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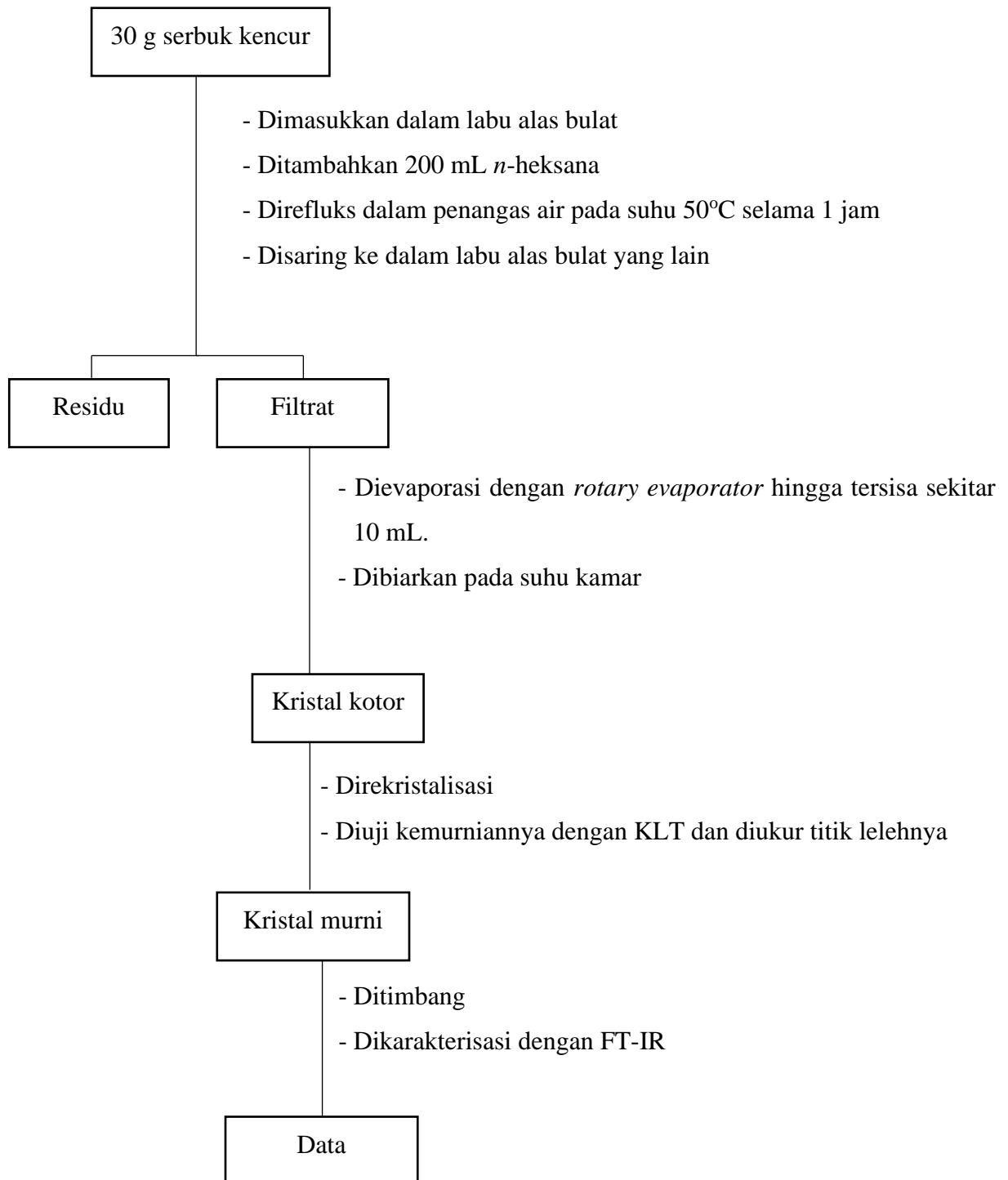
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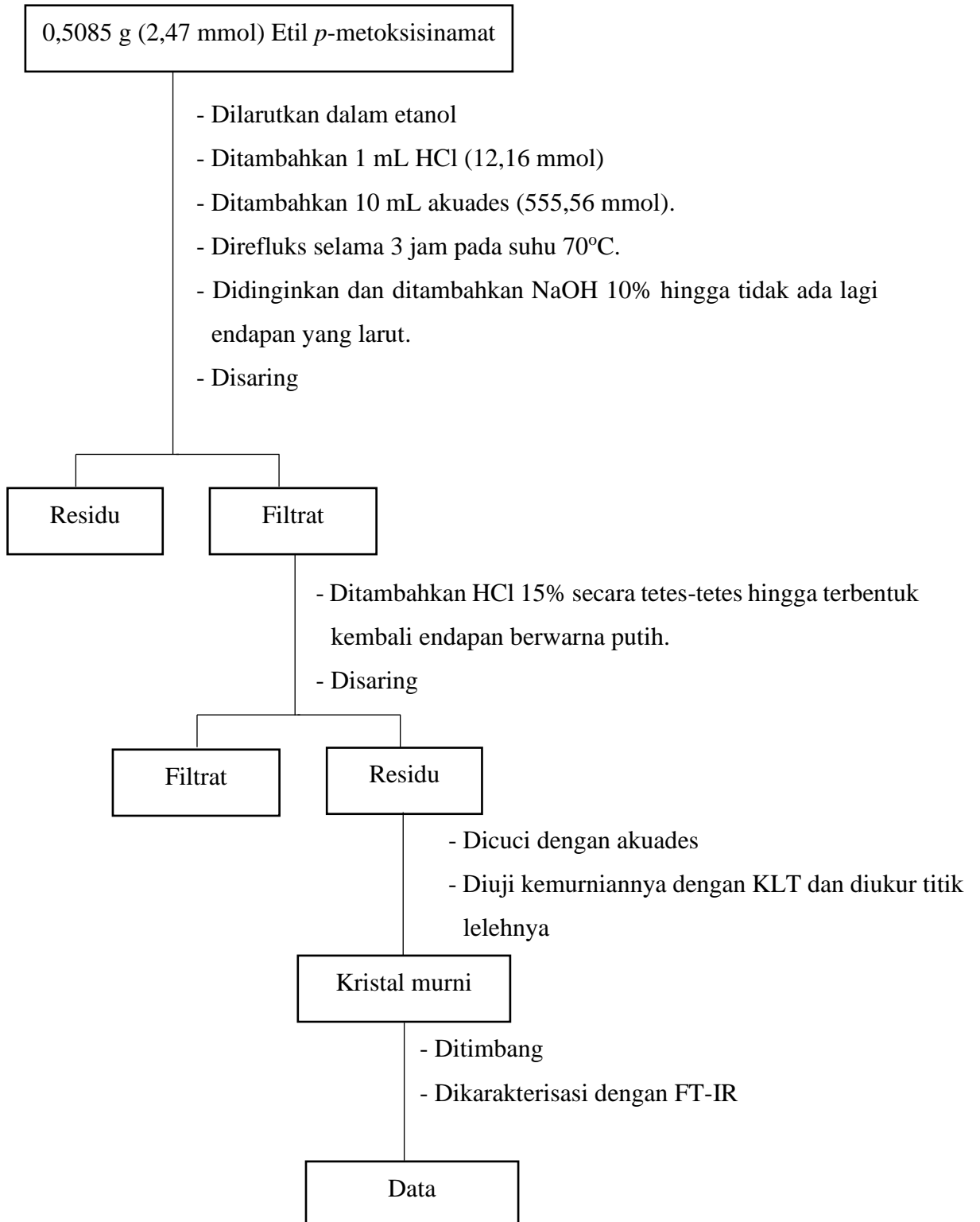
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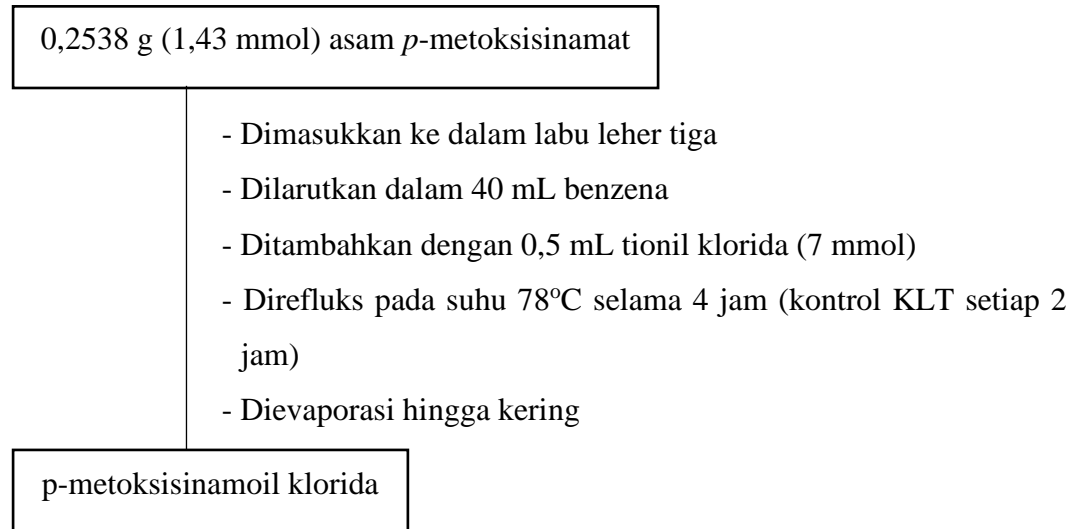
Lampiran 1. Bagan Kerja Isolasi Etil *p*-Metoksisinamat dari Kencur



