	Aliphatic Thioether	Aliphatic Thiocompound
71	Aliphatic Alkoxy, Methoxy		Aliphatic Ether
68	Aliphatic Ester, Acetate		Aliphatic Ester
9.6	Highly Branched Hydrocarbon	Alkyl Group	Aliphatic Compound
9.6	Long Chain Halogen Compound	Aliphatic Halogenated Compound	Aliphatic Halogen Compound
9.5	Aliphatic Alkoxy, Possibly Secondary Ether		Aliphatic Ether
9.5	Alkyl Chain Length more than C4	Alkyl Group	Aliphatic Compound
9.5	Possibly Trialkyl Phosphite or Ether	Substituent Group	Side Chain or Substituent
9.4	Aliphatic Alkoxy, Possibly Ethoxy		Aliphatic Ether
9.4	Branched Hydrocarbon	Alkyl Group	Aliphatic Compound
8.8	Aliphatic Amine or Amino, General		Aliphatic Amine
8.7	Aromatic, Aryl-oxy Carboxylic Acid	Aryl Substituted Carboxylic Acid	Aromatic or Conjugated Carboxylic Acid

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8.7	Aryl Substituted Aliphatic Ether	Aryl Substituted Ether	Aromatic Ether
8.6	Aliphatic Amine Salt, Secondary		Aliphatic Amine
8.6	Aliphatic Hydrated Sulfonate Salt or Alcohol	Substituent Group	Side Chain or Substituent
8.5	Aliphatic Conjugated Ester		Aliphatic Ester
8.4	1,3 Substituted Aryl Alcohol	Aromatic Alcohol	Aromatic Hydroxy Compound
8.4	Aliphatic Amine or Amino, Aryl Subs. General	Aryl Substituted Aliphatic Amine	Aromatic Amine
8.4	Aliphatic Amine, Primary, Ether Subs.		Aliphatic Amine
8.4	Secondary Alcohol, Long Chain 2-OH		Aliphatic Alcohol
8.3	Aliphatic Amine, Primary, Aryl Subs.	Aryl Substituted Aliphatic Amine	Aromatic Amine
8.3	Aliphatic Anhydride - Carbonyl Compound		Aliphatic Anhydride
8.3	Phenyl Substituted Alcohol	Aromatic Alcohol	Aromatic Hydroxy Compound
8.2	1,2 Substituted Aryl Alcohol	Aromatic Alcohol	Aromatic Hydroxy Compound
8.2	Aliphatic Amine, Primary		Aliphatic Amine
8.2	Alkyl-Aryl Phosphonate		Aromatic Phosphorus Compounds
8.1	Tertiary Alcohol		Aliphatic Alcohol
8	Aliphatic Sulfonate or Sulfate	Aliphatic Sulfoxy-compound	Aliphatic Sulfur Compound
8	Carbonyl, Possibly Conjugated Aldehyde		Aliphatic Aldehyde
7.9	Aliphatic Amine, Secondary, Aryl Subs.	Aryl Substituted Aliphatic Amine	Aromatic Amine
7.9	Aliphatic Mercaptan, General	Aliphatic Thiol	Aliphatic Thiocompound
7.9	Secondary Alcohol, In Chain OH		Aliphatic Alcohol
7.8	Branched Hydrocarbon, Methyl	Alkyl Group	Aliphatic Compound
7.8	Linear Bromo Compound	Aliphatic Brominated Compound	Aliphatic Halogen Compound
7.8	Linear Chain	Alkyl Group	Aliphatic Compound
7.8	Long Chain Alkyl, Crystalline	Alkyl Group	Aliphatic Compound
7.7	Aromatic Subst., Possibly Secondary Amide	Aromatic Substituted Amide	Aromatic or Conjugated Amide
7.7	Aromatic Substituted Acid Halide	Aromatic Acid Halide	Aromatic or Conjugated Acid Halide
7.6	Aliphatic Amine, Primary, Branched		Aliphatic Amine
7.5	Alkyl Phosphate		Aliphatic Phosphorus Compounds

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7.5	Aromatic Carboxylic Acid	Aromatic Carboxylic Acid	Aromatic or Conjugated Carboxylic Acid
7.5	Aromatic Carboxylic Acid, Ester Subst.	Aromatic Carboxylic Acid	Aromatic or Conjugated Carboxylic Acid
7.5	Aromatic with Monosubs. Alkyl	Aryl Group	Aromatic Compound
7.5	Primary Alcohol		Aliphatic Alcohol
7.4	Aliphatic Carbodiimide	Aliphatic Carbodiimide	Aliphatic Nitrile or Multiple Bonded Nitrogen
7.4	Aromatic, Nonconjugated Ester, Acetate	Aryl Substituted Ester	Aromatic or Conjugated Ester
7.4	Secondary Amine, N-Methyl, Aryl Subs.	Aryl Substituted Aliphatic Amine	Aromatic Amine
7.3	Aliphatic Alkoxy, Possibly Primary Ether		Aliphatic Ether
7.3	Aliphatic Alkoxy, Possibly Tertiary Ether		Aliphatic Ether
7.3	Aromatic Amino Acid, Free Amino		Aromatic Amino Acid
7.3	N-Alkyl Amino, Tertiary		Aliphatic Amine
7.2	Aliphatic Cyanate	Aliphatic Cyanate	Aliphatic Nitrile or Multiple Bonded Nitrogen
7.2	Aromatic Ester, Amino-Substituted	Aromatic Ester	Aromatic or Conjugated Ester
7.2	Aromatic, Mono or 1,2 Sub., Alkyl	Aryl Group	Aromatic Compound
7.2	Aryl Acid Halide, Possibly 1,3 Subst.	Aryl Acid Halide	Aromatic or Conjugated Acid Halide
7.2	Dialkyl Phosphonate		Aliphatic Phosphorus Compounds
7.1	Aliphatic Aldehyde		Aliphatic Aldehyde
7.1	Aliphatic tert-Amino Acid		Aliphatic Amino Acid
7.1	Aliphatic Thioether	Aliphatic Thioether	Aliphatic Thiocompound
7.1	Aromatic Hydrocarbon, Monosubs. Alkyl	Aromatic Hydrocarbon	Aromatic Compound
7.1	Morpholine		Aliphatic Amine
7.1	Possibly Primary Hydroxy, Long Chain	Substituent Group	Side Chain or Substituent
7.1	Tertiary Alcohol, Internal OH		Aliphatic Alcohol
7.1	Unsaturated Hydrocarbon, Trans Conjugated		Alkene
7	Aliphatic Alpha Amino Acid		Aliphatic Amino Acid
7	Aliphatic Carboxylate, Possibly 2-Keto Substituted		Aliphatic Carboxylate
7	Aliphatic Conjugated Acid Halide	Conjugated Acid Halide	Aromatic or Conjugated Acid Halide
7	Aliphatic Diamine, Primary, Long Chain		Aliphatic Amine
7	Aliphatic Hydroxy, 2-Amino		Aliphatic Amine
7	Aliphatic Linear Acyl Anhydride		Aliphatic Anhydride

