Supporting Information

for

Effective monoallylation of anilines catalyzed by supported KF.

Vittorio Pace, Fernando Martínez, María Fernández, Jose V. Sinisterra and Andrés R. Alcántara
*Organic & Pharmaceutical Chemistry Department. Pharmacy Faculty. Complutense University,
28040-Madrid (Spain)*

Table of contents

1.-Materials and instrumentation.....	2
2.-Synthesis of 2-chloro- 3-iodopropene.....	3
3.-General procedure for KF-Celite catalyzed allylation of anilines.....	6
3.1.- <i>N</i> -allylaniline 2a	7
3.2.- <i>N,N</i> -diallylaniline 3a	9
3.3.- <i>N</i> -(3-methylbut-2-enyl)aniline 2b	11
3.4.- <i>N,N</i> -bis(3-methylbut-2-enyl)aniline 3b	13
3.5.- <i>N</i> -(2-chloroallyl)aniline 2c	15
3.6.- <i>N,N</i> -bis(2-chloroallyl)aniline 3c	17
3.7.- <i>N</i> -(2-bromoallyl)aniline 2d	19
3.8.- <i>N</i> -(2-methylallyl)aniline 2e	21
3.9.- <i>N</i> -(2-chloroallyl)-4-methoxyaniline 5a	23
3.10.- <i>N,N</i> -bis(2-chloroallyl)-4- methoxyaniline 6a	25
3.11.- <i>N</i> -(2-chloroallyl)-3-methoxyaniline 5b	27

3.12.- <i>N</i> -(2-chloroallyl)-2-methoxyaniline 5c	29
3.13.- <i>N</i> -(2-chloroallyl)-4-morpholinoaniline 5d	31
3.14.- <i>N</i> -(2-chloroallyl)- <i>p</i> -nitroaniline 5e	33
3.15.- <i>N</i> -(2-chloroallyl)-3-nitroaniline 5f	35
3.16.- <i>N</i> -allyl-3-nitroaniline 5g	37
3.17.- 3-(2-chloroallylamino)benzonitrile 5h	39
3.18.- 3-chloro- <i>N</i> -(2-chloroallyl)-4-methoxyaniline 5i	41
3.19.- 3-chloro- <i>N,N</i> -(2-chloroallyl)-4-methoxyaniline 6i	43
3.20.- <i>N</i> -(2-chloroallyl)-4-fluoroaniline 5j	45
3.21.- <i>N</i> -(2-bromoallyl)-3-fluoroaniline 5k	47
3.22.- <i>N</i> -(2-chloroallyl)-2,4-difluoroaniline 5l	49
3.23.- <i>N,N</i> -bis-(2-chloroallyl)-2,4-difluoroaniline 6l	52
3.24.- <i>N</i> -(2-chloroallyl)-2-fluoroaniline 5m	54

1. Materials and instrumentation.

2-chloro-3-iodopropene **1c** was prepared as previously reported.¹ All other chemicals were obtained from commercial suppliers and used without purification.

All ¹H NMR, ¹³C NMR, ¹⁹F NMR were recorded on a Bruker AC-250 spectrometer at 250 MHz, at 62.5 MHz and at 235 MHz respectively, using a convenient deuterated solvent (reported in the characterization charts) and the residual peak as internal standard (CFCl₃), or TMS in the case of CDCl₃. Chemical shifts are reported in δ (ppm) referred to ¹H (of residual protons) ¹³C and at ¹⁹F of the deuterated solvents. Carbon multiplicities were obtained from DEPT experiments. All melting points are uncorrected. IR absorption spectra were recorded on a Perkin-Elmer System 2000 FT-IR spectrophotometer. Elementary microanalyses were carried out in the corresponding ‘Centro de

¹ Baldwin, J. E.; Adlington, R. M.; Lowe, C.; O’Neil, I. A.; Sanders, G. L.; Schofield, C. J.; Sweeney, J. B. *Chem. Commun.* **1988**, 15, 1030.

Apoyo a la Investigación of the Complutense University, Madrid, using a Leco[®] CHNS 932 equipment. Column chromatography purifications were conducted on silica gel 60 (40-63 μ m). TLC was carried out on aluminium sheets precoated with silica gel 60F₂₅₄ (Macherey-Nagel, Merk); the spots were visualized under UV light (λ =254 nm) and/or I₂ was used as revealing system. Adducts **1c**¹, **2a**,² **3a**,² **2b**,³ **3b**,³ **2c**,³ **2d**,⁴ **2e**,³ **5b**,⁵ **5c**,⁶ **5e**,⁷ **5g**⁸ are previously described compounds.

2.- Synthesis of 2-chloro- 3-iodopropene **1c**¹.

To a solution of 2,3-dichloropropene (45.00 mmol) in acetone (20 mL), a solution of sodium iodide (54.00 mmol) in the same solvent (25 mL) was added drop-wise at room temperature. The mixture was stirred for 4 h. Water was added, the organic materials were extracted with dichloromethane, dried over magnesium sulfate, and concentrated *in vacuo*. The presence of a peak at 7.9 ppm and the disappearance of the peak of CH₂Cl at 49.1 ppm in the ¹³C spectrum are symptomatic of the quantitative yield of the reaction: it was not necessary any further purification.

Reddish oil, 100% yield.

^1H NMR (250 MHz, CDCl_3) δ (ppm): 4.11 (s, 2H, CH_2I), 5.35 (d, $J = 1.7$ Hz, 1H, $\text{C}=\text{CHH}$), 5.63 (d, $J = 1.7$ Hz, 1H, $\text{C}=\text{CHH}$).

^{13}C NMR (62.5 MHz, CDCl_3) δ (ppm): 7.9 (C_3), 115.8 (C_1), 139.7 (C_2). Anal. Calcd for $\text{C}_3\text{H}_4\text{ClI}$:

C, 17.80; H, 1.99. Found: C, 17.88; H, 2.01.

3.-General Procedure for KF-Celite Catalyzed Allylation of Anilines. Synthesis of different *N*-allylanilines (2a-e; 5a-5l) and *N,N*-diallylanilines (3a-c; 6a-6l).

In a typical reaction, to a suspension containing KF-Celite (1.25 mmol) in anhydrous acetonitrile (3.5 mL), aniline derivative (1.20 mmol) and allylating agent (**1a-e**, 1.00 mmol) were added. Thus, the mixture was refluxed under nitrogen for the appropriate time reported in Tables 1 to 4. After cooling, undissolved solid was removed by filtration and washed twice with dichloromethane. Solvent was evaporated under vacuum and the product was purified, whenever necessary, by column chromatography on silica gel, using eluents as reported below, to afford the desired adduct.