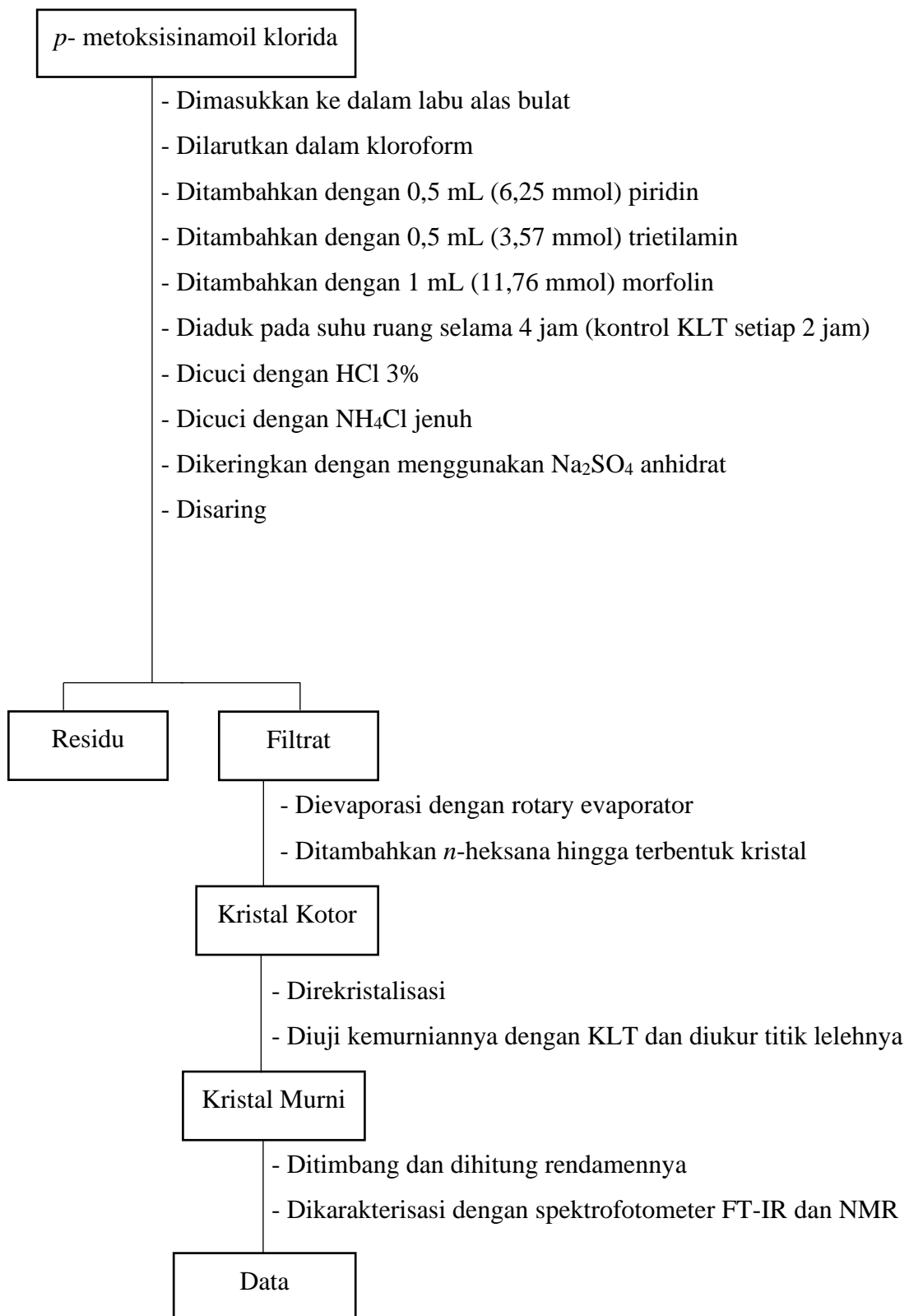
Lampiran 2. Bagan Kerja Sintesis Asam *p*-Metoksisinamat



