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RESEARCH FRONT

Aust. J. Chem.
https://doi.org/10.1071/CH20101

Full Paper

A Facile Microwave and $SnCl_2$ Synthesis of 2,3-Dihydroquinazolin-4(1*H*)-ones

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An elegantly simple, facile, and robust approach to a scaffold of biological importance, 2,3-dihydroquinazolin-4(1*H*)-ones, is reported. A catalytic 1 % $SnCl_2$/microwave-mediated approach afforded access to pure material, collected by cooling and filtration after 20-min microwave irradiation at 120°C. A total of 41 analogues were prepared in isolated yields of 17–99 %. This process was highly tolerant of aliphatic, aromatic, heterocyclic, and acyclic aldehydes, but furan, pyrrole, and thiophene aldehyde reactivity correlated with propensity towards electrophilic addition and/or Diels–Alder addition. As a result, thiophene afforded high yields (80 %) whereas pyrrole carboxaldehyde failed to react. With simple cinnamaldehydes, and in the $SbCl_3$-mediated reaction, and with α,β-unsaturated aldehydes the equivalent quinazolin-4(3*H*)-ones, and not the 2,3-dihydroquinazolin-4(1*H*)-ones, was favoured.

Manuscript received: 25 March 2020.
Manuscript accepted: 6 July 2020.
Published online: 24 September 2020.

Introduction

Our team over the past two decades has sought to develop expedient routes to biologically active compounds. In this regard, our interests span the dynamin and clathrin inhibitors,[1–4] protein phosphatase inhibitors,[5,6] and, most recently, compounds that hijack the aryl hydrocarbon receptor pathways as potential breast cancer drugs.[7,8] As part of a current program, we sought access to a series of substituted 2,3-dihydroquinazolinones.[9,10]

2,3-Dihydroquinazolinones are present in a range of therapeutic compounds spanning compound **1** (anticancer),[11] fenquizone **2** (diuretic),[12] aquamox **3** (antihypertensive),[13] evodiamine **4** (anti-obesity),[14] **5** (analgesic and anti-inflammatory),[15] compound **6** (antileishmanial),[16] and NCI (National Cancer Institute, USA) substance T1D19143 **7** (anticancer)[17] (Fig. 1). The diversity of their biological actions has meant that there have been multiple synthetic routes developed to afford rapid access. Among these are the use of metal

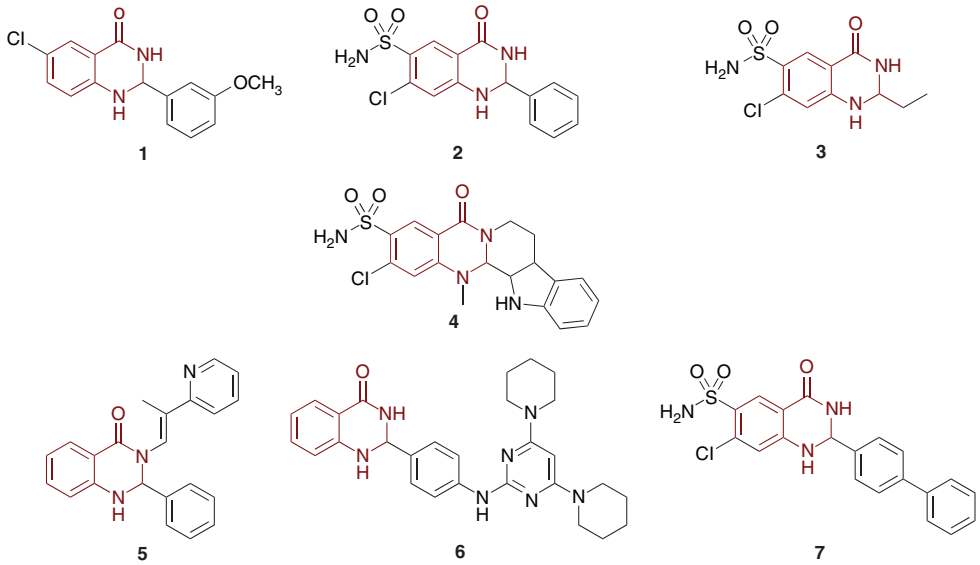


Fig. 1. Example 2,3-dihydroquinazolines with known biological activity. Compound **1** (anticancer), fenquizone **2** (diuretic), aquamox **3** (antihypertensive), evodiamine **4** (anti-obesity), compound **5** (analgesic and anti-inflammatory), compound **6** (antileishmanial) and NCI substance T1D19143 **7** (anticancer).

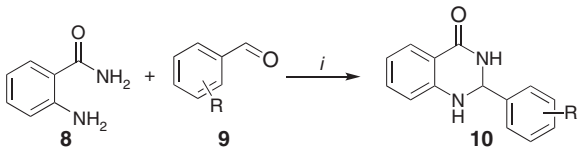
catalysts, $Ga(OTf)_3$,[18] nano-In_2O_3,[19] CuO nanoparticles;[20] organic catalysts: thiamine hydrochloride,[21] 2-morpholinosulfonic acid,[22] β-cyclodextrin-SO_3H,[23] ionic liquids;[24] and other approaches such as magnetic nanoparticles[25] and Amberlyst-15.[26]

The development of a microwave method, a green catalytic approach that affords the desired analogues in good to high yields with a simple workup, is presented herein.

Results and Discussion

Access to the quinazolinones has been obtained with multiple metal catalysts, with several teams proposing numerous reasons for enhancing the green nature of this reaction,[18–20] be it through the use of more benign metals or in some instances using metal-free conditions.[21–26] The use of a microwave and catalytic procedure was explored. With our prior experience with tin,[27–31] we initially explored the simple microwave coupling of 2-aminobenzamide (**8**) with benzaldehyde (**9a**) in the presence of 1 % $SnCl_2$ (Scheme 1).

In a typical experiment, 2-aminobenzamide (**8**) (1 equiv.) was added to a microwave vial containing benzaldehyde (**9a**) (1.05 equiv.), ethanol (3 mL), and 1 mol-% $SnCl_2$. The resulting suspension was irradiated at 120°C for 20 min. With the parent benzaldehyde, the product (**10a**) was collected by filtration in 56 % yield. Inductively coupled plasma (ICP) analysis of the isolated product showed tin concentrations between 4 and 5 ppm. With this simple successful outcome, we extended this protocol to several benzaldehydes (**9a–9f**); these data are presented in Table 1.



Scheme 1. Reagents and conditions: (i) $SnCl_2$ (1 %), EtOH, 120°C, microwave.

As can be determined from analysis of the data presented in Table 1, these reactions occur efficiently. With electron-withdrawing and electron-donating benzaldehydes, yields of ~90 % and 40–60 % respectively were routinely obtained. Cited yields are an average of three experiments in our efforts to demonstrate reaction variability and reproducibility.[32]

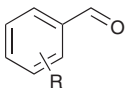
Liquid chromatography–mass spectrometry (LCMS) analysis of the lower-yielding reactions (Supplementary Material), i.e. those with electron-donating substituents, revealed the presence of the corresponding 2-phenylquinazolin-4(3*H*)-one. With cinnamaldehyde, the quinazolin-4(3*H*)-one was isolable in 31 % yield (Scheme 2).

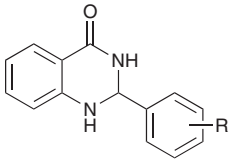
The effect of solvent, shown in Table 2, was examined with the model reaction of **8** and **9a** as for Scheme 1.

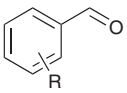
We note from examination of a variety of solvents, with a bias towards the more environmentally friendly, (data presented in Table 2) that both EtOH and H_2O afforded high yield, by precipitation, of the desired **10a**. Acetonitrile with $SnCl_2$ gave a poor yield. In the absence of $SnCl_2$, good yields were observed; noteworthy was the increase in yield with acetonitrile to 87 %. In the $SnCl_2$-free examples, however, the reaction workup was significantly more protracted, with 48 h typically required for product precipitation. With $SnCl_2$, precipitation was evident at the conclusion of each reaction, rendering this approach more expedient. Increasing $SnCl_2$ concentration to 10 mol-% allowed quantitative conversion; however, we viewed this as an unnecessary increase in catalyst loading when the 1 % $SnCl_2$ reaction already afforded high isolated yield. In this sequence of reactions, we also preferred the use of EtOH, as from a practical standpoint, it ensured that the isolated analogues were easier to obtain dry. These reactions also proceeded under solvent-free microwave conditions, but typically afforded an intractable 'glassy' solid (data not shown). This approach was not explored further.

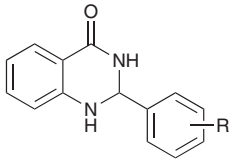
Given the successful outcome of the $SnCl_2$ catalytic approach, we sought to examine an alternative Lewis acid

Table 1. The reaction of 2-aminobenzamide (8) with benzaldehydes 9a–9f with $SnCl_2$ under microwave irradiation (isolated yields are given)

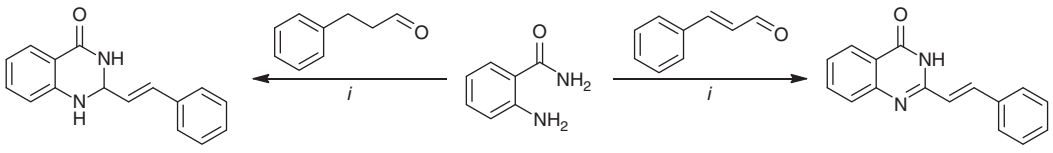








Reagent, R	Product, yield [%]	Reagent, R	Product, yield [%]
9a, H	**10a**, 56–80	**9e**, 4-COOH	**10e**, 75–96
9b, 4-Br	**10b**, 40–94	**9f**, 4-CH_3	**10f**, 40–60
9c, 4-NO_2	**10c**, 85–95		
9d, 4-OH	**10d**, 40–67		



Scheme 2. Reagents and conditions: (i) $SnCl_2$ (1 %), EtOH, 120°C, microwave.

catalyst, and with $SbCl_3$ examined the reaction of **8** and **9a** as with $SnCl_2$ (Table 3 and Scheme 3).

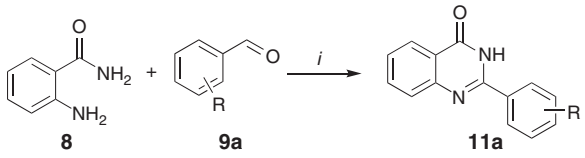
The $SbCl_3$-mediated reaction typically afforded an undesirable and difficult to separate mixture of the desired 2,3-dihydroquinazolin-4(1*H*)-ones and the parent quinazolinon-4(3*H*)-ones. This was evident across the catalyst loadings and solvent systems examined. We do note, though, that essentially quantitative conversion to 2-phenylquinazolon-4(3*H*)-one **11a** was feasible by heating at reflux in THF. We presume that this may be a consequence of initial formation of the 2,3-dihydro analogue (**10**) followed by oxidation in the open flask. This oxidation step has previously been observed with analogues of this nature.[33] In our hands, a $KMnO_4$-mediated oxidation of the 2,3-dihydro analogues gave the equivalent quinazolin4(3*H*)-ones, but this was not the focus of the present work (data not shown).

