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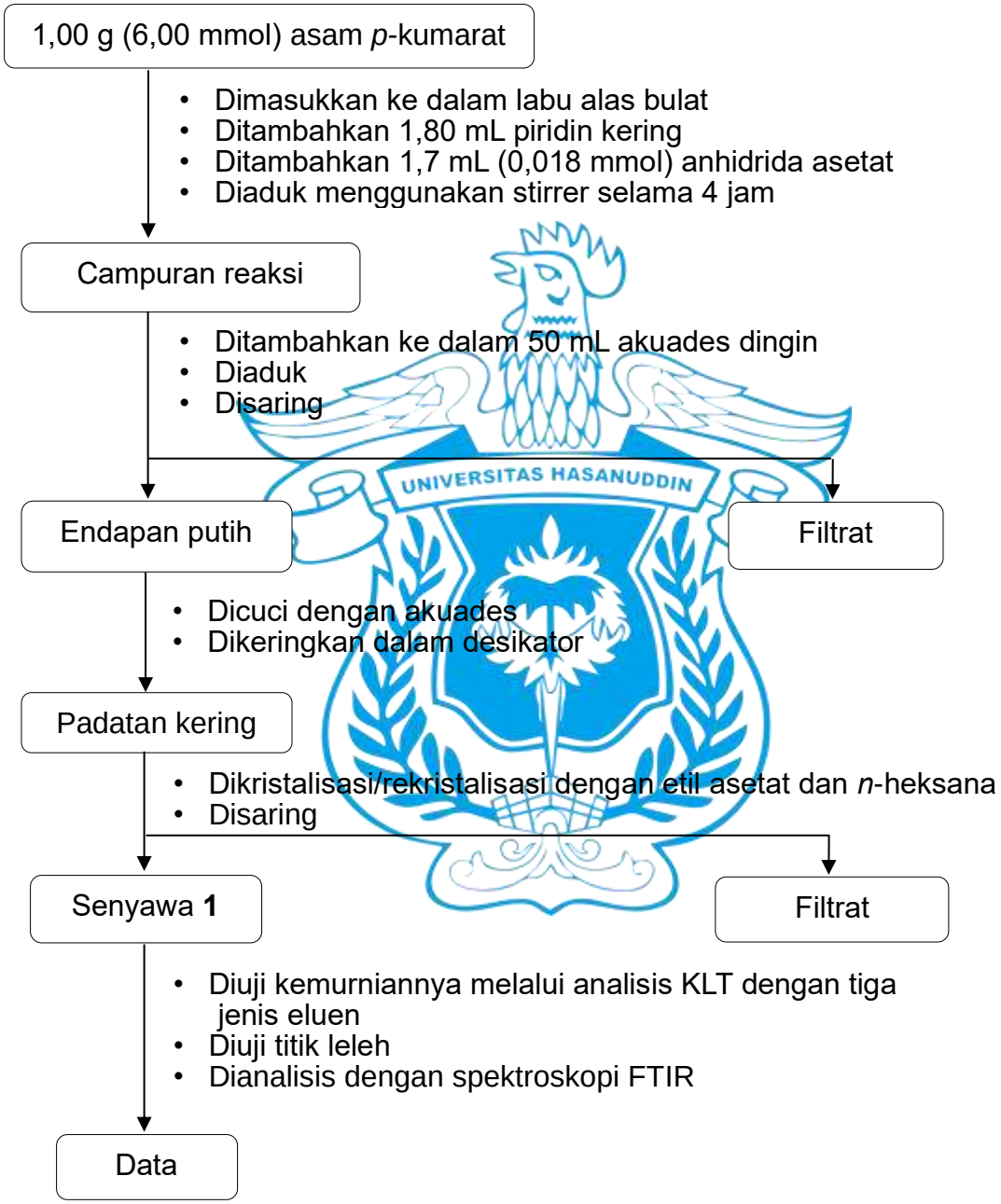
Lampiran 1. Skema Prosedur Sintesis Senyawa **1**