Lampiran 3. Bagan Kerja Sintesis *p*-metoksisinamoil klorida

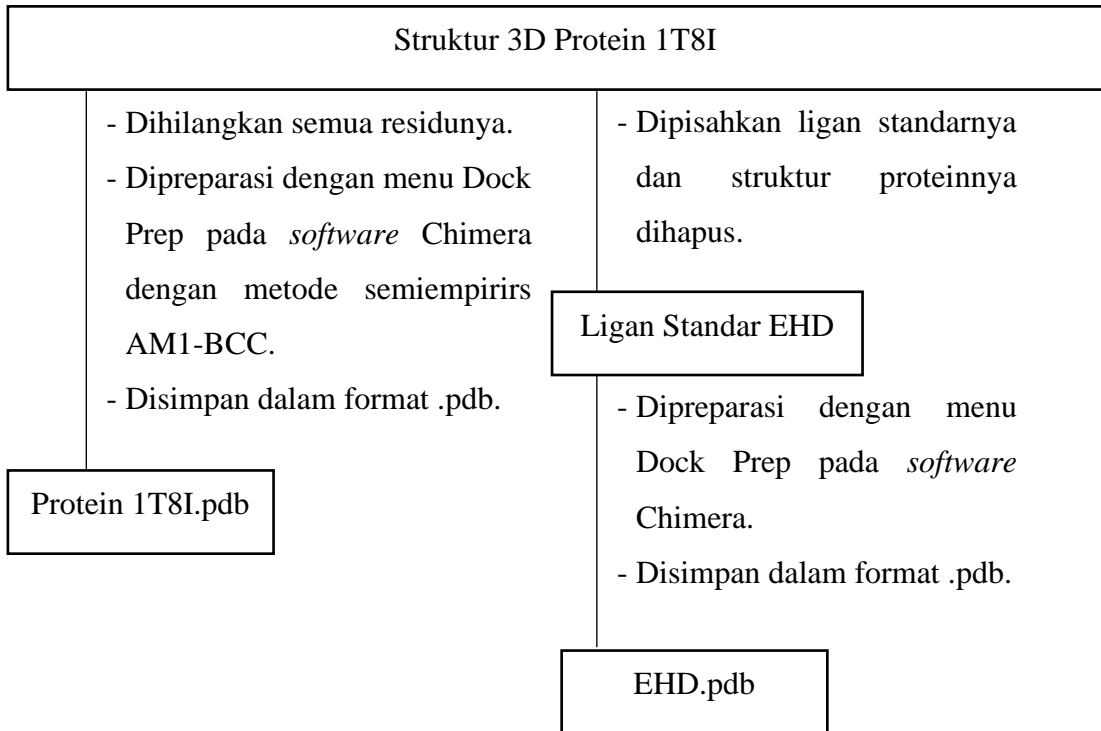


Lampiran 4. Bagan Kerja Sintesis *N*-morfolinil-*p*-Metoksisinamamida

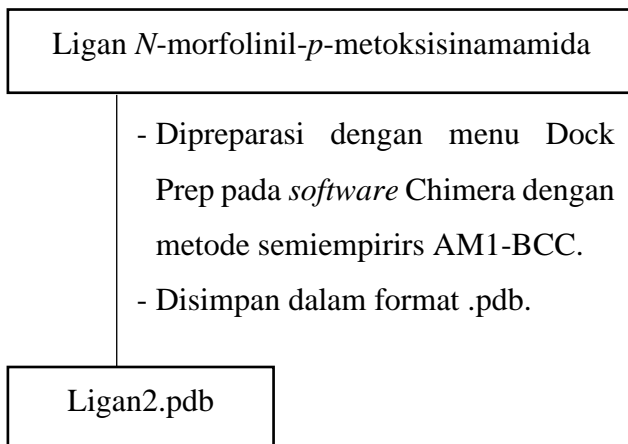


Lampiran 5. Bagan Kerja Pengujian *in silico* *N*-morfolinil-*p*-metoksisinamamida melalui penambatan molekul.