Having established that the microwave/$SnCl_2$ approach was an expedient route to the desired 2,3-dihydroquinazolon-4(1*H*)-ones, we expanded the scope of our investigations to include more interesting aldehydes and ketones and the outcomes of these studies are presented in Table 4.

High tolerances were observed during the $SnCl_2$/microwave coupling of a range of aldehydes, shown in Table 4, which proceeded smoothly. This was especially evident with electron-withdrawing substituents, e.g. 3-Br **9h**, 2-NO_2 **9j**, 4-CN **9m**, affording >85 % isolated yields. Those possessing electron-donating substituents, 3-OCH_3 **9q**, gave low yields (Table 4). As medicinal chemistry requires access to a robust and reliable toolkit, we continued to explore the scope of this coupling,[34,35] introducing several variations of the aldehyde moiety.

Analysis of the data presented in Table 5 reveals similar trends to those noted above; electron-withdrawing substituent result in high yields, and electron-donating substituents, low yields. Heteroaromatic aldehydes were tolerated (**10u** and **10v**), as were small saturated rings (**10w** and **10x**), simple cyclic olefins (**10y**) and aliphatic chains (**10z** and **10aa**). Steric bulk affected yields, with the less encumbered 2-naphthyl **10ac** isolated in 56 %, a greater yield than the equivalent 1-naphthyl **10ab**. This was also noted with the bulky cinnamaldehyde **9ae**, which failed to react. With the five-ring heterocycles furan (**9af**–**9ah**), pyrrole (**9i**), and thiophene (**9aj**), the reaction outcomes aligned with the propensity of the aromatic nucleus to participate in electrophilic and Diels–Alder chemistry. Thus, simple furans failed to react (**9af** and **9ag**), but introducing a bulky electron-withdrawing moiety (**9ah**; Br) afforded a modest yield of the desired analogue, **10ah**. Pyrrole carboxaldehyde (**9ai**) failed to react, whereas thiophene carboxaldehyde (**9aj**) gave 80 % of the isolated product **10aj** (Table 5).

In a final investigation, the effect of aldehyde conjugation on the $SnCl_2$/microwave-mediated coupling was examined. Analysis of the data presented in Table 6 shows that, in most cases, the anticipated 2,3-dihydroquinazolin-4(1*H*)-one scaffold was isolated in modest to good yields, although two indole carboxaldehydes (**9an** and **9ar**) failed to react. Of greater interest was the switch in product outcome on the introduction of simple



Scheme 3. Reagents and conditions: (i) $SbCl_3$ (1–3 %), microwave or reflux.

Table 2. Effect of solvent on the synthesis of 2-phenyl-2,3-dihydroquinazolin-4(1*H*)-one from 2-aminobenzamide (8) and benzaldehyde (9a)

Solvent	$SnCl_2$	Yield	Purity[A]
EtOH	1 % equiv.	80 %	>99 %
MeCN	1 % equiv.	50 %	<45 %
H_2O	1 % equiv.	86 %	<35 %
EtOH	–	61 %	**>96 %**
MeCN	–	87 %[B]	**>99 %**
H_2O	–	65 %[B]	**>99 %**
EtOH	10 %	96 %	**>99 %**
EtOH	1 mol-%/0.4 equiv. K_2CO_3	61 %	**>99 %**

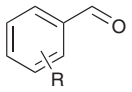
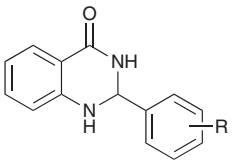
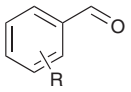
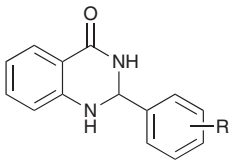
[A]Purity of isolated product as determined by ^{1}H NMR.
[B]Product isolated via slow crystallisation at room temperature over 2 days. No product afforded after addition of H_2O.

Table 3. The reaction of 2-aminobenzamide (8) with benzaldehyde (9a) and $SbCl_3$
Reaction conditions as stated below; isolated yields are given

Solvent	Catalyst [mol-%]	Heating type	Result	Purity
EtOH	1 %	Microwave[A]	2,3-dihydroquinazolinone	>98 %
MeCN	1 %	Microwave (120°C, 20 min)	2,3-dihydroquinazolinone	75 %
MeCN	3 %	Microwave (120°C, 20 min)	2,3-dihydroquinazolinone	90 %
–	3 %	Microwave (120°C, 20 min)	2,3-dihydroquinazolinone	<50 %
–	3 %	Microwave (140°C, 30 min)	2,3-dihydroquinazolinone	<50 %
THF	3 %	Reflux overnight	4(3*H*)-quinazolinone	>98 %

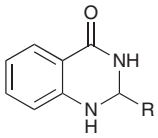
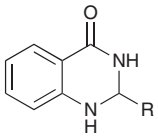
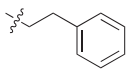
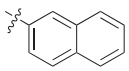
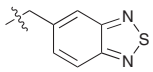
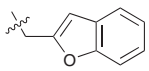
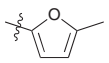
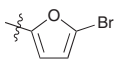
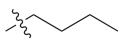
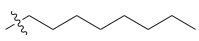
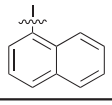
[A]Reaction occurred and product precipitated before 120°C was reached.

Table 4. The reaction of 2-aminobenzamide (8) with benzaldehydes 9g–9s with $SnCl_2$ under microwave irradiation conditions (isolated yields are given)

Reagent	R	Product	Yield [%]	Reagent	R	Product	Yield [%]
9g	2-Br	**10g**	40	**9n**	2-COOH	**10n**	58
9h	3-Br	**10h**	99	**9o**	3-COOH	**10o**	86
9i	3-CF_3	**10i**	29	**9p**	4-Ph	**10p**	75
9j	2-NO_2	**10j**	90	**9q**	3-OCH_3	**10q**	17
9k	3-NO_2	**10k**	78	**9r**	3-OH	**10r**	67
9l	3-CN	**10l**	72	**9s**	3,4,5-tri-OH	**10s**	45
9m	4-CN	**10m**	86				

Table 5. The reaction of 2-aminobenzamide (8) with aldehydes 9t–9aj with $SnCl_2$ under microwave irradiation conditions (isolated yields are given)

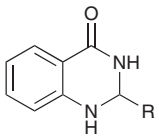
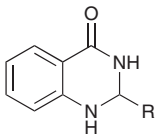
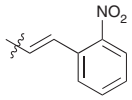
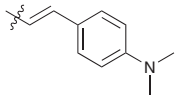
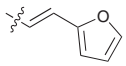
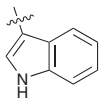
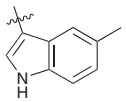
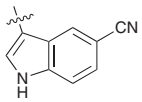
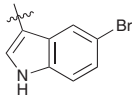
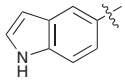
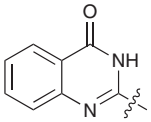
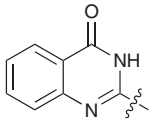
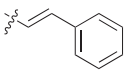
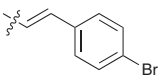
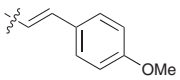
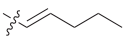
Reagent		Product	Yield [%]	Reagent		Product	Yield [%]
9t		**10t**	39	**9ac**		**10ac**	86
9u		**10u**	48	**9ad**		**10ad**	0
9v		**10v**	71	**9ae**		**10ae**	40
9w		**10w**	87	**9af**		**10af**	0
9x		**10x**	89	**9ag**		**10ag**	0
9y		**10y**	92	**9ah**		**10ah**	25
9z		**10z**	34	**9ai**		**10ai**	0
9aa		**10aa**	34	**9aj**		**10aj**	80
9ab		**10ab**	30				

cinnamaldehydes (**9as**–**9au**) and hepten-2-al (**9av**) affording the conjugated quinazolin-4(3*H*)-ones **11a**–**11d**.

Conclusions

A facile and robust access to 2,3-dihydroquinazolin-4(1*H*)-ones was achieved. A catalytic 1% $SnCl_2$/microwave-mediated approach afforded essentially pure material, collected by cooling and filtration after 20-min microwave irradiation at 120°C. Electron-withdrawing substituents on the aldehyde moiety gave higher yields, often >85%, with good batch-to-batch reproducibility. Electron-donating substituents afforded lower yields, but in a medicinal chemistry campaign, acceptable to enable any required screening.

Table 6. The reaction of 2-aminobenzamide (8) with conjugated aldehydes 9ak–9as (isolated yields are given)

Reagent		Product	Yield [%]	Reagent		Product	Yield [%]
9ak		**10ak**	59	**9ao**		**10ao**	0
9al		**10al**	28	**9ap**		**10ap**	53
9am		**10am**	17	**9aq**		**10aq**	35
9an		**10an**	0	**9ar**		**10ar**	0
Reagent		Product	Yield [%]	Reagent		Product	Yield [%]
9ap		**11a**	54	**9ar**		**11c**	62
9aq		**11b**	37	**9as**		**11d**	24

This procedure was highly tolerant of aliphatic, aromatic, heterocyclic, and acyclic aldehydes. With small-ring heterocycles, e.g. furan, pyrrole, and thiophene, there was a correlation between propensity towards electrophilic addition and Diels–Alder addition. As a result, thiophene afforded high yields (80 %) whereas pyrrole carboxaldehyde failed to react. With simple cinnamaldehydes and α,β-unsaturated aldehydes, a switch occurred towards the corresponding quinazolin-4(3*H*)-ones.

Experimental

General Methods

All reactions were performed using standard laboratory equipment and glassware. HPLC grade solvents and reagents were purchased from Sigma–Aldrich, Alfa Aesar or AK Scientific and used as received. Organic solvents were of bulk quality, and were distilled from glass before use. Organic solvent extracts were dried with magnesium sulfate ($MgSO_4$), and dried under reduced pressure with either Büchi or Heidolph rotary evaporators. Melting points were recorded in open capillaries on a Stuart SMP11 melting point apparatus. Where available, literature values are provided and appropriately referenced. Electrospray mass spectra were recorded using 10 % DMSO/H_2O or HPLC-grade methanol or acetonitrile as carrier solvents on an Agilent Technologies 1260 Infinity Ultra Performance Liquid Chromatography (UPLC) system with a 6120 Quadrupole LCMS in electrospray ionisation (ESI) positive and negative modes. TLC was performed on Merck silica gel 60 F254 precoated aluminium plates with a thickness of 0.2 mm. Column chromatography was performed under flash conditions on Merck silica gel 60 (230–400 mesh). ICP analysis was performed on an Agilent 5110 Inductively Coupled Plasma Optical Emission Spectrometry (ICP-OES) instrument.

