Supporting Information

One-Pot Tandem Approach to Functionalized 3-Hydroxy-2-furanyl-acrylamides
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List of abbreviations:
OAs - 2-Oxoaldehydes
ACN - Acetonitrile
DMF - Dimethylformamide
TEA - Triethylamine
TBHP - tert-Butyl hydroperoxide
MeOH - Methanol
TLC - Thin layer chromatography
h - Hours
rt - Room Temperature
mp - Melting point
1. General Experimental
All chemicals used were of commercial grade and were used as such. $^1$H NMR and $^{13}$C NMR spectra were recorded on 500 and 400 MHz instruments. Chemical data for protons, carbons were reported in parts per million (ppm) downfield from tetramethylsilane and are referenced to the residual proton, carbon in the NMR solvents (CDCl$_3$: 7.26 ppm, $^{13}$C NMR solvents CDCl$_3$: 77.0, Acetone-d$_6$: 206.6, 29.9 ppm). ESI-MS and HRMS spectra were recorded on Agilent 1100 LC-Q-TOF and HRMS-6540-UHD machines. IR spectra were recorded on FTIR spectrophotometer with absorption band given in cm$^{-1}$. Melting points were measured in a digital melting point apparatus.

2. Optimization and Experimental procedures
Table S1: Arylglyoxal 2a and TBHP concentration optimization for the Synthesis of Functionalized (Z)-2-Furanyl-acrylamides

| entry | 2a (mmol) | TBHP (mmol) | yield 3a (%)$^a$ | 4a |
|-------|-----------|-------------|-----------------|----|
| 1     | (1.0)     | TBHP (0.5)  | 35              | 24 |
| 2     | (1.0)     | TBHP (1)    | 69              | 31 |
| 3     | (1.0)     | TBHP (1.1)  | 76              | 36 |
| 4     | (1.0)     | TBHP (1.5)  | 25              | 45 |
| 5     | (1.0)     | TBHP (2.0)  | 7               | 81 |
| 6     | (0.5)     | TBHP (0.5)  | 32              | 57 |
| 7     | (0.5)     | TBHP (1.1)  | 14              | 82 |
| 8     | (0.8)     | TBHP (1.1)  | 66              | 33 |

$^1$Reaction conditions: Benzyolacetonitrile 1a (1.0 mmol), phenylglyoxal 2a (1.0 mmol) and TEA (0.5 mmol), 5-6 M TBHP in decane (1.1 mmol) in toluene at 70 °C. $^a$ Isolated yield.

Procedure for experiment 1: 25 ml round bottomed flask equipped with a magnetic bar, 4-Methylbenzoylacetonitrile 1b (0.628 mmol), phenylglyoxal monohydrate 2a (0.628 mmol) were dissolved in 2 ml of toluene. Free radical scavenger TEMPO (2.51 mmol, 4 equiv) was added to
the reaction mixture followed by the addition of triethylamine (0.371 mmol) and 5-6 M TBHP in
decane (0.817 mmol). The reaction mixture stirred at 70 °C for 5 h by monitoring with TLC. The
required product formation was observed on TLC, then purified by column chromatography and
isolated 65% of 3m.

**Procedure for experiment 2:** 25 ml round bottomed flask equipped with a magnetic bar,
Methylbenzoylacetonitrile 1b (0.628 mmol), phenylglyoxal monohydrate 2a (0.628 mmol) were
dissolved in 2 ml of toluene then added TEA (0.371 mmol). The reaction mixture stirred at 75 °C
for 12 h. To determine the status of the reaction, it was monitored by TLC. No product was
observed on TLC after 12 h.

**Procedure for experiment 3:** 25 ml round bottomed flask equipped with a magnetic bar,
Methylbenzoylacetonitrile 1b (0.628 mmol), phenylglyoxal monohydrate (0.628 mmol) 2a were
dissolved in 2 ml of toluene then added 5-6 M TBHP in decane (0.817 mmol). The reaction
mixture stirred at 75 °C for 12 h. To determine the status of the reaction, it was monitored by
TLC. No product was observed on TLC after 12 h.