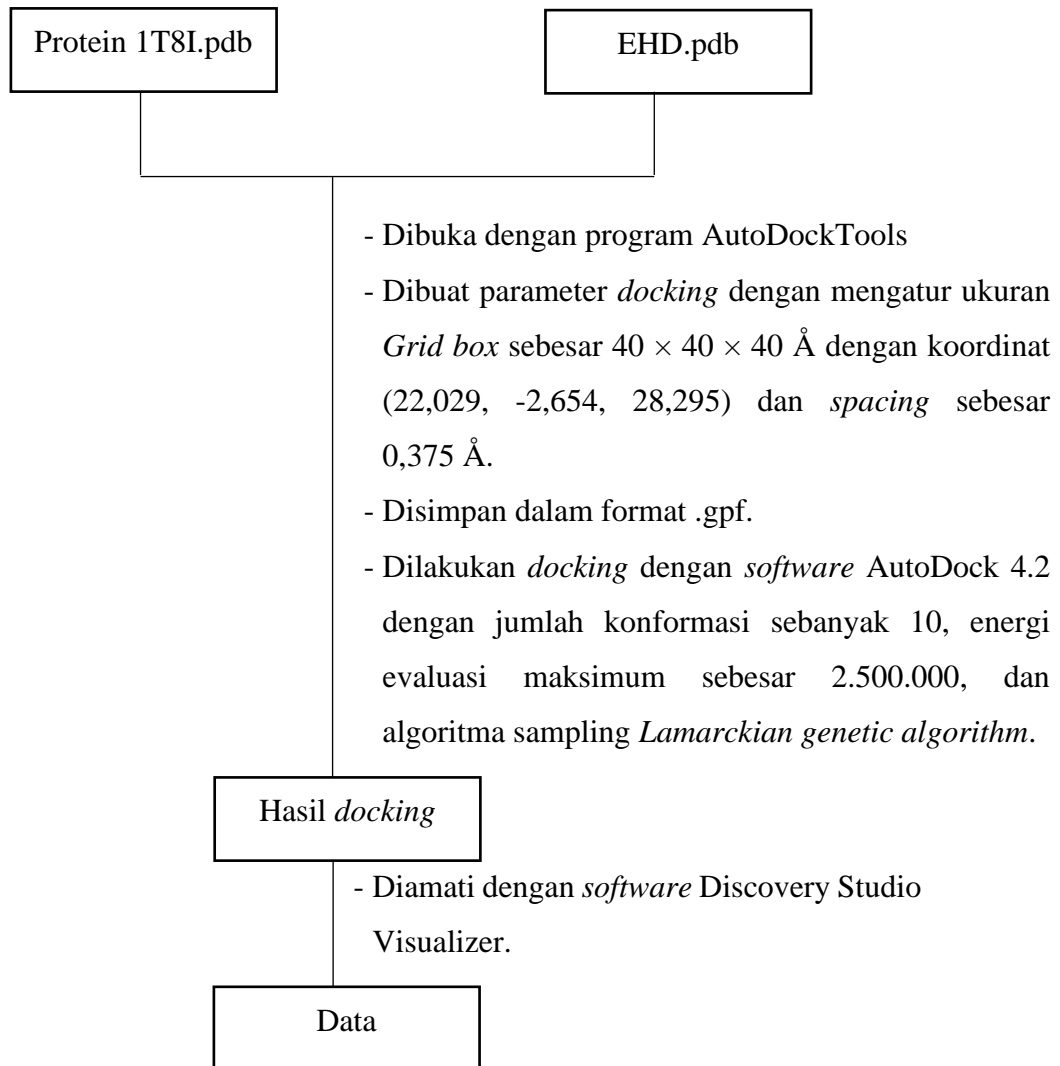
1. Preparasi Protein dan Ligan Standar



2. Preparasi Ligan *N*-morfolinil-*p*-metoksisinamamida



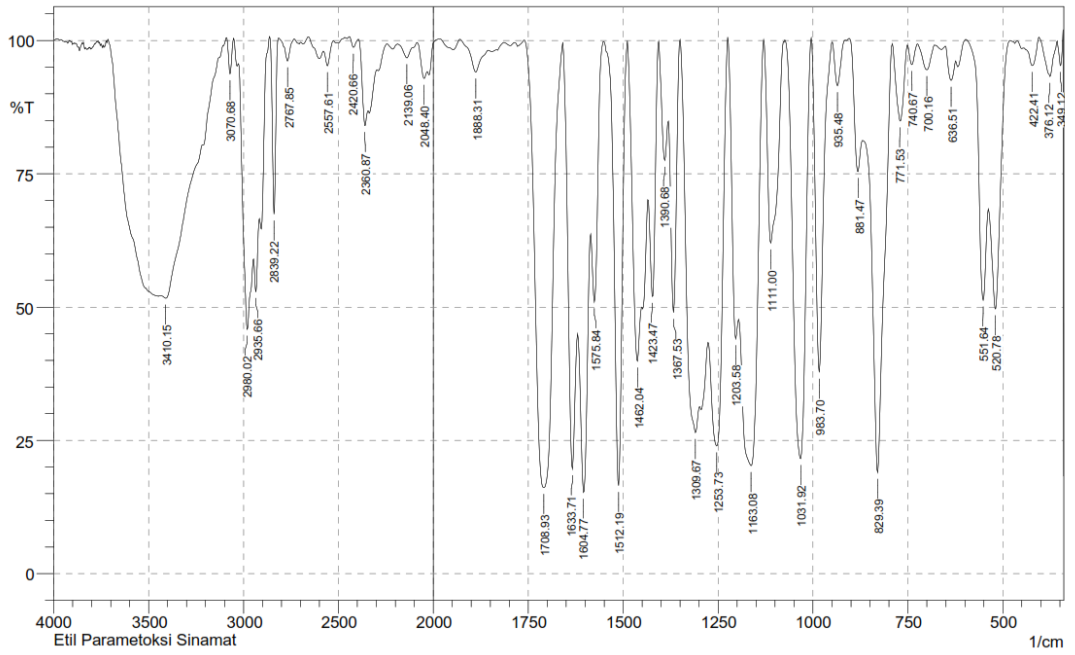
3. Proses Penambatan Molekul



