



Palladium-Catalyzed C-H Bond Arylation and O-to N -Alkyl Migratory Rearrangement of 2-Alkoxythiazoles: One-Pot Access to 2-Alkoxy-5-arylthiazoles or 3-Alkyl-5-arylthiazol-2(3 H)-ones

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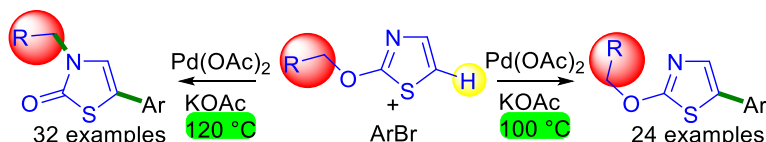
Pd-catalyzed C–H Bond Arylation and *O*- to *N*-alkyl Migratory Rearrangement of 2-Alkoxythiazoles: A One Pot Access to 2-Alkoxy-5-arylthiazoles or 3-Alkyl-5-arylthiazol-2(3*H*)-ones

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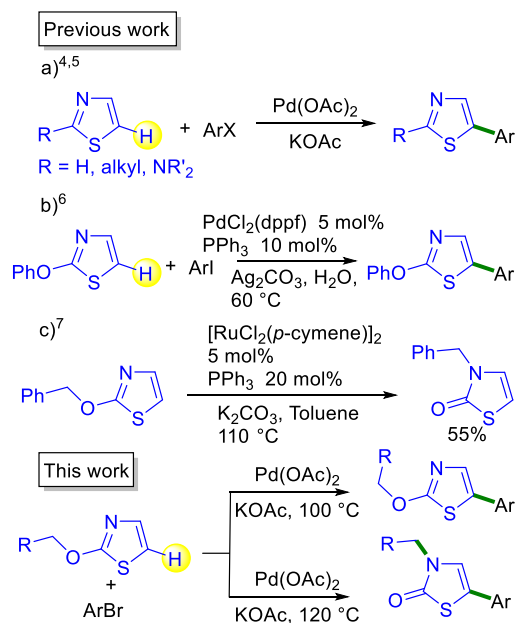
Abstract The Pd-catalyzed direct arylation of 2-alkylthiazoles is a well-known reaction affording the corresponding 2-alkyl-5-arylthiazoles in very high yields. Conversely, the reactivity of 2-alkoxythiazoles has not been described yet. Herein, we report conditions for the Pd-catalyzed regioselective C5-arylation of 2-alkoxythiazoles. Moreover, we also found reactions conditions allowing to obtain 3-alkyl-5-arylthiazol-2(3*H*)-ones *via* a one pot direct arylation with a *O*- to *N*-alkyl migratory rearrangement. The judicious choice of the reaction temperature and time allows to control the selectivity of the reaction. In general, at 100 °C, the 2-alkoxy-5-arylthiazoles were the major products; whereas, at 120 °C with a longer reaction time, the 3-alkyl-5-arylthiazol-2(3*H*)-ones were obtained with good selectivities. The arylation reaction is promoted by a ligand-free air-stable palladium catalyst and a simple and inexpensive base without oxidant or further additives, and tolerates a variety of useful substituents on the aryl bromide and also heteroaryl bromides.

Key words Catalysis, Palladium, C–H functionalization, thiazoles, thiazolones

Metal-catalyzed direct functionalization of 5-membered ring (hetero)arenes is a very powerful synthetic tool for the synthesis of valuable polyheteroaromatics.¹ However, the presence of specific functional groups on heterocycles may result in selectivity issues potentially challenging to handle with. In the C–H bond functionalization of 5-membered ring heteroarenes such as thiazoles, palladium-catalyzed direct C5-arylation is strongly favored.^{2,3} Several procedures for the Pd-catalyzed direct arylation of 2-alkylthiazoles have been reported (Scheme 1, a).⁴ Conversely, only a few examples of Pd-catalyzed direct arylations of thiazoles bearing an heteroelements at C2-position have been described.⁵ Some direct arylations of 2-amine or 2-amide-substituted thiazoles have been reported.⁶ By sharp contrast, Pd-catalyzed direct arylation reactions with thiazoles containing an OR substituent at C2-position are limited to the use of 2-phenoxythiazole (Scheme 1, b).⁶

In this context, in 2011, Dong et al. also studied the reactivity of 2-(benzyloxy)thiazole in Ru-catalyzed *O*- to *N*-alkyl migratory rearrangement.⁷ 3-Benzylthiazol-2(3*H*)-one was obtained in

55% yields using 5 mol% [Ru(*p*-cymene)Cl₂]₂ associated to 20 mol% PPh₃ as catalytic system and K₂CO₃ as the base (Scheme 1, c).



Scheme 1. Direct arylations of thiazoles and *O*- to *N*-alkyl migratory rearrangement.

Therefore, we were interested in the reactivity of 2-alkoxythiazoles as heteroaryl sources for the access to 2-alkoxy-5-arylthiazoles and also to 3-alkyl-5-arylthiazol-2(3*H*)-ones by *O*- to *N*-alkyl migratory rearrangement as they exhibit useful physical or biological properties.⁸ (Scheme 1, bottom).

Accordingly, we report herein general and simple conditions for: *i*) the Pd-catalyzed regioselective C5-arylation of 2-alkoxythiazoles *via* C–H bond functionalization, *ii*) the

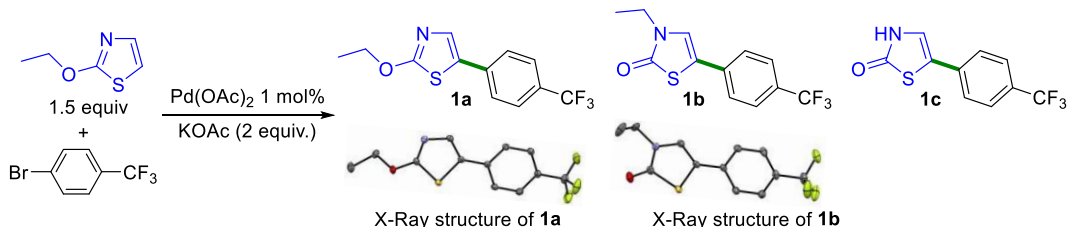
preparation of 3-alkyl-5-arylthiazol-2(3*H*)-ones *via* one pot C5-arylation and *O*- to *N*-alkyl migratory rearrangement of 2-alkoxythiazoles. We found the decisive role of the reaction temperature at the origin of the *O*- to *N*-alkyl migratory rearrangement. The substrate scope for such arylation reactions is described.

Under standard C–H bond functionalization conditions,⁹ we examined the reaction outcome of the coupling of 2-ethoxythiazole with 4-(trifluoromethyl)bromobenzene using 1 mol% of Pd(OAc)₂ catalyst, and 2 equiv. of KOAc as the base in DMA during 6 h (Table 1, entry 4). Under these conditions, an intractable mixture of C5-arylated thiazole **1a**, 3-ethyl-5-arylthiazol-2(3*H*)-ones **1b**, with traces of 5-arylthiazol-2(3*H*)-ones **1c** was obtained (Ratio **1a:1b:1c** 67:24:9). The *O*- to *N*-alkyl migratory rearrangement at the origin of the formation of **1b** is a known reaction previously reported by Dong et al. (see scheme 1, c).⁷ The structures of **1a** and **1b** was confirmed by X-ray analysis.¹⁰ The C5-arylated thiazole **1a** was the major compound using shorter reaction times (1 h - 4 h) (Table 1, entries 1-3). Conversely, a longer reaction time (16 h) allowed to obtain **1b** in 83% selectivity and in 61% yield (Table 1, entry 5). Using a lower reaction temperature (100 °C), a good selectivity in favor of the formation of **1a** was observed (Ratio **1a:1b:1c** 90:4:6). At this temperature, the migratory rearrangement products were observed in very low yield. The influence of solvents was examined; however, both pentan-1-ol and cyclopentyl methyl ether led to low yields in **1a** due to a poor conversion of the aryl bromide and **1b** was not detected

(Table 1, entries 7 and 8). The use of dry DMA at 100 or 120 °C gave similar ratio of **1a:1b:1c** with the use of 99+ DMA (Table 1, entries 9 and 10).

Based on the conditions for selective C5–C–H thiazole arylation without migration: 1 mol% Pd(OAc)₂ catalyst, KOAc base at 100 °C during 6 h, the substrate scope and the functional group tolerance using 2-ethoxythiazole as the reaction partner was investigated (Scheme 2). First, the influence of *para*-substituents on the aryl bromide was determined (Scheme 2). Using 4-bromonitrobenzene or 4-bromobenzonitrile as the aryl sources, good yield of 63% and 78% in **2a** and **3a** were obtained. The reaction tolerates several other functional groups on the aryl bromide such as acetyl, formyl, propionyl, chloro, fluoro or phenyl, affording the 5-arylthiazoles **4a–9a** in 63–88% yields. For the reaction with 4-bromochlorobenzene, the C–Cl bond remained untouched potentially allowing for further functionalization. Conversely, the electron-rich 4-bromotoluene led to **10a** in a lower yield of 54%, and 4-bromoanisole gave the expected product **11a** in a very low yield due to a poor conversion of this aryl bromide. With this substrate, the use of 100 °C as the reaction temperature is not sufficient to promote efficiently the oxidative addition to palladium, but the use of a higher reaction temperature afforded the product **11b** in larger amount; whereas, **11a** was still obtained in very low yield. Formyl, acetyl or fluoro *meta*-substituents on the aryl bromide were well tolerated, and the expected 5-aryl thiazoles **12a–14a** were obtained in 56–77% yields.

Table 1. Influence of the reaction conditions on the selectivity of the C–H bond arylation of 2-ethoxythiazole.^a



Entry	Solvent ^b	Temp. (°C)	Time (h)	Conv. (%) ^c	Ratio ^d 1a:1b:1c	Yield in 1a or 1b (%)
1	DMA	120	1	27	98:0:2	nd
2	DMA	120	2	48	96:0:4	nd
3	DMA	120	4	78	89:5:6	nd
4	DMA	120	6	96	67:24:9	nd
5	DMA	120	16	100	3:83:14	61 of 1b
6	DMA	100	6	94	90:4:6	66 of 1a
7	pentan-1-ol	120	16	<15	100:0:0	nd
8	CPME	120	16	<15	100:0:0	nd
9	Dry DMA	120	16	94	68:21:11	nd
10	Dry DMA	100	6	92	92:3:5	nd

a Reaction conditions: Pd(OAc)₂ 1 mol%, 2-ethoxythiazole (1.5 equiv), 4-bromobenzotrifluoride (1 equiv).