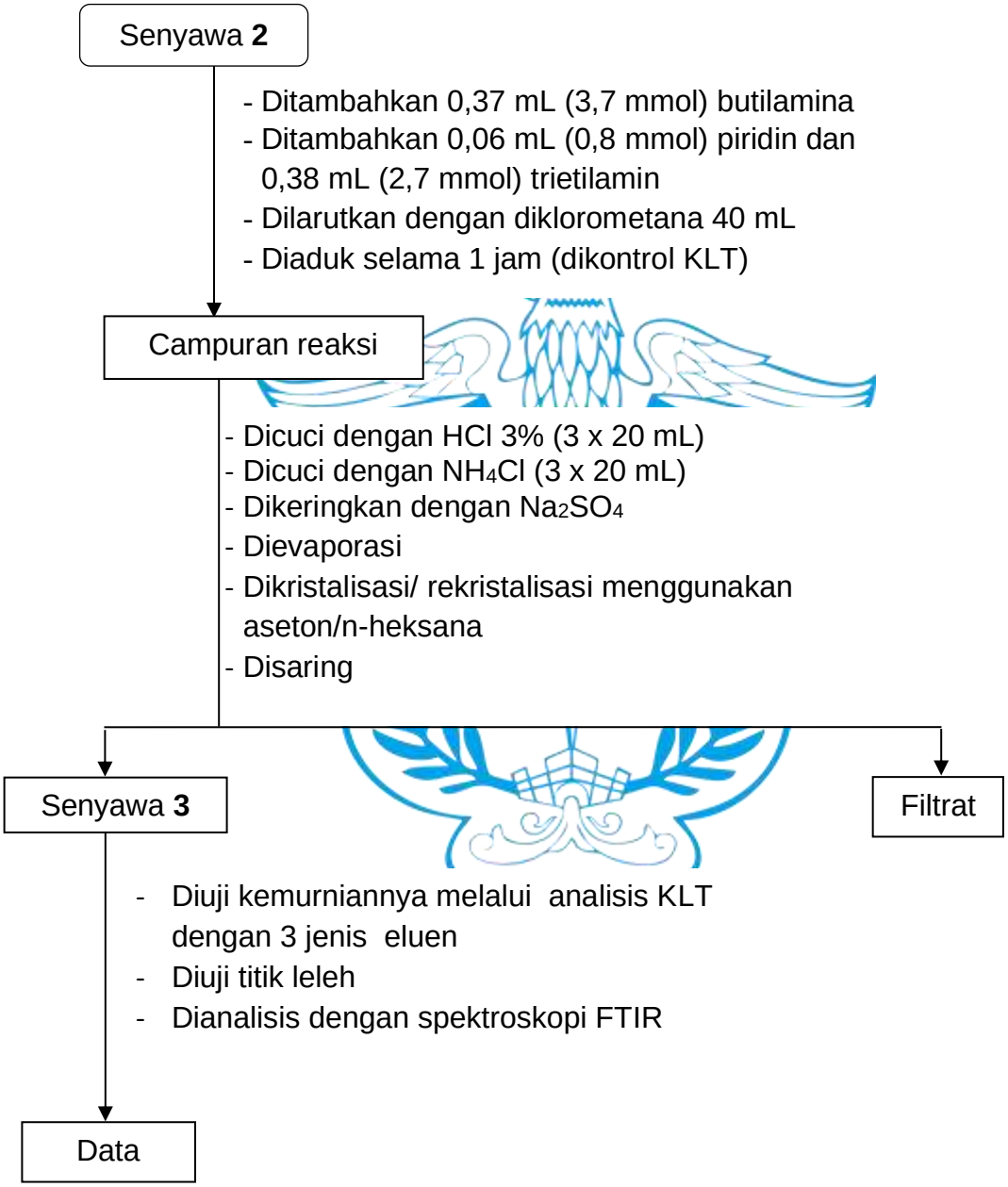
Lampiran 2. Skema Prosedur Sintesis Senyawa **2**