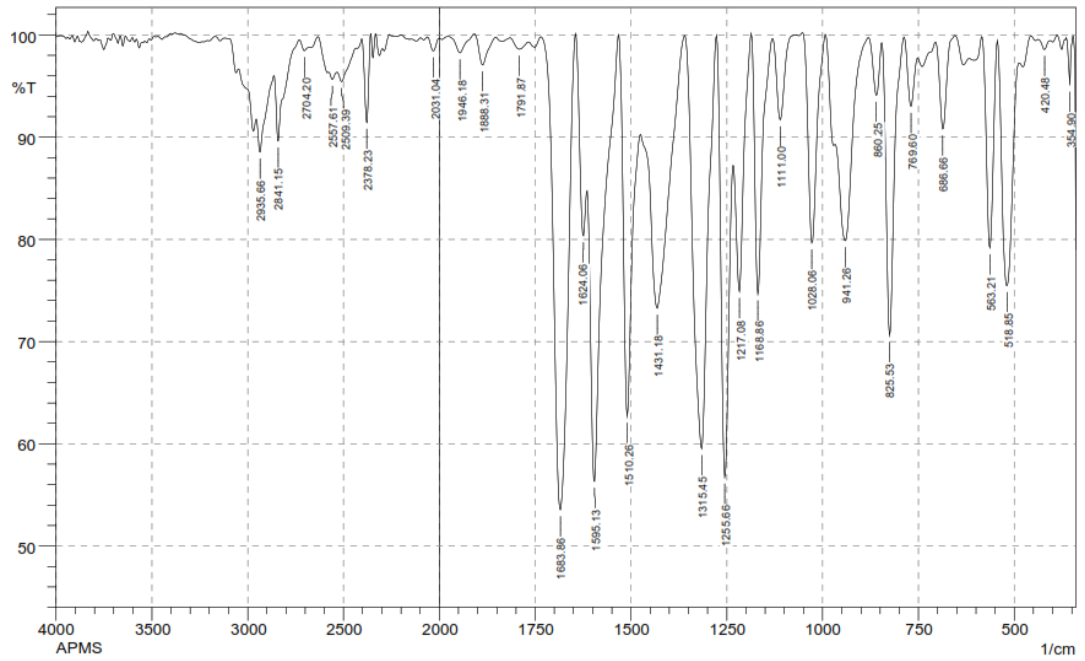
Catatan: Prosedur yang sama dilakukan dengan mengganti EHD.pdb dengan

Ligan2.pdb

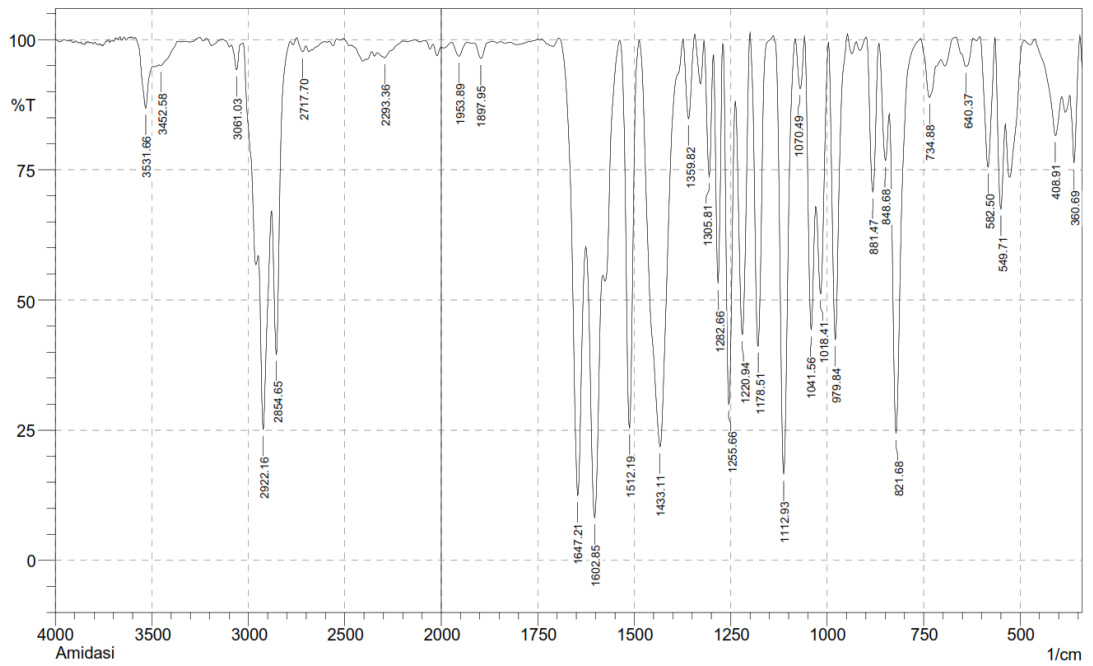
Lampiran 6. Spektrum IR Etil-*p*-metoksisinamat