List of all Functional Groups at 2916 [1/cm]

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7	Aryl Acid Halide, Possibly 1,2 or 1,4 Subst.	Aryl Acid Halide	Aromatic or Conjugated Acid Halide
7	Aryl Substituted Alcohol	Aromatic Alcohol	Aromatic Hydroxy Compound
6.9	Aliphatic Amine Salt, Primary, Hydrochloride		Aliphatic Amine
6.9	Aliphatic Carboxylate, General		Aliphatic Carboxylate
6.9	Aliphatic Primary Amide, Linear		Aliphatic Amide
6.9	Aromatic Substituted, Possibly Tertiary Amide	Aromatic Substituted Amide	Aromatic or Conjugated Amide
6.9	Aromatic, Possibly Tertiary Amide or Ketone	Aromatic Substituted Amide	Aromatic or Conjugated Amide
6.9	Fused 5-Membered Cyclic, Phthalimide	Aromatic Acid Anhydride	Aromatic or Conjugated Acid Anhydride
6.8	Aliphatic Amide, Cyclic, Lactam		Aliphatic Amide
6.8	Aromatic, Nonconjugated Carboxylic Acid	Aryl Substituted Carboxylic Acid	Aromatic or Conjugated Carboxylic Acid
6.8	Unsaturated Hydrocarbon, Cis-Trans Alkene		Alkene
6.8	Unsaturated Hydrocarbon, Ether Conjugated		Alkene
6.7	Aliphatic Amine, Tertiary, Aryl Subs.	Aryl Substituted Aliphatic Amine	Aromatic Amine
6.6	Aliphatic Amino Acid		Aliphatic Amino Acid
6.6	Aromatic Ester, Hydroxy-Substituted	Aromatic Ester	Aromatic or Conjugated Ester
6.6	Aromatic Hydrocarbon, Mono or 1,2 Sub., Alkyl	Aromatic Hydrocarbon	Aromatic Compound
6.6	Aromatic Subst., Acetanilide Derivative	Aromatic Substituted Amide	Aromatic or Conjugated Amide
6.6	Carbonyl, Possibly 2-Hydroxy Acid		Aliphatic Carboxylic Acid
6.5	Aliphatic Ester, Formate		Aliphatic Ester
6.5	Aliphatic Nitrile, Linear Chain	Aliphatic Nitrile	Aliphatic Nitrile or Multiple Bonded Nitrogen
6.5	Aryl Acid Halide, Possibly Chloroformate	Aryl Acid Halide	Aromatic or Conjugated Acid Halide
6.5	Carbonyl, Possibly Alpha Methyl Aldehyde		Aliphatic Aldehyde
6.4	Aliphatic Ether - Alkoxy, General		Aliphatic Ether
6.4	Aliphatic Isocyanate	Aliphatic Cyanate	Aliphatic Nitrile or Multiple Bonded Nitrogen
6.4	Aliphatic Ketone or Carbonyl Compound		Aliphatic Ketone
6.4	Aliphatic Thiol or Mercaptan, Long Chain	Aliphatic Thiol	Aliphatic Thiocompound
6.4	Aromatic Substituted Secondary Amide	Aromatic Substituted Amide	Aromatic or Conjugated Amide