0,70 g (3,4 mmol) Senyawa **1**

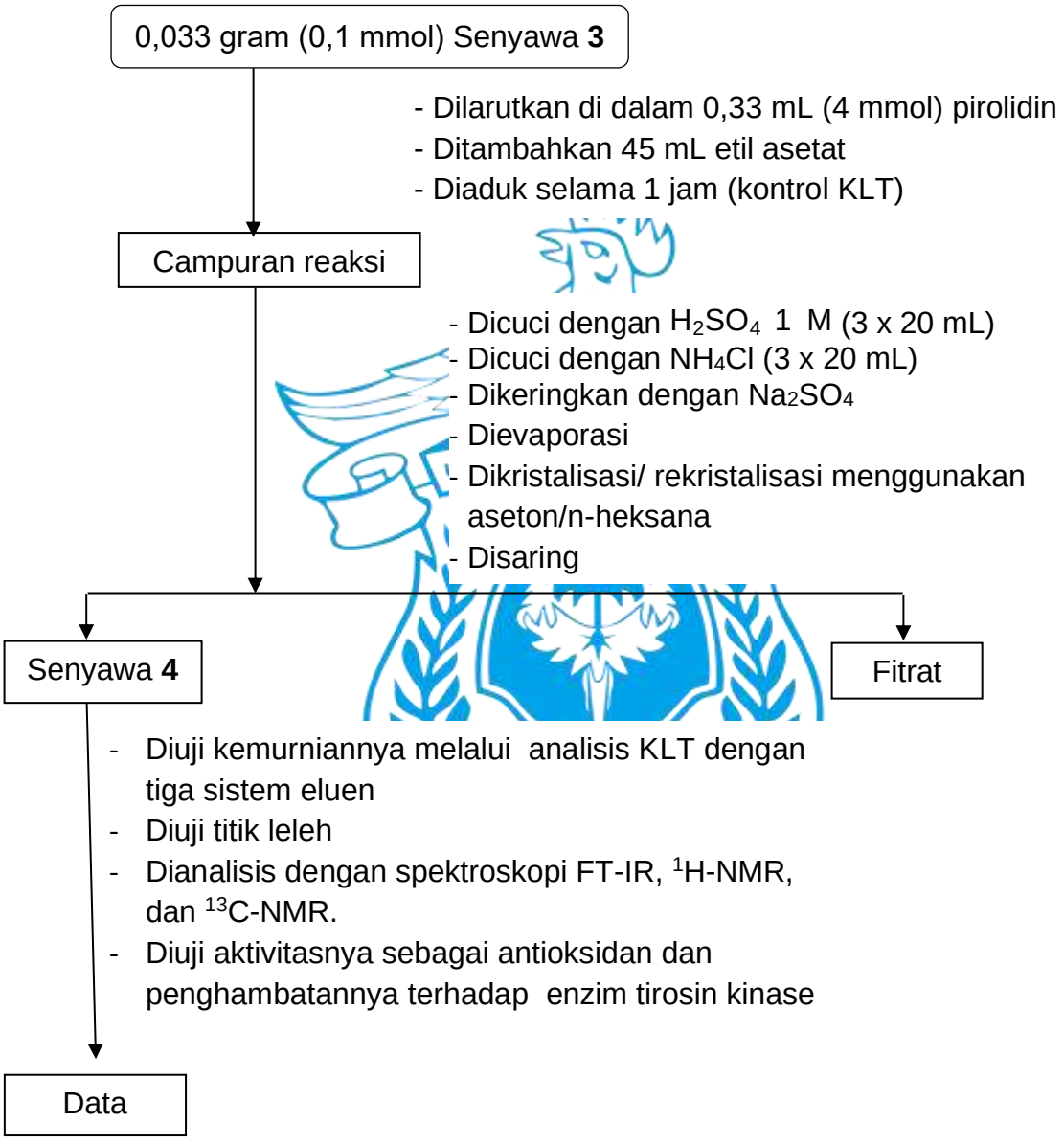
- Dimasukkan ke dalam labu alas bulat leher tiga
- Ditambahkan 20 mL benzena
- Ditambahkan 1,21 mL (17 mmol) tionil klorida
- Direfluks pada suhu 80^{o}C selama 4 jam (kontrol KLT) dengan atmosfer reaksi dialiri gas N_2 selama 5 menit
- Didinginkan pada suhu ruang
- Dievaporasi sampai kering