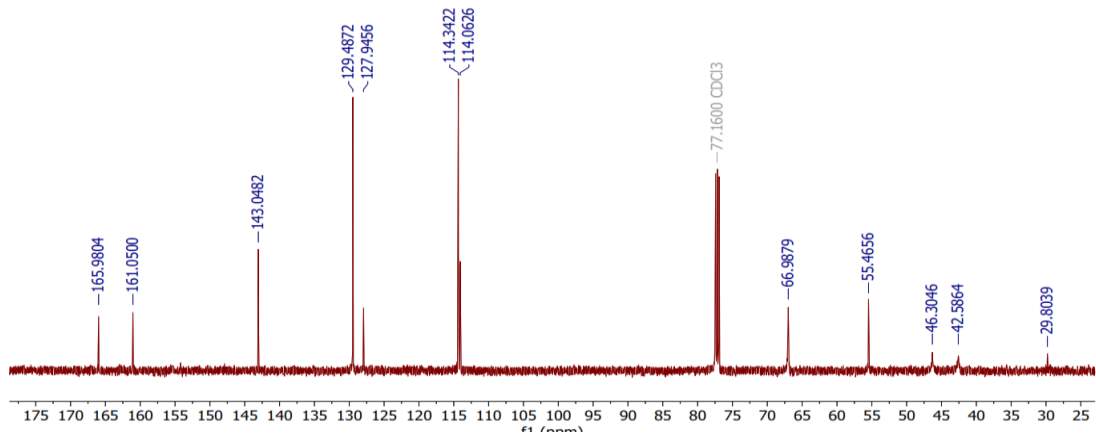
Lampiran 7. Spektrum IR Asam *p*-metoksisinamat



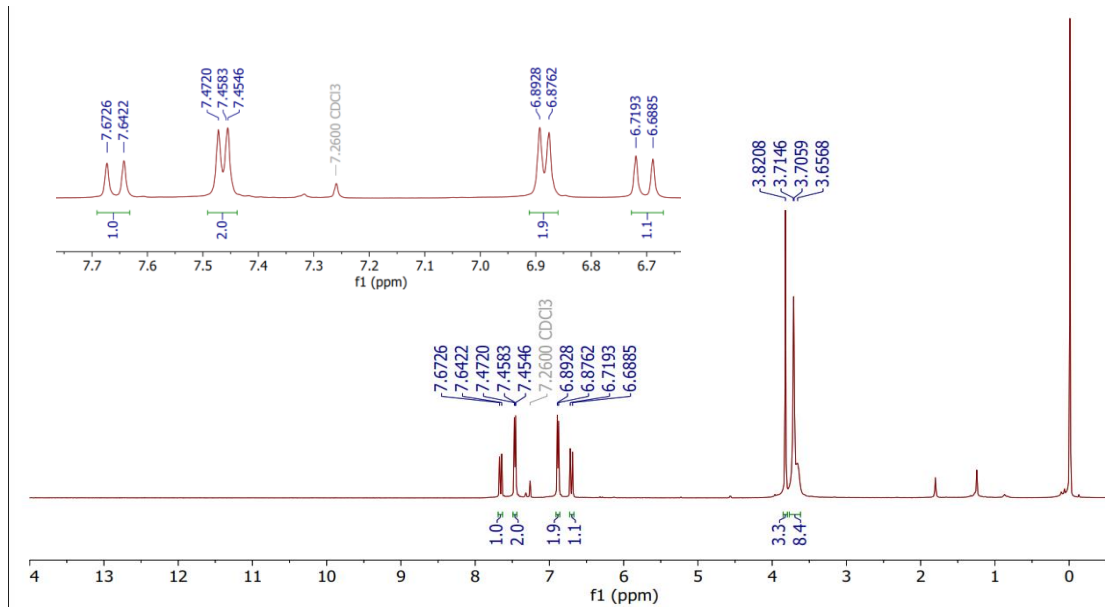
Lampiran 8. Spektrum IR *N*-morfolinil-*p*-metoksisinamamida