3.1.- *N*-allylaniline² 2a.

Reaction time: 2 h. Deep brown oil; LC eluent: dichlorometane; 82 % yield.

¹H NMR (250 MHz, CDCl₃) δ (ppm): 3.81 (dt, *J* = 1.5 Hz, *J* = 5.3 Hz, 2H, NCH₂), 3.84 (bs, 1H, NH), 5.21 (dq, *J* = 1.5 Hz, *J* = 10.1 Hz, 1H, CH=CHH), 5.33 (dq, *J* = 1.5 Hz, *J* = 17.2 Hz, 1H, CH=CHH), 5.99 (ddt, *J* = 5.3 Hz, *J* = 10.1 Hz, *J* = 17.2 Hz, 1H, CH=CH₂), 6.67 (m, *J* = 1.0 Hz, *J* = 8.7 Hz, 2H, *o*-Ph), 6.74 (m, *J* = 1.0 Hz, *J* = 7.3 Hz, 1H, *p*-Ph), 7.21 (m, *J* = 7.3 Hz, *J* = 8.7 Hz, 2H, *m*-Ph)

² Ozawa, F.; Okamoto, H.; Kawagishi, S.; Yamamoto, S.; Minami, T.; Yoshifuji, M. *J. Am. Chem. Soc.* **2002**, *124*, 10968.

^{13}C NMR (62.5 MHz, CDCl_3) δ (ppm): 47.0 (NCH_2), 113.4 (*o*-Ph), 116.7 ($\text{CH}=\text{CH}_2$), 117.9 (*p*-Ph), 129.6 (*m*-Ph), 135.9 ($\text{CH}=\text{CH}_2$), 148.5 (*ipso*-Ph).

FT-IR (NaCl) ($\nu_{\text{max}}/\text{cm}^{-1}$): 3415, 3082, 1603, 1506, 1316, 1263, 994, 919. Anal. Calcd for $\text{C}_9\text{H}_{11}\text{N}$: C, 81.16; H, 8.32; N, 10.52. Found: C, 81.14; H, 8.38; N, 10.48.

3.2.-*N,N*-diallylaniline² 3a.

Reaction time: 2 h. Pinky oil; LC eluent: dichlorometane; 12 % yield.

¹H NMR (250 MHz, CDCl₃) δ (ppm): 3.97 (m, 4H, NCH₂), 5.17-5.29 (m, 4H, CH=CH₂), 5.83-5.99 (m, 2H, CH=CH₂), 6.70-6.77 (m, 3H, *o*-Ph and *p*-Ph), 7.25 (m, 2H, *m*-Ph).

^{13}C NMR (62.5 MHz, CDCl_3) δ (ppm): 51.6 (NCH_2), 111.2 (*o*-Ph), 114.9 ($\text{CH}=\text{CH}_2$), 115.2 (*p*-Ph), 128.0 (*m*-Ph), 132.9 ($\text{CH}=\text{CH}_2$), 147.6 (*ipso*-Ph).

FT-IR (NaCl) ($\nu_{\text{max}}/\text{cm}^{-1}$): 3081, 1599, 1505, 1233, 989, 918. Anal. Calcd for $\text{C}_{12}\text{H}_{15}\text{N}$: C, 83.19; H, 8.73; N, 8.08. Found: C, 83.27; H, 8.68; N, 8.01.

3.3.-N-(3-methylbut-2-enyl)aniline³ 2b.

Reaction time: 4.5 h. Brown oil; LC eluent: dichlorometane; 83 % yield.

¹H NMR (250 MHz, CDCl₃) δ (ppm): 1.77 (s, 3H, CH₃), 1.80 (s, 3H, CH₃), 3.45 (bs, 1H, NH), 3.73 (d, *J* = 6.7 Hz, 2H, NCH₂), 5.34-5.44 (m, 1H, CH₂CH=C), 6.66 (dd, *J* = 1.2 Hz, *J* = 8.3 Hz, 2H, *o*-Ph), 6.76 (ddd, *J* = 0.9 Hz, *J* = 1.2 Hz, *J* = 8.3 Hz, 1H, *p*-Ph), 7.23 (dd, *J* = 7.3 Hz, *J* = 8.3 Hz, 2H, *m*-Ph).

³ Yang, S.-C.; Hsu, Y.-C.; Gan, K.-H. *Tetrahedron* **2006**, 62, 3949.

^{13}C NMR (62.5 MHz, CDCl_3) δ (ppm): 17.9 (CH_3), 25.7 (CH_3), 41.9 (CH_2), 112.8 (*o*-Ph), 117.2 (*p*-Ph), 121.5 ($\text{CH}_2\text{CH}=\text{C}$), 129.1 (*m*-Ph), 135.5 ($\text{CH}=\text{C}(\text{CH}_3)_2$), 148.3 (*ipso*-Ph).

FT-IR (NaCl) ($\nu_{\text{max}}/\text{cm}^{-1}$): 3407, 1603, 1504, 1316, 1253, 893. Anal. Calcd for $\text{C}_{11}\text{H}_{15}\text{N}$: C, 81.94; H, 9.38; N, 8.69. Found: C, 81.49; H, 9.30; N, 8.59.

3.4.-*N,N*-bis-(3-methylbut-2-enyl)aniline³ 3b.

Reaction time: 4.5 h. Brown oil; LC eluent: dichlorometane; 10 % yield.

¹H NMR (250 MHz, CDCl₃) δ (ppm): 1.77 (dd, *J* = 0.8 Hz, *J* = 6.0 Hz, 12H, CH₃), 3.92 (d, *J* = 6.1 Hz, 4H, NCH₂), 5.28 (m, 2H, CH₂CH=C), 6.75 (m, 3H, PhH), 7.25 (m, 2H, PhH).

^{13}C NMR (62.5 MHz, CDCl_3) δ (ppm): 17.8 (CH_3), 25.7 (CH_3), 48.1 (CH_2), 112.7 (*o*-Ph), 115.9 (*p*-Ph), 121.7 ($\text{CH}_2\text{CH}=\text{C}$), 129.0 (*m*-Ph), 133.9 ($\text{CH}=\text{C}(\text{CH}_3)_2$), 148.9 (*ipso*-Ph).