Senyawa **2**

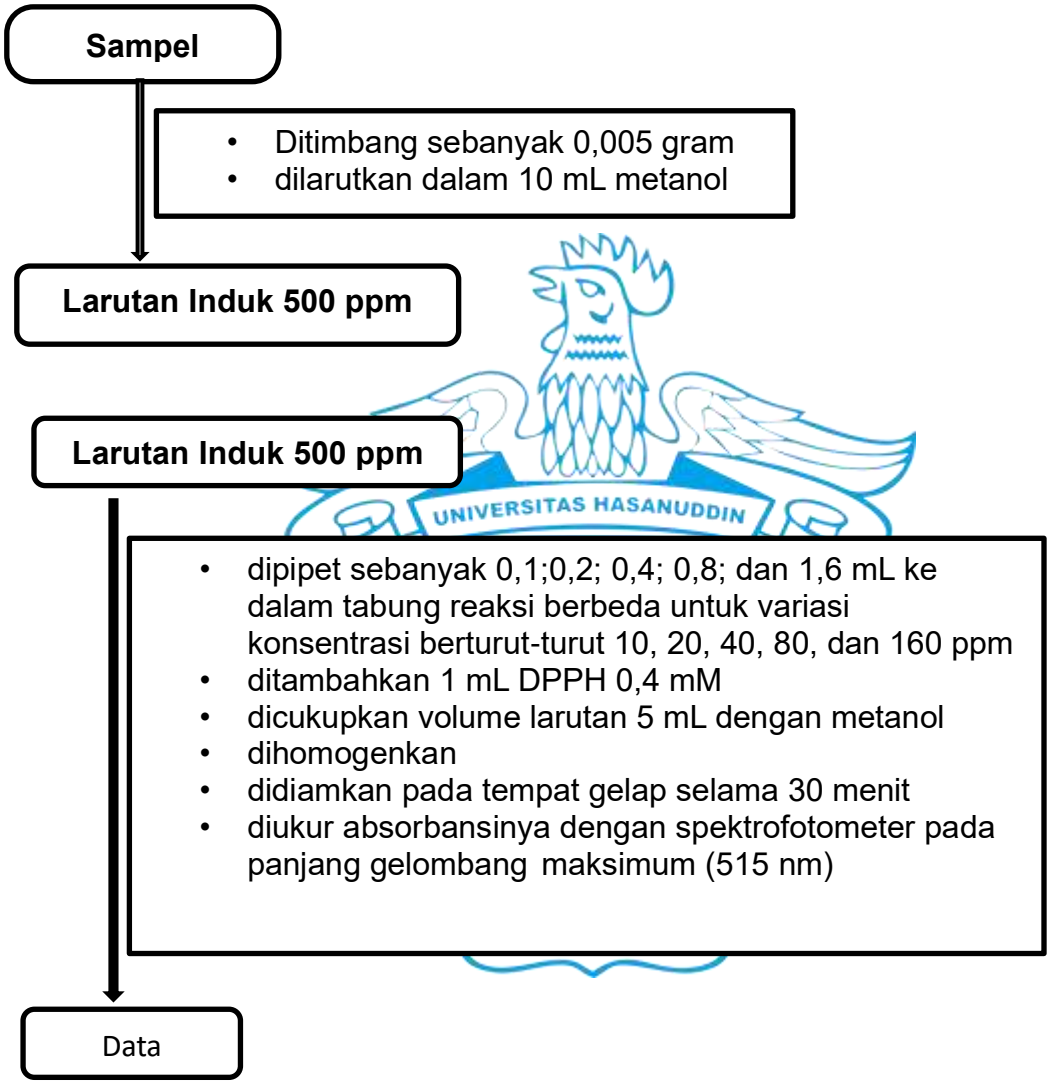
Lampiran 3. Skema Prosedur Sintesis Senyawa **3**