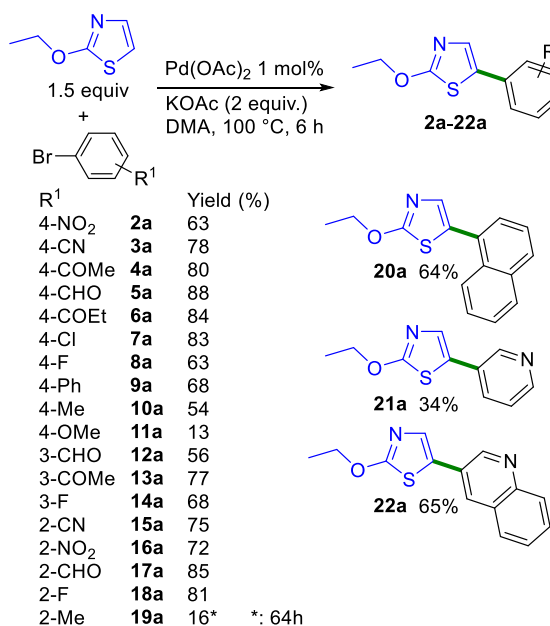
b DMA = dimethylacetamide; CPME = cyclopentyl methyl ether.

c Conv = conversion, based on consumption of 4-bromobenzotrifluoride determined by GC/MS analysis of the crude mixtures.

d Product ratio determined by GC/MS analysis of the crude mixtures.

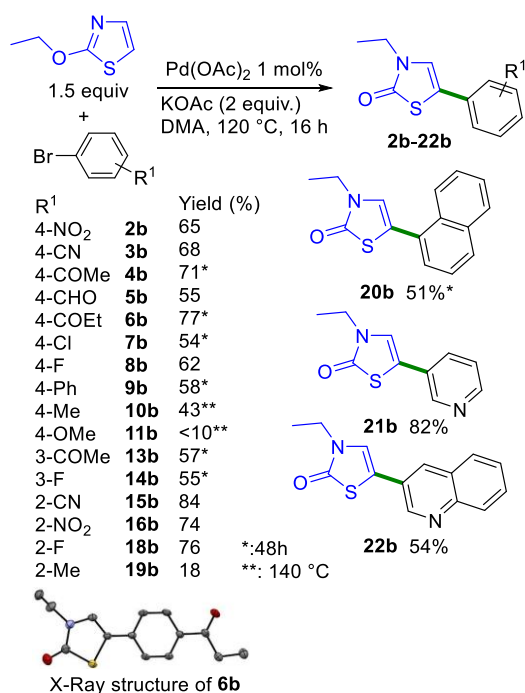
e Yield of isolated product; nd = not determined.

The presence of *ortho*-substituents on the aryl bromide may significantly influence the arylation yields due to steric factors; however, the use of 2-bromobenzonitrile, 2-bromonitrobenzene or 2-bromobenzaldehyde gave the 5-arylthiazoles **15a-17a** in notably high yields. The arylation of 2-ethoxythiazole by 2-fluorobromobenzene also proceeded in high yield. Conversely, the use of 2-bromotoluene gave the product **19a** in only 16% yield due to a very low conversion of this aryl bromide. Using the heteroaryl bromides, 3-bromopyridine and 3-bromoquinoline, the yields in the desired coupling products **21a** and **22a** were moderate to good.



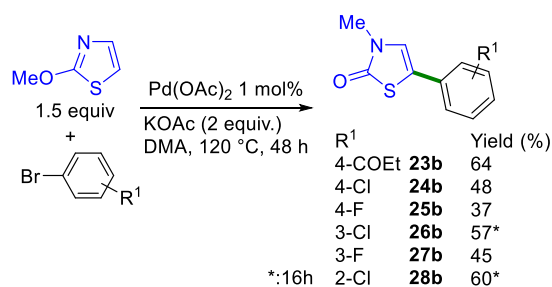
Scheme 2. Scope of C5-arylation of 2-ethoxythiazole.

The scope of the one pot preparation of 3-ethyl-5-arylthiazol-2(3*H*)-ones **b** was also studied using 120 °C as the reaction temperature and again 1 mol% Pd(OAc)₂ catalyst and KOAc base during 16-48 h (Scheme 3). Pleasingly, under these conditions in most cases, high selectivities favoring the formation of the desired 3-ethyl-5-arylthiazol-2(3*H*)-ones **b** were observed. Direct arylation with *O*- to *N*-alkyl migratory rearrangement from bromoarenes bearing nitro, cyano, acetyl, formyl, propionyl, chloro or fluoro *para*-substituents, gave the expected 5-arylthiazol-2(3*H*)-ones **2b-8b** in 54-77% yields. The structure of **6b** was confirmed by X-Ray analysis.¹⁰ Again, the use of the electron-rich aryl bromide 4-bromotoluene led to a lower yield in the desired product **10b** and a higher reaction temperature (140 °C) had to be employed, as at 120 °C a mixture of **10a** and **10b** was obtained. Substituents at *meta*-position on the aryl bromide were also well tolerated, with 3-bromoacetophenone and 3-fluorobenzene giving the products **13b** and **14b** in 57% and 55% yield, respectively. In general, the use of more hindered aryl bromides afforded the 5-arylthiazol-2(3*H*)-ones in high yields. 2-Cyano-, 2-nitro- and 2-fluoro substituted aryl bromides gave the products **15b**, **16b** and **18b** in 74-84% yields. We examined the opportunity to extend the reaction to heteroaryl bromides. Both 3-bromopyridine and 3-bromoquinoline gave the desired biheteroaryls **21b** and **22b** with high selectivity and good yields.



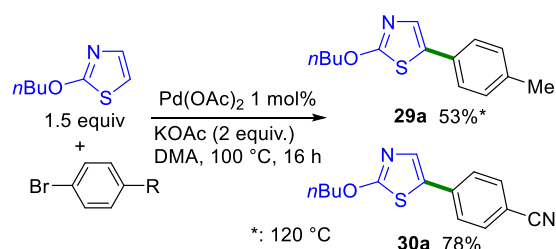
Scheme 3. Scope of C5-arylation of 2-ethoxythiazole with a *O*- to *N*-ethyl migratory rearrangement.

Several reactions using 2-methoxythiazole as the reaction partner were also performed at 120 °C in order to prepare 3-methyl-5-arylthiazol-2(3*H*)-ones (Scheme 4). Similar or lower yields in the desired products **23b-28b** than with 2-ethoxythiazole were obtained. However, the methyl migration step was slower and a long reaction time (48 h) was generally required to reach complete migration.



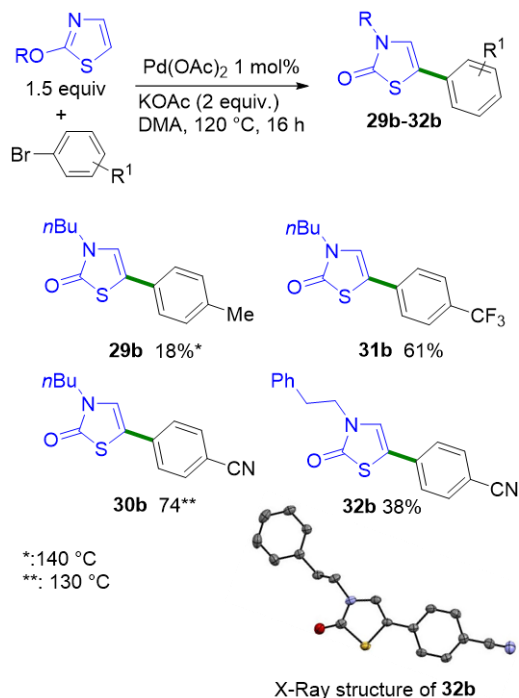
Scheme 4. Scope of C5-arylation of 2-methoxythiazole with a *O*- to *N*-methyl migratory rearrangement.

The reactivity of 2-nbutoxythiazole is quite similar to 2-ethoxythiazole (Schemes 5 and 6). At 100 - 120 °C, the C5-arylated thiazoles **29a** and **30a** were obtained in 53% and 78% yield, respectively.

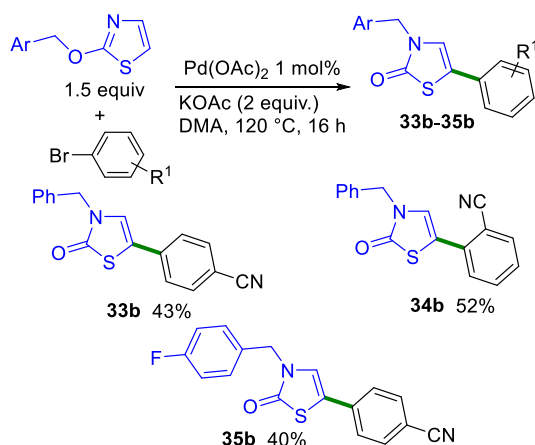


Scheme 5. Scope of C5-arylation of 2-*n*-butoxythiazole.

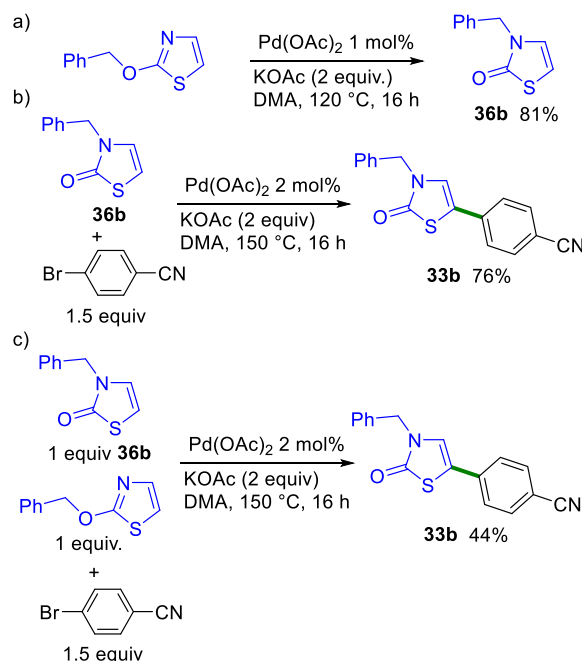
Again, using more elevated temperatures (120 - 140 °C), the *O*- to *N*-butyl migratory rearrangement occurred, giving rise to the products **29b-31b**. Better yields were obtained using electron-deficient aryl bromides. The migration of the phenethyl group of 2-phenethoxythiazole was slower, and the product **32b** was only obtained in 38% yield. The structure of **32b** was confirmed by X-Ray analysis.¹⁰

**Scheme 6.** Scope of the C5-arylation of 2-*n*-butoxythiazole or 2-phenethoxythiazole with a *O*- to *N*-alkyl migratory rearrangement.

Since benzyl is common protecting group of heteroarenes,¹¹ the reactivity 2-(benzyloxy)thiazole was examined (Scheme 7). In the presence of 2- or 4-bromobenzonitriles, the products **33b** and **34b** were obtained in moderate yields; whereas with 4-bromotoluene, the desired product was detected in very low yield. The reaction tolerated a 4-fluorobenzyl group on thiazole.

