**LAMPIRAN A**

**CONTOH PERHITUNGAN PERSENTASE HASIL SINTESIS**

I. Perhitungan berat teoritis

a. Ammonium tiosianat (BM : 76,12 g/mol)

Penimbangan : 1,14 gram

mmol ammonium tiosianat : $\frac{1{,}14 \times 1000}{76{,}12} = 14{,}98 \sim 15$ mmol

b. 2-klorobenzoil klorida (BM : 175,01 g/mol, berat jenis : 1,378 g/cm$^3$)

Volume : 1,3

mmol 2-klorobenzoilklorida : $\frac{1{,}3 \times 1{,}378}{175{,}01} \times 1000 = 10{,}2 \sim 10$ mmol

c. 4-kloroanilin (BM : 127,57 g/mol, berat jenis : 1,43 g/cm$^3$)

Penimbangan : 1,27 gram

mmol anilin : $\frac{1{,}27}{127{,}5} \times 1000 = 9{,}96 \sim 10$ mmol

II. Perhitungan persentase hasil sintesis berdasarkan mmol teoritis

Persentase hasil N-(4-klorofenil)-N'-2-klorobenzoiltiourea :

| ammonium tiosianat + 2-klorobenzoil klorida ⟶ | 2-klorobenzoilisotiosianat + $NH_4Cl$ |
|---|---|
| awal 15 mmol 10 mmol | 0 0 |
| reaksi 10 mmol 10 mmol | 10mmol 10 mmol + |
| sisa 5 mmol 0 | 10 mmol 10 mmol |

| 2-klorobenzoilisotiosianat + 4-kloroanilin ⟶ | N-(4-klorofenil)-N'-2-klorobenzoiltiourea |
|---|---|
| Awal 10 mmo 10 mmol | 0 |
| reaksi 10 mmo 10 mmol | 10 mmol + |
| sisa 0 0 | 10 mmol |

BM teoritis = 324,9

Massa teoritis = 10 mmol x 324,9 = 3,25 gram

Massa praktis = 1,85 gram

% hasil = $\frac{1,85}{3,25}$ x 100% = 56,92 % ≈ 57 %

**LAMPIRAN B**

**PERHITUNGAN ANOVA I**

Anova: Single Factor

SUMMARY

| *Groups* | *Count* | *Sum* | *Average* | *Variance* |
|---|---|---|---|---|
| N-(4-klorofenil)-N'-2klorobenzoiltiourea | 3 | 172 | 57.3333 | 0.33333 |
| N-(2,4-diklorofenil)-N'-2klorobenzoiltiourea | 3 | 155 | 51.6667 | 0.33333 |
| N'-(2,6-diklorofenil)-N'-2klorobenzoiltiourea | 3 | 93 | 31 | 1 |

ANOVA

| *Source of Variation* | *SS* | *df* | *MS* | *F* | *P-value* | *F crit* |
|---|---|---|---|---|---|---|
| Between Groups | 1152.666667 | 2 | 576.333 | 1037.4 | 2.4E-08 | 5.14325 |
| Within Groups | 3.333333333 | 6 | 0.55556 | | | |
| Total | 1156 | 8 | | | | |

**Oneway**

**ANOVA**

hasil

| | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 1152.667 | 2 | 576.333 | 1037.400 | .000 |
| Within Groups | 3.333 | 6 | .556 | | |
| Total | 1156.000 | 8 | | | |

**Post Hoc Tests**

**Multiple Comparisons**

Dependent Variable: hasil
Tukey HSD

| (I) senyawa | (J) senyawa | Mean Difference (I-J) | Std. Error | Sig. | 95% Confidence Interval | |
|---|---|---|---|---|---|---|
| | | Lower Bound | Upper Bound | Lower Bound | Upper Bound | Lower Bound |
| 1.00 | 2.00 | 5.66667(*) | .60858 | .000 | 3.7994 | 7.5340 |
| | 3.00 | 26.33333(*) | .60858 | .000 | 24.4660 | 28.2006 |
| 2.00 | 1.00 | -5.66667(*) | .60858 | .000 | -7.5340 | -3.7994 |
| | 3.00 | 20.66667(*) | .60858 | .000 | 18.7994 | 22.5340 |
| 3.00 | 1.00 | -26.33333(*) | .60858 | .000 | -28.2006 | -24.4660 |
| | 2.00 | -20.66667(*) | .60858 | .000 | -22.5340 | -18.7994 |

* The mean difference is significant at the .05 level.