Lampiran 4. Skema Prosedur Sintesis Senyawa **4**



Lampiran 5. Uji Aktivitas antioksidan Senyawa 4



Lampiran 6. Uji Penghambatan Senyawa **4** Terhadap enzim tirosin kinase

1 μL Senyawa Uji 5 μ M

-Ditransfer 1 μL 1x buffer kinase 5% DMSO
-Ditambahkan 0,5 μL stok kinase working
- Disentrifuse pelat untuk mencampur pereaksi
- Digoyangkan 2 menit
- Diinkubasi pada suhu ruang selama 10 menit
- Ditambahkan stok ATP/substrate working
- Disentrifuse Kembali
- Digoyangkan selama 2 menit
- Diinkubasi Kembali selama 60 menit
- Ditambahkan 5 μL pereaksi ADP-glo
- Digoyangkan selama 2 menit
- Diinkubasi kembali selama 40 menit
- Ditambahkan 10 μL pereaksi pendeteksi kinase
- Digoyangkan selama 2 menit
- Diukur luminesen dengan Glomax explorer (waktu integrasi 0,5 detik)

Data Luminesen

Catatan :

- Blangko dibuat dengan perlakuan yang sama (tanpa senyawa dan kinase working)
- Kontrol negative dibuat dengan perlakuan yang sama (tanpa senyawa uji)
- Senyawa uji yang dimaksud adalah kontrol positif (erlotinib) dan senyawa target

Lampiran 7. Perhitungan Reaktan

1. Sintesis Senyawa 1

1.1 Asam *p*-kumarat

mol asam *p*-kumarat $= \frac{\text{massa asam } p\text{-kumarat}}{\text{Mr asam } p\text{-kumarat}}$

$= \frac{1{,}00 \text{ g}}{164{,}16 \text{ g/mol}}$

= 0,006 mol

= 6,0 mmol

1.2 Anhidrida Asetat

mol anhidrida asetat = 3 kali mol asam *p*-kumarat

= 3 x 0,006 mol

= 0,018 mol

= 18 mmol

massa anhidrida asetat = mol anhidrida asetat x Mr anhidrida asetat

= 0,018 mol x 102,09 g/mol

= 1,84 g

volume anhidrida asetat $= \frac{\text{massa anhidrida asetat}}{\rho \text{ anhidrida asetat}}$

$= \frac{1{,}84 \text{ g}}{1{,}082 \text{ g/mL}}$

= 1,7 mL

2. Sintesis Senyawa 2

2.1 Hasil Senyawa **1**

mol senyawa **1** $= \frac{\text{massa senyawa } \mathbf{1}}{\text{Mr senyawa } \mathbf{1}}$

$= \frac{0{,}70 \text{ g}}{206{,}20 \text{ g/mol}}$

= 0,0034 mol

= 3,4 mmol

2.2 Tionil Klorida

mol tionil klorida = 5 x mol senyawa **1**

= 5 x 0,0034 mol

= 0,017 mol

= 17 mmol

massa tionil klorida = mol tionil klorida x Mr tionil klorida

= 0,017 mol x 118,97 g/mol

= 2,022 g

volume tionil klorida $= \frac{\text{massa tionil klorida}}{\text{densitas tionil klorida}}$