**Scheme 7.** Scope of the C5-arylation of 2-benzyloxythiazole with a *O*- to *N*-benzyl migratory rearrangement.

The reactivity of 2-(benzyloxy)thiazole in the absence of aryl bromide using the direct arylation conditions was also examined and provided the *O*- to *N*-alkyl migratory rearrangement product 3-benzylthiazol-2(3*H*)-one **36b** in 81% yield, indicating that during the direct arylation reaction, a partial *O*- to *N*-alkyl rearrangement may occur (Scheme 8, a).¹² We thus examined the reactivity of 3-benzylthiazol-2(3*H*)-one **36b** in Pd-catalyzed direct arylation. In the presence of 4-bromobenzonitrile, the expected product **33b** was obtained in 76% yield (Scheme 8, b), revealing that the formation of the 3-alkyl-5-arylthiazol-2(3*H*)-ones **b** may arise from the direct arylation of both 2-alkylthiazoles and 3-alkylthiazol-2(3*H*)-ones. As expected the use of an equimolar mixture of 2-(benzyloxy)thiazole and 3-benzylthiazol-2(3*H*)-one **36b** also afforded the product **33b**. (Scheme 8, c).

**Scheme 8.** 2-(Benzyloxy)thiazole *O*- to *N*-alkyl migratory rearrangement and Pd-catalyzed direct arylation of 3-benzylthiazol-2(3*H*)-one **36b**.

In summary, we disclosed simple general conditions for the palladium-catalyzed C-H bond functionalization of 2-alkoxythiazoles allowing the access to *i*) 2-alkoxy-5-arylthiazoles *via* direct C5-arylation or *ii*) 3-alkyl-5-arylthiazol-2(3*H*)-ones *via* one pot C5-arylation with a *O*- to *N*-alkyl migratory rearrangement. The selectivity of the reaction was found to strongly depend on the reaction temperature and time, as the *O*- to *N*-alkyl migratory rearrangement required a temperature > 100 °C. This temperature-dependent selectivity was applied to the synthesis of 2-alkoxythiazoles and 3-alkyl-5-arylthiazolones using a wide scope of aryl bromides including heteroaryl bromides. With ligand-free air-stable $\text{Pd}(\text{OAc})_2$ catalyst and inexpensive KOAc base in DMA, the C5-arylated thiazoles and 3-alkyl-5-arylthiazolones were obtained in good yields with aryl bromides bearing nitrile, nitro, acetyl, formyl, trifluoromethyl, chloro or fluoro substituents. Due to the wide availability of diversely substituted aryl bromides at an affordable cost, such simple reaction conditions should be very

attractive for synthetic chemists, giving a robust access to both 2-alkoxy-5-arylthiazoles and 3-alkyl-5-arylthiazol-2(3*H*)-ones.

Experimental section

General: Pd(OAc)₂ (99%) was purchased from Aldrich. DMA (99+%) extra pure and KOAc (99%) were purchased from ACROS. 2-Methoxythiazole and 2-ethoxythiazole were purchased from Fluorochem. These compounds were not purified before use.

Procedure A, typical experiment for the synthesis of C5-arylated thiazoles: (products **1a-30a**): The reaction of the aryl bromide (1 mmol), thiazole derivative (1.5 mmol) and KOAc (0.196 g, 2 mmol) in the presence of Pd(OAc)₂ (2.2 mg, 1 mol%) in DMA (5 mL) under argon at 100-120 °C (see schemes) during 6-64 h (see schemes), affords the C5-arylated thiazoles after cooling, evaporation of the solvent and filtration on silica gel (pentane/Et₂O).

Procedure B, typical experiment for the synthesis of C5-arylated thiazoles: (products **1b-35b**): The reaction of the aryl bromide (1 mmol), thiazole derivative (1.5 mmol) and KOAc (0.196 g, 2 mmol) in the presence of Pd(OAc)₂ (2.2 mg, 1 mol%) in DMA (5 mL) under argon at 120-140 °C (see schemes) during 16-48 h (see schemes), affords the C5-arylated thiazoles after cooling, evaporation of the solvent and filtration on silica gel (pentane/Et₂O).

2-Ethoxy-5-(4-(trifluoromethyl)phenyl)thiazole (1a)

Following procedure A, 4-bromobenzotrifluoride (0.225 g, 1 mmol) and 2-ethoxythiazole (0.194 g, 1.5 mmol) affords **1a** in 66% (0.180 g) yield as a white solid: mp 101-103 °C.

¹H NMR (400 MHz, CDCl₃): δ 7.60 (d, *J* = 8.2 Hz, 2H), 7.53 (d, *J* = 8.2 Hz, 2H), 7.40 (s, 1H), 4.51 (q, *J* = 7.3 Hz, 2H), 1.47 (t, *J* = 7.3 Hz, 3H).

¹³C NMR (100 MHz, CDCl₃): δ 174.6, 135.7, 133.8, 129.5 (q, *J* = 32.8 Hz), 129.4, 126.1 (q, *J* = 3.8 Hz), 125.5, 124.1 (q, *J* = 272.0 Hz), 68.0, 14.6.

HRMS calcd for [M+Na]⁺ C₁₂H₁₀F₃NOSNa 296.0327, found: 296.0327.

3-Ethyl-5-(4-(trifluoromethyl)phenyl)thiazol-2(3*H*)-one (1b)

Following procedure B, 4-bromobenzotrifluoride (0.225 g, 1 mmol) and 2-ethoxythiazole (0.194 g, 1.5 mmol) affords **1b** in 61% (0.166 g) yield as a white solid: mp 91-93 °C.

¹H NMR (400 MHz, CDCl₃): δ 7.60 (d, *J* = 8.2 Hz, 2H), 7.42 (d, *J* = 8.2 Hz, 2H), 6.96 (s, 1H), 3.83 (q, *J* = 7.3 Hz, 2H), 1.37 (t, *J* = 7.3 Hz, 3H).

¹³C NMR (100 MHz, CDCl₃): δ 170.4, 135.2, 129.5 (q, *J* = 32.8 Hz), 126.1 (q, *J* = 3.8 Hz), 124.9, 124.0 (q, *J* = 272.0 Hz), 120.8, 117.2, 40.8, 14.8.

HRMS calcd for [M+Na]⁺ C₁₂H₁₀F₃NOSNa 296.0327, found: 296.0330.

5-(4-(Trifluoromethyl)phenyl)thiazol-2(3*H*)-one (1c)

Following procedures A or B, this compound was isolated as a side-product in low yield as a side-product.

¹H NMR (400 MHz, CDCl₃): δ 9.24 (s, 1H), 7.63 (d, *J* = 8.2 Hz, 2H), 7.45 (d, *J* = 8.2 Hz, 2H), 6.98 (s, 1H).

¹H NMR (500 MHz, CD₃OD): δ 7.67 (d, *J* = 8.2 Hz, 2H), 7.60 (d, *J* = 8.2 Hz, 2H), 7.35 (s, 1H), 3.33 (s, 1H).

¹³C NMR (125 MHz, CD₃OD): δ 175.2, 137.3, 130.3 (q, *J* = 32.8 Hz), 127.1 (q, *J* = 3.8 Hz), 126.2, 125.6 (q, *J* = 272.0 Hz), 120.4, 120.0.

LRMS calcd for M⁺ C₁₀H₆F₃NOS 245, found 245.

2-Ethoxy-5-(4-nitrophenyl)thiazole (2a)

Following procedure A, 4-bromonitrobenzene (0.202 g, 1 mmol) and 2-ethoxythiazole (0.194 g, 1.5 mmol) affords **2a** in 63% (0.157 g) yield as a yellow solid: mp 174-176 °C.

¹H NMR (400 MHz, CDCl₃): δ 8.21 (d, *J* = 8.7 Hz, 2H), 7.56 (d, *J* = 8.7 Hz, 2H), 7.50 (s, 1H), 4.52 (q, *J* = 7.3 Hz, 2H), 1.47 (t, *J* = 7.3 Hz, 3H).

¹³C NMR (100 MHz, CDCl₃): δ 175.5, 146.7, 138.7, 135.3, 128.0, 125.9, 124.6, 68.3, 14.6.

HRMS calcd for [M+Na]⁺ C₁₁H₁₀N₂O₃SNa 273.0304, found: 273.0302.

2-Ethyl-5-(4-nitrophenyl)thiazol-2(3*H*)-one (2b)

Following procedure B, 4-bromonitrobenzene (0.202 g, 1 mmol) and 2-ethoxythiazole (0.194 g, 1.5 mmol) affords **2b** in 65% (0.162 g) yield as a yellow solid: mp >200 °C.

¹H NMR (400 MHz, CDCl₃): δ 8.22 (d, *J* = 8.7 Hz, 2H), 7.46 (d, *J* = 8.7 Hz, 2H), 7.08 (s, 1H), 3.86 (q, *J* = 7.3 Hz, 2H), 1.39 (t, *J* = 7.3 Hz, 3H).

¹³C NMR (100 MHz, CDCl₃): δ 170.2, 146.7, 138.1, 124.9, 124.6, 122.4, 116.4, 41.0, 14.8.

HRMS calcd for [M+Na]⁺ C₁₁H₁₀N₂O₃SNa 273.0304, found: 273.0306.

4-(2-Ethoxythiazol-5-yl)benzonitrile (3a)

Following procedure A, 4-bromobenzonitrile (0.182 g, 1 mmol) and 2-ethoxythiazole (0.194 g, 1.5 mmol) affords **3a** in 78% (0.179 g) yield as a white solid: mp 105-107 °C.

¹H NMR (400 MHz, CDCl₃): δ 7.59 (d, *J* = 8.2 Hz, 2H), 7.47 (d, *J* = 8.2 Hz, 2H), 7.41 (s, 1H), 4.48 (q, *J* = 7.3 Hz, 2H), 1.43 (t, *J* = 7.3 Hz, 3H).

¹³C NMR (100 MHz, CDCl₃): δ 174.8, 136.5, 134.6, 132.8, 128.9, 125.8, 118.7, 110.6, 68.0, 14.5.

HRMS calcd for [M+Na]⁺ C₁₂H₁₀N₂OSNa 253.0406, found: 253.0405.

4-(3-Ethyl-2-oxo-2,3-dihydrothiazol-5-yl)benzonitrile (3b)

Following procedure B, 4-bromobenzonitrile (0.182 g, 1 mmol) and 2-ethoxythiazole (0.194 g, 1.5 mmol) affords **3b** in 68% (0.156 g) yield as a yellow solid: mp 101-103 °C.

¹H NMR (400 MHz, CDCl₃): δ 7.62 (d, *J* = 8.2 Hz, 2H), 7.41 (d, *J* = 8.2 Hz, 2H), 7.02 (s, 1H), 3.83 (q, *J* = 7.3 Hz, 2H), 1.37 (t, *J* = 7.3 Hz, 3H).

¹³C NMR (100 MHz, CDCl₃): δ 170.2, 136.2, 132.8, 125.0, 121.8, 118.6, 116.6, 110.7, 40.9, 14.7.

HRMS calcd for [M+Na]⁺ C₁₂H₁₀N₂OSNa 253.0406, found: 253.0407.