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6.4	Aryl Subst. Acid Anhydride, General	Aromatic Acid Anhydride	Aromatic or Conjugated Acid Anhydride
6.4	Possibly Alkyl Phosphine Oxide or Ether	Substituent Group	Side Chain or Substituent
6.4	Possibly Phosphonic Compound or Ether	Substituent Group	Side Chain or Substituent
6.4	Unsaturated Hydrocarbon, Simple Alkyne		Alkyne
6.4	Unsaturated Hydrocarbon, Trans Alkene		Alkene
6.3	Aliphatic Mercapto Group	Substituent Group	Side Chain or Substituent
6.3	Aryl Fused 5-Membered Cyclic Anhydride	Aromatic Acid Anhydride	Aromatic or Conjugated Acid Anhydride
6.2	Alkyl Aryl Ketone	Aromatic Ketone	Aromatic or Conjugated Ketone
6.2	N-Methyl Amino, Secondary		Aliphatic Amine
6.2	Silanol	Silanols	Aliphatic Silicon Compound
6.1	Aliphatic Ester, Oxalate		Aliphatic Ester
6.1	Aliphatic Hydroxy, Secondary Amino		Aliphatic Alcohol
6.1	Aliphatic Mercapto, Alcohol	Aliphatic Thiol	Aliphatic Thiocompound
6	Aromatic, Nonconjugated Ketone	Aryl Substituted Ketone	Aromatic or Conjugated Ketone
5.9	Aliphatic Isonitrile	Aliphatic Nitrile	Aliphatic Nitrile or Multiple Bonded Nitrogen
5.9	Aliphatic Mercapto, Ether	Aliphatic Thiol	Aliphatic Thiocompound
5.9	Aromatic Carboxylic Acid, 1,3-subst.	Aromatic Carboxylic Acid	Aromatic or Conjugated Carboxylic Acid
5.9	Aromatic Substituted Primary Amide	Aromatic Substituted Amide	Aromatic or Conjugated Amide
5.9	Unsaturated Hydrocarbon, Terminal Alkyne		Alkyne
5.8	Aliphatic Carboxylate, Possibly Acetate		Aliphatic Carboxylate
5.8	Aliphatic Nitro Group		Aliphatic Nitro-oxy Compound
5.8	Aliphatic Sulfite	Aliphatic Sulfoxy-compound	Aliphatic Sulfur Compound
5.8	Aromatic, Nonconjugated Aldehyde	Aryl Substituted Aldehyde	Aromatic or Conjugated Aldehyde
5.8	Carbonyl, Possibly Alpha Methylene Aldehyde		Aliphatic Aldehyde
5.8	Carboxylic Acid, Long Chain, Solid		Aliphatic Carboxylic Acid
5.8	Unsaturated Hydrocarbon, Cyclic, > C5		Alkene
5.7	Aliphatic Nitrite		Aliphatic Nitro-oxy Compound
5.7	Aromatic Ester, Nitro Substituted	Aromatic Ester	Aromatic or Conjugated Ester
5.7	Aryl Ketone, Possibly 2-Hydroxy	Aromatic Ketone	Aromatic or Conjugated Ketone

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5.7	Unsaturated Hydrocarbon, Cis Alkene		Alkene
5.6	Aryl Strained Ring or Activated Carbonyl	Substituent Group	Side Chain or Substituent
5.6	Aryl Subst., 6-Membered Cyclic Anhydride	Aromatic Acid Anhydride	Aromatic or Conjugated Acid Anhydride
5.6	Isothiocyanate	Aliphatic Thiocyanate	Aliphatic Nitrile or Multiple Bonded Nitrogen
5.6	N-Methyl Amino, Tertiary, Aliphatic		Aliphatic Amine
5.5	Aliphatic Acid Halide, Linear		Aliphatic Acid Halide
5.5	Possibly Terminal Alkyne	Substituent Group	Side Chain or Substituent
5.4	Carboxylic Acid, Linear Chain		Aliphatic Carboxylic Acid
5.4	Carboxylic Acid, Long Chain		Aliphatic Carboxylic Acid
5.4	Dimethyl Silanes	Silanes	Aliphatic Silicon Compound
5.3	Aliphatic Alkoxy, Possibly Chloroethyl		Aliphatic Ether
5.3	Aliphatic Sulfonylchloride	Aliphatic Sulfoxy-compound	Aliphatic Sulfur Compound
5.3	Carbonyl, Possibly Conjugated Ketone		Aliphatic Ketone
5.3	Carbonyl, Possibly Long Chain Ketone		Aliphatic Ketone
5.3	Carboxylic Acid, Diacid		Aliphatic Carboxylic Acid
5.2	Aliphatic Tertiary		Aliphatic Amide
5.2	Aromatic Ester, Salicylate	Aromatic Ester	Aromatic or Conjugated Ester
5.2	Carbonyl, Possibly Conjugated Acid		Aliphatic Carboxylic Acid
5.1	Aliphatic Alkoxy, Epoxide		Aliphatic Ether
5.1	Aromatic Carboxylic Acid, 1,2-subst.	Aromatic Carboxylic Acid	Aromatic or Conjugated Carboxylic Acid
5.1	Aryl Subst., 5-Membered Cyclic Anhydride	Aromatic Acid Anhydride	Aromatic or Conjugated Acid Anhydride
5.1	Carbonyl, Possibly Methyl Ketone		Aliphatic Ketone
5.1	Fused Cyclic Anhydride, Five Membered		Aliphatic Anhydride
5	Aliphatic Acid Halide, Long Chain Linear		Aliphatic Acid Halide
5	Aliphatic Conjugated Ring Acid Anhydride	Conjugated Acid Anhydride	Aromatic or Conjugated Acid Anhydride
5	Aliphatic Ether or Sulfone	Substituent Group	Side Chain or Substituent
5	Possibly Dithiol	Aliphatic Thiol	Aliphatic Thiocompound
4.8	Alkene Conjugated Ketone	Conjugated Ketone	Aromatic or Conjugated Ketone
4.8	Aryl Fused 6-Membered Cyclic Anhydride	Aromatic Acid Anhydride	Aromatic or Conjugated Acid Anhydride
4.8	Methyl Silanes	Silanes	Aliphatic Silicon Compound
4.7	Aryl Ester	Aromatic Ester	Aromatic or Conjugated Ester