$= \frac{2,022\ \text{g}}{1,678\ \text{g/mL}}$

= 1,21 mL

3. Sintesis Senyawa 3

3.1 Butilamin

mol butilamin = 1,1 x mol senyawa **1**

= 1,1 x 0,0034 mol

= 0,0037 mol

= 3,7 mmol

massa butilamin = n butilamin x Mr butilamin

= 0,0037 mol x 73,14 g/mol

= 0,271 g

volume butilamin $= \frac{\text{massa butilamin}}{\text{densitas butilamin}}$

$= \frac{0,271\ \text{g}}{0,74\ \text{g/mL}}$

= 0,37 mL

3.2 Piridin

mol piridin = 0,25 x mol senyawa **1**

= 0,25 x 0,0034 mol

= 0,0008 mol

= 0,8 mmol

massa piridin = 0,0008 mol x 79,1 g/mol

= 0,063 g

volume piridin $= \frac{\text{massa piridin}}{\text{densitas piridin}}$

$= \frac{0{,}063\ \text{g}}{0{,}9819\ \text{g/mL}}$

= 0,06 mL

3.3 Trietilamin

mol trietilamin = 0,8 x mol senyawa **1**

= 0,8 x 0,0034 mol

= 0,0027 mol

massa trietilamin = 0,0027 mol x 101,19 g/mol

= 0,273 g

volume trietilamin $= \frac{\text{massa trietilamin}}{\text{densitas trietilamin}}$

$= \frac{0{,}273\ \text{g}}{0{,}7255\ \text{g/mL}}$

= 0,38 mL

4. Sintesis Senyawa 4

4.1 Senyawa **3**

mol senyawa **3** $= \frac{\text{massa senyawa } \mathbf{3}}{\text{Mr senyawa } \mathbf{3}}$

$= \frac{0{,}033\ \text{g}}{261\ \text{g/mol}}$

= 0,0001 mol

= 0,1 mmol

4.2 Pirolidin

mol pirolidin = 40 x mol senyawa **3**

= 40 x 0,0001 mol

= 0,004 mol

= 4 mmol

massa pirolidin = mol pirolidin x Mr pirolidin

= 0,004 mol x 71,12 g/mol

= 0,284 g

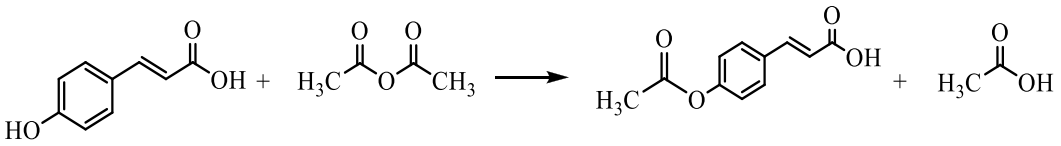
volume pirolidin $= \frac{\text{massa pirolidin}}{\text{densitas pirolidin}}$