Lampiran 9. Spektrum ¹³C-NMR N-morfolinil-p-metoksisinamamida



Lampiran 10. Spektrum ¹H-NMR N-morfolinil-p-metoksisinamamida

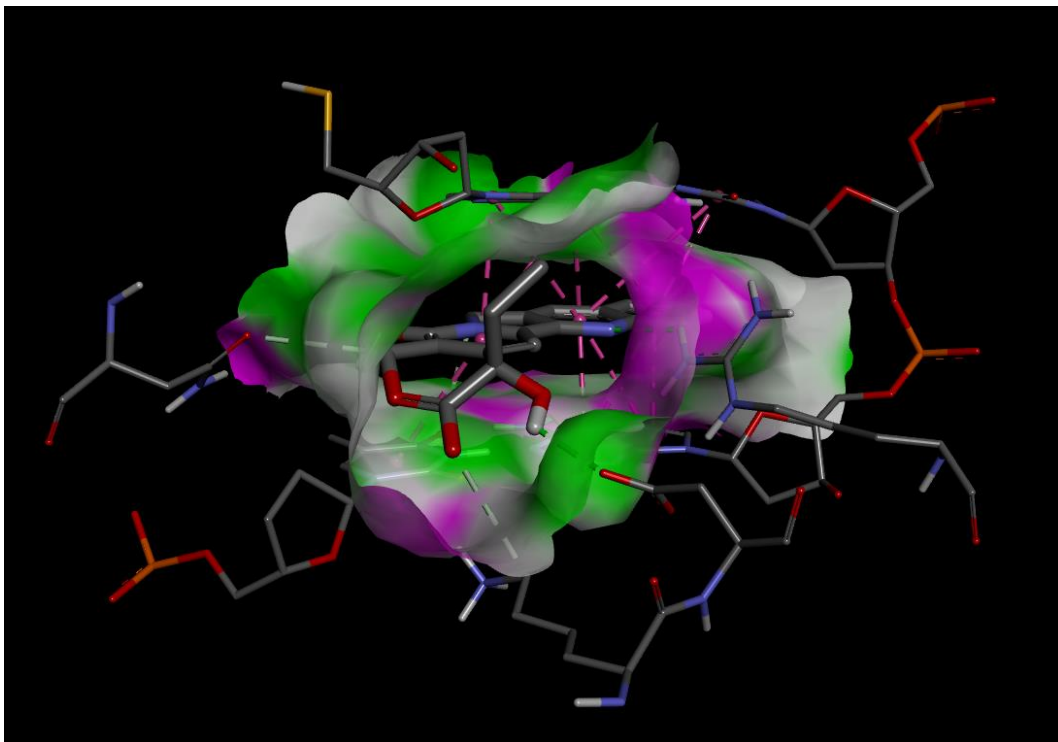


Lampiran 11. Hasil *Redocking* Ligan Standar EHD Terhadap Protein Top1

RMSD TABLE

Rank	Sub-Rank	Run	Binding Energy	Cluster RMSD	Reference RMSD	Grep Pattern
1	1	5	-10.62	0.00	0.66	RANKING
1	2	6	-10.60	0.11	0.62	RANKING
1	3	10	-10.56	0.16	0.60	RANKING
1	4	8	-10.51	0.26	0.67	RANKING
1	5	3	-10.50	0.28	0.67	RANKING
1	6	1	-10.48	0.35	0.59	RANKING
1	7	9	-10.48	0.35	0.60	RANKING
1	8	7	-10.47	0.35	0.58	RANKING
1	9	2	-10.47	0.33	0.54	RANKING
1	10	4	-10.46	0.33	0.58	RANKING

Tabel RMSD *redocking* ligan standar EHD terhadap Protein Top1



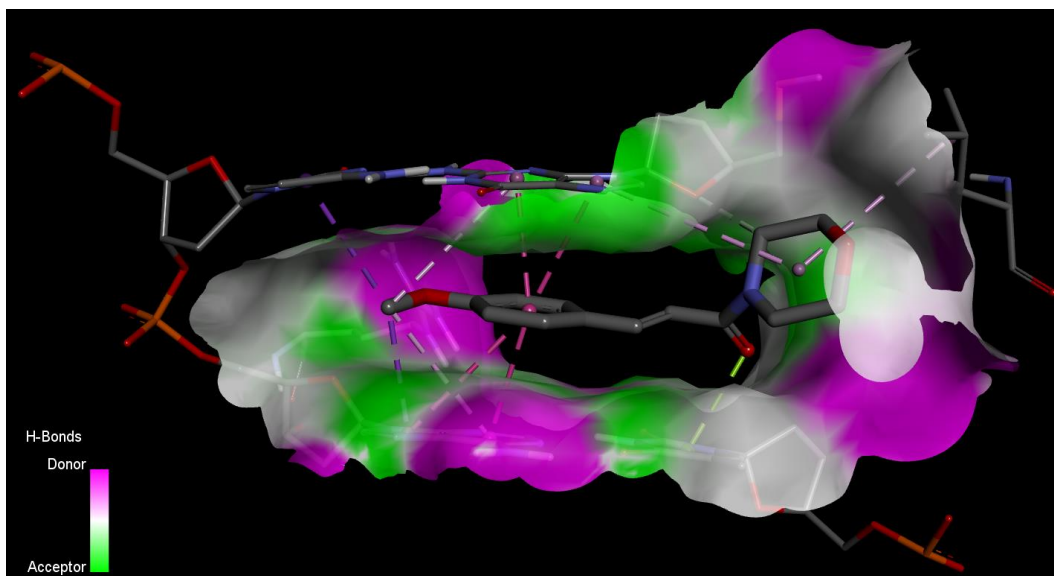
Interaksi 3D konformasi 2 ligan EHD dengan protein Top1

Lampiran 12. Hasil *Docking* Senyawa Hasil Sintesis Terhadap Protein Top1

RMSD TABLE

Rank	Sub-Rank	Run	Binding Energy	Cluster RMSD	Reference RMSD	Grep Pattern
1	1	7	-6.78	0.00	4.28	RANKING
2	1	10	-6.72	0.00	3.66	RANKING
2	2	9	-6.72	0.03	3.66	RANKING
2	3	4	-6.71	0.05	3.66	RANKING
2	4	8	-6.71	0.08	3.66	RANKING
2	5	5	-6.69	0.09	3.65	RANKING
2	6	1	-6.69	0.11	3.65	RANKING
3	1	6	-6.47	0.00	4.54	RANKING
3	2	3	-6.46	0.09	4.54	RANKING
3	3	2	-6.44	0.18	4.59	RANKING

Tabel RMSD *docking* senyawa hasil sintesis terhadap Protein Top1



Interaksi 3D konformasi 7 senyawa hasil sintesis dengan protein Top1

Lampiran 13. Perhitungan Reaktan

1. Sintesis senyawa asam *p*-metoksisinamat

a. Etil *p*-metoksisinamat (EPMS)

$$\text{mol EPMS} = \frac{\text{massa EPMS}}{\text{Mr EPMS}}$$

$$\text{mol EPMS} = \frac{0,5085 \text{ g}}{206,24 \text{ g/mol}} = 0,00247 \text{ mol} = 2,47 \text{ mmol}$$

b. HCl

Volume HCl 37% = 1 mL

ρ HCl = 1,2 g/mL

$$\text{mol HCl} = \frac{1,2 \text{ g/mL} \times 1 \text{ mL} \times 37/100}{36,5 \text{ g/mol}} = 0,01216 \text{ mol} = 12,16 \text{ mmol}$$

c. Akuades (H₂O)

Volume H₂O = 10 mL

ρ H₂O = 1 g/mL

$$\text{mol H}_2\text{O} = \frac{1 \text{ g/mL} \times 10 \text{ mL}}{18 \text{ g/mol}} = 0,55556 \text{ mol} = 555,56 \text{ mmol}$$