**Homogeneous Subsets**

**hasil**

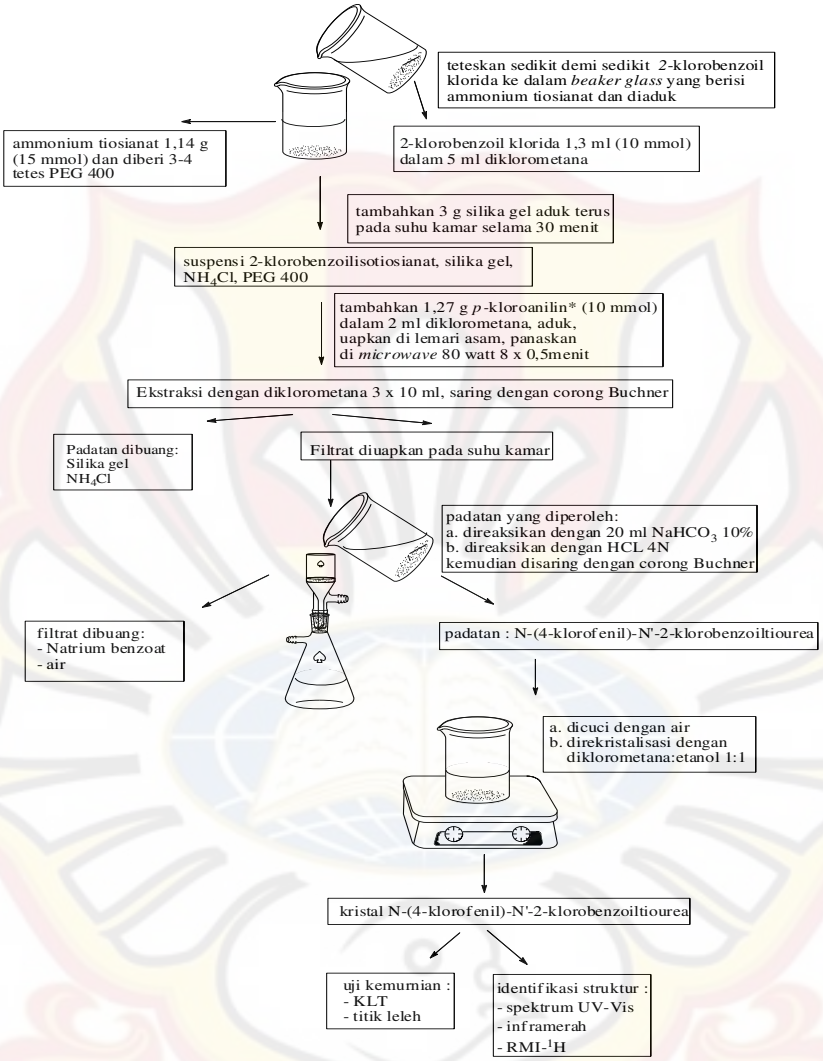
Tukey HSD

| | N | Subset for alpha = .05 | | |
|---|---|---|---|---|
| senyawa | 1 | 2 | 3 | 1 |
| 3.00 | 3 | 31.0000 | | |
| 2.00 | 3 | | 51.6667 | |
| 1.00 | 3 | | | 57.3333 |
| Sig. | | 1.000 | 1.000 | 1.000 |

Means for groups in homogeneous subsets are displayed.
a Uses Harmonic Mean Sample Size = 3.000.

## LAMPIRAN C

## SKEMA KERJA SINTESIS TURUNAN N-(4-KLOROFENIL)-N'-2-KLOROBENZOILTIOUREA

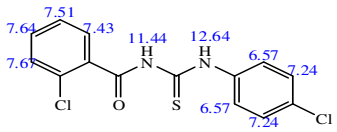


Keterangan *:

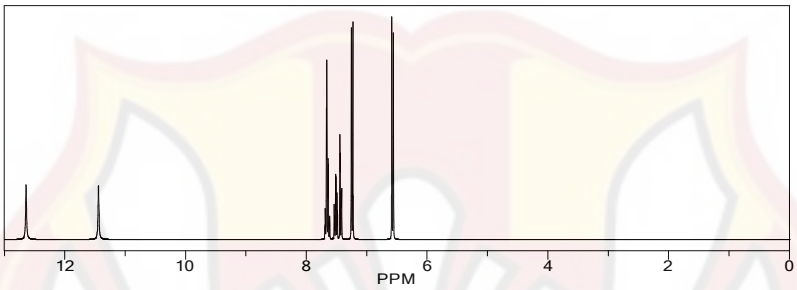
- Sintesis N-(2,4-diklorofenil)-N'-2-klorobenzoiltiourea: penambahan 4-kloroanilin diganti 1,62 g (10 mmol) 2,4-dikloroanilin.
- Sintesis N-(2,6-diklorofenil)-N'-2-klorobenzoiltiourea: penambahan 4-kloroanilin diganti 1,62 g (10 mmol) 2,6-dikloroanilin.