1-(4-(2-Ethoxythiazol-5-yl)phenyl)ethan-1-one (4a)

Following procedure A, 4-bromoacetophenone (0.199 g, 1 mmol) and 2-ethoxythiazole (0.194 g, 1.5 mmol) affords **4a** in 80% (0.198 g) yield as a white solid: mp 85-87 °C.

^1H NMR (400 MHz, CDCl_3): δ 7.94 (d, J = 8.2 Hz, 2H), 7.50 (d, J = 8.2 Hz, 2H), 7.44 (s, 1H), 4.51 (q, J = 7.3 Hz, 2H), 2.60 (s, 3H), 1.46 (t, J = 7.3 Hz, 3H).

^{13}C NMR (100 MHz, CDCl_3): δ 197.3, 174.7, 136.7, 135.9, 134.1, 129.8, 129.3, 125.6, 68.0, 26.7, 14.6.

HRMS calcd for $[\text{M}+\text{Na}]^+$ $\text{C}_{13}\text{H}_{13}\text{NO}_2\text{SNa}$ 270.0559, found: 270.0562.

5-(4-Acetylphenyl)-3-ethylthiazol-2(3H)-one (4b)

Following procedure B, 4-bromoacetophenone (0.199 g, 1 mmol) and 2-ethoxythiazole (0.194 g, 1.5 mmol) affords **4b** in 71% (0.175 g) yield as a yellow solid: mp 166-168 °C.

^1H NMR (400 MHz, CDCl_3): δ 7.93 (d, J = 8.2 Hz, 2H), 7.40 (d, J = 8.2 Hz, 2H), 7.00 (s, 1H), 3.83 (q, J = 7.3 Hz, 2H), 2.59 (s, 3H), 1.37 (t, J = 7.3 Hz, 3H).

^{13}C NMR (100 MHz, CDCl_3): δ 197.2, 170.5, 136.2, 136.0, 129.2, 124.6, 121.0, 117.5, 40.8, 26.7, 14.8.

HRMS calcd for $[\text{M}+\text{Na}]^+$ $\text{C}_{13}\text{H}_{13}\text{NO}_2\text{SNa}$ 270.0559, found: 270.0560.

4-(2-Ethoxythiazol-5-yl)benzaldehyde (5a)

Following procedure A, 4-bromobenzaldehyde (0.185 g, 1 mmol) and 2-ethoxythiazole (0.194 g, 1.5 mmol) affords **5a** in 88% (0.205 g) yield as a white solid: mp 90-92 °C.

^1H NMR (400 MHz, CDCl_3): δ 9.95 (s, 1H), 7.83 (d, J = 8.2 Hz, 2H), 7.55 (d, J = 8.2 Hz, 2H), 7.45 (s, 1H), 4.49 (q, J = 7.3 Hz, 2H), 1.44 (t, J = 7.3 Hz, 3H).

^{13}C NMR (100 MHz, CDCl_3): δ 191.3, 174.9, 138.0, 135.1, 134.5, 130.5, 129.5, 125.9, 68.0, 14.5.

HRMS calcd for $[\text{M}+\text{Na}]^+$ $\text{C}_{12}\text{H}_{11}\text{NO}_2\text{SNa}$ 256.0403, found: 256.0404.

4-(3-Ethyl-2-oxo-2,3-dihydrothiazol-5-yl)benzaldehyde (5b)

Following procedure B, 4-bromobenzaldehyde (0.185 g, 1 mmol) and 2-ethoxythiazole (0.194 g, 1.5 mmol) affords **5b** in 55% (0.128 g) yield as a yellow solid: mp 138-140 °C.

^1H NMR (400 MHz, CDCl_3): δ 9.98 (s, 1H), 7.86 (d, J = 8.2 Hz, 2H), 7.47 (d, J = 8.2 Hz, 2H), 7.05 (s, 1H), 3.84 (q, J = 7.3 Hz, 2H), 1.38 (t, J = 7.3 Hz, 3H).

^{13}C NMR (100 MHz, CDCl_3): δ 191.3, 170.4, 137.6, 135.3, 130.6, 124.9, 121.6, 117.4, 40.9, 14.8.

HRMS calcd for $[\text{M}+\text{Na}]^+$ $\text{C}_{12}\text{H}_{11}\text{NO}_2\text{SNa}$ 256.0403, found: 256.0406.

1-(4-(2-Ethoxythiazol-5-yl)phenyl)propan-1-one (6a)

Following procedure A, 4-bromopropiophenone (0.213 g, 1 mmol) and 2-ethoxythiazole (0.194 g, 1.5 mmol) affords **6a** in 84% (0.219 g) yield as a white solid: mp 130-132 °C.

^1H NMR (400 MHz, CDCl_3): δ 7.93 (d, J = 8.2 Hz, 2H), 7.48 (d, J = 8.2 Hz, 2H), 7.41 (s, 1H), 4.49 (q, J = 7.3 Hz, 2H), 2.96 (q, J = 7.3 Hz, 2H), 1.45 (t, J = 7.3 Hz, 3H), 1.21 (t, J = 7.3 Hz, 3H).

^{13}C NMR (100 MHz, CDCl_3): δ 199.9, 174.6, 136.4, 135.6, 133.9, 129.8, 128.9, 125.5, 67.9, 31.8, 14.6, 8.35.

HRMS calcd for $[\text{M}+\text{Na}]^+$ $\text{C}_{14}\text{H}_{15}\text{NO}_2\text{SNa}$ 284.0716, found: 284.0718.

3-Ethyl-5-(4-propionylphenyl)thiazol-2(3H)-one (6b)

Following procedure B, 4-bromopropiophenone (0.213 g, 1 mmol) and 2-ethoxythiazole (0.194 g, 1.5 mmol) affords **6b** in 77% (0.201 g) yield as a yellow solid: mp 125-127 °C.

^1H NMR (400 MHz, CDCl_3): δ 7.93 (d, J = 8.2 Hz, 2H), 7.38 (d, J = 8.2 Hz, 2H), 7.00 (s, 1H), 3.82 (q, J = 7.3 Hz, 2H), 2.97 (q, J = 7.3 Hz, 2H), 1.37 (t, J = 7.3 Hz, 3H), 1.21 (t, J = 7.3 Hz, 3H).

^{13}C NMR (100 MHz, CDCl_3): δ 199.9, 170.4, 136.0, 135.7, 128.8, 124.6, 120.9, 117.5, 40.8, 31.8, 14.8, 8.3.

HRMS calcd for $[\text{M}+\text{Na}]^+$ $\text{C}_{14}\text{H}_{15}\text{NO}_2\text{SNa}$ 284.0716, found: 284.0714.

5-(4-Chlorophenyl)-2-ethoxythiazole (7a)

Following procedure A, 4-bromochlorobenzene (0.191 g, 1 mmol) and 2-ethoxythiazole (0.194 g, 1.5 mmol) affords **7a** in 83% (0.198 g) yield as a white solid: mp 79-81 °C.

^1H NMR (400 MHz, CDCl_3): δ 7.36 (d, J = 8.2 Hz, 2H), 7.32 (d, J = 8.2 Hz, 2H), 7.28 (s, 1H), 4.49 (q, J = 7.3 Hz, 2H), 1.45 (t, J = 7.3 Hz, 3H).

^{13}C NMR (100 MHz, CDCl_3): δ 173.9, 133.4, 132.6, 130.6, 129.7, 129.3, 127.1, 67.8, 14.6.

HRMS calcd for $[\text{M}+\text{Na}]^+$ $\text{C}_{11}\text{H}_{10}\text{ClNOSNa}$ 262.0064, found: 262.0065.

5-(4-Chlorophenyl)-3-ethylthiazol-2(3H)-one (7b)

Following procedure B, 4-bromochlorobenzene (0.191 g, 1 mmol) and 2-ethoxythiazole (0.194 g, 1.5 mmol) affords **7b** in 54% (0.129 g) yield as a white solid: mp 101-103 °C.

^1H NMR (400 MHz, CDCl_3): δ 7.32 (d, J = 8.2 Hz, 2H), 7.26 (d, J = 8.2 Hz, 2H), 6.82 (s, 1H), 3.81 (q, J = 7.3 Hz, 2H), 1.36 (t, J = 7.3 Hz, 3H).

^{13}C NMR (100 MHz, CDCl_3): δ 170.5, 133.5, 130.3, 129.3, 126.1, 119.4, 117.6, 40.7, 14.8.

HRMS calcd for $[\text{M}+\text{Na}]^+$ $\text{C}_{11}\text{H}_{10}\text{ClNOSNa}$ 262.0064, found: 262.0063.

2-Ethoxy-5-(4-fluorophenyl)thiazole (8a)

Following procedure A, 4-bromofluorobenzene (0.175 g, 1 mmol) and 2-ethoxythiazole (0.194 g, 1.5 mmol) affords **8a** in 63% (0.140 g) yield as a white solid: mp 67-69 °C.

^1H NMR (400 MHz, CDCl_3): δ 7.40 (dd, J = 8.3, 5.2 Hz, 2H), 7.22 (s, 1H), 7.05 (t, J = 8.2 Hz, 2H), 4.48 (q, J = 7.3 Hz, 2H), 1.45 (t, J = 7.3 Hz, 3H).

^{13}C NMR (100 MHz, CDCl_3): δ 173.7, 162.3 (d, J = 247.5 Hz), 132.1, 129.9, 128.3, 127.7 (d, J = 8.0 Hz), 116.1 (d, J = 21.9 Hz), 67.8, 14.6.

HRMS calcd for $[\text{M}+\text{Na}]^+$ $\text{C}_{11}\text{H}_{10}\text{FNOSNa}$ 246.0359, found: 256.0359.

3-Ethyl-5-(4-fluorophenyl)thiazol-2(3H)-one (8b)

Following procedure B, 4-bromofluorobenzene (0.175 g, 1 mmol) and 2-ethoxythiazole (0.194 g, 1.5 mmol) affords **8b** in 62% (0.138 g) yield as a white solid: mp 81-83 °C.

^1H NMR (400 MHz, CDCl_3): δ 7.31 (dd, J = 8.3, 5.2 Hz, 2H), 7.05 (t, J = 8.2 Hz, 2H), 6.75 (s, 1H), 3.81 (q, J = 7.3 Hz, 2H), 1.36 (t, J = 7.3 Hz, 3H).

^{13}C NMR (100 MHz, CDCl_3): δ 170.6, 162.4 (d, J = 247.5 Hz), 128.0 (d, J = 3.4 Hz), 126.7 (d, J = 8.1 Hz), 118.8, 117.8, 116.1 (d, J = 22.0 Hz), 40.6, 14.8.

HRMS calcd for $[\text{M}+\text{Na}]^+$ $\text{C}_{11}\text{H}_{10}\text{FNOSNa}$ 246.0359, found: 256.0361.

5-([1,1'-Biphenyl]-4-yl)-2-ethoxythiazole (9a)

Following procedure A, 4-bromobiphenyl (0.233 g, 1 mmol) and 2-ethoxythiazole (0.194 g, 1.5 mmol) affords **9a** in 68% (0.191 g) yield as a yellow solid: mp 137-139 °C.