FT-IR (NaCl) ($\nu_{\text{max}}/\text{cm}^{-1}$): 3092, 1599, 1504, 1311, 1236, 891. Anal. Calcd for $\text{C}_{16}\text{H}_{23}\text{N}$: C, 83.79; H, 10.11; N, 6.11. Found: C, 83.92; H, 10.01; N, 6.15.

3.5.-N-(2-chloroallyl)aniline³ 2c.

Reaction time 6 h. Deep brown oil; LC eluent: dichlorometane; 86 % yield.

¹H NMR (250 MHz, CDCl₃) δ (ppm): 3.96 (dd, *J* = 1.2 Hz, *J* = 1.3 Hz, 2H, NCH₂), 4.13 (bs, 1H, NH), 5.35 (dd, *J* = 1.2 Hz, *J* = 2.7 Hz, 1H, ClC=CHH), 5.46 (dd, *J* = 1.5 Hz, *J* = 3.1 Hz, 1H, ClC=CHH), 6.65 (dd, *J* = 0.9 Hz, *J* = 8.2 Hz, 2H, *o*-Ph), 6.78 (ddt, *J* = 0.9 Hz, *J* = 1.2 Hz, *J* = 7.3 Hz, 1H, *p*-Ph), 7.23 (dd, *J* = 7.3 Hz, *J* = 8.2 Hz, 2H, *m*-Ph).

^{13}C NMR (62.5 MHz, CDCl_3) δ (ppm): 49.4 (NCH_2), 111.8 ($\text{C}=\text{CH}_2$), 112.3 (*o*-Ph), 117.5 (*p*-Ph), 128.6 (*m*-Ph), 138.5 ($\text{ClC}=\text{CH}_2$), 146.1 (*ipso*-Ph).

FS6VP102

FT-IR (NaCl) ($\nu_{\text{max}}/\text{cm}^{-1}$): 3418, 3081, 1604, 1506, 1323, 1267, 889. Anal. Calcd for $\text{C}_9\text{H}_9\text{ClN}$: C, 64.48; H, 6.01; N, 8.36. Found: C, 64.11; H, 5.56; N, 8.28.

3.6.- *N,N*-bis(2-chloroallyl)aniline **3c**.

Reaction time 6 h. Deep brown oil; LC eluent: dichlorometane; 9 % yield.

^1H NMR (250 MHz, CDCl_3) δ (ppm): 4.11 (s, 4H, NCH_2), 5.30 (d, $J = 1.7$ Hz, 2H, $\text{ClC}=\text{CHH}$), 5.38 (d, $J = 1.6$ Hz, 2H, $\text{ClC}=\text{CHH}$), 6.72 (m, 2H, *o*-Ph), 6.82 (m, 1H, *p*-Ph), 7.27 (m, 2H, *m*-Ph).

^{13}C NMR (62.5 MHz, CDCl_3) δ (ppm): 57.0 (NCH_2), 112.6 ($\text{C}=\text{CH}_2$), 118.5 (*o*-Ph), 129.7 (*m*-Ph), 137.6 ($\text{ClC}=\text{CH}_2$), 147.2 (*ipso*-Ph).

FS6VP119

FT-IR (NaCl) ($\nu_{\text{max}}/\text{cm}^{-1}$): 3081, 1602, 1505, 1262, 1231, 888. Anal. Calcd for $\text{C}_{12}\text{H}_{13}\text{Cl}_2\text{N}$: C, 59.52; H, 5.41; N, 5.78. Found: C, 59.26; H, 5.50; N, 5.71.

3.7.-N(2-bromoallyl)aniline⁴ 2d.

Reaction time 7 h. Deep brown oil; LC eluent: dichlorometane; 92 % yield.

¹H NMR (250 MHz, CDCl₃) δ (ppm): 4.06 (s, 2H, NCH₂), 4.21 (bs, 1H, NH), 5.64 (s, 1H, BrC=CHH), 5.93 (s, 1H, BrC=CHH), 6.68 (d, *J* = 7.4 Hz, 2H, *o*-Ph), 6.84 (t, *J* = 6.7 Hz, 1H, *p*-Ph), 7.27 (t, *J* = 7.4 Hz, 2H, *m*-Ph).

⁴ Barluenga, J.; Canteli, R. M.; Flórez, J. *J. Org. Chem.* **1996**, *61*, 3753.

^{13}C NMR (62.5 MHz, CDCl_3) δ (ppm): 51.4 (NCH_2), 112.3 (*o*-Ph), 116.1 ($\text{BrC}=\text{CH}_2$), 117.5 (*p*-Ph), 128.7 (*m*-Ph), 130.5 ($\text{BrC}=\text{CH}_2$), 146.0 (*ipso*-Ph).

FT-IR (NaCl) ($\nu_{\text{max}}/\text{cm}^{-1}$): 3447, 3084, 1606, 1520, 1340, 1267, 891. Anal. Calcd for $\text{C}_9\text{H}_{10}\text{BrN}$: C, 50.97; H, 4.75; N, 6.60. Found: C, 50.59; H, 4.61; N, 6.68.

3.8.- *N*-(2-methylallyl)aniline³ 2e.

Reaction time 9 h. Temperature 70 °C. Deep brown oil; LC eluent: dichlorometane / ethyl acetate 1 %; 86 % yield.

¹H NMR (250 MHz, CDCl₃) δ (ppm): 1.84 (d, *J* = 0.5 Hz, 3H, CH₃), 3.72 (s, 2H, NCH₂), 3.94 (bs, 1H, NH), 4.91-4.96 (m, 1H, C=CHH), 5.00-5.04 (m, 1H, C=CHH), 6.65 (m, 2H, *o*-Ph), 6.74 (tt, *J* = 1.0 Hz, *J* = 6.7 Hz, *J* = 7.3 Hz, 1H, *p*-Ph), 7.22 (dd, *J* = 7.3 Hz, *J* = 8.0 Hz, 2H, *m*-Ph).

^{13}C NMR (62.5 MHz, CDCl_3) δ (ppm): 20.4 (CH_3), 49.8 (NCH_2), 110.8 ($\text{C}=\text{CH}_2$), 112.7 (*o*-Ph), 117.2 (*p*-Ph), 129.1 (*m*-Ph), 142.7 ($\text{C}=\text{CH}_2$), 148.2 (*ipso*-Ph).