# LAMPIRAN D

## ESTIMASI RMI-$^1$H N-(4-KLOROFENIL)-N'-2-KLOROBENZOILTIOUREA




Estimation quality is indicated by color: good, medium, rough

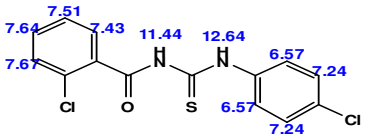



Protocol of the H-1 NMR Prediction:

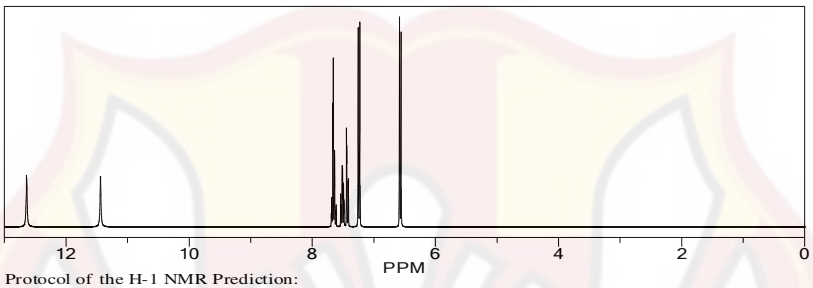
| Node | Shift | Base + Inc. | Comment (ppm rel. to TMS) |
|---|---|---|---|
| NH | 12.64 | 4.00 | aromatic C-NH |
| | | 8.64 | general corrections |
| NH | 11.44 | 8.00 | sec. amide |
| | | 3.44 | general corrections |
| CH | 7.67 | 7.26 | 1-benzene |
| | | 0.01 | 1 -Cl |
| | | 0.18 | 1 -C(=O)N |
| | | 0.22 | general corrections |
| CH | 7.24 | 7.26 | 1-benzene |
| | | 0.01 | 1 -Cl |
| | | -0.25 | 1 -N |
| | | 0.22 | general corrections |
| CH | 6.57 | 7.26 | 1-benzene |
| | | -0.06 | 1 -Cl |
| | | -0.80 | 1 -N |
| | | 0.17 | general corrections |
| CH | 7.43 | 7.26 | 1-benzene |
| | | -0.06 | 1 -Cl |
| | | 0.69 | 1 -C(=O)N |
| | | -0.46 | general corrections |
| CH | 7.24 | 7.26 | 1-benzene |
| | | 0.01 | 1 -Cl |
| | | -0.25 | 1 -N |
| | | 0.22 | general corrections |
| CH | 6.57 | 7.26 | 1-benzene |
| | | -0.06 | 1 -Cl |
| | | -0.80 | 1 -N |
| | | 0.17 | general corrections |
| CH | 7.64 | 7.26 | 1-benzene |
| | | -0.06 | 1 -Cl |
| | | 0.25 | 1 -C(=O)N |
| | | 0.19 | general corrections |
| CH | 7.51 | 7.26 | 1-benzene |
| | | -0.12 | 1 -Cl |
| | | 0.18 | 1 -C(=O)N |
| | | 0.19 | general corrections |

# LAMPIRAN E

## ESTIMASI RMI-$^{1}$H N-(2,4-DIKLOROFENIL)-N'-2-KLOROBENZOILTIOUREA




Estimation quality is indicated by color: good, medium, rough

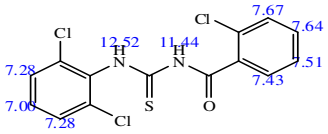



Protocol of the H-1 NMR Prediction:

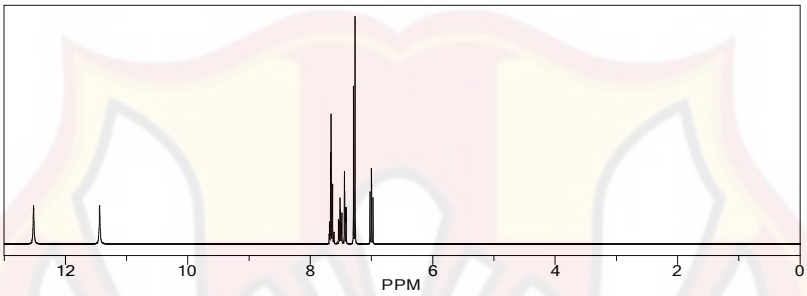
| Node | Shift | Base + Inc. | Comment (ppm rel. to TMS) |
|---|---|---|---|
| NH | 12.64 | 4.00 | aromatic C-NH |
| | | 8.64 | general corrections |
| NH | 11.44 | 8.00 | sec. amide |
| | | 3.44 | general corrections |
| CH | 7.67 | 7.26 | 1-benzene |
| | | 0.01 | 1 -Cl |
| | | 0.18 | 1 -C(=O)N |
| | | 0.22 | general corrections |
| CH | 7.24 | 7.26 | 1-benzene |
| | | 0.01 | 1 -Cl |
| | | -0.25 | 1 -N |
| | | 0.22 | general corrections |
| CH | 6.57 | 7.26 | 1-benzene |
| | | -0.06 | 1 -Cl |
| | | -0.80 | 1 -N |
| | | 0.17 | general corrections |
| CH | 7.43 | 7.26 | 1-benzene |
| | | -0.06 | 1 -Cl |
| | | 0.69 | 1 -C(=O)N |
| | | -0.46 | general corrections |
| CH | 7.24 | 7.26 | 1-benzene |
| | | 0.01 | 1 -Cl |
| | | -0.25 | 1 -N |
| | | 0.22 | general corrections |
| CH | 6.57 | 7.26 | 1-benzene |
| | | -0.06 | 1 -Cl |
| | | -0.80 | 1 -N |
| | | 0.17 | general corrections |
| CH | 7.64 | 7.26 | 1-benzene |
| | | -0.06 | 1 -Cl |
| | | 0.25 | 1 -C(=O)N |
| | | 0.19 | general corrections |
| CH | 7.51 | 7.26 | 1-benzene |
| | | -0.12 | 1 -Cl |
| | | 0.18 | 1 -C(=O)N |
| | | 0.19 | general corrections |

# LAMPIRAN F

## ESTIMASI RMI-$^{1}$H N-(2,6-DIKLOROFENIL)-N'-2-KLOROBENZOILTIOUREA




Estimation quality is indicated by color: good, medium, rough




Protocol of the H-1 NMR Prediction:

| Node | Shift | Base + Inc. | Comment (ppm rel. to TMS) |
|---|---|---|---|
| NH | 12.52 | 4.00 | aromatic C-NH |
| | | 8.52 | general corrections |
| NH | 11.44 | 8.00 | sec. amide |
| | | 3.44 | general corrections |
| CH | 7.28 | 7.26 | 1-benzene |
| | | -0.12 | 1 -Cl |
| | | 0.01 | 1 -Cl |
| | | -0.25 | 1 -N |
| | | 0.38 | general corrections |
| CH | 7.67 | 7.26 | 1-benzene |
| | | 0.01 | 1 -Cl |
| | | 0.18 | 1 -C(=O)N |
| | | 0.22 | general corrections |
| CH | 7.43 | 7.26 | 1-benzene |
| | | -0.06 | 1 -Cl |
| | | 0.69 | 1 -C(=O)N |
| | | -0.46 | general corrections |
| CH | 7.28 | 7.26 | 1-benzene |
| | | 0.01 | 1 -Cl |
| | | -0.12 | 1 -Cl |
| | | -0.25 | 1 -N |
| | | 0.38 | general corrections |
| CH | 7.00 | 7.26 | 1-benzene |
| | | -0.06 | 1 -Cl |
| | | -0.06 | 1 -Cl |
| | | -0.64 | 1 -N |
| | | 0.50 | general corrections |
| CH | 7.64 | 7.26 | 1-benzene |
| | | -0.06 | 1 -Cl |
| | | 0.25 | 1 -C(=O)N |
| | | 0.19 | general corrections |
| CH | 7.51 | 7.26 | 1-benzene |
| | | -0.12 | 1 -Cl |
| | | 0.18 | 1 -C(=O)N |
| | | 0.19 | general corrections |