¹H NMR (400 MHz, CDCl₃): δ 7.63-7.57 (m, 4H), 7.52 (d, *J* = 8.2 Hz, 2H), 7.48-7.42 (m, 2H), 7.39-7.32 (m, 2H), 4.51 (q, *J* = 7.3 Hz, 2H), 1.47 (t, *J* = 7.3 Hz, 3H).

¹³C NMR (100 MHz, CDCl₃): δ 173.8, 140.5, 140.4, 132.2, 131.1, 130.6, 129.0, 127.7, 127.6, 127.0, 126.3, 67.6, 14.6.

HRMS calcd for [M+Na]⁺ C₁₇H₁₅NONa 304.767, found: 304.0767.

5-([1,1'-Biphenyl]-4-yl)-3-ethylthiazol-2(3H)-one (9b)

Following procedure B, 4-bromobiphenyl (0.233 g, 1 mmol) and 2-ethoxythiazole (0.194 g, 1.5 mmol) affords **9b** in 58% (0.163 g) yield as a yellow solid: mp 162-164 °C.

¹H NMR (400 MHz, CDCl₃): δ 7.60 (d, *J* = 8.2 Hz, 4H), 7.49-7.31 (m, 5H), 6.88 (s, 1H), 3.83 (q, *J* = 7.3 Hz, 2H), 1.38 (t, *J* = 7.3 Hz, 3H).

¹³C NMR (100 MHz, CDCl₃): δ 170.7, 140.7, 140.3, 130.7, 129.0, 127.8, 127.7, 127.0, 125.3, 119.0, 118.5, 40.6, 14.8.

HRMS calcd for [M+Na]⁺ C₁₇H₁₅NOSNa 304.0767, found: 304.0764.

2-Ethoxy-5-(*p*-tolyl)thiazole (10a)

Following procedure A, 4-bromotoluene (0.171 g, 1 mmol) and 2-ethoxythiazole (0.194 g, 1.5 mmol) affords **10a** in 54% (0.118 g) yield as a white solid: mp 36-38 °C.

¹H NMR (400 MHz, CDCl₃): δ 7.35 (d, *J* = 8.1 Hz, 2H), 7.28 (s, 1H), 7.18 (d, *J* = 8.1 Hz, 2H), 4.50 (q, *J* = 7.3 Hz, 2H), 2.37 (s, 3H), 1.47 (t, *J* = 7.3 Hz, 3H).

¹³C NMR (100 MHz, CDCl₃): δ 173.4, 137.5, 131.6, 131.0, 129.7, 129.2, 125.9, 67.5, 21.3, 14.6.

HRMS calcd for [M+Na]⁺ C₁₂H₁₃NOSNa 242.0610, found: 242.0611.

3-Ethyl-5-(*p*-tolyl)thiazol-2(3H)-one (10b)

Following procedure B at 140 °C, 4-bromotoluene (0.171 g, 1 mmol) and 2-ethoxythiazole (0.194 g, 1.5 mmol) affords **10b** in 43% (0.094 g) yield as a yellow solid: mp 81-83 °C.

¹H NMR (400 MHz, CDCl₃): δ 7.25 (d, *J* = 8.1 Hz, 2H), 7.16 (d, *J* = 8.1 Hz, 2H), 6.77 (s, 1H), 3.81 (q, *J* = 7.3 Hz, 2H), 2.35 (s, 3H), 1.36 (t, *J* = 7.3 Hz, 3H).

¹³C NMR (100 MHz, CDCl₃): δ 170.8, 137.8, 129.8, 128.9, 124.9, 119.0, 118.3, 40.5, 21.3, 14.8.

HRMS calcd for [M+Na]⁺ C₁₂H₁₃NOSNa 242.0610, found: 242.0611.

2-Ethoxy-5-(4-methoxyphenyl)thiazole (11a)

Following procedure A, 4-bromoanisole (0.187 g, 1 mmol) and 2-ethoxythiazole (0.194 g, 1.5 mmol) affords **11a** in 13% (0.030 g) yield as a white solid: mp 78-80 °C.

¹H NMR (400 MHz, CDCl₃): δ 7.36 (d, *J* = 8.2 Hz, 2H), 7.18 (s, 1H), 6.90 (d, *J* = 8.2 Hz, 2H), 4.48 (q, *J* = 7.3 Hz, 2H), 3.82 (s, 3H), 1.45 (t, *J* = 7.3 Hz, 3H).

¹³C NMR (100 MHz, CDCl₃): δ 173.8, 159.4, 131.0, 127.4, 124.7, 114.5, 67.5, 55.5, 14.7.

HRMS calcd for [M+Na]⁺ C₁₂H₁₃NO₂Na 258.0559, found: 258.0560.

3-(2-Ethoxythiazol-5-yl)benzaldehyde (12a)

Following procedure A, 3-bromobenzaldehyde (0.185 g, 1 mmol) and 2-ethoxythiazole (0.194 g, 1.5 mmol) affords **12a** in 56% (0.130 g) yield as a yellow solid: mp 66-68 °C.

¹H NMR (400 MHz, CDCl₃): δ 10.03 (s, 1H), 7.92 (s, 1H), 7.76 (d, *J* = 7.8 Hz, 1H), 7.68 (d, *J* = 7.8 Hz, 1H), 7.53 (t, *J* = 7.8 Hz, 1H), 7.40 (s, 1H), 4.50 (q, *J* = 7.3 Hz, 2H), 1.46 (t, *J* = 7.3 Hz, 3H).

¹³C NMR (100 MHz, CDCl₃): δ 192.0, 174.3, 137.1, 133.3, 133.2, 131.5, 129.8, 129.4, 128.9, 126.4, 67.9, 14.6.

HRMS calcd for [M+Na]⁺ C₁₂H₁₁NO₂Na 256.0403, found: 256.0403.

1-(3-(2-Ethoxythiazol-5-yl)phenyl)ethan-1-one (13a)

Following procedure A, 3-bromoacetophenone (0.199 g, 1 mmol) and 2-ethoxythiazole (0.194 g, 1.5 mmol) affords **13a** in 77% (0.190 g) yield as a yellow solid: mp 58-60 °C.

¹H NMR (400 MHz, CDCl₃): δ 7.97 (s, 1H), 7.80 (d, *J* = 8.2 Hz, 1H), 7.59 (d, *J* = 8.2 Hz, 1H), 7.41 (t, *J* = 7.8 Hz, 1H), 7.36 (s, 1H), 4.47 (q, *J* = 7.3 Hz, 2H), 2.59 (s, 3H), 1.43 (t, *J* = 7.3 Hz, 3H).

¹³C NMR (100 MHz, CDCl₃): δ 197.7, 174.0, 137.8, 132.9, 132.7, 130.2, 129.3, 127.4, 125.3, 67.7, 26.7, 14.5.

HRMS calcd for [M+Na]⁺ C₁₃H₁₃NO₂Na 270.0559, found: 270.0559.

5-(3-Acetylphenyl)-3-ethylthiazol-2(3H)-one (13b)

Following procedure B, 3-bromoacetophenone (0.199 g, 1 mmol) and 2-ethoxythiazole (0.194 g, 1.5 mmol) affords **13b** in 57% (0.141 g) yield as a yellow solid: mp 113-115 °C.

¹H NMR (400 MHz, CDCl₃): δ 7.93 (s, 1H), 7.82 (d, *J* = 8.2 Hz, 1H), 7.52-7.41 (m, 2H), 6.95 (s, 1H), 3.82 (q, *J* = 7.3 Hz, 2H), 2.62 (s, 3H), 1.37 (t, *J* = 7.3 Hz, 3H).

¹³C NMR (100 MHz, CDCl₃): δ 197.7, 170.5, 137.8, 132.4, 129.4, 129.3, 127.6, 124.1, 120.0, 117.7, 40.7, 26.8, 14.8.

HRMS calcd for [M+Na]⁺ C₁₃H₁₃NO₂Na 270.0559, found: 270.0561.

2-Ethoxy-5-(3-fluorophenyl)thiazole (14a)

Following procedure A, 3-bromofluorobenzene (0.175 g, 1 mmol) and 2-ethoxythiazole (0.194 g, 1.5 mmol) affords **14a** in 68% (0.151 g) yield as a white solid: mp 60-62 °C.

¹H NMR (400 MHz, CDCl₃): δ 7.35-7.25 (m, 2H), 7.20 (d, *J* = 8.0 Hz, 1H), 7.13 (dt, *J* = 8.0, 1.2 Hz, 1H), 6.95 (dd, *J* = 8.0, 1.4 Hz, 1H), 4.48 (q, *J* = 7.3 Hz, 2H), 1.45 (t, *J* = 7.3 Hz, 3H).

¹³C NMR (100 MHz, CDCl₃): δ 174.8, 163.1 (d, *J* = 247.0 Hz), 134.2 (d, *J* = 8.3 Hz), 133.0, 130.6 (d, *J* = 8.7 Hz), 129.6, 121.6 (d, *J* = 2.9 Hz), 114.4 (d, *J* = 21.3 Hz), 112.7 (d, *J* = 23.0 Hz), 67.8, 14.6.

HRMS calcd for [M+Na]⁺ C₁₁H₁₀FNOSNa 246.0359, found: 246.0358.

3-Ethyl-5-(3-fluorophenyl)thiazol-2(3H)-one (14b)

Following procedure B, 3-bromofluorobenzene (0.175 g, 1 mmol) and 2-ethoxythiazole (0.194 g, 1.5 mmol) affords **14b** in 55% (0.123 g) yield as a yellow solid: mp 68-70 °C.

¹H NMR (400 MHz, CDCl₃): δ 7.35-7.28 (m, 1H), 7.10 (d, *J* = 8.0 Hz, 1H), 7.03 (dt, *J* = 8.0, 1.2 Hz, 1H), 6.99 (dd, *J* = 8.0, 1.4 Hz, 1H), 6.86 (s, 1H), 3.82 (q, *J* = 7.3 Hz, 2H), 1.37 (t, *J* = 7.3 Hz, 3H).

¹³C NMR (100 MHz, CDCl₃): δ 170.5, 163.2 (d, *J* = 247.0 Hz), 133.9 (d, *J* = 8.3 Hz), 130.7 (d, *J* = 8.7 Hz), 120.6 (d, *J* = 3.0 Hz), 119.9, 117.6, 114.7 (d, *J* = 21.3 Hz), 111.8 (d, *J* = 22.2 Hz), 40.7, 14.8.

HRMS calcd for [M+Na]⁺ C₁₁H₁₀FNOSNa 246.0359, found: 246.0359.

2-(2-Ethoxythiazol-5-yl)benzonitrile (15a)

Following procedure A, 2-bromobenzonitrile (0.182 g, 1 mmol) and 2-ethoxythiazole (0.194 g, 1.5 mmol) affords **15a** in 75% (0.172 g) yield as a white solid: mp 64-66 °C.