Lampiran 6. Uji Aktivitas Inhibisi Xantin Oksidase

A. Perhitungan allopurinol

Dibuat beberapa konsentrasi : 0,25 (1) $V_1 \cdot C_1 = V_2 \cdot C_2$ $V_1 \cdot 100 = 1,5 \times 0,25$ $V_1 = 0,00375 \text{ mL} = 3,75 \text{ } \mu\text{L}(\text{allopurinol})$ $1,5 \text{ ml} = 1500 \text{ } \mu\text{L}$ $1500 - 3,75 = 1,496 \text{ } \mu\text{L}(\text{dapar})$ 0,50 (2) $V_1 \cdot C_1 = V_2 \cdot C_2$ $V_1 \cdot 100 = 1,5 \times 0,50$ $V_1 = 0,0075 \text{ mL} = 7,5 \text{ } \mu\text{L}(\text{allopurinol})$ $1,5 \text{ ml} = 1500 \text{ } \mu\text{L}$ $1500 - 7,5 = 1,492 \text{ } \mu\text{L}(\text{dapar})$ 0,75 (3) $V_1 \cdot C_1 = V_2 \cdot C_2$ $V_1 \cdot 100 = 1,5 \times 0,75$ $V_1 = 0,01125 \text{ mL} = 11,25 \text{ } \mu\text{L}(\text{allopurinol})$ $1,5 \text{ ml} = 1500 \text{ } \mu\text{L}$ $1500 - 11,25 = 1,488 \text{ } \mu\text{L}(\text{dapar})$ 1 (4) $V_1 \cdot C_1 = V_2 \cdot C_2$ $V_1 \cdot 100 = 1,5 \times 1$ $V_1 = 0,015 \text{ mL} = 15 \text{ } \mu\text{L}(\text{allopurinol})$ $1,5 \text{ ml} = 1500 \text{ } \mu\text{L}$ $1500 - 15 = 1,485 \text{ } \mu\text{L}(\text{dapar})$ 1,25 (5) $V_1 \cdot C_1 = V_2 \cdot C_2$ $V_1 \cdot 100 = 1,5 \times 1,25$ $V_1 = 0,01875 \text{ mL} = 18,75 \text{ } \mu\text{L}(\text{allopurinol})$ $1,5 \text{ ml} = 1500 \text{ } \mu\text{L}$ $1500 - 18,75 = 1,481 \text{ } \mu\text{L}(\text{dapar})$	1,5 (6) $V_1 \cdot C_1 = V_2 \cdot C_2$ $V_1 \cdot 100 = 1,5 \times 1,5$ $V_1 = 0,0225 \text{ mL} = 22,5 \text{ } \mu\text{L}(\text{allopurinol})$ $1,5 \text{ ml} = 1500 \text{ } \mu\text{L}$ $1500 - 22,5 = 1,447 \text{ } \mu\text{L}(\text{dapar})$ 1,75 (7) $V_1 \cdot C_1 = V_2 \cdot C_2$ $V_1 \cdot 100 = 1,5 \times 1,75$ $V_1 = 0,02625 \text{ mL} = 26,25 \text{ } \mu\text{L}(\text{allopurinol})$ $1,5 \text{ ml} = 1500 \text{ } \mu\text{L}$ $1500 - 26,25 = 1,473 \text{ } \mu\text{L}(\text{dapar})$ 2 (8) $V_1 \cdot C_1 = V_2 \cdot C_2$ $V_1 \cdot 100 = 1,5 \times 2$ $V_1 = 0,03 \text{ mL} = 30 \text{ } \mu\text{L}(\text{allopurinol})$ $1,5 \text{ ml} = 1500 \text{ } \mu\text{L}$ $1500 - 30 = 1470 \text{ } \mu\text{L}(\text{dapar})$ 2,5 (9) $V_1 \cdot C_1 = V_2 \cdot C_2$ $V_1 \cdot 100 = 1,5 \times 2,5$ $V_1 = 0,0375 \text{ mL} = 37,5 \text{ } \mu\text{L}(\text{allopurinol})$ $1,5 \text{ ml} = 1500 \text{ } \mu\text{L}$ $1500 - 37,5 = 1,462 \text{ } \mu\text{L}(\text{dapar})$ 2,75 (10) $V_1 \cdot C_1 = V_2 \cdot C_2$ $V_1 \cdot 100 = 1,5 \times 2,75$ $V_1 = 0,04125 \text{ mL} = 41,25 \text{ } \mu\text{L}25(\text{allopurinol})$ $1,5 \text{ ml} = 1500 \text{ } \mu\text{L}$ $1500 - 41,25 = 1,458 \text{ } \mu\text{L}(\text{dapar})$
---	---

NO	SAMPEL	KONSENTRASI (ppm)	Abs Akhir (B)	Abs Awal (A)	B-A	KONTROL	% INHIBISI
1	Allopurinol	1,75	0,069	0,023	0,046	0,0566	18,72791519
		2	0,074	0,032	0,042		25,795053
		2,5	0,087	0,053	0,034		39,92932862
		2,75	0,099	0,068	0,031		45,22968198
		1,75	0,087	0,039	0,048		15,19434629
		2	0,099	0,056	0,043		24,02826855
		2,5	0,112	0,077	0,035		38,16254417
		2,75	0,126	0,094	0,032		43,46289753