FT-IR (NaCl) ($\nu_{\text{max}}/\text{cm}^{-1}$): 3418, 3080, 1604, 1540, 1504, 1314, 1260, 890. Anal. Calcd for $\text{C}_{10}\text{H}_{13}\text{N}$: C, 81.59; H, 8.90; N, 9.51. Found: 81.66; H, 8.76; N, 9.50

3.9.-N-(2-chloroallyl)-4-methoxyaniline 5a.

Reaction time 6 h. Deep brown oil; LC eluent: dichlorometane. 79 % yield.

$^1\text{H NMR}$ (250 MHz, CDCl_3) δ (ppm): 3.77 (s, 3H, OCH_3), 3.92 (m, 2H, NCH_2), 5.34 (dd, $J = 1.4$ Hz, $J = 2.9$ Hz, 1H, ClC=CHH), 5.43 (dd, $J = 1.4$ Hz, $J = 2.9$ Hz, 1H, ClC=CHH), 6.62 (dt, $J = 2.3$ Hz, $J = 3.5$ Hz, $J = 8.3$ Hz, 2H, H_2 , H_6 -Ph), 6.82 (dt, $J = 2.3$ Hz, $J = 5.8$ Hz, $J = 8.8$ Hz, 2H, H_3 , H_5 -Ph).

^{13}C NMR (62.5 MHz, CDCl_3) δ (ppm): 51.5 (OCH_3), 56.1 (NCH_2), 113.0 ($\text{C}=\text{CH}_2$), 114.8 (C_2 , C_6 -Ph), 115.2 (C_3 , C_5 -Ph), 140.0 (C_1 -Ph), 141.3 ($\text{ClC}=\text{CH}_2$), 152.9 (C_4 -Ph).

FT-IR (NaCl) ($\nu_{\text{max}}/\text{cm}^{-1}$): 3412, 3080, 2833, 1644, 1614, 1515, 1261, 1249, 889, 820. Anal. Calcd for $\text{C}_{10}\text{H}_{12}\text{ClNO}$: C, 60.76; H, 6.12; N, 7.09. Found: C, 60.61; H, 6.21; N, 7.00.

3.10.- *N,N*-bis(2-chloroallyl)-4-methoxyaniline 6a.

Reaction time 6 h. Deep brown oil; LC eluent: dichlorometane. 10 % yield.

^1H NMR (250 MHz, CDCl_3) δ (ppm): 3.78 (s, 3H, OCH_3), 4.06 (m, 4H, NCH_2), 5.31 (dd, $J = 1.1$ Hz, $J = 2.2$ Hz, 2H, ClC=CHH), 5.37 (dd, $J = 1.3$ Hz, $J = 2.5$ Hz, 2H, ClC=CHH), 6.68 (dt, $J = 2.4$ Hz, $J = 3.7$ Hz, $J = 10.1$ Hz, 2H, H_2 , $H_6\text{-Ph}$), 6.85 (dt, $J = 2.3$ Hz, $J = 3.4$ Hz, $J = 9.9$ Hz, 2H, H_3 , $H_5\text{-Ph}$).

^{13}C NMR (62.5 MHz, CDCl_3) δ (ppm): 56.1 (OCH_3), 57.5 (NCH_2), 112.6 ($\text{C}=\text{CH}_2$), 114.0 (C_2 , C_6 -Ph), 115.1 (C_3 , C_5 -Ph), 138.0 ($\text{ClC}=\text{CH}_2$), 141.6 (C_1 -Ph), 152.7 (C_4 -Ph).

FT-IR (NaCl) ($\nu_{\text{max}}/\text{cm}^{-1}$): 3109, 2833, 1645, 1514, 1244, 889, 815. Anal. Calcd for $\text{C}_{13}\text{H}_{15}\text{Cl}_2\text{NO}$: C, 57.37; H, 5.56; N, 5.15. Found: 57.47; H, 5.34; N, 5.20.

3.11.- *N*-(2-chloroallyl)-3-methoxyaniline⁵ 5b.

Reaction time 8 h. Deep brown oil; LC eluent: dichlorometane. 67 % yield.

¹H NMR (250 MHz, CDCl₃) δ (ppm): 3.81 (s, 3H, OCH₃), 3.95 (s, 2H, NCH₂), 5.35 (dd, *J* = 1.6 Hz, *J* = 3.0 Hz, 1H, ClC=CHH), 5.46 (dd, *J* = 1.5 Hz, *J* = 3.0 Hz, 1H, ClC=CHH), 6.20 (t, *J* = 2.2 Hz, 1H, *H*₂-Ph), 6.28 (ddd, *J* = 0.7 Hz, *J* = 2.2 Hz, *J* = 5.8 Hz, *J* = 8.2 Hz, 2H, *H*₆-Ph), 6.35 (ddd, *J* = 0.7 Hz, *J* = 2.2 Hz, *J* = 5.8 Hz, *J* = 8.2 Hz, 2H, *H*₄-Ph), 7.13 (t, *J* = 8.1, *H*₅-Ph).

⁵ McDonald, B. G.; Proctor, G. R. *J. Chem. Soc. Perkin Trans. I* **1975**, 15, 1446.

^{13}C NMR (62.5 MHz, CDCl_3) δ (ppm): 50.5 (OCH_3), 55.5 (NCH_2), 99.5 ($\text{C}_2\text{-Ph}$), 103.5 ($\text{C}_4\text{-Ph}$), 106.5 ($\text{C}_6\text{-Ph}$), 113.0 ($\text{C}=\text{CH}_2$), 130.5 ($\text{C}_5\text{-Ph}$), 139.6 ($\text{ClC}=\text{CH}_2$), 148.7 ($\text{C}_1\text{-Ph}$), 162.2 ($\text{C}_3\text{-Ph}$).

FT-IR (NaCl) ($\nu_{\text{max}}/\text{cm}^{-1}$): 3417, 3080, 2834, 1641, 1614, 1514, 1497, 1460, 1261, 1209, 892, 810, 704. Anal. Calcd for $\text{C}_{10}\text{H}_{12}\text{ClNO}$: C, 60.76; H, 6.12; N, 7.09. Found: C, 60.64; H, 6.18; N, 7.12.

3.12.- *N*-(2-chloroallyl)-2-methoxyaniline⁶ 5c

Reaction time 7 h. Deep brown oil; LC eluent: dichlorometane. 75 % yield.