¹H NMR (400 MHz, CDCl₃): δ 7.70 (dd, *J* = 8.2, 0.9 Hz, 1H), 7.58 (s, 1H), 7.57 (td, *J* = 7.8, 1.3 Hz, 1H), 7.46 (d, *J* = 8.2 Hz, 1H), 7.36 (td, *J* = 7.8, 1.3 Hz, 1H), 4.51 (q, *J* = 7.3 Hz, 2H), 1.45 (t, *J* = 7.3 Hz, 3H).

¹³C NMR (100 MHz, CDCl₃): δ 175.2, 136.7, 135.1, 134.4, 133.1, 129.5, 127.8, 126.1, 118.6, 110.1, 68.0, 14.6.

HRMS calcd for [M+Na]⁺ C₁₂H₁₀N₂OSNa 253.0406, found: 253.0408.

2-(3-Ethyl-2-oxo-2,3-dihydrothiazol-5-yl)benzonitrile (15b)

Following procedure B, 2-bromobenzonitrile (0.182 g, 1 mmol) and 2-ethoxythiazole (0.194 g, 1.5 mmol) affords **15b** in 84% (0.193 g) yield as a white solid: mp 60-62 °C.

¹H NMR (400 MHz, CDCl₃): δ 7.69 (d, *J* = 8.2 Hz, 1H), 7.58 (t, *J* = 7.8 Hz, 1H), 7.40-7.31 (m, 3H), 3.84 (q, *J* = 7.3 Hz, 2H), 1.37 (t, *J* = 7.3 Hz, 3H).

¹³C NMR (100 MHz, CDCl₃): δ 170.2, 134.5, 133.4, 128.5, 127.6, 124.1, 118.8, 114.0, 108.6, 40.9, 14.7.

HRMS calcd for [M+Na]⁺ C₁₂H₁₀N₂OSNa 253.0406, found: 253.0406.

2-Ethoxy-5-(2-nitrophenyl)thiazole (16a)

Following procedure A, 2-bromonitrobenzene (0.202 g, 1 mmol) and 2-ethoxythiazole (0.194 g, 1.5 mmol) affords **16a** in 72% (0.180 g) yield as a yellow oil.

¹H NMR (400 MHz, CDCl₃): δ 7.81 (d, *J* = 8.2 Hz, 1H), 7.60 (t, *J* = 7.8 Hz, 1H), 7.53-7.45 (m, 2H), 7.11 (s, 1H), 4.50 (q, *J* = 7.3 Hz, 2H), 1.46 (t, *J* = 7.3 Hz, 3H).

¹³C NMR (100 MHz, CDCl₃): δ 175.7, 149.4, 136.2, 132.7, 132.4, 129.1, 125.9, 124.3, 123.8, 68.0, 14.6.

HRMS calcd for [M+Na]⁺ C₁₁H₁₀N₂O₃Na 273.0304, found: 273.0305.

3-Ethyl-5-(2-nitrophenyl)thiazol-2(3H)-one (16b)

Following procedure B, 2-bromonitrobenzene (0.202 g, 1 mmol) and 2-ethoxythiazole (0.194 g, 1.5 mmol) affords **16b** in 74% (0.185 g) yield as a yellow solid: mp 67-69 °C.

¹H NMR (400 MHz, CDCl₃): δ 7.77 (d, *J* = 8.2 Hz, 1H), 7.60 (t, *J* = 7.8 Hz, 1H), 7.49-7.43 (m, 2H), 6.69 (s, 1H), 3.80 (q, *J* = 7.3 Hz, 2H), 1.34 (t, *J* = 7.3 Hz, 3H).

¹³C NMR (100 MHz, CDCl₃): δ 170.9, 149.2, 132.5, 131.9, 129.1, 125.7, 124.4, 123.2, 112.0, 40.8, 14.8.

HRMS calcd for [M+Na]⁺ C₁₁H₁₀N₂O₃Na 273.0304, found: 273.0306.

2-(2-Ethoxythiazol-5-yl)benzaldehyde (17a)

Following procedure A, 2-bromobenzaldehyde (0.185 g, 1 mmol) and 2-ethoxythiazole (0.194 g, 1.5 mmol) affords **17a** in 85% (0.198 g) yield as a yellow solid: mp 72-74 °C.

¹H NMR (400 MHz, CDCl₃): δ 10.23 (s, 1H), 7.99 (d, *J* = 8.2 Hz, 1H), 7.60 (td, *J* = 7.8, 1.4 Hz, 1H), 7.52-7.43 (m, 2H), 7.03 (s, 1H), 4.52 (q, *J* = 7.3 Hz, 2H), 1.47 (t, *J* = 7.3 Hz, 3H).

¹³C NMR (100 MHz, CDCl₃): δ 191.5, 175.6, 137.6, 134.8, 134.6, 133.9, 131.6, 128.7, 128.4, 125.0, 68.0, 14.6.

HRMS calcd for [M+Na]⁺ C₁₂H₁₁NO₂Na 256.0403, found: 256.0403.

2-Ethoxy-5-(2-fluorophenyl)thiazole (18a)

Following procedure A, 2-bromofluorobenzene (0.175 g, 1 mmol) and 2-ethoxythiazole (0.194 g, 1.5 mmol) affords **18a** in 81% (0.180 g) yield as a yellow oil.

¹H NMR (400 MHz, CDCl₃): δ 7.49 (s, 1H), 7.46 (td, *J* = 7.6, 2.0 Hz, 1H), 7.25-7.20 (m, 1H), 7.17-7.09 (m, 2H), 4.51 (q, *J* = 7.3 Hz, 2H), 1.47 (t, *J* = 7.3 Hz, 3H).

¹³C NMR (100 MHz, CDCl₃): δ 174.8, 159.0 (d, *J* = 249.0 Hz), 135.5 (d, *J* = 7.6 Hz), 128.8 (d, *J* = 8.2 Hz), 128.4 (d, *J* = 3.5 Hz), 124.7 (d, *J* = 3.4 Hz), 124.0, 120.0 (d, *J* = 13.5 Hz), 116.3 (d, *J* = 22.1 Hz), 67.9, 14.7.

HRMS calcd for [M+Na]⁺ C₁₁H₁₀FNOSNa 246.0359, found: 246.0361.

3-Ethyl-5-(2-fluorophenyl)thiazol-2(3H)-one (18b)

Following procedure B, 2-bromofluorobenzene (0.175 g, 1 mmol) and 2-ethoxythiazole (0.194 g, 1.5 mmol) affords **18b** in 76% (0.169 g) yield as a yellow solid: mp 54-56 °C.

¹H NMR (400 MHz, CDCl₃): δ 7.28-7.18 (m, 2H), 7.16-7.10 (m, 2H), 7.09 (s, 1H), 3.82 (q, *J* = 7.3 Hz, 2H), 1.37 (t, *J* = 7.3 Hz, 3H).

¹³C NMR (100 MHz, CDCl₃): δ 170.3, 159.4 (d, *J* = 249.5 Hz), 128.5 (d, *J* = 8.6 Hz), 127.7 (d, *J* = 3.5 Hz), 124.8 (d, *J* = 3.5 Hz), 123.5 (d, *J* = 14.6 Hz), 119.7 (d, *J* = 12.2 Hz), 116.2 (d, *J* = 22.0 Hz), 112.5 (d, *J* = 3.1 Hz), 40.7, 14.8.

HRMS calcd for [M+Na]⁺ C₁₁H₁₀FNOSNa 246.0359, found: 246.0359.

2-Ethoxy-5-(o-tolyl)thiazole (19a)

Following procedure A, 2-bromotoluene (0.171 g, 1 mmol) and 2-ethoxythiazole (0.194 g, 1.5 mmol) affords **19a** in 16% (0.035 g) yield as a colorless oil.

¹H NMR (400 MHz, CDCl₃): δ 7.33 (d, *J* = 7.9 Hz, 1H), 7.30-7.17 (m, 3H), 7.07 (s, 1H), 4.51 (q, *J* = 7.3 Hz, 2H), 2.41 (s, 3H), 1.47 (t, *J* = 7.3 Hz, 3H).

¹³C NMR (100 MHz, CDCl₃): δ 173.8, 136.6, 134.6, 131.2, 130.9, 130.6, 128.3, 126.2, 67.6, 21.2, 14.7.

HRMS calcd for [M+Na]⁺ C₁₂H₁₃NOSNa 242.0610, found: 242.0609.

3-Ethyl-5-(o-tolyl)thiazol-2(3H)-one (19b)

Following procedure B, 2-bromotoluene (0.171 g, 1 mmol) and 2-ethoxythiazole (0.194 g, 1.5 mmol) affords **19b** in 18% (0.039 g) yield as a yellow oil.

¹H NMR (400 MHz, CDCl₃): δ 7.30-7.15 (m, 4H), 6.53 (s, 1H), 3.82 (q, *J* = 7.3 Hz, 2H), 2.42 (s, 3H), 1.37 (t, *J* = 7.3 Hz, 3H).

¹³C NMR (100 MHz, CDCl₃): δ 171.5, 136.5, 131.1, 131.0, 129.9, 128.5, 126.4, 121.4, 117.9, 40.4, 21.2, 14.8.

HRMS calcd for [M+Na]⁺ C₁₂H₁₃NOSNa 242.0610, found: 242.0612.

2-Ethoxy-5-(naphthalen-1-yl)thiazole (20a)

Following procedure A, 1-bromonaphthalene (0.207 g, 1 mmol) and 2-ethoxythiazole (0.194 g, 1.5 mmol) affords **13a bis** in 64% (0.164 g) yield as a yellow oil.

¹H NMR (400 MHz, CDCl₃): δ 8.25-8.19 (m, 1H), 7.92-7.83 (m, 2H), 7.56-7.44 (m, 4H), 7.23 (s, 1H), 4.55 (q, *J* = 7.3 Hz, 2H), 1.51 (t, *J* = 7.3 Hz, 3H).

¹³C NMR (100 MHz, CDCl₃): δ 174.8, 135.5, 133.9, 132.2, 129.2, 129.0, 128.7, 128.5, 127.8, 126.8, 126.3, 125.5, 125.4, 67.6, 14.7.

HRMS calcd for [M+Na]⁺ C₁₅H₁₃NOSNa 278.0610, found: 278.0614.

3-Ethyl-5-(naphthalen-1-yl)thiazol-2(3H)-one (20b)

Following procedure B, 1-bromonaphthalene (0.207 g, 1 mmol) and 2-ethoxythiazole (0.194 g, 1.5 mmol) affords **20b** in 51% (0.130 g) yield as a yellow oil.

¹H NMR (400 MHz, CDCl₃): δ 8.22 (d, *J* = 8.0 Hz, 1H), 7.92-7.83 (m, 2H), 7.56-7.44 (m, 4H), 6.71 (s, 1H), 3.88 (q, *J* = 7.3 Hz, 2H), 1.41 (t, *J* = 7.3 Hz, 3H).

¹³C NMR (100 MHz, CDCl₃): δ 171.7, 134.0, 131.9, 129.4, 129.2, 128.7, 128.2, 126.9, 126.4, 125.5, 125.1, 122.1, 116.6, 40.5, 14.9.

HRMS calcd for [M+Na]⁺ C₁₅H₁₃NOSNa 278.0610, found: 278.0607.