Nuclear magnetic resonance (NMR) spectroscopy was performed on a Brüker Avance III 400 MHz spectrometer, where proton NMR (^{1}H NMR) spectra and carbon NMR (^{13}C NMR) spectra were acquired at 400 and 100 MHz respectively, or a Brüker Avance III 600 MHz spectrometer, where proton NMR (^{1}H NMR) spectra and carbon NMR (^{13}C NMR) spectra were acquired at 600 and 150 MHz respectively. All spectra were recorded in deuterated dimethyl sulfoxide ([D6]DMSO), deuterated acetone ([D6]acetone) or deuterated chloroform ($CDCl_3$) obtained from Cambridge Isotope Laboratories Inc. Chemical shifts (δ) are measured in parts per million (ppm) and referenced against the internal reference peaks. Coupling constants (J) are measured in hertz (Hz). NMR assignments were determined through the interpretation of one- and two-dimensional spectra. Multiplicities are denoted as singlet (s), broad singlet (bs), doublet (d), doublet of doublets (dd), triplet (t), quartet (q), triplet of doublets (td), doublet of triplets (dt) and multiplet (m). Peaks are listed in decreasing chemical shift in the following format: chemical shift (integration (^{1}H), multiplicity

(^{1}H), coupling constant (^{1}H). A Biotage® Initiator+ was used to perform microwave reactions.

*2-Phenyl-2,3-dihydroquinazolin-4(1*H*)-one (**10a**)*

To a microwave vial containing 2-aminobenzamide (**8**; 226 mg, 1.66 mmol), benzaldehyde (**9a**; 0.17 mL, 1.73 mmol, 1.1 equiv.) and tin(II) chloride (3 mg, 0.015 mmol, 0.01 equiv.) were added and stirred in ethanol (3 mL) to form a suspension. The microwave vial was then irradiated at 120°C for 20 min. The resultant precipitate was then collected by filtration and washed with minimal H_2O (or diethyl ether), affording 2-phenyl-2,3-dihydroquinazolin-4(1*H*)-one as a white crystalline solid (298 mg, 80 %).

δ_H (400 MHz, DMSO) 8.27 (s, 1H), 7.61 (dd, *J* 7.7, 1.6, 1H), 7.49 (dd, *J* 8.2, 1.3, 2H), 7.43–7.31 (m, 3H), 7.24 (ddd, *J* 8.2, 7.2, 1.6, 1H), 7.10 (s, 1H), 6.75–6.73 (m, 1H), 6.69–6.65 (m, 1H), 5.75 (s, 1H). δ_C (101 MHz, DMSO) 163.6, 147.9, 141.6, 133.3, 128.4, 128.3 (2C), 127.3, 126.8 (2C), 117.1, 114.9, 114.4, 66.5. *m/z* (LRMS ESI+) 225 (M + H, $C_{14}H_{13}N_2O$, 100 %); (ESI–) 223 (M – H $C_{14}H_{11}N_2O$, 100 %). ν_{max} (ATR)/cm^{-1} 3308 (NH), 3169 (NH), 3061 (CH), 1649 (C=O). Mp >225°C (dec.).

*2-(4-Bromophenyl)-2,3-dihydroquinazolin-4(1*H*)-one (**10b**)*

Synthesised as for **10a** from **8** and 4-bromobenzaldehyde (**9b**) to afford the title compound **10b** as a white solid, 418 mg; 94 % yield.

δ_H (400 MHz, DMSO) 8.32 (s, 1H, NH), 7.61–7.57 (m, 3H), 7.44–7.42 (m, 2H), 7.25 (ddd, *J* 8.2, 7.2, 1.6, 1H), 7.13 (s, 1H, NH), 6.74 (dd, *J* 8.1, 0.5 ,), 6.70–6.66 (m, 1H), 5.75 (s, 1H). δ_C (101 MHz, DMSO) 163.5, 147.6, 141.1, 133.4, 131.2 (2C), 129.1 (2C), 127.4, 121.6, 117.3, 114.9, 114.5, 65.8. *m/z* (LRMS ESI+) 303 (M + H, $C_{14}H_{12}^{79}BrN_2O$, 100 %), 305 (M + H, $C_{14}H_{12}^{81}BrN_2O$, 95 %), 347 (M + FA-H (FA = formic acid), $C_{14}H_{12}^{79}BrN_2O$, 100 %), 349 (M + FA-H, $C_{14}H_{12}^{81}BrN_2O$, 95 %); (ESI–) 301 (M-H, $C_{14}H_{10}^{79}BrN_2O$, 100 %), 303 (M – H, $C_{14}H_{10}^{81}BrN_2O$, 95 %). ν_{max} (ATR)/cm^{-1} (3308, N–H), 1652 (C=O). Mp >191°C (dec.).

*2-(4-Nitrophenyl)-2,3-dihydroquinazolin-4(1*H*)-one (**10c**)*

Synthesised as for **10a** from **8** and 4-nitrobenzaldehyde (**9c**) to afford the *title compound* **10c** as a yellow solid, 425 mg; 95 % yield.

δ_H (400 MHz, DMSO) 8.51 (s, 1H), 8.25 (d, *J* 8.8, 2H), 7.74 (d, *J* 8.7, 2H), 7.62–7.60 (m, 1H), 7.32 (s, 1H), 7.28–7.24 (m, 1H), 6.76 (d, *J* 8.0, 1H), 6.69 (t, *J* 7.4, 1H), 5.91 (s, 1H). δ_C (101 MHz, DMSO) 163.3, 149.3, 147.2, 133.6, 128.0, 127.4, 123.6, 117.5, 114.9, 114.5, 65.3. ν_{max} (ATR)/cm^{-1} 3279 (NH), 3173 (NH), 3100 (CH), 1644 (C=O). *m/z* (LRMS ESI+) 270.1 (M + H, $C_{14}H_{11}N_3O_3$, 100 %); (LRMS ESI–) 268.1 (M – H, $C_{14}H_{11}N_3O_3$, 100 %). Mp >197°C (dec.).

*2-(4-Hydroxyphenyl)-2,3-dihydroquinazolin-4(1*H*)-one (**10d**)*

Synthesised as for **10a** from **8** and 4-hydroxybenzaldehyde (**9d**) to afford the *title compound* **10d** as a white solid, 163 mg; 67 % yield.

δ_H (400 MHz, DMSO) 9.53 (s, 1H), 8.09 (d, *J* 4.3, 1H), 7.61 (dd, *J* 7.7, 1.5, 1H), 7.32–7.29 (m, 2H), 7.24 (ddd, *J* 8.3, 7.2, 1.6, 1H), 6.94 (s, 1H), 6.79–6.66 (m, 4H), 5.66 (s, 1H). δ_C (101 MHz, DMSO) 164.2, 158.1, 148.6, 133.7, 132.1, 128.7 (2C), 127.8, 117.5, 115.4 (2C), 114.8, 67.1. ν_{max} (ATR)/cm^{-1} 3346 (NH), 3175 (NH), 1229 (C=O). *m/z* (LRMS ESI+) 241.1 (M + H, $C_{14}H_{13}N_2O_2$, 100 %); (ESI–) 239.1 (M-H, $C_{14}H_{12}N_2O_2$, 100 %). Mp >200°C.

*2-(4-Carboxyphenyl)-2,3-dihydroquinazolin-4(1*H*)-one (**10e**)*

Synthesised as for **10a** from **8** and 4-formylbenzoic acid (**9e**) to afford the *title compound* **10e** as a white solid, 341 mg; 96 % yield.

δ_H (400 MHz, DMSO) 8.38 (s, 1H), 7.94–7.92 (m, 2H), 7.60 (dd, *J* 12.0, 4.9, 3H), 7.25 (ddd, *J* 8.7, 7.3, 1.6, 1H), 7.20 (s, 1H), 6.74 (d, *J* 7.7, 1H), 6.70–6.68 (m, 1H), 5.82 (s, 1H). δ_C (101 MHz, DMSO) 167.3, 163.8, 147.7, 146.7, 133.8, 131.0 (2C), 129.6, 127.6, 127.1 (2C), 117.6, 115.0, 114.7, 66.1. ν_{max} (ATR)/cm^{-1} 3289 (NH), 2800 (OH), 1695 (C=O), 725 (C=C). *m/z* (LRMS ESI+) 269.2 (M + H, $C_{15}H_{13}N_2O_3$, 100 %); (ESI–) 267.1 (M-H, $C_{15}H_{11}N_2O_3$, 100 %). Mp >300°C.

*2-(*p*-Tolyl)-2,3-dihydroquinazolin-4(1*H*)-one (**10f**)*

Synthesised as for **10** from **8** and 4-methylbenzaldehyde (**9f**) to afford the *title compound* **10f** as an off-white solid, 141 mg; 60 % yield.

δ_H (400 MHz, DMSO) 8.22 (s, 1H), 7.60 (dd, *J* 7.7, 1.4, 1H), 7.36 (d, *J* 8.0, 2H), 7.23 (ddd, *J* 8.7, 7.3, 1.6, 1H), 7.18 (d, *J* 7.9, 2H), 7.04 (s, 1H), 6.73 (d, *J* 8.1, 1H), 6.68–6.64 (m, 1H), 5.70 (s, 1H), 2.29 (s, 3H). δ_C (101 MHz, DMSO) 164.1, 148.3, 139.1, 138.2, 133.7, 129.3 (2C), 127.8, 127.2 (2C), 117.54, 115.4, 114.9, 66.8, 21.2. ν_{max} (ATR)/cm^{-1} 3312 (NH), 2918 (CH), 1655 (C=O). *m/z* (LRMS ESI+) 239.1 (M + H, $C_{15}H_{15}N_2O$, 100 %); (LRMS ESI–) 237.2 (M-H, $C_{15}H_{13}N_2O_3$, 100 %). Mp >207.6°C.

*2-(2-Bromophenyl)-2,3-dihydroquinazolin-4(1*H*)-one (**10g**)*

Synthesised as for **10a** from **8** and 2-bromobenzaldehyde (**9g**) to afford the *title compound* **10g** as a white solid, 187 mg; 40 % yield.

δ_H (400 MHz, DMSO) 8.19 (s, 1H, NH), 7.69–7.64 (m, 3H), 7.45 (td, *J* 7.5, 1.1, 1H), 7.33 (ddd, *J* 7.9, 7.4, 1.8, 1H), 7.26 (ddd, *J* 8.2, 7.2, 1.6, 1H), 6.98 (s, 1H, NH, H_1), 6.77–6.70 (m, 2H), 6.09 (s, 1H). δ_C (101 MHz, DMSO) 163.6, 147.7, 139.1, 133.4, 132.8, 130.7, 129.1, 128.1, 127.4, 122.2, 117.5, 114.7, 114.6, 66.4. *m/z* (LRMS ESI+) 303 (M + H, $C_{14}H_{12}^{79}BrN_2O$, 100 %), 305 (M + H, $C_{14}H_{12}^{81}BrN_2O$, 95 %); (ESI–) 301 (M – H, $C_{14}H_9^{79}BrN_2O$, 100 %), 303 (M – H, $C_{14}H_9^{81}BrN_2O$, 95 %). ν_{max} (ATR)/cm^{-1} 3365 (NH), 1646 (C=O). Mp >173°C (dec.).