B. Perhitungan Sampel Uji

- Ekstrak Etanol : 300, 250, 200, 150, 100, 50,25, 10, 5, 2.5 µg/ml

Konsentrasi yang dibuat yaitu :		
300 (1) $V_1 \cdot C_1 = V_2 \cdot C_2$ $V_1 \cdot 1000 = 1,5 \times 300$ $V_1 = 0,45 \text{ mL} = 450 \text{ µL (sampel)}$ $1,5 \text{ ml} = 1500 \text{ µL}$ $1500 - 450 \text{ (sampel)} = 1050 \text{ µL (dapar)}$ 250 (2) $V_1 \cdot C_1 = V_2 \cdot C_2$ $V_1 \cdot 1000 = 1,5 \times 250$ $V_1 = 0,375 \text{ mL} = 375 \text{ µL (sampel)}$ $1,5 \text{ ml} = 1500 \text{ µL}$ $1500 - 375 \text{ (sampel)} = 1125 \text{ µL (dapar)}$ 200 (3) $V_1 \cdot C_1 = V_2 \cdot C_2$ $V_1 \cdot 1000 = 1,5 \times 200$ $V_1 = 0,3 \text{ mL} = 300 \text{ µL (sampel)}$ $1,5 \text{ ml} = 1500 \text{ µL}$ $1500 - 300 \text{ (sampel)} = 1200 \text{ µL (dapar)}$ 150 (4) $V_1 \cdot C_1 = V_2 \cdot C_2$ $V_1 \cdot 1000 = 1,5 \times 150$ $V_1 = 0,225 \text{ mL} = 225 \text{ µL (sampel)}$ $1,5 \text{ ml} = 1500 \text{ µL}$ $1500 - 225 \text{ (sampel)} = 1275 \text{ µL (dapar)}$ 100 (5) $V_1 \cdot C_1 = V_2 \cdot C_2$ $V_1 \cdot 1000 = 1,5 \times 100$ $V_1 = 0,15 \text{ mL} = 150 \text{ µL (sampel)}$ $1,5 \text{ ml} = 1500 \text{ µL}$ $1500 - 150 \text{ (sampel)} = 1350 \text{ µL (dapar)}$		50 (6) $V_1 \cdot C_1 = V_2 \cdot C_2$ $V_1 \cdot 1000 = 1,5 \times 50$ $V_1 = 0,075 \text{ mL} = 75 \text{ µL (sampel)}$ $1,5 \text{ ml} = 1500 \text{ µL}$ $1500 - 75 \text{ (sampel)} = 1425 \text{ µL (dapar)}$ 25 (7) $V_1 \cdot C_1 = V_2 \cdot C_2$ $V_1 \cdot 1000 = 1,5 \times 25$ $V_1 = 0,0375 \text{ mL} = 37,5 \text{ µL (sampel)}$ $1,5 \text{ ml} = 1500 \text{ µL}$ $1500 - 37,5 \text{ (sampel)} = 1,462 \text{ µL (dapar)}$ 10 (8) $V_1 \cdot C_1 = V_2 \cdot C_2$ $V_1 \cdot 1000 = 1,5 \times 10$ $V_1 = 0,015 \text{ mL} = 15 \text{ µL (sampel)}$ $1,5 \text{ ml} = 1500 \text{ µL}$ $1500 - 15 \text{ (sampel)} = 1485 \text{ µL (dapar)}$ 5 (9) $V_1 \cdot C_1 = V_2 \cdot C_2$ $V_1 \cdot 1000 = 1,5 \times 5$ $V_1 = 0,0075 \text{ mL} = 7,5 \text{ µL (sampel)}$ $1,5 \text{ ml} = 1500 \text{ µL}$ $1500 - 7,5 \text{ (sampel)} = 1,492 \text{ µL (dapar)}$ 2,5 (10) $V_1 \cdot C_1 = V_2 \cdot C_2$ $V_1 \cdot 1000 = 1,5 \times 2,5$ $V_1 = 0,00375 \text{ mL} = 3,75 \text{ µL (sampel)}$ $1,5 \text{ ml} = 1500 \text{ µL}$ $1500 - 3,75 \text{ (sampel)} = 1,496 \text{ µL (dapar)}$

2						
		75	0,084	0,049	0,035	38,16254417
		100	0,093	0,061	0,032	43,46289753
		125	0,065	0,038	0,027	52,29681979
		150	0,064	0,039	0,025	55,83038869
		175	0,065	0,044	0,021	62,898
		200	0,063	0,045	0,018	68,19787986
		225	0,067	0,053	0,014	75,26501767
		250	0,072	0,0610	0,011	80,56537102
		275	0,072	0,066	0,006	89,39929329
		300	0,081	0,076	0,005	91,16607774
		75	0,082	0,047	0,035	38,16254417
		100	0,075	0,044	0,031	45,22968198
		125	0,078	0,052	0,026	54,06360424
		150	0,082	0,057	0,025	55,83038869
		175	0,078	0,056	0,022	61,13074205
		200	0,067	0,05	0,017	69,96466431
		225	0,077	0,064	0,013	77,03180212
		250	0,075	0,065	0,010	82,33215548
		275	0,083	0,077	0,006	89,39929329
		300	0,087	0,082	0,005	91,16607774