2-Ethoxy-5-(pyridin-3-yl)thiazole (21a)

Following procedure A, 3-bromopyridine (0.158 g, 1 mmol) and 2-ethoxythiazole (0.194 g, 1.5 mmol) affords **21a** in 34% (0.070 g) yield as a yellow solid: mp 132-134 °C.

¹H NMR (400 MHz, CDCl₃): δ 8.72 (bs, 1H), 8.51 (bs, 1H), 7.74 (d, *J* = 8.0 Hz, 1H), 7.37 (s, 1H), 7.32 (dd, *J* = 8.0, 4.8 Hz, 1H), 4.51 (q, *J* = 7.3 Hz, 2H), 1.46 (t, *J* = 7.3 Hz, 3H).

¹³C NMR (100 MHz, CDCl₃): δ 174.6, 148.3, 146.6, 133.7, 133.3, 128.6, 126.9, 123.9, 68.0, 14.6.

HRMS calcd for [M+Na]⁺ C₁₀H₁₀N₂OSNa 229.0406, found: 229.0404.

3-Ethyl-5-(pyridin-3-yl)thiazol-2(3H)-one (21b)

Following procedure B, 3-bromopyridine (0.158 g, 1 mmol) and 2-ethoxythiazole (0.194 g, 1.5 mmol) affords **21b** in 82% (0.169 g) yield as a yellow solid: mp 87-89 °C.

¹H NMR (400 MHz, CDCl₃): δ 8.68 (bs, 1H), 8.51 (bs, 1H), 7.62 (d, *J* = 8.0 Hz, 1H), 7.32 (dd, *J* = 8.0, 4.8 Hz, 1H), 6.95 (s, 1H), 3.84 (q, *J* = 7.3 Hz, 2H), 1.38 (t, *J* = 7.3 Hz, 3H).

¹³C NMR (100 MHz, CDCl₃): δ 170.4, 148.3, 145.6, 132.5, 128.3, 124.0, 120.5, 115.0, 40.8, 14.8.

HRMS calcd for [M+Na]⁺ C₁₀H₁₀N₂OSNa 229.0406, found: 229.0404.

2-Ethoxy-5-(quinolin-3-yl)thiazole (22a)

Following procedure A, 3-bromoquinoline (0.208 g, 1 mmol) and 2-ethoxythiazole (0.194 g, 1.5 mmol) affords **22a** in 65% (0.166 g) yield as a yellow solid: mp 115-117 °C.

¹H NMR (400 MHz, CDCl₃): δ 9.07 (d, *J* = 2.2 Hz, 1H), 8.11 (d, *J* = 8.0 Hz, 1H), 8.09 (d, *J* = 2.2 Hz, 1H), 7.82 (d, *J* = 8.0 Hz, 1H), 7.70 (t, *J* = 8.0 Hz, 1H), 7.57 (t, *J* = 8.0 Hz, 1H), 7.51 (s, 1H), 4.54 (q, *J* = 7.3 Hz, 2H), 1.48 (t, *J* = 7.3 Hz, 3H).

¹³C NMR (100 MHz, CDCl₃): δ 174.5, 147.9, 147.0, 133.8, 131.8, 129.7, 129.3, 128.0, 127.8, 127.6, 127.5, 125.6, 68.0, 14.6.

HRMS calcd for [M+Na]⁺ C₁₄H₁₂N₂OSNa 279.0562, found: 279.0564.

3-Ethyl-5-(quinolin-3-yl)thiazol-2(3H)-one (22b)

Following procedure B, 3-bromoquinoline (0.208 g, 1 mmol) and 2-ethoxythiazole (0.194 g, 1.5 mmol) affords **22b** in 54% (0.138 g) yield as a yellow solid: mp 164-166 °C.

¹H NMR (400 MHz, CDCl₃): δ 9.00 (s, 1H), 8.10 (d, *J* = 8.0 Hz, 1H), 7.94 (d, *J* = 2.2 Hz, 1H), 7.81 (d, *J* = 8.0 Hz, 1H), 7.71 (t, *J* = 8.0 Hz, 1H), 7.58 (t, *J* = 8.0 Hz, 1H), 7.08 (s, 1H), 3.87 (q, *J* = 7.3 Hz, 2H), 1.41 (t, *J* = 7.3 Hz, 3H).

¹³C NMR (100 MHz, CDCl₃): δ 170.3, 147.0, 146.6, 134.3, 131.1, 129.8, 129.2, 127.9, 127.8, 125.7, 120.7, 115.7, 40.9, 14.8.

HRMS calcd for [M+Na]⁺ C₁₄H₁₂N₂OSNa 279.0562, found: 279.0563.

3-Methyl-5-(4-propionylphenyl)thiazol-2(3H)-one (23b)

Following procedure B, 4-bromopropiophenone (0.213 g, 1 mmol) and 2-methoxythiazole (0.173 g, 1.5 mmol) affords **23b** in 64% (0.158 g) yield as a yellow solid: mp 144-146 °C.

¹H NMR (400 MHz, CDCl₃): δ 7.95 (d, *J* = 8.3 Hz, 2H), 7.39 (d, *J* = 8.3 Hz, 2H), 6.96 (s, 1H), 2.99 (q, *J* = 7.6 Hz, 2H), 3.42 (s, 3H), 1.23 (t, *J* = 7.6 Hz, 3H).

¹³C NMR (100 MHz, CDCl₃): δ 199.9, 170.9, 135.9, 135.8, 128.9, 124.6, 122.1, 117.5, 32.5, 31.9, 8.4.

HRMS calcd for [M+Na]⁺ C₁₃H₁₃NO₂SNa 270.0559, found: 270.0559.

5-(4-Chlorophenyl)-3-methylthiazol-2(3H)-one (24b)

Following procedure B, 4-bromochlorobenzene (0.192 g, 1 mmol) and 2-methoxythiazole (0.173 g, 1.5 mmol) affords **24b** in 48% (0.108 g) yield as a yellow solid: mp 146-148 °C.

¹H NMR (400 MHz, CDCl₃): δ 7.36 (d, *J* = 8.3 Hz, 2H), 7.28 (d, *J* = 8.3 Hz, 2H), 6.82 (s, 1H), 3.41 (s, 3H).

¹³C NMR (100 MHz, CDCl₃): δ 170.9, 133.6, 130.2, 129.3, 126.1, 120.7, 117.5, 32.4.

HRMS calcd for [M+Na]⁺ C₁₀H₈ClNOSNa 247.9907, found: 247.9907.

5-(4-Fluorophenyl)-3-methylthiazol-2(3H)-one (25b)

Following procedure B, 4-bromofluorobenzene (0.175 g, 1 mmol) and 2-methoxythiazole (0.173 g, 1.5 mmol) affords **25b** in 37% (0.77 g) yield as a yellow solid: mp 125-127 °C.

¹H NMR (400 MHz, CDCl₃): δ 7.29 (dd, *J* = 8.3, 5.2 Hz, 2H), 7.07 (t, *J* = 8.2 Hz, 2H), 6.73 (s, 1H), 3.38 (s, 3H).

¹³C NMR (100 MHz, CDCl₃): δ 171.1, 162.3 (d, *J* = 247.5 Hz), 127.9 (d, *J* = 3.4 Hz), 126.7 (d, *J* = 8.1 Hz), 120.2, 117.7, 116.2 (d, *J* = 22.0 Hz), 32.4.

HRMS calcd for [M+Na]⁺ C₁₀H₈FNOSNa 232.0203, found: 232.0204.

5-(3-Chlorophenyl)-3-methylthiazol-2(3H)-one (26b)

Following procedure B, 3-bromochlorobenzene (0.192 g, 1 mmol) and 2-methoxythiazole (0.173 g, 1.5 mmol) affords **26b** in 57% (0.128 g) yield as a yellow solid: mp 138–140 °C.

¹H NMR (400 MHz, CDCl₃): δ 7.37–7.32 (m, 1H), 7.31 (d, *J* = 8.0 Hz, 1H), 7.28 (t, *J* = 7.9 Hz, 1H), 7.22 (d, *J* = 7.8 Hz, 1H), 6.87 (s, 1H), 3.42 (s, 3H).

¹³C NMR (100 MHz, CDCl₃): δ 170.9, 135.1, 133.4, 130.4, 127.8, 124.8, 123.1, 121.3, 117.1, 32.4.

HRMS calcd for [M+Na]⁺ C₁₀H₈ClNOSNa 247.9907, found: 247.9905.

3-Methyl-5-(3-fluorophenyl)thiazol-2(3H)-one (27b)

Following procedure B, 3-bromofluorobenzene (0.175 g, 1 mmol) and 2-methoxythiazole (0.173 g, 1.5 mmol) affords **27b** in 45% (0.094 g) yield as a white solid: mp 116–118 °C.

¹H NMR (400 MHz, CDCl₃): δ 7.35–7.28 (m, 1H), 7.10 (d, *J* = 8.0 Hz, 1H), 7.03 (dt, *J* = 8.0, 1.2 Hz, 1H), 6.99 (dd, *J* = 8.0, 1.4 Hz, 1H), 6.84 (s, 1H), 3.39 (s, 3H).

¹³C NMR (100 MHz, CDCl₃): δ 170.9, 163.2 (d, *J* = 247.0 Hz), 133.7 (d, *J* = 8.3 Hz), 130.7 (d, *J* = 8.7 Hz), 121.2, 120.6 (d, *J* = 3.0 Hz), 117.3 (d, *J* = 2.9 Hz), 114.7 (d, *J* = 21.3 Hz), 111.8 (d, *J* = 22.2 Hz), 32.4.

HRMS calcd for [M+Na]⁺ C₁₀H₈FNOSNa 232.0203, found: 232.0205.

5-(2-Chlorophenyl)-3-methylthiazol-2(3H)-one (28b)

Following procedure B, 2-bromochlorobenzene (0.192 g, 1 mmol) and 2-methoxythiazole (0.173 g, 1.5 mmol) affords **28b** in 60% (0.135 g) yield as a white solid: mp 79–81 °C.

¹H NMR (400 MHz, CDCl₃): δ 7.42 (dd, *J* = 7.9, 1.7 Hz, 1H), 7.33 (dd, *J* = 7.8, 1.9 Hz, 1H), 7.27 (t, *J* = 7.9 Hz, 1H), 7.23 (t, *J* = 7.8 Hz, 1H), 6.99 (s, 1H), 3.40 (s, 3H).

¹³C NMR (100 MHz, CDCl₃): δ 171.4, 132.1, 130.9, 130.4, 130.1, 129.0, 127.3, 124.8, 114.8, 32.4.

HRMS calcd for [M+Na]⁺ C₁₀H₈ClNOSNa 247.9907, found: 247.9908.

2-Butoxy-5-(*p*-tolyl)thiazole (29a)

Following procedure A, 4-bromotoluene (0.171 g, 1 mmol) and 2-*n*butoxythiazole (0.235 g, 1.5 mmol) at 120 °C, affords **29a** in 53% (0.131 g) yield as a yellow solid: mp 57–59 °C.

