Supporting Information

for

N-heteroarylation of chiral α-aminoesters by means of Palladium-Catalyzed Buchwald-Hartwig Reaction

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Influence of acid catalysis in N-heteroarylilation of \( \alpha \)-aminoesters.

Typical procedure: reaction of 4-methyl-2-chloroquinoline with ethylglycinate.

A 5 ml microwave tube was charged with 4-methyl-2-chloroquinoline 1 (1mmol), ethyl glycinate (2mmol), increasing amount of Et\(_3\)N (0, 2 or 4 eq) and EtOH (2ml). The tube was sealed and the mixture was allowed to stir at 140°C under argon atmosphere. After 2, 4, 6 and 8 hours an aliquot of the resulting mixture was taken and analyzed by HPLC in order to determine the amount of starting material 1 (Figure 1), N-quinoline glycinester 2 (Figure 2), and also the corresponding acid 18 (Figure 3).

**Figure 1.** Consumption of 2-chloroquinoline 1 (yields after 2, 4, 6 and 8 hours)

**Figure 2.** Formation of 2-quinolineglycine ester 2 (yields after 2, 4, 6 and 8 hours)
Figure 3. Formation of 2-quinolineglycine 18 (yields after 2, 4, 6 and 8 hours)
$^1$H and $^{13}$C spectra of compound 2a (Method A)
$^1$H spectra of compound 2a (Method B)
$^{13}$C spectra of compound 2a (Method B)
$^1$H spectra of compound 2a (prepared by N-Boc deprotection)
$^1$H and $^{13}$C spectra of compound 2b (Method A)
$^1$H spectra of compound 2b (Method B)
$^{13}\text{C}$ spectra of compound 2b (Method B)
$^{1}$H spectra of compound 2b (prepared by N-Boc deprotection)
$^1$H and $^{13}$C spectra of compound 2c (Method A)
$^1$H spectra of compound 2c (Method B)
$^{13}$C spectra of compound 2c (Method B)
$^1$H and $^{13}$C spectra of compound 2d (Method A)
$^1$H spectra of compound 2d (Method B)
$^{13}$C spectra of compound 2d (Method B)
$^1$H spectra of compound 2e

![Diagram of 1H spectra of compound 2e]
$^{13}$C spectra of compound 2e

![Chemical structure of compound 2e](image)
$^1$H spectra of compound 2f
$^{13}$C spectra of compound 2f
$^1$H spectra of compound 2g
$^{13}$C spectra of compound 2g
$^1$H spectra of compound 3
$^{13}$C spectra of compound 3

![Chemical structure of compound 3]
$^1$H spectra of compound 4
$^{13}$C spectra of compound 4
$^1$H spectra of compound 5

![Chemical structure of compound 5](attachment:structure.png)
$^{13}$C spectra of compound 5
$^1$H spectra of compound 6
$^{13}$C spectra of compound 6

\[
\text{MeO} \quad \text{Nil} \quad \text{Nil} \quad \text{OEt}
\]
$^1$H spectra of compound 7
$^{13}$C spectra of compound 7
$^1$H spectra of compound 8
$^{13}$C spectra of compound 8
$^1$H spectra of compound 10a
$^{13}$C spectra of compound 10a
$^1$H spectra of compound 10b
$^{13}$C spectra of compound 10b
$^1$H spectra of compound **11a**
$^{13}$C spectra of compound 11a
$^1$H spectra of compound 11b
$^{13}$C spectra of compound 11b
$^1$H spectra of compound 12
$^{13}$C spectra of compound 12

![Chemical Structure of Compound 12](image)
$^1$H spectra of compound 13
$^{13}$C spectra of compound 13

H$_2$N

O

O

H
$^1$H spectra of compound 14
$^{13}$C spectra of compound 14

\[ \text{Diagram of compound 14} \]
$^1$H spectra of compound 15
$^{13}$C spectra of compound 15

![Compound 15 Structure]
$^1$H spectra of compound 16
$^{13}$C spectra of compound 16

![Chemical structure of compound 16](image_url)

**Diagram Description**
- The spectrum shows the carbon signals of compound 16.
- Peaks at specific ppm values indicate the carbon atoms in different environments.
- The chemical structure includes a primary amine group, an ester group, and aromatic rings.

**Notes**
- ppm values are listed on the right side of the spectrum.
- The spectrum is used to identify the carbon atoms and their environments in the compound.
$^1$H spectra of compound 17
$^{13}$C spectra of compound 17
$^1$H spectra of compound 20
$^{13}$C spectra of compound 20
$^1$H spectra of compound 22
$^{13}$C spectra of compound 22
Optical purity studies (\textsuperscript{1}H NMR of 2a, 2b, 2c, 2d, 2e, 2f, 2g, 3, 4, 5, 6, 7, 8)

A- Use of S-Mosher acid for characterization of optical purity of \( \alpha \)-aminoester derivatives.

\[
\begin{align*}
&\text{(S)} & &\text{R} & &\text{R'} & &\text{Et} & &\text{MeO} & &\text{CF}_3 & &\text{COOH} & &\text{N} & &\text{H} & &\text{COO}^- \\
\rightarrow &\text{(S)} & &\text{R} & &\text{R'} & &\text{Et} & &\text{F}_3\text{C} & &\text{O} & &\text{Me} & &\text{N} & &\text{H} & &\text{COO}^-
\end{align*}
\]

Pure diastereomeric salts

\[
\begin{align*}
&\text{(R\textsuperscript{*},S\textsuperscript{*})} & &\text{R} & &\text{R'} & &\text{Et} & &\text{MeO} & &\text{CF}_3 & &\text{COOH} & &\text{N} & &\text{H} & &\text{COO}^- \\
\rightarrow &\text{S} & &\text{R} & &\text{R'} & &\text{Et} & &\text{F}_3\text{C} & &\text{O} & &\text{Me} & &\text{N} & &\text{H} & &\text{COO}^-
\end{align*}
\]

Racemic diastereomeric salts
Zoom 0.5-5.0 ppm
Zoom 0.5-5.0 ppm
Zoom 0.5-5.0 ppm
Zoom 0.5-6.0 ppm
Zoom 0.5-5.0 ppm
Zoom 0.5-6.0 ppm
B- Use of diastereomeric esters for characterization of optical purity of α-aminoester derivatives. (1H NMR of 14 and 17)