¹H NMR (250 MHz, CDCl₃) δ (ppm): 3.91 (s, 3H, OCH₃), 4.00 (s, 2H, NCH₂), 5.35 (dd, *J* = 1.2 Hz, *J* = 2.6 Hz, 1H, ClC=CHH), 5.45 (dd, *J* = 1.5 Hz, *J* = 3.1 Hz, 1H, ClC=CHH), 6.61 (dd, *J* = 1.5 Hz, *J* = 7.8 Hz, 1H, *H*₆-Ph), 6.76 (td, *J* = 1.5 Hz, *J* = 7.6 Hz, 1H, *H*₅-Ph), 6.85 (dd, *J* = 1.6 Hz, *J* = 7.9 Hz, 1H, *H*₃-Ph), 6.92 (td, *J* = 1.6 Hz, *J* = 7.5, *H*₄-Ph).

⁶ Blechert, S.; Gericke, R.; Winterfeldt, E. *Chem. Ber.*, **1973**, 106, 355.

^{13}C NMR (62.5 MHz, CDCl_3) δ (ppm): 50.3 (NCH_2), 55.9 (OCH_3), 110.0 ($\text{C}_6\text{-Ph}$), 110.7 ($\text{C}_3\text{-Ph}$), 112.6 ($\text{C}=\text{CH}_2$), 117.8 ($\text{C}_4\text{-Ph}$), 121.6 ($\text{C}_5\text{-Ph}$), 137.1 ($\text{C}_1\text{-Ph}$), 139.6 ($\text{ClC}=\text{CH}_2$), 147.1 ($\text{C}_2\text{-Ph}$).

FS6VP189

FT-IR (NaCl) ($\nu_{\text{max}}/\text{cm}^{-1}$): 3430, 3089, 2939, 2835, 1644, 1603, 1515, 1456, 1246, 1223, 1031, 890, 756. Anal. Calcd for $\text{C}_{10}\text{H}_{12}\text{ClNO}$: C, 60.76; H, 6.12; N, 7.09. Found: C, 60.80; H, 6.23; N, 7.01.

3.13.- *N*-(2-chloroallyl)-4-morpholinoaniline 5d.

Reaction time 5 h. Brown crystals. Mp 70 °C. LC eluent: dichlorometane./ ethyl acetate 15 %. 67 % yield.

^1H NMR (250 MHz, DMSO- d_6) δ (ppm): 2.90 (d, $J = 2.5$ Hz, 4H, $\text{NCH}_2\text{CH}_2\text{O}$), 3.70 (d, $J = 2.6$ Hz, 4H, $\text{NCH}_2\text{CH}_2\text{O}$), 3.81 (d, $J = 5.9$ Hz, 2H, HNCH_2), 5.31 (s, 1H, ClC=CHH), 5.43 (s, 1H, ClC=CHH), 5.86 (t, $J = 5.9$ Hz, 1H, NH), 6.52 (dd, $J = 1.8$ Hz, $J = 8.7$ Hz, $J = 8.2$ Hz, 2H, $H_2\text{-}H_6$ Ph), 6.75 (dd, $J = 1.8$ Hz, $J = 8.6$ Hz, 2H, $H_3\text{-}H_5$ Ph).

^{13}C NMR (62.5 MHz, DMSO- d_6) δ (ppm): 49.8 (HNCH $_2$), 50.8 (NCH $_2$ CH $_2$ O), 66.7 (NCH $_2$ CH $_2$ O), 112.7 (C=CH $_2$), 113.4 (C $_3$, C $_5$ -Ph), 117.8 (C $_2$, C $_6$ -Ph), 140.4 (ClC=CH $_2$), 141.9 (C $_4$ -Ph), 143.1 (C $_1$ -Ph).

FT-IR (NaCl) ($\nu_{\text{max}}/\text{cm}^{-1}$): 3372, 3083, 3029, 2959, 2854, 2688, 1644, 1520, 1454, 1117, 1086, 1050, 925, 891. Anal. Calcd for C $_{13}$ H $_{17}$ ClN $_2$ O: C, 61.78; H, 6.78; N, 11.08. Found: C, 61.59; H, 6.68; N, 11.19.

3.14.-N-(2-chloroallyl)-p-nitroaniline⁷ 5e.

Reaction time 4 h. Yellow crystals. Mp 91°C; LC eluent: dichlorometane / ethyl acetate 2 %. 87 % yield.

¹H NMR (250 MHz, CDCl₃) δ (ppm): 4.08 (d, *J* = 6.0 Hz, 2H, NCH₂), 4.96 (bs, 1H, NH), 5.44 (d, *J* = 3.6 Hz, 2H, C=CH₂), 6.63 (d, *J* = 9.1 Hz, 2H, H₂, H₆-Ph), 8.15 (d, *J* = 9.1 Hz, 2H, H₃, H₅-Ph).

⁷ McDonald, B.; Malean, A.; Proctor, G. R. *J. Chem. Soc., Chem. Commun.* **1973**, 6, 208.

^{13}C NMR (62.5 MHz, CDCl_3) δ (ppm): 49.8 (NCH_2), 112.0 (C_2 , $\text{C}_6\text{-Ph}$), 113.9 ($\text{C}=\text{CH}_2$), 126.8 (C_3 , $\text{C}_5\text{-Ph}$), 137.9 ($\text{C}_4\text{-Ph}$), 139.2 ($\text{ClC}=\text{CH}_2$), 152.6 ($\text{C}_1\text{-Ph}$).

FT-IR (NaCl) ($\nu_{\text{max}}/\text{cm}^{-1}$): 3416, 3081, 1604, 1539, 1509, 1535, 1353, 1315, 1269, 849. Anal. Calcd for $\text{C}_9\text{H}_9\text{ClN}_2\text{O}_2$: C, 50.84; H, 4.27; N, 13.17. Found: C, 50.77; H, 4.33; N, 13.25.

3.15.- *N*-(2-chloroallyl)-3-nitroaniline 5f.

Reaction time 2.5 h. Yellow crystals. Mp 84-85°C; LC eluent: dichlorometane / ethyl acetate 2 %.

93 % yield.

^1H NMR (250 MHz, CDCl_3) δ (ppm): 4.02 (dd, $J = 1.1$ Hz, $J = 1.3$ Hz, 2H, NCH_2), 4.55 (m, 1H, NH), 5.40 (dd, $J = 1.1$ Hz, $J = 2.8$ Hz, 1H, ClC=CHH), 5.46 (dd, $J = 1.3$ Hz, $J = 3.0$ Hz, 1H, ClC=CHH), 6.91 (ddd, 1H, $J = 0.5$ Hz, $J = 2.4$ Hz, $J = 8.2$ Hz, 1H, $H_6\text{-Ph}$), 7.34 (t, $J = 8.1$ Hz, 1H, $H_5\text{-Ph}$), 7.45 (t, $J = 2.3$ Hz, 1H, $H_2\text{-Ph}$), 7.60 (ddd, 1H, $J = 0.6$ Hz, $J = 2.2$ Hz, $J = 8.1$ Hz, 1H, $H_2\text{-Ph}$).