*2-(3-Bromophenyl)-2,3-dihydroquinazolin-4(1*H*)-one (**10h**)*

Synthesised as for **10a** from **8** and 3-bromobenzaldehyde (**9h**) to afford the *title compound* **10h** as a white solid, 491 mg; 99 % yield.

δ_H (400 MHz, DMSO) 8.39 (s, 1H), 7.65 (t, *J* 1.7, 1H), 7.60 (dd, *J* 7.7, 1.4, 1H), 7.52 (ddd, *J* 7.9, 1.8, 1.0, 1H), 7.47 (d, *J* 7.8, 1H), 7.34 (t, *J* 7.8, 1H), 7.25 (ddd, *J* 8.6, 7.3, 1.6, 1H), 7.20 (s, 1H), 6.75 (d, *J* 7.8, 1H), 6.72–6.64 (m, 1H), 5.76 (s, 1H). δ_C (101 MHz, DMSO) 163.6, 147.5, 144.8, 133.7, 131.3, 130.7, 129.7, 127.5, 125.8, 121.7, 117.5, 114.9, 114.6, 65.5. ν_{max} (ATR)/cm^{-1} 3282 (NH), 3172 (NH), 3062 (CH), 1645 (C=O). *m/z* (LRMS ESI+) 303 (M + H, $C_{14}H_{12}{}^{79}BrN_2O$, 100 %), 305 (M + H, $C_{14}H_{12}{}^{81}BrN_2O$, 90 %); (ESI–) 301 (M – H, $C_{14}H_{10}{}^{79}BrN_2O$, 100 %), 303 (M – H, $C_{14}H_{10}{}^{81}BrN_2O$, 90 %). Mp >174°C (dec.).

*2-(3-(Trifluoromethylphenyl)-2,3-dihydroquinazolin-4(1*H*)-one (**10i**)*

Synthesised as for **10a** from **8** and 3-trifluoromethylbenzaldehyde (**9i**) to afford the *title compound* **10i** as a white solid, 138 mg; 29 % yield.

δ_H (400 MHz, DMSO) 8.42 (s, 1H), 7.85 (s, 1H), 7.80 (d, *J* 7.7, 1H), 7.72 (d, *J* 7.8, 1H), 7.64–7.610 (m, 2H), 7.29–7.23 (m, 2H), 6.78–6.76 (m, 1H), 6.72–6.68 (m, 1H), 5.89 (s, 1H). δ_C (101 MHz, DMSO) 163.5, 147.6, 143.1, 133.5, 131.0, 129.5, 127.4, 125.20, 125.16, 123.64, 123.60, 117.4, 114.9, 114.5, 65.7. ν_{max} (ATR)/cm^{-1} 3275 (NH), 3211 (NH), 1645 (C=O). *m*/*z* (LRMS ESI+) 293.1 (M + H, $C_{15}H_{12}F_3N_2O$, 100 %); (LRMS ESI–) 291.1 (M – H, $C_{15}H_{10}F_3N_2O$, 100 %). Mp 137–141°C.

*2-(2-Nitrophenyl)-2,3-dihydroquinazolin-4(1*H*)-one (**10j**)*

Synthesised as for **10a** from **8** and 2-nitrobenzaldehyde (**9j**) to afford the *title compound* **10j** as an orange solid, 414 mg; 90 % yield.

δ_H (400 MHz, DMSO) 8.21 (s, 1H), 8.06 (dd, *J* 8.1, 0.9, 1H), 7.85–7.84 (m, 1H), 7.79 (t, *J* 7.2, 1H), 7.66–7.61 (m, 2H), 7.28–7.24 (m, 1H), 7.00 (s, 1H), 6.77 (d, *J* 8.1, 1H), 6.72 (t, *J* 7.5, 1H), 6.33 (s, 1H). δ_C (101 MHz, DMSO) 163.3, 147.7, 147.1, 135.9, 133.9, 133.5, 129.9, 128.9, 127.3, 124.7, 117.7, 114.9, 114.5, 62.2. ν_{max} (ATR)/cm^{-1} 3409 (NH), 3182 (NO), 1654 (C=O). *m*/*z* (LRMS ESI+) 270.1 (M + H, $C_{14}H_{11}N_3O_3$, 100 %). Mp >194.6°C (dec.).

*2-(3-Nitrophenyl)-2,3-dihydroquinazolin-4(1*H*)-one (**10k**)*

Synthesised as for **10a** from **8** and 3-nitrobenzaldehyde (**9k**) to afford the *title compound* **10k** as a yellow-orange solid, 356 mg; 78 % yield.

δ_H (400 MHz, DMSO) 8.52 (s, 1H), 8.36 (s, 1H), 8.13–8.19 (m, 1H), 7.94 (d, *J* 7.7, 1H), 7.70 (t, *J* 7.9, 1H), 7.62 (d, *J* 7.3, 1H), 7.34 (s, 1H), 7.27 (t, 1H), 6.79 (d, *J* 8.1, 1H), 6.70 (t, *J* 7.4, 1H), 5.95 (s, 1H). δ_C (101 MHz, DMSO) 163.3, 147.7, 147.3, 144.3, 133.6, 133.4, 130.0, 127.4, 123.3, 121.6, 117.5, 114.9, 114.6, 65.2. ν_{max} (ATR)/cm^{-1} 3289 (NH), 3179 (NH), 3072 (CH), 1650 (C=O). *m*/*z* (LRMS ESI+) 270.1 (M + H, $C_{14}H_{11}N_3O_3$, 100 %); (LRMS ESI–) 268.1 (M – H, $C_{14}H_{11}N_3O_3$, 100 %). Mp >194°C (dec.).

*2-(3-Cyanophenyl)-2,3-dihydroquinazolin-4(1*H*)-one (**10l**)*

Synthesised as for **10a** from **8** and 3-cyanobenzaldehyde (**9l**) to afford the *title compound* **10l** as a white solid, 308 mg; 72 % yield.

δ_H (400 MHz, DMSO) 8.42 (s, 1H), 7.91 (s, 1H), 7.85–7.82 (m, 2H), 7.62 (ddd, *J* 7.8, 4.6, 3.3, 2H), 7.33–7.20 (m, 2H), 6.77 (d, *J* 8.0, 1H), 6.73–6.68 (m, 1H), 5.85 (s, 1H). δ_C (101 MHz, DMSO) 163.4, 147.5, 143.3, 133.5, 132.2, 131.7, 130.6, 129.7, 127.4, 118.7, 117.5, 115.0, 114.6, 111.2, 65.5. ν_{max} (ATR)/cm^{-1} 3372 (NH), 3178 (NH), 2232 (CN), 1659 (C=O). *m*/*z* (LRMS ESI+) 250.1 (M + H, $C_{15}H_{12}N_3O$, 100 %); (LRMS ESI–) 248.1 (M – H, $C_{15}H_{10}N_3O$, 100 %). Mp 224–230°C.

*2-(4-Cyanophenyl)-2,3-dihydroquinazolin-4(1*H*)-one (**10m**)*

Synthesised as for **10a** from **8** and 4-cyanobenzaldehyde (**9m**) to afford the *title compound* **10m** as a white solid, 347 mg; 86 % yield.

δ_H (400 MHz, DMSO) 8.47 (s, 1H), 7.90–7.84 (m, 2H), 7.66 (d, *J* 8.2, 2H), 7.61 (dd, *J* 7.7, 1.4, 1H), 7.31–7.22 (m, 2H), 6.76 (d, *J* 8.1, 1H), 6.71–6.65 (m, 1H), 5.85 (s, 1H). δ_C (101 MHz, DMSO) 163.8, 147.81, 147.79, 134.0, 132.9, 128.1, 127.9, 119.1, 117.9, 115.4, 115.0, 111.5, 66.0. ν_{max} (ATR)/cm^{-1} 3346 (NH), 2227 (CN), 1664 (C=O). *m*/*z* (LRMS ESI+) 250.1 (M + H, $C_{15}H_{12}N_3O$, 100 %); (LRMS ESI–) 248.1 (M – H, $C_{15}H_{10}N_3O$, 100 %). Mp 240–247°C.

*2-(2-Carboxyphenyl)-2,3-dihydroquinazolin-4(1*H*)-one (**10n**)*

Synthesised as for **10a** from **8** and 2-carboxybenzaldehyde (**9n**) to afford the *title compound* **10n** as a yellow solid, 252 mg; 58 % yield.

δ_H (400 MHz, DMSO) 9.48 (s, 1H), 8.22 (s, 1H), 7.60 (dd, *J* 7.7, 1.5, 1H), 7.23 (ddd, *J* 8.2, 7.2, 1.6, 1H), 7.16 (t, *J* 7.9, 1H), 7.06 (s, 1H), 6.89 (t, *J* 4.3, 2H), 6.76–6.69 (m, 2H), 6.69–6.63 (m, 1H), 5.64 (s, 1H). δ_C (101 MHz, DMSO) 163.5, 157.3, 147.8, 143.2, 133.3, 129.3, 127.3, 117.4, 117.0, 115.3, 114.9, 114.3, 113.7, 66.5, 39.5. ν_{max} (ATR)/cm^{-1} 3282 (NH), 3036 (NH), 1726 (C=O), 1674 (C=O). *m*/*z* (LRMS ESI+) 251.1 (M + H – H_2O, $C_{15}H_{11}N_2O_2$, 100 %); (ESI–): 249.1 (M – H – H_2O, $C_{15}H_9N_2O_2$, 100 %). Mp >240°C (dec.).

*2-(3-Carboxyphenyl)-2,3-dihydroquinazolin-4(1*H*)-one (**10o**)*

Synthesised as for **10a** from **8** and 3-carboxybenzaldehyde (**9o**) to afford the *title compound* **10o** as a white solid, 398 mg; 86 % yield.

δ_H (400 MHz, DMSO) 8.38 (s, 1H), 8.08 (s, 1H), 7.90 (dt, 1H), 7.71 (dt, 1H), 7.60 (dd, *J* 7.8, 1.5, 1H), 7.51 (t, *J* 9.6, 1H), 7.25 (ddd, *J* 8.2, 7.2, 1.6, 1H), 7.19 (s, 1H), 6.74 (d, 1H), 6.71–6.65 (m, 1H), 5.83 (s, 1H). δ_C (101 MHz, DMSO) 167.4, 163.8, 147.8, 142.5, 133.8, 131.5, 131.1, 129.5, 129.0, 127.9, 127.6, 117.6, 115.0, 114.7, 66.1. ν_{max} (ATR)/cm^{-1} 3334 (NH), 3200 (NH), 1666 (C=O), 750.5 (C=C). *m*/*z* (LRMS ESI+) 269.2 (M + H, $C_{15}H_{13}N_2O_3$, 100 %). Mp >300°C.

*2-([1,1′-Biphenyl]-4-yl)-2,3-dihydroquinazolin-4(1*H*)-one (**10p**)*

Synthesised as for **10a** from **8** and 4¢-phenylbenzaldehyde (**9p**) to afford the *title compound* **10p** as a white solid, 398 mg; 75 % yield.