Fraksi Etil Asetat dan etanol air =

200, 150, 100, 50, 25, 10, 5, 2.5, 1.25, 0.625 µg/ml

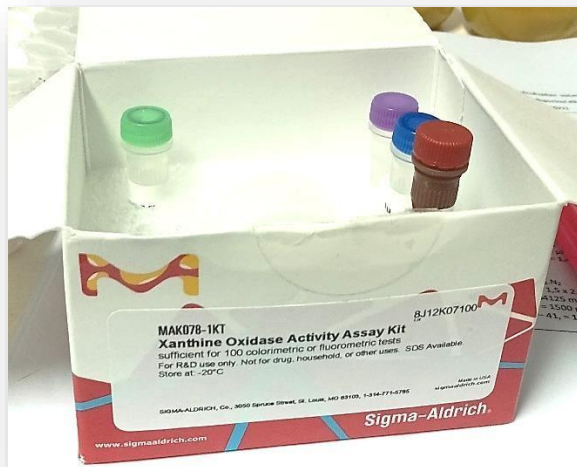
Konsentrasi yang dibuat yaitu :		200 (1) $V_1 \cdot C_1 = V_2 \cdot C_2$ $V_1 \cdot 1000 = 1,5 \times 200$ $V_1 = 0,3 \text{ mL} = 300 \text{ µL (sampel)}$ $1,5 \text{ ml} = 1500 \text{ µL}$ $1500 - 300 \text{ (sampel)} = 1200 \text{ µL (dapar)}$ 150 (2) $V_1 \cdot C_1 = V_2 \cdot C_2$ $V_1 \cdot 1000 = 1,5 \times 150$ $V_1 = 0,225 \text{ mL} = 225 \text{ µL (sampel)}$ $1,5 \text{ ml} = 1500 \text{ µL}$ $1500 - 225 \text{ (sampel)} = 1275 \text{ µL (dapar)}$ 100 (3) $V_1 \cdot C_1 = V_2 \cdot C_2$ $V_1 \cdot 1000 = 1,5 \times 100$ $V_1 = 0,15 \text{ mL} = 150 \text{ µL (sampel)}$ $1,5 \text{ ml} = 1500 \text{ µL}$ $1500 - 150 \text{ (sampel)} = 1350 \text{ µL (dapar)}$ 50 (4) $V_1 \cdot C_1 = V_2 \cdot C_2$ $V_1 \cdot 1000 = 1,5 \times 50$ $V_1 = 0,075 \text{ mL} = 75 \text{ µL (sampel)}$ $1,5 \text{ ml} = 1500 \text{ µL}$ $1500 - 75 \text{ (sampel)} = 1425 \text{ µL (dapar)}$ 25 (5) $V_1 \cdot C_1 = V_2 \cdot C_2$ $V_1 \cdot 1000 = 1,5 \times 25$ $V_1 = 0,0375 \text{ mL} = 37,5 \text{ µL (sampel)}$ $1,5 \text{ ml} = 1500 \text{ µL}$ $1500 - 37,5 \text{ (sampel)} = 1,462 \text{ µL (dapar)}$	10 (6) $V_1 \cdot C_1 = V_2 \cdot C_2$ $V_1 \cdot 1000 = 1,5 \times 10$ $V_1 = 0,015 \text{ mL} = 15 \text{ µL (sampel)}$ $1,5 \text{ ml} = 1500 \text{ µL}$ $1500 - 15 \text{ (sampel)} = 1485 \text{ µL (dapar)}$ 5 (7) $V_1 \cdot C_1 = V_2 \cdot C_2$ $V_1 \cdot 1000 = 1,5 \times 5$ $V_1 = 0,0075 \text{ mL} = 7,5 \text{ µL (sampel)}$ $1,5 \text{ ml} = 1500 \text{ µL}$ $1500 - 7,5 \text{ (sampel)} = 1492 \text{ µL (dapar)}$ 2,5 (8) $V_1 \cdot C_1 = V_2 \cdot C_2$ $V_1 \cdot 1000 = 1,5 \times 2,5$ $V_1 = 0,00375 \text{ mL} = 3,75 \text{ µL (sampel)}$ $1,5 \text{ ml} = 1500 \text{ µL}$ $1500 - 3,75 \text{ (sampel)} = 1,496 \text{ µL (dapar)}$ 1.25 (9) $V_1 \cdot C_1 = V_2 \cdot C_2$ $V_1 \cdot 1000 = 2 \times 1.25$ $V_1 = 0,0025 \text{ mL} = 2,5 \text{ µL (sampel)}$ $2 \text{ ml} = 2000 \text{ µL}$ $2000 - 2,5 \text{ (sampel)} = 1,997,5 \text{ µL (dapar)}$ 0,625 (10) $V_1 \cdot C_1 = V_2 \cdot C_2$ $V_1 \cdot 1000 = 1,5 \times 0,625$ $V_1 = 0,0009375 \text{ mL} = 0,9375 \text{ µL (sampel)}$ $1,5 \text{ ml} = 1500 \text{ µL}$ $1500 - 0,9375 \text{ (sampel)} = 1,499 \text{ µL (dapar)}$
--	--	--	---

3						
		5	0,056	0,027	0,029	48,76325088
		10	0,061	0,035	0,026	54,06360424
		25	0,068	0,045	0,023	59,3639576
		50	0,074	0,055	0,019	66,43109541
		75	0,082	0,066	0,016	71,73144876
		100	0,088	0,074	0,014	75,26501767
		125	0,093	0,082	0,011	80,56537102
		150	0,097	0,089	0,008	85,86572438
		175	0,102	0,096	0,006	89,39929329
		200	0,109	0,104	0,005	91,16607774
		5	0,052	0,024	0,028	50,53003534
		10	0,059	0,034	0,025	55,83038869
		25	0,063	0,041	0,022	61,13074205
		50	0,068	0,050	0,018	68,19787986
		75	0,074	0,058	0,016	71,73144876
		100	0,080	0,068	0,012	78,79858657
		125	0,085	0,076	0,009	84,09893993
		150	0,091	0,083	0,008	85,86572438
		175	0,098	0,092	0,006	89,39929329
		200	0,104	0,100	0,004	92,93286219