¹H NMR (400 MHz, CDCl₃): δ 7.35 (d, *J* = 8.1 Hz, 2H), 7.28 (s, 1H), 7.18 (d, *J* = 8.1 Hz, 2H), 4.43 (t, *J* = 7.3 Hz, 2H), 2.37 (s, 3H), 1.81 (quint., *J* = 7.2 Hz, 2H), 1.55 (sext., *J* = 7.2 Hz, 2H), 1.00 (t, *J* = 7.3 Hz, 3H).

¹³C NMR (100 MHz, CDCl₃): δ 173.6, 137.5, 131.6, 131.0, 129.7, 129.3, 125.9, 71.5, 31.0, 21.3, 19.2, 13.9.

HRMS calcd for [M+Na]⁺ C₁₄H₁₇NOSNa 270.0923, found: 270.0922.

3-Butyl-5-(*p*-tolyl)thiazol-2(3H)-one (29b)

Following procedure B, 4-bromotoluene (0.171 g, 1 mmol) and 2-*n*butoxythiazole (0.235 g, 1.5 mmol) at 140 °C, affords **29b** in 18% (0.044 g) yield as a yellow solid: mp 61–63 °C.

¹H NMR (400 MHz, CDCl₃): δ 7.25 (d, *J* = 8.1 Hz, 2H), 7.16 (d, *J* = 8.1 Hz, 2H), 6.75 (s, 1H), 3.74 (t, *J* = 7.3 Hz, 2H), 2.35 (s, 3H), 1.71 (quint., *J* = 7.2 Hz, 2H), 1.41 (sext., *J* = 7.2 Hz, 2H), 0.97 (t, *J* = 7.3 Hz, 3H).

¹³C NMR (100 MHz, CDCl₃): δ 171.0, 137.8, 129.8, 128.9, 124.9, 118.8, 118.7, 45.3, 31.6, 21.3, 20.0, 13.8.

HRMS calcd for [M+Na]⁺ C₁₄H₁₇NOSNa 270.0923, found: 270.0921.

4-(2-Butoxythiazol-5-yl)benzonitrile (30a)

Following procedure A, 4-bromobenzonitrile (0.182 g, 1 mmol) and 2-*n*butoxythiazole (0.235 g, 1.5 mmol) at 120 °C, affords **30a** in 78% (0.201 g) yield as a white solid: mp 86–88 °C.

¹H NMR (400 MHz, CDCl₃): δ 7.61 (d, *J* = 8.1 Hz, 2H), 7.49 (d, *J* = 8.1 Hz, 2H), 7.42 (s, 1H), 4.43 (t, *J* = 7.3 Hz, 2H), 1.79 (quint., *J* = 7.2 Hz, 2H), 1.53 (sext., *J* = 7.2 Hz, 2H), 0.97 (t, *J* = 7.3 Hz, 3H).

¹³C NMR (100 MHz, CDCl₃): δ 175.1, 136.6, 134.7, 132.8, 128.9, 125.9, 118.7, 110.6, 72.0, 30.9, 19.1, 13.8.

HRMS calcd for [M+Na]⁺ C₁₄H₁₄N₂OSNa 281.0719, found: 281.0720.

4-(3-Butyl-2-oxo-2,3-dihydrothiazol-5-yl)benzonitrile (30b)

Following procedure B, 4-bromobenzonitrile (0.182 g, 1 mmol) and 2-*n*butoxythiazole (0.235 g, 1.5 mmol) at 130 °C, affords **30b** in 74% (0.191 g) yield as a white solid: mp 136–138 °C.

¹H NMR (400 MHz, CDCl₃): δ 7.63 (d, *J* = 8.3 Hz, 2H), 7.41 (d, *J* = 8.3 Hz, 2H), 6.99 (s, 1H), 3.78 (t, *J* = 7.3 Hz, 2H), 1.73 (quint., *J* = 7.2 Hz, 2H), 1.42 (sext., *J* = 7.2 Hz, 2H), 0.97 (t, *J* = 7.3 Hz, 3H).

¹³C NMR (100 MHz, CDCl₃): δ 170.4, 136.2, 132.9, 125.0, 122.2, 118.7, 116.5, 110.8, 45.7, 31.5, 19.9, 13.7.

HRMS calcd for [M+Na]⁺ C₁₄H₁₄N₂OSNa 281.0719, found: 281.0721.

3-Butyl-5-(4-(trifluoromethyl)phenyl)thiazol-2(3H)-one (31b)

Following procedure B, 4-bromobenzotrifluoride (0.225 g, 1 mmol) and 2-*n*butoxythiazole (0.235 g, 1.5 mmol) at 120 °C, affords **31b** in 61% (0.183 g) yield as a yellow solid: mp 98–100 °C.

¹H NMR (400 MHz, CDCl₃): δ 7.59 (d, *J* = 8.3 Hz, 2H), 7.42 (d, *J* = 8.3 Hz, 2H), 6.94 (s, 1H), 3.77 (t, *J* = 7.3 Hz, 2H), 1.72 (quint., *J* = 7.2 Hz, 2H), 1.42 (sext., *J* = 7.2 Hz, 2H), 0.97 (t, *J* = 7.3 Hz, 3H).

¹³C NMR (100 MHz, CDCl₃): δ 170.6, 135.2, 129.5 (q, *J* = 32.8 Hz), 126.1 (q, *J* = 3.8 Hz), 124.9, 124.0 (q, *J* = 272.0 Hz), 121.2, 116.9, 45.6, 31.5, 19.9, 13.7.

HRMS calcd for [M+Na]⁺ C₁₄H₁₄F₃NOSNa 324.0640, found: 324.0642.

4-(2-Oxo-3-phenethyl-2,3-dihydrothiazol-5-yl)benzonitrile (32b)

Following procedure B, 4-bromobenzonitrile (0.182 g, 1 mmol) and 2-phenethoxythiazole (0.308 g, 1.5 mmol) at 120 °C, affords **32b** in 38% (0.116 g) yield as a yellow solid: mp 146–148 °C.

¹H NMR (400 MHz, CDCl₃): δ 7.59 (d, *J* = 8.3 Hz, 2H), 7.36–7.23 (m, 5H), 7.19 (d, *J* = 8.3 Hz, 2H), 6.58 (s, 1H), 4.01 (t, *J* = 7.3 Hz, 2H), 3.03 (t, *J* = 7.3 Hz, 2H).

¹³C NMR (100 MHz, CDCl₃): δ 170.3, 137.5, 136.1, 132.8, 129.0, 128.9, 127.2, 125.0, 122.5, 118.6, 115.9, 110.8, 47.5, 35.5.

HRMS calcd for [M+Na]⁺ C₁₈H₁₄N₂ONaS 329.0719, found: 329.0720.

4-(3-Benzyl-2-oxo-2,3-dihydrothiazol-5-yl)benzonitrile (33b)

Following procedure B, 4-bromobenzonitrile (0.182 g, 1 mmol) and 2-(benzyloxy)thiazole (0.286 g, 1.5 mmol) at 120 °C, affords **33b** in 43% (0.126 g) yield as a white solid: mp >200 °C.

¹H NMR (400 MHz, CDCl₃): δ 7.61 (d, *J* = 8.2 Hz, 2H), 7.44–7.27 (m, 7H), 6.90 (s, 1H), 4.95 (s, 2H).

¹³C NMR (100 MHz, CDCl₃): δ 170.5, 136.0, 135.5, 132.9, 129.3, 128.7, 128.1, 125.1, 121.6, 118.6, 117.1, 111.1, 49.1.

HRMS calcd for [M+Na]⁺ C₁₇H₁₂N₂OSNa 315.0562, found: 315.0562.

2-(3-Benzyl-2-oxo-2,3-dihydrothiazol-5-yl)benzonitrile (**34b**)

Following procedure B, 2-bromobenzonitrile (0.182 g, 1 mmol) and 2-(benzyloxy)thiazole (0.286 g, 1.5 mmol) at 120 °C, affords **34b** in 52% (0.152 g) yield as a yellow solid: mp 98–100 °C.

¹H NMR (400 MHz, CDCl₃): δ 7.67 (dd, *J* = 8.2, 1.3 Hz, 1H), 7.57 (td, *J* = 8.0, 1.2 Hz, 1H), 7.41–7.30 (m, 8H), 4.96 (s, 2H).

¹³C NMR (100 MHz, CDCl₃): δ 170.5, 135.5, 134.5, 134.4, 133.4, 129.2, 128.6, 128.5, 128.2, 127.8, 124.2, 118.6, 114.3, 108.8, 49.2.

HRMS calcd for [M+Na]⁺ C₁₇H₁₂N₂OSNa 315.0562, found: 315.0564.

4-(3-(4-Fluorobenzyl)-2-oxo-2,3-dihydrothiazol-5-yl)benzonitrile (**35b**)

Following procedure B, 4-bromobenzonitrile (0.182 g, 1 mmol) and 2-((4-fluorobenzyl)oxy)thiazole (0.313 g, 1.5 mmol) at 120 °C, affords **35b** in 40% (0.124 g) yield as a yellow solid: mp 147–149 °C.

¹H NMR (400 MHz, CDCl₃): δ 7.61 (d, *J* = 8.2 Hz, 2H), 7.37 (d, *J* = 8.2 Hz, 2H), 7.30 (dd, *J* = 8.6, 4.9 Hz, 2H), 7.08 (t, *J* = 8.6 Hz, 2H), 6.90 (s, 1H), 4.91 (s, 2H).

¹³C NMR (100 MHz, CDCl₃): δ 170.5, 162.8 (d, *J* = 247.8 Hz), 135.9, 132.9, 131.3 (d, *J* = 3.2 Hz), 129.9 (d, *J* = 8.3 Hz), 125.2, 121.4, 118.6, 117.3, 116.3 (d, *J* = 21.8 Hz), 111.2, 48.4.

HRMS calcd for [M+Na]⁺ C₁₇H₁₁FN₂ONa 333.0468, found: 333.0468.

3-Benzylthiazol-2(3H)-one (**36b**)¹³

The reaction of 2-(benzyloxy)thiazole (0.191 g, 1 mmol) and KOAc (0.196 g, 2 mmol) in the presence of Pd(OAc)₂ (2.2 mg, 1 mol%) in DMA (5 mL) under argon at 120 °C during 16 h, affords **36b** after cooling, evaporation of the solvent and filtration on silica gel (pentane/ether 4/1) in 81% (0.155 g) yield as a yellow oil.

¹H NMR (400 MHz, CDCl₃): δ 7.40–7.21 (m, 5H), 6.48 (d, *J* = 5.4 Hz, 1H), 6.09 (d, *J* = 5.4 Hz, 1H), 4.86 (s, 2H).

¹³C NMR (100 MHz, CDCl₃): δ 172.1, 136.0, 129.0, 128.2, 127.9, 124.3, 101.6, 48.7.

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Supporting Information

YES (this text will be updated with links prior to publication)

Primary Data

NO.

Conflict of Interest

The authors declare no conflict of interest.

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