δ_H (400 MHz, DMSO) 8.38 (s, 1H), 8.08 (s, 1H), 7.90 (dt, 1H), 7.71 (dt, 1H), 7.60 (dd, *J* 7.8, 1.5, 1H), 7.51 (t, *J* 9.6, 1H), 7.25 (ddd, *J* 8.2, 7.2, 1.6, 1H), 7.19 (s, 1H), 6.74 (d, 1H), 6.71–6.65 (m, 1H), 5.83 (s, 1H). δ_C (101 MHz, DMSO) 167.4, 163.8, 147.8, 142.5, 133.8, 131.5, 131.1, 129.5, 129.0, 127.9, 127.6, 117.6, 115.0, 114.7, 66.1. ν_{max} (ATR)/cm^{-1} 3334 (NH), 3200 (NH), 1666 (C=O), 750.5 (C=C). (LRMS ESI–) 267.1 (M – H, $C_{15}H_{15}N_2O_3$, 100 %), 535.2 (2M – H, $C_{15}H_{15}N_2O_3$, 100 %). Mp >300°C.

*2-(3-Methoxyphenyl)-2,3-dihydroquinazolin-4(1*H*)-one (**10q**)*

Synthesised as for **10a** from **8** and 3-methoxybenzaldehyde (**9q**) to afford the *title compound* **10q** as an off-white solid, 72 mg; 17 % yield.

δ_H (400 MHz, DMSO) 8.29 (s, 1H), 7.61 (dd, *J* 7.7, 1.5, 1H), 7.30 (t, *J* 8.1, 1H), 7.28–7.22 (m, 1H), 7.12 (s, 1H), 7.09–7.04 (m, 2H), 6.91 (ddd, *J* 8.2, 2.5, 0.8, 1H), 6.78–6.74 (m, 1H), 6.70–6.64 (m, 1H), 5.72 (s, 1H), 3.75 (s, 3H). δ_C (101 MHz, DMSO) 164.0, 159.7, 148.3, 143.8, 133.8, 129.9, 127.8, 119.4, 117.6, 115.4, 114.90, 114.1, 113.0, 66.5, 55.6. ν_{max} (ATR)/cm^{-1} 3288 (NH), 3053 (NH), 2916 (CH), 1645 (C=O). *m*/*z* (LRMS ESI+) 255.1 (M + H, $C_{15}H_{15}N_2O_2$, 100 %). (LRMS ESI–) 253.1 (M – H, $C_{15}H_{13}N_2O_2$, 100 %). Mp 140–147°C.

*2-(3-Hydroxyphenyl)-2,3-dihydroquinazolin-4(1H)-one (**10r**)*

Synthesised as for **10a** from **8** and 3-hydroxybenzaldehyde (**9r**) to afford the *title compound* **10r** as a white solid, 260 mg; 67 % yield.

δ_H (400 MHz, DMSO) 9.52 (d, *J* 1.7, 1H), 8.22 (s, 1H), 7.59 (dd, *J* 7.7, 1.4, 1H), 7.27–7.19 (m, 1H), 7.16 (t, *J* 8.1, 1H), 7.06 (s, 1H), 6.88 (t, *J* 4.0, 2H), 6.72 (ddd, *J* 7.1, 3.1, 1.8, 2H), 6.69–6.62 (m, 1H), 5.64 (s, 1H). δ_C (101 MHz, DMSO) 163.7, 157.4, 147.9, 143.3, 133.4, 129.4, 127.4, 117.5, 117.1, 115.4, 114.9, 114.4, 113.7, 66.5. ν_{max} (ATR)/cm^{-1} 3282 (NH), 3100 (OH), 1650 (C=O). *m/z* (LRMS ESI+) 241.1 (M + H, $C_{14}H_{13}N_2O_2$, 100 %), 481.2 (2M + H, $C_{14}H_{13}N_2O_2$, 10 %); (ESI–) 239.1 (M– H, $C_{14}H_{11}N_2O_2$, 100 %), 479.2 (2M + H, $C_{14}H_{11}N_2O_2$, 50 %). Mp 200–209°C.

*2-(3,4,5-Trihydroxyphenyl)-2,3-dihydroquinazolin-4(1H)-one (**10s**)*

Synthesised as for **10a** from **8** and 3,4,5-trihydroxybenzaldehyde (**9s**) to afford the *title compound* **10s** as a white solid, 260 mg; 45 % yield.

δ_H (400 MHz, DMSO) 9.52 (d, *J* 1.7, 1H), 8.22 (s, 1H), 7.59 (dd, *J* 7.7, 1.4, 1H), 7.27–7.19 (m, 1H), 7.16 (t, *J* 8.1, 1H), 7.06 (s, 1H), 6.88 (t, *J* 4.0, 2H), 6.72 (ddd, *J* 7.1, 3.1, 1.8, 2H), 6.69–6.62 (m, 1H), 5.64 (s, 1H). δ_C (101 MHz, DMSO) 163.7, 157.4, 147.9, 143.3, 133.4, 129.4, 127.4, 117.5, 117.1, 115.4, 114.9, 114.4, 113.7, 66.5. ν_{max} (ATR)/cm^{-1} 3282 (NH), 3100 (OH) 1650 (C=O). *m/z* (LRMS ESI+) 241.1 (M + H, $C_{14}H_{13}N_2O_2$, 100 %), 481.2 (2M + H, $C_{14}H_{13}N_2O_2$, 10 %); (ESI–) 239.1 (M-H, $C_{14}H_{11}N_2O_2$, 100 %), 479.2 (2M + H, $C_{14}H_{11}N_2O_2$, 50 %). Mp 200–209°C.

*2-Phenethyl-2,3-dihydroquinazolin-4(1H)-one (**10t**)*

Synthesised as for **10a** from **8** and phenylacetaldehyde (**9t**) to afford the *title compound* **10t** as a yellow solid, 159 mg; 39 % yield.

δ_H (400 MHz, DMSO) 8.02 (s, 1H, NH, H_3), 7.60 (dd, *J* 7.7, 1.5, 1H), 7.32–7.15 (m, 6H), 6.77–6.73 (m, 1H), 6.71–6.65 (m, 2H), 4.74 (t, *J* 5.0, 1H, H_2), 2.79–2.72 (m, 2H), 1.97–1.89 (m, 2H). δ_C (101 MHz, DMSO) 164.1, 148.6, 141.6, 133.1, 128.4 (2C), 128.3 (2C), 127.4, 125.8, 117.1, 115.1, 114.4, 64.0, 36.7, 29.3. ν_{max} (ATR)/cm^{-1} 3302 (NH), 3175 (NH), 3000 (CH_2), 1647 (C=O). *m/z* (LRMS ESI+) 253.2 (M + H, $C_{16}H_{17}N_2O$, 100 %); (ESI–), 251.1 (M – H, $C_{16}H_{15}N_2O$, 100 %), 297.2 (M + FA-H, $C_{16}H_{15}N_2O$, 100 %). Mp >128°C (dec.).

*2-(Benzo[c][1,2,5]thiadiazol-5-yl)-2,3-dihydroquinazolin-4(1H)-one (**10u**)*

Synthesised as for **10a** from **8** and benzo[*c*][1,2,5]thiadiazole-5-carbaldehyde (**9u**) to afford the *title compound* **10u** as a brown solid, 112 mg; 48 % yield.

δ_H (400 MHz, DMSO) 8.54 (s, 1H), 8.13 (d, *J* 9.2, 1H), 8.04 (s, 1H), 7.92 (dd, *J* 9.1, 1.6, 1H), 7.63 (dd, *J* 7.7, 1.3, 1H), 7.35 (s, 1H), 7.29–7.25 (m, 1H), 6.79 (d, *J* 8.0, 1H), 6.72–6.65 (m, 1H), 6.01 (s, 1H). δ_C (101 MHz, DMSO) 163.4, 154.2, 154.0, 147.4, 143.6, 133.6, 129.2, 127.4, 121.5, 118.5, 117.4, 114.9, 114.5, 65.8. ν_{max} (ATR)/cm^{-1} 3243 (NH), 3029, 1654 (C=O). *m/z* (LRMS ESI+) 283.1 (M + H, $C_{14}H_{11}N_4OS$, 100 %); (ESI–) 281.1 (M – H, $C_{14}H_9N_4OS$, 100 %). Mp 216–218°C.

*2-(Benzofuran-2-ylmethyl)-2,3-dihydroquinazolin-4(1H)-one (**10v**)*

Synthesised as for **10a** from **8** and benzofuran-2-carbaldehyde (**9v**) to afford the *title compound* **10v** as a white solid, 171 mg; 71 % yield.

δ_H (400 MHz, DMSO) 8.59 (d, *J* 2.9, 1H), 7.61 (ddd, *J* 8.3, 7.7, 1.1, 2H), 7.52 (dd, *J* 8.2, 0.6, 1H), 7.42 (s, 1H), 7.30–7.19 (m, 3H), 6.79 (d, *J* 7.7, 1H), 6.72–6.67 (m, 2H), 5.93 (t, *J* 2.9, 1H). δ_C (101 MHz, DMSO) 163.2, 157.3, 154.2, 146.9, 133.4, 127.5, 127.3, 124.6, 123.0, 121.4, 117.4, 115.0, 114.6, 111.2, 104.0, 60.4. ν_{max} (ATR)/cm^{-1} 3269 (NH), 3178 (NH), 3010, 1662 (C=O). *m/z* (LRMS ESI+) 265.1 (M + H, $C_{16}H_{13}N_2O_2$, 100 %); (ESI–) 263.1 (M – H, $C_{16}H_{11}N_2O_2$, 100 %). Mp 192–198°C.

*2-Cyclopentyl-2,3-dihydroquinazolin-4(1H)-one (**10w**)*

Synthesised as for **10a** from **8** and cyclopentyl carboxaldehyde (**9w**) to afford the *title compound* **10w** as a white solid, 304 mg; 87 % yield.

δ_H (400 MHz, DMSO) 7.91 (s, 1H), 7.56 (dd, *J* 7.7, 1.3, 1H), 7.23–7.19 (m, 1H), 6.76 (d, *J* 7.9, 1H), 6.64–6.60 (m, 1H), 6.53 (s, 1H), 4.48 (d, *J* 6.6, 1H), 2.25–2.10 (m, 1H), 1.65–1.43 (m, 8H). δ_C (101 MHz, DMSO) 163.6, 148.2, 133.0, 127.2, 116.6, 115.1, 114.3, 67.7, 44.9, 27.3, 27.2, 25.1, 25.0. ν_{max} (ATR)/cm^{-1} 3329 (NH), 3185 (NH), 2964 (CH_2), 1635 (C=O). *m/z* (LRMS ESI+) 217.1 (M + H, $C_{13}H_{17}N_2O$, 100 %). Mp 166–177°C.

*2-Cyclohexyl-2,3-dihydroquinazolin-4(1H)-one (**10x**)*

Synthesised as for **10a** from **8** and cyclohexyl carboxaldehyde (**9x**) to afford the *title compound* **10x** as a white solid, 223 mg; 89 % yield.