$= \frac{0{,}284\ \text{g}}{0{,}866\ \text{g/mL}}$

= 0,33 mL

Lampiran 8. Perhitungan Rendemen Reaksi

1. Sintesis Senyawa 1



6,0 mmol 18,0 mmol 6,0 mmol

Bobot teoritis = mol produk x Mr produk

= 0,006 mol x 206 g/mol

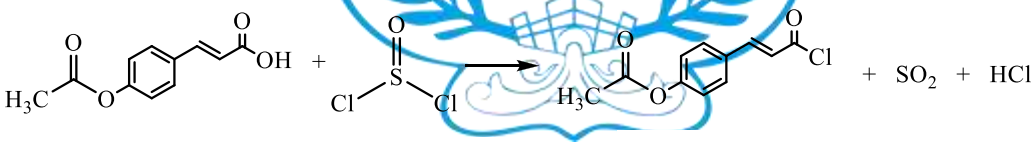
= 1,236 g

Rendemen $= \frac{\text{bobot praktik}}{\text{bobot teoritis}} \times 100\%$

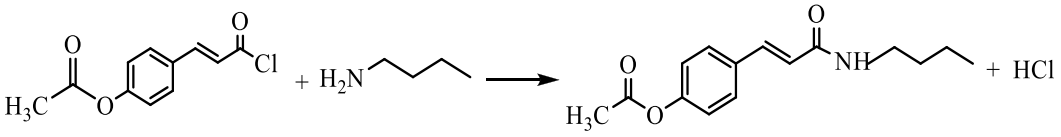
$= \frac{0{,}700\ g}{1{,}236\ g} \times 100\%$

= 56,63%

2. Sintesis Senyawa 3



3,4 mmol 17 mmol 3,4 mmol



3,4 mmol 3,7 mmol 3,4 mmol

Bobot teoritis = mol produk x Mr produk

= 0,0034 mol x 261 g/mol

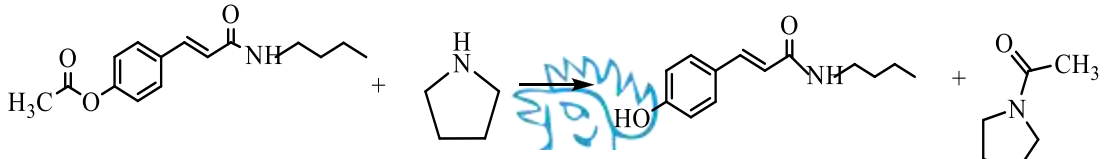
= 0,887 g

Rendemen $= \frac{\text{bobot praktik}}{\text{bobot teoritis}} \times 100\%$

$$= \frac{0{,}033\ g}{0{,}887\ g} \times 100\%$$

$$= 37{,}20\%$$

3. Sintesis Senyawa 4



0,1 mmol 4 mmol 0,1 mmol

Bobot teoritis = mol produk x Mr produk

= 0,0001 mol x 219 g/mol

= 0,022 g

Rendemen $= \frac{\text{bobot praktik}}{\text{bobot teoritis}} \times 100\%$

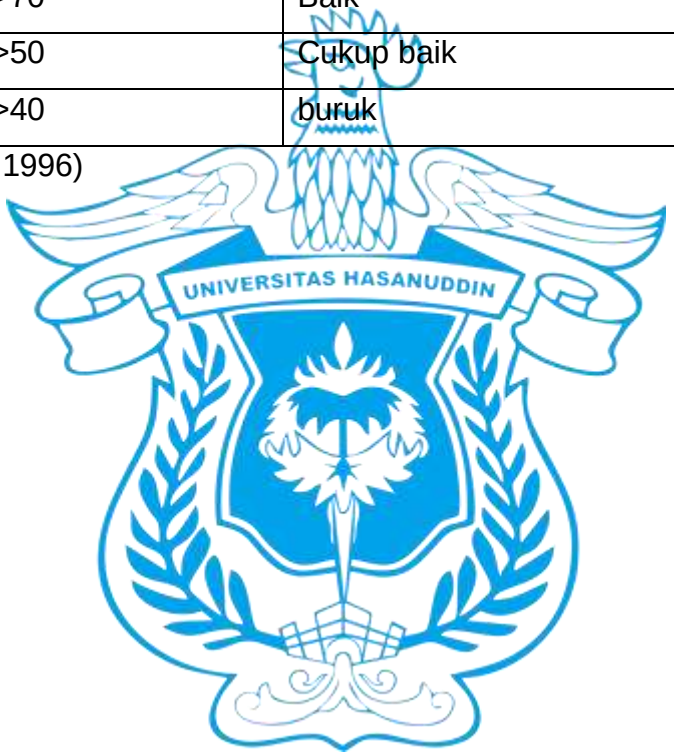
$= \frac{0{,}021\ g}{0{,}022\ g} \times 100\%$