**Procedure for experiment 4:** Phenylglyoxal monohydrate 2a (1eq) and TBHP in decane
(1.3eq) were dissolved in 2 ml of toluene and stirred at 75 °C for 1 h. We observed
phenylglyoxalic acid 5 yielded up to 85%.

**Procedure for experiment 5:** (E)-2-(4-methylbenzoyl)-4-oxo-4-phenylbut-2-enenitrile 5l (0.17
mmol) and Methylbenzoylacetonitrile 1b (0.17 mmol) was dissolved in toluene (2 ml). 2-oxo-2-
phenylacetic acid 5 (0.13 mmol) was added to the reaction mixture followed by the addition of
trethylamine (0.08 mmol) and 5-6 M TBHP in decane (0.13 mmol). The reaction mixture stirred
at 70 °C for 5 h by monitoring with TLC. The required product formation was observed on TLC,
then purified by column chromatography and isolated 68% of 3m.

**General procedure for synthesis of (Z)-2-(4-cyano-furanyl)-3-hydroxy-acrylamides 3:** To a
25 ml round bottomed flask equipped with a magnetic bar, aroylacetonitrile 1 (0.689 mmol),
arylglyoxal monohydrate 2 (0.689 mmol) were dissolved in 2 ml of toluene then added TEA
(0.344 mmol) and TBHP in Decane (0.754 mmol). The reaction mixture stirred at 70 °C for 4-6
h. To determine the status of the reaction, it was monitored by TLC. After completion, reaction
mixture was cooled to room temperature, 15 ml of water was added to the reaction mixture and
extracted with ethyl acetate (2x 15 ml). The combined organic layer was washed with brine
solution, dried over Na₂SO₄ and concentrated on rotavap and purified by column
chromatography by using ethylacetate and hexane (1:4) producing desired product in good yields (45-76%). To get crystals of the compounds 3f and 3n, we dissolved 50mg of compound in 5ml of chloroform to kept for 5 days in culture tube with screw cap and we found the colorless crystals of the compounds.

3. Single crystal X-ray diffraction studies of compound 3n (CCDC no: CCDC 1819045) and 3f (CCDC no: CCDC 1818522)

2.1. Single crystal X-ray diffraction studies of compound 3n (CCDC no: CCDC 1819045)

**Experimental Detail**

The entire crystallographic calculations of the compound were done with Bruker AXS KAPPA APEX-2 diffractometer equipped with graphite monochromator. The structure was solved by direct methods and refined by full-matrix least-squares calculations using SHELXL–2014. Reliability index (R-factor) for $F^2 > 2\sigma(F^2)$ is found to be 3.48%, which confirms the convergence of the reliable structure. The crystal data, details of data collection and structure refinement are given in Table S2 (page SI4). All H atoms, except the hydroxyl group (-OH group) H atom, were positioned geometrically and refined using a riding model, with C–H = 0.93 Å, N–H = 0.86 Å and $U_{iso}(H) = 1.2 U_{eq}$(parent atom). The molecular structure with the atomic scheme is shown in Figure S1 as thermal displacement ellipsoid plot.

**Discussion**

The compound 3c crystallized in the monoclinic centrosymmetric lattice with the four molecules in the unit cell. The benzene ring is oriented with an angle of 5.7(2)$^\circ$ with the central furan ring and the central furan ring is oriented with angles of 66.9(1) and 12.5(1)$^\circ$ with the two bromophenyl rings. Further, these bromophenyl rings are making dihedral angle of 77.1(1)$^\circ$ to each other. Figure S2 shows the packing diagram of the molecules viewed down along $a$-axis of the unit cell. The molecular structure features one intramolecular classical O-H...O hydrogen bond between hydroxyl and carbonyl O atoms leading to self associated S(6) motif. However, the crystal structure is stabilized by classical N-H...N hydrogen bond (between amide and cyanide groups) and non-classical weak intermolecular C-H···O interactions. Interestingly, electronegative bromine atoms are not involved in hydrogen bonding interactions.
### Table S2a
Crystallographic data of compound 3n