δ_H (400 MHz, DMSO) 7.86 (s, 1H), 7.55 (dd, *J* 7.7, 1.5, 1H), 7.19 (ddd, *J* 8.7, 7.2, 1.6, 1H), 6.74 (d, *J* 7.7, 1H), 6.62–6.58 (m, 1H), 6.54 (s, 1H), 4.45–4.43 (m, 1H), 1.71–1.55 (m, 6H), 1.16–1.07 (m, 4H). δ_C (101 MHz, DMSO) 163.7, 148.3, 133.0, 127.2, 116.4, 114.8, 114.1, 68.6, 42.8, 27.0, 26.7, 25.9, 25.6, 25.5. ν_{max} (ATR)/cm^{-1} 3336 (NH), 3172 (NH), 2921 (CH_2), 1642 (C=O). *m/z* (LRMS ESI+) 231.2 (M + H, $C_{15}H_{19}N_2O$, 100 %). Mp 176–184°C.

*2-(Cyclohex-3-en-1-yl)-2,3-dihydroquinazolin-4(1H)-one (**10y**)*

Synthesised as for **10a** from **8** and cyclohex-3-ene-1-carbaldehyde (**9y**) to afford the *title compound* **10y** as an off-white solid, 337 mg; 92 % yield.

δ_H (400 MHz, DMSO) 7.95 (d, *J* 44.3, 1H), 7.56 (d, *J* 7.7, 1H), 7.23–7.19 (m, 1H), 6.75 (t, *J* 8.2, 1H), 6.65–6.53 (m, 2H), 5.65 (s, 2H), 4.56 (dd, *J* 4.2, 1.9, 1H), 2.05–1.97 (m, 4H), 1.83–1.74 (m, 2H), 1.36–1.34 (m, 1H), δ_C (101 MHz, DMSO) 163.8, 163.7, 148.3, 148.3, 133.1, 133.0, 127.2, 126.8, 126.7, 126.0, 125.9, 116.6, 116.58, 114.9, 114.8, 114.2, 114.1, 67.9, 67.8, 38.9, 38.6, 25.9, 25.6, 24.70, 24.68, 23.1, 22.8. ν_{max} (ATR)/cm^{-1} 3353 (NH), 3172 (NH), 3036 (CH_2), 160 (C=O). *m/z* (LRMS ESI+) 229.2 (M + H, $C_{14}H_{17}N_2O$, 100 %); (ESI–) 273.1 (M – H^+FA, $C_{15}H_{19}N_2O_2$, 100 %). Mp 178–185°C.

*2-Butyl-2,3-dihydroquinazolin-4(1H)-one (**10z**)*

Synthesised as for **10a** from **8** and butyraldehyde (**9z**) to afford the *title compound* **10z** as a white solid, 136 mg; 34 % yield.

δ_H (400 MHz, DMSO) 7.87 (s, 1H), 7.58 (dd, *J* 7.7, 1.2, 1H), 7.24–7.20 (m, 1H), 6.73 (d, *J* 8.0, 1H), 6.65 (dd, *J* 11.0, 3.9, 1H),

6.55 (s, 1H), 4.68 (t, *J* 5.3, 1H), 1.64–1.61 (m, 2H), 1.40–1.28 (m, 4H), 0.88 (t, *J* 7.2, 3H). δ_C (101 MHz, DMSO) 163.9, 148.5, 133.0, 127.3, 116.9, 115.0, 114.4, 64.4, 34.7, 25.4, 22.1, 13.9. ν_{max} (ATR)/cm^{-1} 3340 (NH), 3178 (NH), 2926 (CH_2), 1643 (C=O). *m*/*z* (LRMS ESI+) 205.2 (M + H, $C_{12}H_{17}N_2O$, 100 %). Mp 137–143°C.

*2-Octyl-2,3-dihydroquinazolin-4(1*H*)-one (**10aa**)*

Synthesised as for **10a** from **8** and octylaldehyde (**9aa**) to afford the *title compound* **10aa** as a white solid, 113 mg; 34 % yield.

δ_H (400 MHz, DMSO) 7.87 (s, 1H), 7.58 (dd, *J* 7.7, 1.5, 1H), 7.22 (ddd, *J* 8.3, 7.2, 1.6, 1H), 6.73 (d, 1H), 6.65 (d, 1H), 6.55 (s, 1H), 4.68 (t, *J* 5.2, 1H), 1.68–1.55 (m, 2H), 1.44–1.39 (m, 2H), 1.31–1.25 (m, 8H), 0.87 (t, *J* 6.8, 3H). δ_C (101 MHz, DMSO) 163, 148.5, 133.0, 127.3, 116.8, 115.0, 114.3, 64.4, 35.0, 31.2, 28.9, 28.7, 23.2, 22.1, 13.9. ν_{max} (ATR)/cm^{-1} 3333 (NH), 3185 (NH), 22925 (CH_2), 1641 (C=O). *m*/*z* (LRMS ESI+) 247.2 (M + H, $C_{15}H_{23}N_2O$, 100 %); (LRMS ESI–) 291.2 (M + FA-H, $C_{16}H_{25}N_2O_3$, 100 %). Mp 160–163°C.

*2-(Naphthalen-1-yl)-2,3-dihydroquinazolin-4(1*H*)-one (**10ab**)*

Synthesised as for **10a** from **8** and 2-naphthylaldehyde (**9ab**) to afford the *title compound* **10ab** as a white solid, 374 mg; 30 % yield.

δ_H (400 MHz, DMSO) 8.37 (s, 1H), 7.96–7.90 (m, 4H), 7.70 (dd, *J* 8.6, 1.6, 1H), 7.64 (dd, *J* 7.7, 1.5, 1H), 7.53 (dd, *J* 6.2, 3.3, 2H), 7.25 (ddd, *J* 8.3, 7.3, 1.6, 1H), 7.19 (s, 1H), 6.77 (d, *J* 7.7, 1H), 6.71–6.67 (m, 1H), 5.94 (s, 1H). δ_C (101 MHz, DMSO) 163.6, 147.9, 138.9, 133.4, 133.0, 132.5, 128.1, 128.0, 127.6, 127.4, 126.43, 126.38, 125.9, 124.8, 117.2, 114.9, 114.4, 66.8. ν_{max} (ATR)/cm^{-1} 3275 (NH), 8978 (CH), 1646 (C=O). *m*/*z* (LRMS ESI+) 275.1 (M + H, $C_{18}H_{15}N_2O$, 100 %); (LRMS ESI–) 273.1 (M – H, $C_{18}H_{13}N_2O$, 100 %). Mp 202–206°C.

*2-(Naphthalen-2-yl)-2,3-dihydroquinazolin-4(1*H*)-one (**10ac**)*

Synthesised as for **10a** from **8** and 1-naphthylaldehyde (**9ac**) to afford the *title compound* **10ac** as a white solid, 130 mg; 86 % yield.

δ_H (400 MHz, DMSO) 8.57–8.54 (m, 1H), 8.27 (s, 1H), 8.01–7.96 (m, 2H), 7.72–7.69 (m, 2H), 7.59–7.51 (m, 3H), 7.28–7.24 (m, 1H), 7.08 (s, 1H), 6.76–6.71 (m, 2H), 6.49 (s, 1H). δ_C (101 MHz, DMSO) 164.5, 148.9, 135.6, 134.2, 133.7, 131.0, 129.8, 129.1, 128.0, 126.51, 126.50, 126.3, 125.7, 125.1, 117.7, 115.4, 115.0, 66.4. ν_{max} (ATR)/cm^{-1} 3359, 3217 (NH), 3004, 1649 (C=O). LRMS (ESI+) 275.2 (M + H, $C_{18}H_{15}N_2O$, 100 %). Mp 182–186°C.

*(E)-2-(1,2-Diphenylvinyl)-2,3-dihydroquinazolin-4(1*H*)-one (**10ad**)*

No reaction observed.

*(Z)-2-(1-Bromo-2-phenylvinyl)-2,3-dihydroquinazolin-4(1*H*)-one (**10ae**)*

Synthesised as for **10a** from **8** and (*Z*)-2-bromo-3-phenylacrylaldehyde (**9ae**) to afford the *title compound* **10ae** as a pale yellow solid, 212 mg; 40 % yield.

δ_H (400 MHz, DMSO) 8.30 (d, *J* 1.3, 1H), 7.64–7.63 (m, 2H), 7.58 (dd, *J* 7.7, 1.4, 1H), 7.43– 7.39 (m, 2H), 7.37 (dd, *J* 4.9, 3.6, 1H), 7.25–7.19 (m, 3H), 6.72 (d, *J* 8.0, 1H), 6.62 (t, 1H), 5.64 (s, 1H). δ_C (101 MHz, DMSO) 162.6, 146.9, 134.3, 133.4, 129.6, 129.0 (2C), 128.6, 128.5, 128.5, 128.4 (2C), 127.0, 116.6, 113.6, 113.4, 70.6. ν_{max} (ATR)/cm^{-1} 3263 (NH), 3178 (NH), 3053 (CH), 1646 (C=O). *m*/*z* (LRMS ESI+) 329.1 (M + H, $C_{16}H_{13}^{79}BrN_2O$, 100 %) 331.1 (M + H, $C_{16}H_{13}^{81}BrN_2O$, 95 %). Mp 180–183°C.

*2-(Furan-2-yl)-2,3-dihydroquinazolin-4(1*H*)-one (**10af**)*

No reaction observed.

*2-(5-Methylfuran-2-yl)-2,3-dihydroquinazolin-4(1*H*)-one (**10ag**)*

No reaction observed

*2-(5-Bromofuran-2-yl)-2,3-dihydroquinazolin-4(1*H*)-one (**10ah**)*

Synthesised as for **10a** from **8** and 5-bromo-2-furfural (**9ah**) to afford the *title compound* **10ah** as an off-white solid, 123 mg; 25 % yield.

δ_H (400 MHz, DMSO) 8.44 (s, 1H), 7.61 (s, 1H), 7.27 (s, 2H), 6.73 (d, *J* 30.9, 2H), 6.56–6.21 (m, 2H), 5.75 (s, 1H). δ_C (101 MHz, DMSO) 163.1, 156.6, 146.9, 133.4, 127.3, 121.0, 117.5, 114.9, 114.6, 112.3, 110.2, 60.0. ν_{max} (ATR)/cm^{-1} 3270 (NH), 3165 (NH), 1651 (C=O). *m*/*z* (LRMS ESI+) 293.1 (M + H, $C_{12}H_{10}^{79}BrN_2O_2$, 100 %), 295.1 (M + H, $C_{12}H_{10}^{81}BrN_2O_2$, 100 %); (LRMS ESI–) 291.1 (M – H, $C_{12}H_8^{79}BrN_2O_2$, 100 %), 293.1 (M – H, $C_{12}H_8^{81}BrN_2O_2$, 100 %). Mp >150°C (dec.).

*2-(1*H*-Pyrrol-2-yl)-2,3-dihydroquinazolin-4(1*H*)-one (**10ai**)*

No reaction observed.