^{13}C NMR (62.5 MHz, CDCl_3) δ (ppm): 50.2 (NCH_2), 107.3 ($\text{C}_2\text{-Ph}$), 113.3 ($\text{C}_4\text{-Ph}$), 113.8 ($\text{C}=\text{CH}_2$), 119.3 ($\text{C}_6\text{-Ph}$), 130.3 ($\text{C}_5\text{-Ph}$), 138.5 ($\text{ClC}=\text{CH}_2$), 148.0 ($\text{C}_1\text{-Ph}$), 149.8 ($\text{C}_3\text{-Ph}$).

FT-IR (NaCl) ($\nu_{\text{max}}/\text{cm}^{-1}$): 3414, 3079, 1604, 1538, 1506, 1351, 1313, 1267, 888, 850, 720. Anal.

Calcd for $\text{C}_9\text{H}_9\text{ClN}_2\text{O}_2$: C, 50.84; H, 4.27; N, 13.17. Found: C, 50.81; H, 4.37; N, 13.26.

3.16.- *N*-allyl-3-nitroaniline 5g⁸.

Reaction time 3 h. Orange crystals. Mp 67°C; LC eluent: dichlorometane / ethyl acetate 5 %. 90 % yield.

¹H NMR (250 MHz, CDCl₃) δ (ppm): 3.87 (ddd, *J* = 1.2 Hz, *J* = 1.8 Hz, *J* = 4.1 Hz, 2H, NCH₂), 4.21 (bs, 1H, NH), 5.20 (ddt, *J* = 1.2 Hz, *J* = 1.3 Hz, *J* = 8.0 Hz, 1H, HC=CHH), 5.30 (ddt, *J* = 1.2 Hz, *J* = 1.5 Hz, *J* = 14.1 Hz, 1H, HC=CHH), 5.91 (ddt, *J* = 4.1 Hz, *J* = 8.2 Hz, *J* = 14.1 Hz, 1H, HC=CH₂), 6.90 (dd, *J* = 1.6 Hz, *J* = 6.4 Hz, 1H, *H*₆-Ph), 7.25 (dd, *J* = 6.5 Hz, *J* = 6.4 Hz, 1H, *H*₅-Ph), 7.40 (dd, *J* = 1.8 Hz, *J* = 2.2 Hz, 1H, *H*₂-Ph), 7.50 (d, *J* = 2.1 Hz, 1H, *H*₄-Ph).

⁸ Hsu, Y. -C.; Gan, K. -H.; Yang, S. -C. *Chem. Pharm. Bull.* **2005**, 53, 1266.

^{13}C NMR (62.5 MHz, CDCl_3) δ (ppm): 46.6 (NCH_2), 106.9 ($\text{C}_2\text{-Ph}$), 112.5 ($\text{C}_4\text{-Ph}$), 117.4 ($\text{C}=\text{CH}_2$), 119.3 ($\text{C}_6\text{-Ph}$), 130.1 ($\text{C}_5\text{-Ph}$), 134.4 ($\text{HC}=\text{CH}_2$), 149.1 ($\text{C}_1\text{-Ph}$), 149.8 ($\text{C}_3\text{-Ph}$).

FT-IR (NaCl) ($\nu_{\text{max}}/\text{cm}^{-1}$): 3420, 3079, 1604, 1538, 1506, 1351, 1313, 1267, 888, 850, 801. Anal.

Calcd for $\text{C}_9\text{H}_{10}\text{N}_2\text{O}_2$: C, 60.66; H, 5.66; N, 15.72. Found: C, 60.42; H, 5.70; N, 15.61.

3.17.- 3-(2-chloroallylamino)benzonitrile 5h.

Reaction time 2.5 h. Deep brown oil; LC eluent: dichlorometane / ethyl acetate 2 %. 90% yield.

^1H NMR (250 MHz, CDCl_3) δ (ppm): 3.98 (t, $J = 1.3$ Hz, 2H, NCH_2), 4.23 (bs, 1H, NH), 5.39 (dd, $J = 1.2$ Hz, $J = 2.4$ Hz, 1H, ClC=CHH), 5.44 (dd, $J = 1.3$ Hz, $J = 3.0$ Hz, 1H, ClC=CHH), 6.85-6.90 (m, 2H, $\text{H}_2\text{-H}_6$ Ph), 7.06 (dt, $J = 1.2$ Hz, $J = 7.6$ Hz, 1H, $\text{H}_4\text{-Ph}$), 7.30 (m, 1H, $\text{H}_5\text{-Ph}$).

^{13}C NMR (62.5 MHz, CDCl_3) δ (ppm): 50.2 (NCH_2), 113.4 ($\text{C}_3\text{-Ph}$), 113.7 ($\text{C}=\text{CH}_2$), 115.8 ($\text{C}_6\text{-Ph}$), 118.0 ($\text{C}_2\text{-Ph}$), 119.7 (CN), 122.2 ($\text{C}_4\text{-Ph}$), 130.5 ($\text{C}_5\text{-Ph}$), 138.4 ($\text{ClC}=\text{CH}_2$), 147.4 ($\text{C}_1\text{-Ph}$).

FT-IR (NaCl) ($\nu_{\text{max}}/\text{cm}^{-1}$): 3396, 3071, 2925, 2230, 1605, 1585, 1519, 1333, 1277, 893, 781. Anal.

Calcd for $\text{C}_{10}\text{H}_9\text{ClN}_2$: C, 62.35; H, 4.71; N, 14.61. Found: C, 62.20; H, 4.60; N, 14.66.

3.18.- 3-chloro-*N*-(2-chloroallyl)-4-methoxyaniline 5i.

Reaction time 6 h. Deep brown oil; LC eluent: dichlorometane. 69 % yield.