4							
		5	0,056	0,004	0,052		8,127208481
		10	0,060	0,011	0,049		13,42756184
		25	0,064	0,020	0,044		22,2614841
		50	0,071	0,032	0,039		31,09540636
		75	0,077	0,041	0,036		36,39575972
		100	0,082	0,050	0,032	0,0566	43,46289753
		125	0,088	0,059	0,029		48,76325088
		150	0,094	0,068	0,026		54,06360424
		175	0,099	0,075	0,024		57,59717314
		200	0,106	0,083	0,023		59,3639576
	Fraksi Air						
		5	0,053	0,018	0,035		38,16254417
		10	0,059	0,029	0,030		46,99646643
		25	0,065	0,037	0,028		50,53003534
		50	0,072	0,049	0,023		59,3639576
		75	0,079	0,059	0,020		64,66431095
		100	0,084	0,068	0,016	0,0566	71,73144876
		125	0,089	0,078	0,011		80,56537102
		150	0,093	0,084	0,009		84,09893993
		175	0,098	0,091	0,007		87,63250883
		200	0,105	0,099	0,006		89,39929329

Reagen	Sampel dan Standar	Sampel Kosong
Xantin Oksidase Penyangga Pengujian	44 µl	46 µl
Xantin Oksidase Campuran Substrat	2 µl	-
Xantin Oksidase Campuran Enzim	2 µl	2 µl
Peroksidase Fluoresen Substrat	2 µl	2 µl

(Aldrich S. 2016.)

1 kit enzim xantin oksidase**Penimbangan pembanding allopurinol dan sampel uji**

Pembuatan larutan induk pembanding dan sampel uji



Cek Ph dapar



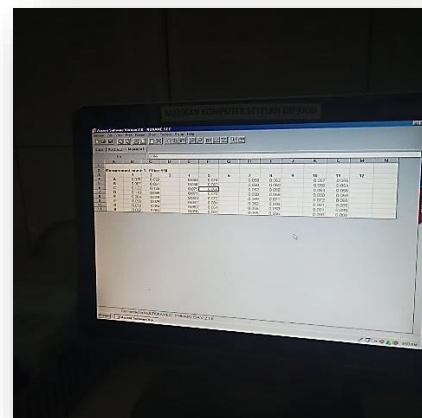
Pengenceran larutan pembanding dan larutan sampel uji



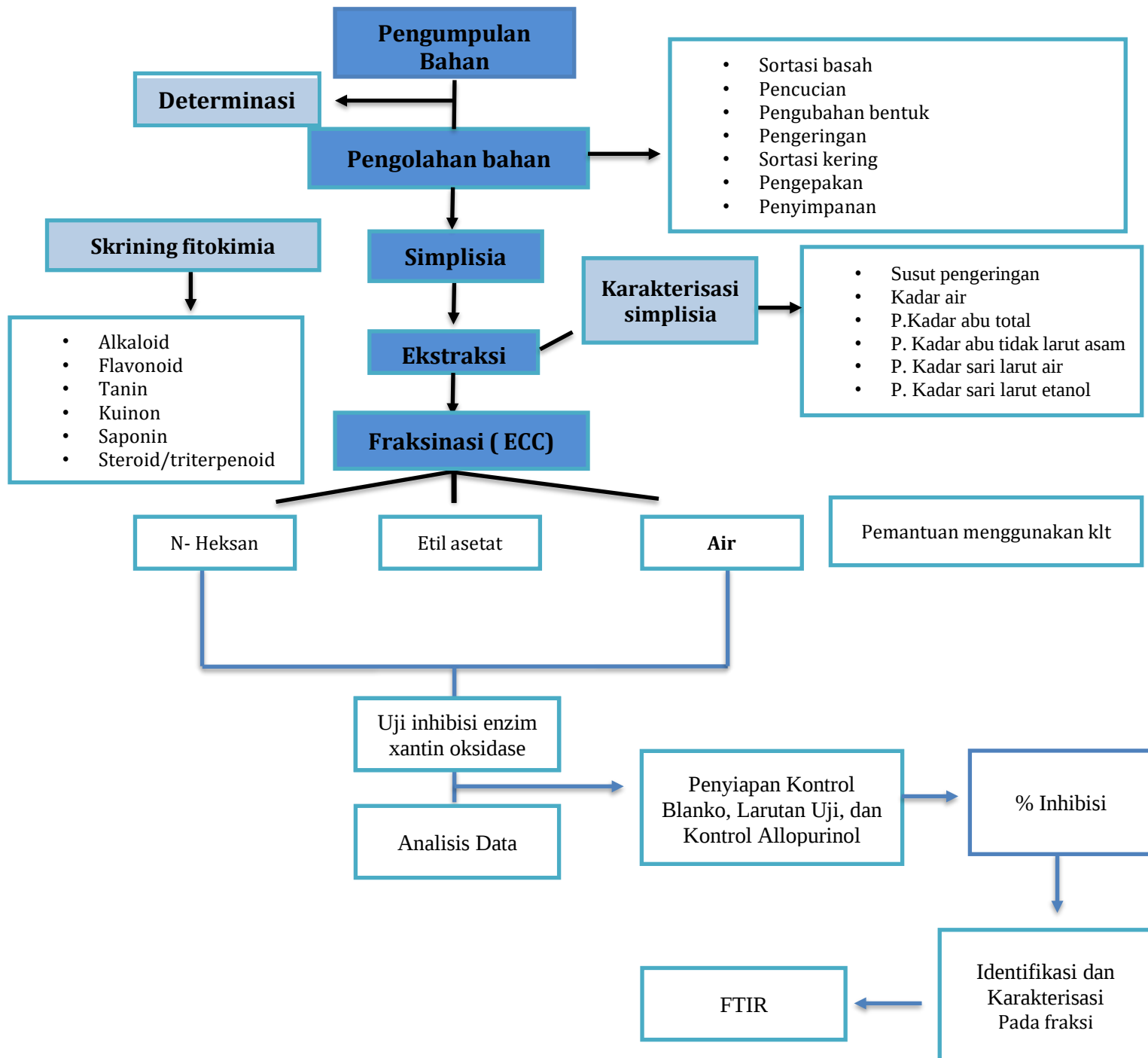
Reagen ,pembanding dan sampel uji dimasukan ke dalam welplate