*2-(Thiophen-2-yl)-2,3-dihydroquinazolin-4(1*H*)-one (**10aj**)*

Synthesised as for **10a** from **8** and thiophen-2-carboxaldehyde (**9aj**) to afford the *title compound* **10aj** as a white solid, 309 mg; 80 % yield.

δ_H (400 MHz, DMSO) 8.44 (s, 1H), 7.62 (dd, *J* 7.7, 1.3, 1H), 7.45 (dd, *J* 5.0, 1.2, 1H), 7.26–7.24 (m, 2H), 7.12 (d, *J* 3.0, 1H), 6.98 (dd, *J* 5.0, 3.5, 1H), 6.76 (d, *J* 7.8, 1H), 6.70 (t, 1H), 6.02 (s, 1H). δ_C (101 MHz, DMSO) 163.1, 147.2, 146.4, 133.4, 127.3, 126.5, 125.9, 125.7, 117.5, 115.1, 114.7, 62.6. ν_{max} (ATR)/cm^{-1} 3295 (NH), 3172 (NH), 1649 (C=O). *m*/*z* (LRMS ESI+) 231.1 (M + H, $C_{12}H_{11}N_2OS$, 100 %); (LRMS ESI–) 229.1 (M-H, $C_{12}H_{11}N_2OS$, 100 %). Mp 197–206°C.

*(E)-2-(2-Nitrostyryl)-2,3-dihydroquinazolin-4(1*H*)-one (**10ak**)*

Synthesised as for **10a** from **8** and (*E*)-3-(2-nitrophenyl)-acrylaldehyde (**9ak**) to afford the *title compound* **10ak** as a yellow solid, 289 mg; 59 % yield.

δ_H (400 MHz, DMSO) 8.50 (d, *J* 8.9, 1H), 8.35 (s, 1H), 8.09 (d, *J* 7.0, 1H), 8.05 (dd, *J* 8.1, 1.1, 1H), 7.94 (dd, *J* 7.8, 1.5, 1H), 7.81–7.76 (m, 1H), 7.74 (d, *J* 15.8, 1H), 7.68–7.62 (m, 2H), 7.53 (td, *J* 7.7, 1.6, 1H), 7.37–7.31 (m, 2H), 7.23–7.21 (m, 1H). δ_C (101 MHz, DMSO) 167.1, 163.2, 149.0, 148.2, 139.3, 133.6, 132.4, 131.9, 130.6, 129.9, 129.7, 128.7, 128.1, 126.3, 124.6, 118.9. ν_{max} (ATR)/cm^{-1} 3249 (NH), 2971 (NH), 1668 (C=O), 1519 (NO), 1349 (NO). *m*/*z* (LRMS ESI+) 296.1 (M + H, $C_{16}H_{14}N_3O_3$, 100 %). Mp 127–134°C.

*(E)-2-(2-(Furan-2-yl)vinyl)-2,3-dihydroquinazolin-4(1*H*)-one (**10al**)*

Synthesised as for **10a** from **8** and (*E*)-3-(furan-2-yl)-acrylaldehyde (**9al**) to afford the *title compound* **10al** as a white solid, 109 mg; 28 % yield.

δ_H (400 MHz, DMSO) 8.13 (s, 1H), 7.63–7.59 (m, 2H), 7.27–7.22 (m, 1H), 6.87 (s, 1H), 6.74 (d, *J* 8.1, 1H), 6.71–6.65 (m, 1H), 6.54–6.48 (m, 3H), 6.12 (dd, *J* 15.8, 6.5, 1H), 5.26 (d, *J* 6.5, 1H). δ_C (101 MHz, DMSO) 163.3, 151.1, 147.6, 143.2, 133.3, 127.3, 126.7, 119.9, 117.2, 114.9, 114.6, 111.8, 109.6, 65.0. ν_{max} (ATR)/cm^{-1} 3236 (NH), 2971 (NH), 1634 (C=O). *m/z* (LRMS ESI+) 241.1 (M + H, $C_{14}H_{13}N_2O_2$, 100 %). Mp 148–151°C.

*2-(5-Methyl-1H-indol-3-yl)-2,3-dihydroquinazolin-4(1**H**)-one (**10am**)*

Synthesised as for **10a** from **8** and 5-methyl-1*H*-indole-3-carbaldehyde (**9am**) to afford the *title compound* **10am** as a pink solid, 73 mg; 17 % yield.

δ_H (400 MHz, DMSO) 12.09 (s, 1H), 11.74 (s, 1H), 8.50 - 8.49 (m, 2H), 8.10 (dd, *J* 7.9, 1.0, 1H), 7.79– 7.75 (m, 2H), 7.41–7.35 (m, 2H), 7.06 (dd, *J* 8.3, 1.4, 1H), 2.47 (s, 3H). δ_C (101 MHz, DMSO) 162.1, 150.4, 149.8, 135.2, 134.3, 129.6, 129.1, 127.0, 125.81, 125.80, 125.1, 124.1, 122.1, 120.4, 111.6, 108.1, 21.5. *m/z* (LRMS ESI+) 276.2 (M + H, $C_{17}H_{14}N_3O$, 100 %); (ESI–) 274.1 (M – H, $C_{17}H_{12}N_3O$, 100 %). ν_{max} (ATR)/cm^{-1} 3385 (NH), 3114 (NH), 2965, 1663 (C=O). Mp >155°C (dec.).

*2-(5-Bromo-1H-indol-3-yl)-2,3-dihydroquinazolin-4(1H)-one (**10an**)*

No reaction observed.

*(E)-2-(4-(Dimethylamino)styryl)-2,3-dihydroquinazolin-4(1H)-one (**10ao**)*

No reaction observed.

*2-(1H-Indol-3-yl)-2,3-dihydroquinazolin-4(1H)-one (**10ap**)*

Synthesised as for **10a** from **8** and 1*H*-indole-3-carbaldehyde (**9ap**) to afford the *title compound* **10ap** as an orange solid, 220 mg; 53 % yield.

δ_H (400 MHz, DMSO) 11.09 (s, 1H), 8.09 (s, 1H), 7.78–7.76 (m, 1H), 7.66 (dd, *J* 7.8, 1.4, 1H), 7.41–7.39 (m, 2H), 7.24 (dt, 1H), 7.11–7.10 (m, 1H), 7.01–6.98 (m, 1H), 6.92 (s, 1H), 6.76 (d, *J* 8.0, 1H), 6.71–6.68 (m, 1H), 6.04 (s, 1H). δ_C (101 MHz, DMSO) 164.2, 148.8, 136.6, 133.0, 127.5, 125.4, 124.7, 121.4, 120.0, 118.8, 117.0, 115.3, 114.40, 114.41, 111.7, 61.7. *m/z* (LRMS ESI+) 264.1 (M + H, $C_{16}H_{14}N_3O$, 100 %); (ESI–) 262 (M – H, $C_{16}H_{12}N_3O$, 100 %). ν_{max} (ATR)/cm^{-1} 3579, 3398, 3185 (NH), 2991, 1641 (C=O). Mp 196–216°C.

*3-(4-Oxo-1,2,3,4-tetrahydroquinazolin-2-yl)-1H-indole-5-carbonitrile (**10aq**)*

Synthesised as for **10a** from **8** and 3-formyl-1*H*-indole-5-carbonitrile (**9aq**) to afford the *title compound* **10aq** as a yellow solid, 103 mg; 35 % yield.

δ_H (400 MHz, DMSO) 12.35 (s, 1H), 12.30 (s, 1H), 9.10 (s, 1H), 8.71 (d, *J* 2.5, 1H), 8.12 (d, *J* 7.7, 1H), 7.80 (dt, *J* 14.9, 7.5, 2H), 7.67 (t, *J* 7.4, 1H), 7.61 (d, *J* 8.2, 1H), 7.44 (dd, *J* 15.9, 9.2, 1H). δ_C (101 MHz, DMSO) 162.0, 149.4, 149.3, 138.7, 134.5, 131.4, 127.6, 127.3, 125.8, 125.6, 125.5, 125.3, 120.6, 120.5, 113.6, 109.3, 103.2. ν_{max} (ATR)/cm^{-1} 3282 (NH), 3120 (NH), 2227 (CN), 1679 (C=O). *m/z* (LRMS ESI+) 287.1 (M + H, $C_{17}H_{11}N_4O$, 100 %); (LRMS ESI–) 285.1 (M – H, $C_{17}H_9N_4O$, 100 %). Mp >250°C (dec.).

*2-(1H-Indol-5-yl)-2,3-dihydroquinazolin-4(1H)-one (**10ap**)*

No reaction observed.

*(E)-2-Styrylquinazolin-4(3H)-one (**11a**)*

Synthesised as for **10a** from **8** and cinnamaldehyde (**9aq**) to afford the *title compound* **11a** as an off-white solid, 248 mg; 54 % yield.

δ_H (400 MHz, DMSO) 12.33 (s, 1H), 8.11 (d, *J* 7.4, 1H), 7.95 (d, *J* 16.2, 1H), 7.81 (t, *J* 7.1, 1H), 7.72–7.63 (m, 3H), 7.50–7.40 (m, 4H), 7.01 (d, *J* 16.2, 1H). δ_C (101 MHz, DMSO) 161.7, 151.4, 149.0, 138.3, 135.0, 134.5, 129.8, 129.1 (2C), 127.6 (2C), 127.1, 126.2, 125.9, 121.1, quaternary carbon not observed. ν_{max} (ATR)/cm^{-1} 3105 (NH), 3042 (CH), 1668 (C=O). *m/z* (LRMS ESI+) 249.1 (M + H, $C_{16}H_{13}N_2O$, 100 %); (LRMS ESI–) 247.2 (M – H, $C_{16}H_{11}N_2O$, 100 %). Mp 243–256°C.

*(E)-2-(4-Methoxystyryl)quinazolin-4(3H)-one (**11b**)*

Synthesised as for **10a** from **8** and (*E*)-3-(4-methoxyphenyl)-acrylaldehyde (**9ar**) to afford the *title compound* **11b** as a yellow solid, 165 mg; 37 % yield.

δ_H (400 MHz, DMSO) 12.25 (s, 1H), 8.10 (dd, *J* 7.9, 1.1, 1H), 7.91 (d, *J* 16.1, 1H), 7.81–7.77 (m, 1H), 7.66–7.60 (m 3H), 7.47–7.43 (m, 1H), 7.02 (d, *J* 8.7, 2H), 6.85 (d, *J* 16.1, 1H), 3.81 (s, 3H). δ_C (101 MHz, DMSO) 161.8, 160.6, 151.7, 149.2, 138.0, 134.5, 129.3 (2C), 127.6, 127.0, 125.9, 125.8, 121.0, 118.5, 114.6 (2C), 55.3. ν_{max} (ATR)/cm^{-1} 3100 (NH), 3049, 1668 (C=O). LRMS (ESI+) 279.1 (M + H, $C_{17}H_{15}N_2O_2$, 100 %); (ESI–) 277.1 (M – H, $C_{17}H_{13}N_2O_2$, 100 %). Mp >210°C (dec.).