^1H NMR (250 MHz, CDCl_3) δ (ppm): 3.85 (s, 3H, OCH_3), 3.91 (t, $J = 1.2$ Hz, 2H, NCH_2), 5.36 (dd, $J = 1.4$ Hz, $J = 2.9$ Hz, 1H, ClC=CHH), 5.43 (dd, $J = 1.4$ Hz, $J = 3.0$ Hz, 1H, ClC=CHH), 6.54 (dd, $J = 2.9$ Hz, $J = 8.8$ Hz, 1H, $H_6\text{-Ph}$), 6.72 (d, $J = 2.8$ Hz, 1H, $H_2\text{-Ph}$), 6.84 (d, $J = 8.8$ Hz, 1H, $H_5\text{-Ph}$).

^{13}C NMR (62.5 MHz, CDCl_3) δ (ppm): 51.2 (NCH_2), 57.3 (OCH_3), 112.7 ($\text{C}_6\text{-Ph}$), 113.4 ($\text{C}=\text{CH}_2$), 114.3 ($\text{C}_2\text{-Ph}$), 115.9 ($\text{C}_5\text{-Ph}$), 123.7 ($\text{C}_3\text{-Ph}$), 139.4 ($\text{ClC}=\text{CH}_2$), 141.7 ($\text{C}_1\text{ Ph}$), 148.3 ($\text{C}_4\text{ Ph}$).

FS6VP173

FT-IR (NaCl) ($\nu_{\text{max}}/\text{cm}^{-1}$): 3419, 3076, 3003, 2933, 2837, 1644, 1615, 1504, 1463, 1282, 1234, 1089, 1062, 1020, 890. Anal. Calcd for $\text{C}_{10}\text{H}_{11}\text{Cl}_2\text{NO}$: C, 51.75; H, 4.78; N, 6.03. Found: C, 51.89; H, 4.66; N, 6.12.

3.19.- 3-chloro-*N,N*-(2-chloroallyl)-4-methoxyaniline 6i.

Reaction time 6 h. Deep brown oil; LC eluent: dichlorometane. 7 % yield.

$^1\text{H NMR}$ (250 MHz, CDCl_3) δ (ppm): 3.86 (s, 3H, OCH_3), 4.05 (m, 4H, NCH_2), 5.29 (dd, $J = 1.6$ Hz, $J = 3.3$ Hz, 2H, ClC=CHH), 5.39 (dd, $J = 1.5$ Hz, $J = 3.2$ Hz, 2H, ClC=CHH), 6.57 (dd, $J = 3.1$ Hz, $J = 9.0$ Hz, 1H, $H_6\text{-Ph}$), 6.76 (d, $J = 3.1$ Hz, 1H, $H_2\text{-Ph}$), 6.86 (d, $J = 9.0$ Hz, 1H, $H_5\text{-Ph}$).

^{13}C NMR (62.5 MHz, CDCl_3) δ (ppm): 57.2 (OCH_3), 57.3 (NCH_2), 111.9 ($\text{C}_6\text{-Ph}$), 112.9 ($\text{C}=\text{CH}_2$), 114.1 ($\text{C}_5\text{-Ph}$), 115.1 ($\text{C}_2\text{-Ph}$), 123.7 ($\text{C}_3\text{-Ph}$), 137.5 ($\text{ClC}=\text{CH}_2$), 142.2 ($\text{C}_1\text{-Ph}$), 148.1 ($\text{C}_4\text{-Ph}$).

FS6VP174

FT-IR (NaCl) ($\nu_{\text{max}}/\text{cm}^{-1}$): 3088, 2837, 1648, 1519, 1252, 1042, 891. Anal. Calcd for $\text{C}_{13}\text{H}_{14}\text{Cl}_3\text{NO}$: C, 50.92; H, 4.60; N, 4.57. Found: C, 50.73; H, 4.71; N, 4.38.

3.20.- *N*-(2-chloroallyl)-4-fluoroaniline 5j.

Reaction time 5 h. Deep brown oil; LC eluent: dichlorometane. 80 % yield.

^1H NMR (250 MHz, CDCl_3) δ (ppm): 3.92 (t, $J = 1.2$ Hz, 2H, NCH_2), 4.18 (bs, 1H, NH), 5.35 (dd, $J = 1.5$ Hz, $J = 3.1$ Hz, 1H, ClC=CHH), 5.43 (dd, $J = 1.5$ Hz, $J = 3.1$ Hz, 1H, ClC=CHH), 6.56-6.63 (m, $H_2, H_6\text{-Ph}$), 6.88-6.98 m, $H_3, H_5\text{-Ph}$).

^{13}C NMR (62.5 MHz, CDCl_3) δ (ppm): 51.1 (NCH_2), 113.1 ($\text{C}=\text{CH}_2$), 114.3 ($^3J(\text{C},\text{F}) = 7.5$ Hz, C_2 , C_6 -Ph), 116.2 ($^2J(\text{C},\text{F}) = 21.9$ Hz, C_3, C_5 -Ph), 139.6 ($\text{ClC}=\text{CH}_2$), 143.4 ($^4J(\text{C},\text{F}) = 2.0$ Hz C_1 -Ph), 156.6 ($^1J(\text{C},\text{F}) = 234.6$ Hz, C_4 -Ph).

^{19}F NMR (235 MHz, CDCl_3) δ (ppm): -127.4 (bs).

FT-IR (NaCl) ($\nu_{\text{max}}/\text{cm}^{-1}$): 3424, 3081, 2963, 1514, 1263, 925, 898, 820. Anal. Calcd for $\text{C}_9\text{H}_9\text{ClFN}$: C, 58.23; H, 4.89; N, 7.55. Found: C, 58.37; H, 4.96; N, 7.39.

3.21.- N-(2-bromoallyl)-3-fluoroaniline 5k.

Reaction time 3.5 h. Deep brown oil; LC eluent: dichlorometane. 85 % yield.

^1H NMR (250 MHz, CDCl_3) δ (ppm): 4.01 (s, 2H, NCH_2), 4.34 (bs, 1H, NH), 5.62 (s, 1H, BrC=CHH), 5.89 (s, 1H, BrC=CHH), 6.32-6.51 (m, 3H, H_2 , H_4 , H_6 -Ph), 7.15 (m, 1H, H_5 -Ph).

FS6VP168

C=C(Br)CNc1ccc(F)cc1

166.40
162.53
149.02
148.05
130.94
130.88
130.73
117.40
109.29
109.25
108.47
108.93
108.42
108.02
78.03
77.52
77.01
52.29

FT-IR (NaCl) ($\nu_{\text{max}}/\text{cm}^{-1}$): 3426, 3038, 2921, 2230, 1622, 1592, 1516, 1449, 1333, 1274, 1179, 1153, 928, 898, 831, 763. Anal. Calcd for $\text{C}_9\text{H}_9\text{BrFN}$: C, 46.98; H, 3.94; N, 6.09. Found: C, 47.03; H, 4.01; N, 6.00.