2. Sintesis senyawa *p*-metoksisinamoil klorida

a. Asam *p*-metoksisinamat (APMS)

$$\text{mol APMS} = \frac{\text{massa APMS}}{\text{Mr APMS}}$$

$$\text{mol APMS} = \frac{0,2538 \text{ g}}{178 \text{ g/mol}} = 0,00143 \text{ mol} = 1,43 \text{ mmol}$$

b. Tionil Klorida (SOCl₂)

V SOCl₂ = 0,5 mL

ρ SOCl₂ = 1,64 g/mL

$$\text{mol SOCl}_2 = \frac{1,64 \text{ g/mL} \times 0,5 \text{ mL}}{118,97 \text{ g/mol}} = 0,00689 \text{ mol} = 6,89 \text{ mmol}$$

3. Sintesis senyawa *N*-morfolinil-*p*-metoksisinamamida

a. Morfolin

Volume morfolin = 1 mL

ρ morfolin = 1,01 g/mL

$$\text{mol morfolin} = \frac{1,01 \text{ g/mL} \times 1 \text{ mL}}{87,1 \text{ g/mol}} = 0,01159 \text{ mol} = 11,59 \text{ mmol}$$

b. Trietilamina

Volume trietilamina = 0,5 mL

ρ trietilamin = 0,726 g/mL

$$\text{mol trietilamin} = \frac{0,726 \text{ g/mL} \times 0,5 \text{ mL}}{101,19 \text{ g/mol}} = 0,00359 \text{ mol} = 3,59 \text{ mmol}$$

c. Piridin

Volume piridin = 0,5 mL

ρ piridin = 0,982 g/mL

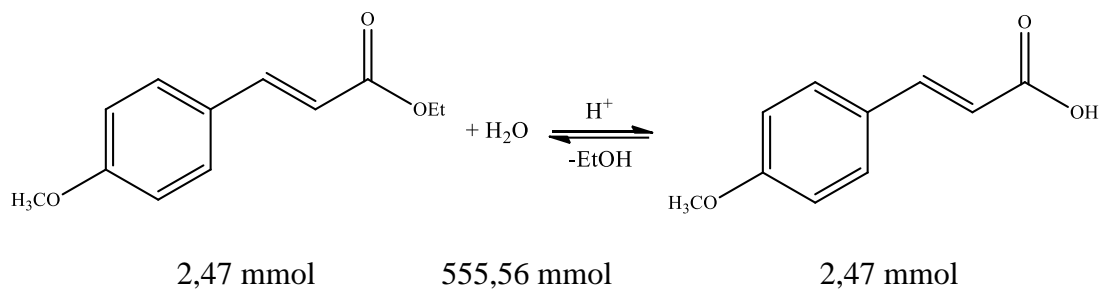
$$\text{mol piridin} = \frac{0,982 \text{ g/mL} \times 0,5 \text{ mL}}{79,1 \text{ g/mol}} = 0,00621 \text{ mol} = 6,21 \text{ mmol}$$

Lampiran 14. Perhitungan Rendemen

1. Isolasi Etil *p*-metoksisinamat

$$\begin{aligned}\% \text{ rendemen} &= \frac{\text{berat isolat}}{\text{berat sampel}} \times 100\% \\ &= \frac{0,6241}{30 \text{ g}} \times 100\% \\ &= 2,08\%\end{aligned}$$

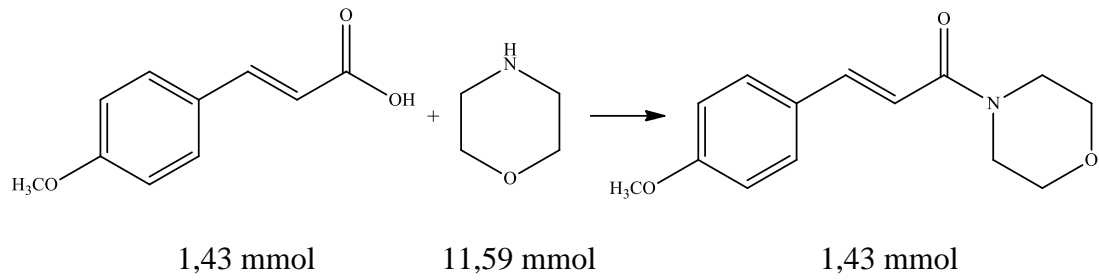
2. Sintesis senyawa asam *p*-metoksisinamat



$$\begin{aligned}\text{Berat teori} &= \text{mmol APMS} \times \text{Mr APMS} \\ &= 2,47 \text{ mmol} \times 178 \text{ mg/mmol} \\ &= 439,7 \text{ mg} = 0,4397 \text{ g}\end{aligned}$$

$$\begin{aligned}\% \text{ rendemen} &= \frac{\text{berat praktek}}{\text{berat teori}} \times 100\% \\ &= \frac{0,1518}{0,43076} \times 100\% \\ &= 34,53\%\end{aligned}$$

3. Sintesis senyawa *N*-morfolinil-*p*-metoksisinamamida



Berat teori = (mmol \times Mr) *N*-morfolinil-*p*-metoksisinamamida

$$= 1,43 \text{ mmol} \times 247 \text{ mg/mmol}$$

$$= 352,1 \text{ mg} = 0,3521 \text{ g}$$

$$\% \text{ rendemen} = \frac{\text{berat praktek}}{\text{berat teori}} \times 100\%$$

$$= \frac{0,0565}{0,3521} \times 100\%$$

$$= 16,04\%$$

Lampiran 15. Dokumentasi Penelitian



Rimpang kencur



Bubuk kencur



Proses refluks



Proses evaporasi



Produk isolasi



Produk hidrolisis



Produk klorinasi



Proses amidasi



Produk Amidasi