*(E)-2-(4-Bromostyryl)quinazolin-4(3H)-one (**11c**)*

Synthesised as for **10a** from **8** and (*E*)-3-(4-bromophenyl)-acrylaldehyde (**9as**) to afford the *title compound* **11c** as a white solid, 82 mg; 62 % yield.

δ_H (400 MHz, DMSO) 12.34 (s, 1H), 8.12 (dd, *J* 7.9, 1.0, 1H), 7.92 (d, *J* 16.2, 1H), 7.84–7.80 (m, 1H), 7.67 (dd, *J* 8.1, 6.1, 3H), 7.62 (d, *J* 8.6, 2H), 7.49 (t, *J* 7.5, 1H), 7.03 (d, *J* 16.2, 1H). δ_C (101 MHz, DMSO) 162.2, 151.7, 149.4, 137.4, 135.0, 134.8, 132.5 (2C), 130.0 (2C), 127.6, 126.8, 126.3, 123.4, 122.4, 121.6. ν_{max} (ATR)/cm^{-1} 3004, 1665 (C=O), 770 (C–Br). *m/z* (LRMS ESI+) 327 (M + H, $C_{16}H_{12}Br^{79}N_2O$, 100 %) 329 (M + H, $C_{16}H_{12}Br^{81}N_2O$, 85 %); (ESI–) 325 (M – H, $C_{16}H_{10}Br^{79}N_2O$, 100 %), 327 (M – H, $C_{16}H_{10}Br^{81}N_2O$, 95 %). Mp 296–310°C.

*(E)-2-(Hex-1-en-1-yl)quinazolin-4(3H)-one (**11d**)*

Synthesised as for **10a** from **8** and (*E*)-hex-2-enal (**9at**) to afford the *title compound* **11d** as a brown solid, 102 mg; 24 % yield.

δ_H (400 MHz, DMSO) 8.14 (s, 1H), 7.94–7.88 (m, 2H), 7.64 (s, 1H), 2.85 (s, 1H), 2.64 (s, 1H), 1.79 (s, 1H), 1.36–1.28 (m, 4H), 0.89 (m, 4H). δ_C (101 MHz, DMSO) 160.8, 135.9, 128.1, 126.8, 120.4, 32.9, 31.2, 29.6, 28.5, 27.5, 22.3, 22.1, 14.4. ν_{max} (ATR)/cm^{-1} 2908 (NH), 1708 (C=O). *m/z* (LRMS ESI+) 229.1 (M + H, $C_{14}H_{17}N_2O$, 100 %); (LRMS ESI–) 227.1 (M – H, $C_{14}H_{15}N_2O$, 100 %). Mp 147–176°C.

Supplementary Material

Copies of the ^1H and ^{13}C NMR spectra of the compounds reported in this work are available on the Journal's website.

Conflict of Interest

The authors declare no conflicts of interest.

Acknowledgements

N. S. O. is the recipient of a University of Newcastle Postgraduate Research Scholarship (UNPRS) and this work was supported by the Australian

Research Council (ARC Discovery Project grant award number DP180101781) and equipment grants from the Australian Cancer Research Foundation and Ramaciotti Foundation. The authors would like to thank Dr Enis Nadia Md Yusof (Universiti Putra Malaysia) for her invaluable expertise with tin-based ICP analysis.

References

[1] C. B. Harper, M. R. Popoff, A. McCluskey, P. J. Robinson, F. A. Meunier, *Trends Cell Biol.* **2013**, *23*, 90. doi:10.1016/J.TCB.2012.10.007
[2] M. J. Robertson, F. M. Deane, P. J. Robinson, A. McCluskey, *Nat. Protoc.* **2014**, *9*, 851. doi:10.1038/NPROT.2014.046
[3] M. J. Robertson, F. M. Deane, P. J. Robinson, V. Haucke, A. McCluskey, *Nat. Protoc.* **2014**, *9*, 1592. doi:10.1038/NPROT.2014.106
[4] L. von Kleist, W. Stahlschmidt, H. Bulut, K. Gromova, D. Puchkov, M. J. Robertson, K. A. MacGregor, N. Tomlin, A. Pechstein, N. Chau, M. Chircop, J. A. Sakoff, J. von Kries, W. Saenger, H.-G. Kräusslich, O. Shupliakov, P. J. Robinson, A. McCluskey, V. Haucke, *Cell* **2011**, *146*, 471. doi:10.1016/J.CELL.2011.06.025
[5] A. McCluskey, A. T. R. Sim, J. A. Sakoff, *J. Med. Chem.* **2002**, *45*, 1151. doi:10.1021/JM010066K
[6] L. Hizartzidis, C. P. Gordon, J. Gilbert, J. A. Sakoff, A. McCluskey, *ChemMedChem* **2019**, *14*, 1152. doi:10.1002/CMDC.201900180
[7] J. R. Baker, C. C. Russell, J. Gilbert, J. A. Sakoff, A. McCluskey, *ChemMedChem* **2020**, *15*, 490. doi:10.1002/CMDC.201900643
[8] J. R. Baker, J. A. Sakoff, A. McCluskey, *Med. Res. Rev.* **2019**, *40*, 972.
[9] K. S. Gajula, N. Mameda, S. Kodumuri, D. Chevella, R. Banothu, V. Amrutham, B. I. Kutepov, N. Nama, *Synth. Commun.* **2018**, *48*, 2866. doi:10.1080/00397911.2018.1506033
[10] R. Mekala, M. V. Madhubabu, G. Dhanunjaya, S. Regati, K. B. Chandrasekhar, J. Sarva, *Synth. Commun.* **2017**, *47*, 121. doi:10.1080/00397911.2016.1254801
[11] M. J. Hour, L. J. Huang, S. C. Kuo, Y. Xia, K. Bastow, Y. Nakanishi, E. Hamel, K. H. Lee, *J. Med. Chem.* **2000**, *43*, 4479. doi:10.1021/JM000151C
[12] E. Cohen, B. Klarberg, J. R. Vaughan, *J. Am. Chem. Soc.* **1959**, *81*, 5508. doi:10.1021/JA01529A062
[13] V. J. Ram, Farhanullah, B. K. Tripathi, A. K. Srivastava, *Bioorg. Med. Chem.* **2003**, *11*, 2439. doi:10.1016/S0968-0896(03)00142-1
[14] J. Rudolph, W. P. Esler, S. O'Connor, P. D. G. Coish, P. L. Wickens, M. Brands, D. E. Bierer, B. T. Bloomquist, G. Bondar, L. Chen, C.-Y. Chuang, T. H. Claus, Z. Fathi, W. Fu, U. R. Khire, J. A. Kristie, X.-G. Liu, D. B. Lowe, A. C. McClure, M. Michels, A. A. Ortiz, P. D. Ramsden, R. W. Schoenleber, T. E. Shelekhin, A. Vakalopoulos, W. Tang, L. Wang, L. Yi, S. J. Gardell, J. N. Livingston, L. J. Sweet, W. H. Bullock, *J. Med. Chem.* **2007**, *50*, 5202. doi:10.1021/JM070071+
[15] K. Okumura, T. Oine, Y. Yamada, G. Hayashi, M. Nakama, *J. Med. Chem.* **1968**, *11*, 348. doi:10.1021/JM00308A036
[16] M. Badolato, F. Aiello, N. Neamati, *RSC Adv.* **2018**, *8*, 20894. doi:10.1039/C8RA02827C
[17] G. M. Chinigo, M. Paige, S. Grindrod, E. Hamel, S. Dakshanamurthy, M. Chruszcz, W. Minor, M. L. Brown, *J. Med. Chem.* **2008**, *51*, 4620. doi:10.1021/JM800271C
[18] J. Chen, D. Wu, F. He, M. Liu, H. Wu, J. Ding, W. Su, *Tetrahedron Lett.* **2008**, *49*, 3814. doi:10.1016/J.TETLET.2008.03.127
[19] S. Santra, M. Rahman, A. Roy, A. Majee, A. Hajra, *Catal. Commun.* **2014**, *49*, 52. doi:10.1016/J.CATCOM.2014.01.032
[20] J. Zhang, D. Ren, Y. Ma, W. Wang, H. Wu, *Tetrahedron* **2014**, *70*, 5274. doi:10.1016/J.TET.2014.05.059
[21] Y. Chen, W. Shan, M. Lei, L. Hu, *Tetrahedron Lett.* **2012**, *53*, 5923. doi:10.1016/J.TETLET.2012.08.090
[22] V. B. Labade, P. V. Shinde, M. S. Shingare, *Tetrahedron Lett.* **2013**, *54*, 5778. doi:10.1016/J.TETLET.2013.08.037
[23] J. Wu, X. Du, J. Ma, Y. Zhang, Q. Shi, L. Luo, B. Song, S. Yang, D. P. Hu, *Green Chem.* **2014**, *16*, 3210. doi:10.1039/C3GC42400F
[24] A. Davoodnia, S. Allameh, A. R. Fakhari, N. Tavakoli-Hoseini, *Chin. Chem. Lett.* **2010**, *21*, 550. doi:10.1016/J.CCLET.2010.01.032
[25] A. Ghorbani-Choghamarani, M. Norouzi, *J. Mol. Catal. Chem.* **2014**, *395*, 172. doi:10.1016/J.MOLCATA.2014.08.013
[26] P. V. N. S. Murthy, D. Rambabu, G. R. Krishna, C. M. Reddy, K. R. S. Prasad, M. V. B. Rao, M. Pal, *Tetrahedron Lett.* **2012**, *53*, 863. doi:10.1016/J.TETLET.2011.12.023
[27] J. Safari, S. Gandomi-Ravandi, *J. Mol. Catal. Chem.* **2014**, *390*, 1. doi:10.1016/J.MOLCATA.2014.02.013
[28] S. K. Leitch, A. McCluskey, *Synlett* **2003**, 699. doi:10.1055/S-2003-38365
[29] A. McCluskey, I. W. Muderawan, Muntari, D. J. Young, *J. Org. Chem.* **2001**, *66*, 7811. doi:10.1021/JO015904X
[30] C. M. Gordon, A. McCluskey, *Chem. Commun.* **1999**, 1431. doi:10.1039/A903661J
[31] T. M. Cokley, R. L. Marshall, A. McCluskey, D. J. Young, *Tetrahedron Lett.* **1996**, *37*, 1905. doi:10.1016/0040-4039(96)00149-9
[32] R. G. Bergman, R. L. Dasnheiser, *Angew. Chem. Int. Ed.* **2016**, *55*, 12548. doi:10.1002/ANIE.201606591
[33] S. Mohammed, R. A. Voshwakarma, S. B. Bharate, *J. Org. Chem.* **2015**, *80*, 6915. doi:10.1021/ACS.JOC.5B00989
[34] W. P. Walters, J. Green, J. R. Weiss, M. A. Murcko, *J. Med. Chem.* **2011**, *54*, 6405. doi:10.1021/JM200504P
[35] S. D. Roughley, A. M. Jordan, *J. Med. Chem.* **2011**, *54*, 3451. doi:10.1021/JM200187Y