Cek absorbansi pada alat elisa reader



Lampiran 7. Skema Penelitian



Lampiran 8. Karu Bimbingan



Universitas
Bhakti Kencana



KARTU BIMBINGAN TUGAS AKHIR I/TUGAS AKHIR II

Pembimbing Utama	: apt Aris Suhardiman, M.Si
Nama Mahasiswa	: Renia Pratiwi
NPM	: 221FF04024
Bidang Ilmu	: Biologi Farmasi

No	Hari/Tanggal	Waktu	Tempat	Materi	Paraf Dosen
1	Jumat, 16 februari 2024	15.00	Ruang Kapprodi	Diskusi Prosedur	JS
2	Kamis, 22 februari 2024	7.30	Ruang Kapprodi	Diskusi Prosedur enzim xantin	JS
3	Selasa, 27 februari 2024	08.00	Ruang Kapprodi	Diskusi Pemantauan plat klt ekstrak, fraksi	JS
4	Jumat, 1 Maret 2024	7.30	Ruang Kapprodi	Diskusi Pemantaun plat kkg	JS
5	Jumat, 8 Maret 2024	14.00	Ruang Kapprodi	Diskusi hasil pemantauan	JS
6	Jumat, 21 Maret 2024	7.30	Ruang Kapprodi	Diskusi hasil kkg (1)	JS
7	Kamis, 28 Maret 2024	14.00	Ruang Kapprodi	Diskusi hasil kkg (2)	JS
8	Senin, 22 April 2024	7.30	Ruang Kapprodi	Diskusi Hasil isolate	JS
9	Kamis, 6 Juni 2024	7.02	Ruangan S2	Diskusi memnentukan konsentrasi tiap sampel	JS
10	Jumat, 14 Juni 2024	11.43	Ruangan S2	Diskusi perhitungan pengenceran	JS
11	Selasa, 2 Juli 2024	08.00	Ruangan S2	Diskusi perhitungan enzim	JS
12	Kamis, 4 Juli 2024	09.15	Ruangan S2	Diskusi pengolahan data enzim (1)	JS
13	Selasa, 9 Juli 2024	11.13	Ruangan S2	Diskusi isolat	JS
14	Rabu, 10 Juli 2024	7.30	Ruangan S2	Diskusi pengolahan data enzim (2)	JS
15	Kamis, 11 Juli 2024	16.00	Ruangan S2	Diskusi pengolahan % inhibisi enzim	JS
16	Jl. Soekarno Hatta No 754 Bandung 022 7830 760, 022 7830 765				



**Fakultas Farmasi
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KARTU BIMBINGAN TUGAS AKHIR I/TUGAS AKHIR II

Pembimbing Serta	: Kania Fajarwati, M.S.Farm
Nama Mahasiswa	: Renia Pratiwi
NPM	: 221FF04024
Bidang Ilmu	: Biologi Farmasi

[illegible]

Calatan : Kartu ini harus dibawa setiap kali melakukan bimbingan dan harus diisi oleh dosen pembimbing.

Lampiran 9. CV



Renia Pratiwi

Lulusan Baru

Data Pribadi

• Nama	: Renia Pratiwi
• Tempat, tanggal lahir	: Lampung, 12 Juli 1999
• Alamat	: RT 001/RW 001, Desa Gaya Baru Delapan,
• No Telepon	: 0857-1512-9261
• Jenis Kelamin	: Perempuan
• Agama	: Islam
• Kewarganegaraan	: Indonesia
• Email	: reniapratiwi24@gmail.com
• Status	: Belum Menikah

Pendidikan

• SDN 2 Gaya Baru 2	(2006 - 2012)
• SMPN 1 Seputih Surabaya	(2012 - 2015)
• SMAN 1 Seputih Surabaya	(2015 - 2018)
• Stikes Madani Yogyakarta (D3)	(2018 - 2021)
• Universitas Bhakti Kencana (s1)	(2022 - 2024)

Pengalaman

- Ketua PM (D3)
- Anggota PMR (SMA)
- Pkl Di Puskesmas Sewon II Yogyakarta
- Pkl Di Apotik Wonokromo Yogyakarta

Hobi

- Membaca

Lampiran 10. Hasil Cek Plagiarisme

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Lampiran 11. Surat Publikasi

**SURAT PERSETUJUAN PUBLIKASI TUGAS AKHIR
DALAM BENTUK ARTIKEL DI JURNAL ILMIAH**

Yang bertanda tangan di bawah ini,

Nama : Apt. Aris Suhardiman, M.Si

NIDN : 0401018308

Selaku pembimbing utama dari mahasiswa,

Nama : Renia Pratiwi

NIM : 221FF04024

menyatakan bahwa demi kebaikan perkembangan ilmu pengetahuan, saya menyetujui Skripsi yang telah dibuat oleh mahasiswa tersebut dengan judul:

**IDENTIFIKASI GOLONGAN SENYAWA FRAKSI ETIL ASETAT DAN AIR DAUN GAHARU
(*Aquilaria malaccensis* L.) SERTA UJI AKTIVITAS ANTIHIPERURISEMIA SECARA IN
VITRO**

untuk dipublikasikan atau dilampirkan sebagai artikel di *Pharmaceutical Science Society* (pharmacia) Universitas dengan halaman web <https://pharmacia.pensoft.net/> yang berdampak tidak diinputkan ke repository dalam bentuk Skripsi melainkan dalam bentuk publikasi ilmiah.

Mengetahui,

Bandung, 20 September 2024



Apt. Aris Suhardiman, M.Si

NIDN. 0401018308