= 95,45%

Lampiran 9. : Kriteria rendamen reaksi

Persentase(%)	Kriteria
100	kuantitatif
>90	hebat
>80	Sangat baik
>70	Baik
>50	Cukup baik
>40	buruk

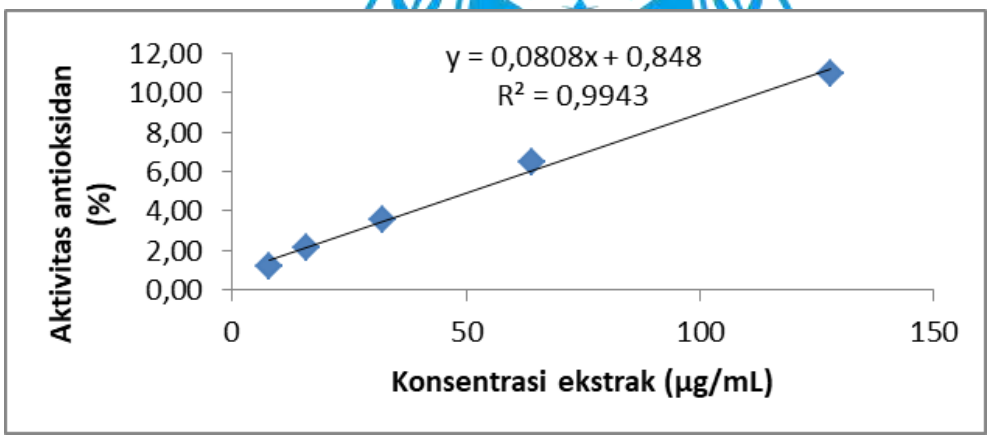
(Vogel et al., A.I., 1996)



Lampiran 10. : Data Hasil Pengukuran Aktivitas Antioksidan senyawa 4

No	Konsentrasi (µg/mL)	Absorbansi (A) λ = 515 nm	Aktivitas Antioksidan (%)
1	8	0,505	1,17
2	16	0,500	2,15
3	32	0,493	3,52
4	64	0,478	6,46
5	128	0,455	10,96
6	Kontrol	0,511	-

No	Konsentrasi (µg/mL)	Aktivitas Antioksidan (%)	Nilai IC_{50} (µg/mL)
1	8	1,17	
2	16	2,15	
3	32	3,52	608,3168
4	64	6,46	
5	128	10,96	



$IC_{50} = \frac{50-b}{a}$

sesuai dengan persamaan y = ax + b

sehingga:

$IC_{50} = \frac{50-0{,}848}{0{,}0808} = 608{,}3168$

Lampiran 11. : Data Hasil Pengukuran Aktivitas penghambatan senyawa 4 terhadap enzim tirosin kinase

RAW DATA dan % INHIBISI SAMPEL

Jenis Enzim	Blanko	Kontrol-	Kontrol +	Sampel	% Inhibisi	
					Sampel	Kontrol+
c-MER	700,0	5.718.0	4.574,0	5.307,0	8	23
FLT	560.0	6.075,0	1.966,0	4.381,0	31	75
FMS	560,0	1.363,0	1.010,0	1.340,0	3	44

% inhibisi dihitung menggunakan rumus:

% inhibisi = (((Lk-Lb)-(Ls-Lb))/(Lk-Lb)) x 100%

Keterangan:

Lk = luminesen kontrol negatif

Lb =Luminesen blangko

Ls = Luminesen sampel

Contoh Perhitungan untuk enzim FLT

% inhibisi = (((Lk-Lb)-(Ls-Lb))/(Lk-Lb)) x 100%

= [(6.075,0 - 560.0)-(4.381,0 - 560.0)]/((6.075,0 - 560.0)] *100%

= [(5515)-(3821) /(5515) x100%

= [(1694)/(5515) x100%

= 31%