3.22.- *N*-(2-chloroallyl)-2,4-difluoroaniline 5l.

Reaction time 7 h. Deep brown oil. LC eluent: dichlorometane. 78 % yield.

¹H NMR (250 MHz, CDCl₃) δ (ppm): 3.97 (t, 2H, *J* = 1.2 Hz, 2H, NCH₂), 5.37 (dd, *J* = 1.3 Hz, *J* = 2.9 Hz, 1H, ClC=CHH), 5.44 (dd, *J* = 1.5 Hz, *J* = 3.0 Hz, 1H, ClC=CHH), 6.60 (td, *J* = 5.4 Hz, *J* = 9.3 Hz, 1H, H₆-Ph), 6.78 (m, 1H, H₃-Ph), 6.83 (m, 1H, H₅-Ph).

^{13}C NMR (62.5 MHz, CDCl_3) δ (ppm): 50.5 (NCH_2), 104.0 ($^2J(\text{C},\text{F}) = 23.2$ Hz, $^2J(\text{C},\text{F}) = 25$ Hz, $\text{C}_3\text{-Ph}$), 111.1 (3.5 Hz, 22.0 Hz, $\text{C}_5\text{-Ph}$), 113.2 ($\text{C}=\text{CH}_2$), 132.1 ($^3J(\text{C},\text{F}) = 9.8$ Hz, $^4J(\text{C},\text{F}) = 3.0$ Hz, $\text{C}_1\text{-Ph}$), 139.1 ($\text{ClC}=\text{CH}_2$), 153.0 ($^1J(\text{C},\text{F}) = 245.0$ Hz, $^2J(\text{C},\text{F}) = 16.9$ Hz, $^3J(\text{C},\text{F}) = 8.0$ Hz, $^4J(\text{C},\text{F}) = 3.0$ Hz, $\text{C}_4\text{-Ph}$), 155.3 ($^1J(\text{C},\text{F}) = 244.8$ Hz, $^2J(\text{C},\text{F}) = 16.5$ Hz, $^3J(\text{C},\text{F}) = 8.1$ Hz, $^4J(\text{C},\text{F}) = 2.9$ Hz, $\text{C}_2\text{-Ph}$).

^{19}F NMR (235 MHz, CDCl_3) δ (ppm): -133.2 (bs), -125.2 (bs).

FT-IR (NaCl) ($\nu_{\text{max}}/\text{cm}^{-1}$): 3415, 3054, 1643, 1637, 1603, 1508, 1439, 1323, 1265, 894. **EI MS**

(m/z , %): 203.9, 204.9, 205.9, 206.9, 128.8. Anal. Calcd for $\text{C}_9\text{H}_8\text{ClF}_2\text{N}$: C, 53.09; H, 3.96; N, 6.88.

Found: C, 52.98; H, 4.01; N, 6.76.

3.23.- *N,N*-bis-(2-chloroallyl)-2,4-difluoroaniline **6l**.

Reaction time 7 h. Deep brown oil. LC eluent: dichlorometane. 5 % yield.

^1H NMR (250 MHz, CDCl_3) δ (ppm): 4.02 (s, 4H, 4H, NCH_2), 5.35 (dd, $J = 1.2$ Hz, $J = 2.3$ Hz, 2H, ClC=CHH), 5.40 (dd, $J = 1.2$ Hz, $J = 2.3$ Hz, 2H, ClC=CHH), 6.76-6.96 (m, 3H, H_3 , H_5 , H_6 -Ph).

EI MS (m/z , %): 277.8, 279.8, 278.8, 281.9, 280.8, 283.0, 202.8.

FT-IR (NaCl) ($\nu_{\max}/\text{cm}^{-1}$): 3054, 1635, 1595, 1510, 1436, 1278, 1142, 895. Anal. Calcd for $\text{C}_{12}\text{H}_{11}\text{Cl}_2\text{F}_2\text{N}$: C, 51.82; H, 3.99; N, 5.04. Found: C, 51.49; H, 4.13; N, 5.18.

3.24.- *N*-(2-chloroallyl)-2-fluoroaniline 5m.

Reaction time 36 h. Deep brown oil; LC eluent: dichlorometane / petroleum ether 10%. 79 % yield.

$^1\text{H NMR}$ (250 MHz, CDCl_3) δ (ppm): 4.01 (t, $J = 1.2$ Hz, 2H, NCH_2), 4.12 (bs, 1H, NH), 5.37 (dd, $J = 1.4$ Hz, $J = 2.9$ Hz, 1H, $\text{ClC}=\text{CHH}$), 5.46 (dd, $J = 1.5$ Hz, $J = 3.1$ Hz, 1H, $\text{ClC}=\text{CHH}$), 6.69-6.77 (m, H_4 , H_6 -Ph), 6.99-7.08 m, H_3 , H_5 -Ph).

^{13}C NMR (62.5 MHz, CDCl_3) δ (ppm): 50.3 (NCH_2), 113.2 ($^3J(\text{C},\text{F}) = 7.9$ Hz, $\text{C}_4\text{-Ph}$), 113.3 ($\text{C}=\text{CH}_2$), 115.1 ($^2J(\text{C},\text{F}) = 18.3$ Hz, $\text{C}_3\text{-Ph}$), 118.4 ($^3J(\text{C},\text{F}) = 7.2$ Hz, $\text{C}_6\text{-Ph}$), 125.0 ($^4J(\text{C},\text{F}) = 3.5$ Hz, $\text{C}_5\text{-Ph}$), 135.2 ($^2J(\text{C},\text{F}) = 11.2$ Hz, $\text{C}_1\text{-Ph}$), 138.9 ($\text{ClC}=\text{CH}_2$), 151.9 ($^1J(\text{C},\text{F}) = 237.4$ Hz, $\text{C}_2\text{-Ph}$).

^{19}F NMR (235 MHz, CDCl_3) δ (ppm): -137.4 (bs). **FT-IR** (NaCl) ($\nu_{\text{max}}/\text{cm}^{-1}$): 3442, 3069, 2927, 1622, 1588, 1520, 1454, 1336, 1268, 1191, 1104, 891, 752. Anal. Calcd for $\text{C}_9\text{H}_9\text{ClFN}$: C, 58.23; H, 4.89; N, 7.55. Found: C, 58.11; H, 4.93; N, 7.47.