| Property                        | Value                      |
|--------------------------------|----------------------------|
| Empirical formula              | C_{26}H_{16}Br_{2}N_{2}O_{3} |
| Formula weight                 | 564.23                     |
| Wavelength                     | 0.71073 Å                  |
| Crystal system & Space group   | Monoclinic, P 2_1/c       |
| Unit cell dimensions           | a = 13.399(19) Å           |
|                                | b = 10.904(14) Å; β = 112.68(2°) |
|                                | c = 16.85(2) Å             |
| Volume, Z                      | 2271(5) Å³, 4              |
| Density (calculated)           | 1.650 Mg/m³                |
| Absorption coefficient         | 3.602 mm⁻³                 |
| F(000)                         | 1120                       |
| Crystal size                   | 0.21 × 0.18 × 0.16 mm³     |
| Theta range for data collection| 2.282 to 30.653°           |
| Index ranges                   | -19 ≤ h ≤ 19, -15 ≤ k ≤ 13, -24 ≤ l ≤ 24 |
| Reflections collected          | 34572                      |
| Independent reflections        | 6975 [R(int) = 0.0345]      |
| Completeness to theta = 25.24° | 99.90%                     |
| Refinement method              | Full-matrix least-squares on F² |
| Data / restraints / parameters | 6975 / 0 / 302             |
| Goodness-of-fit on F²          | 1.021                      |
| Final R indices [I>2sigma(I)]  | R1 = 0.0348, wR2 = 0.0755  |
| R indices (all data)           | R1 = 0.0597, wR2 = 0.0839  |
| Largest diff. peak and hole    | 0.447 and -0.800 e.Å⁻³     |

### Table S2b
Hydrogen bonds geometries in 3n

| D-H...A (Å, °) | d(D-H) (Å) | d(H...A) (Å) | d(D...A) (Å) | <(DHA) (°) |
|----------------|------------|--------------|--------------|------------|
| O1-H3...O2     | 0.85(3)    | 1.70(3)      | 2.478(4)     | 152(3)     |
| N2-H5...N1^#1  | 0.86       | 2.42         | 3.069(4)     | 133        |
| C11-H12...O2^#1| 0.93       | 2.57         | 3.124(4)     | 118        |
| C12-H13...O2^#1| 0.93       | 2.63         | 3.148(4)     | 116        |

Equivalent position: #1 -x+1,y-1/2,-z+3/2
**Figure S1.** The molecular structure of the compound 3n with the numbering scheme for the atoms and 50% probability displacement ellipsoids.

**Figure S2.** Packing diagram of the molecule 3n viewed down along $a$-axis of the unit cell. H-bonds are shown as dashed lines.
2.2. Single crystal X-ray diffraction studies of compound 3f (CCDC no: CCDC 1818522)

Experimental Detail

The X-ray intensity data of the compound were done with Bruker AXS KAPPA APEX-2 diffractometer equipped with graphite monochromator. The structure was solved by direct methods and refined by full-matrix least-squares calculations using SHELXL–2014.\(^2\) Reliability index (R-factor) for \(F^2 > 2\sigma(F^2)\) is found to be 5.46\%, which confirms the convergence of the reliable structure. The crystal data, details of data collection and structure refinement are given in Table S3 (page SI7). All H atoms, except the hydroxyl group (-OH group) H atom, were positioned geometrically and refined using a riding model, with C–H = 0.93 Å, N-H = 0.86 Å and \(U_{iso}(H) = 1.2 U_{eq}\) (parent atom). Hydrogen of the hydroxyl group is located from difference Fourier map and refined, isotropically. One of the O atoms (O3) of the -NO2 group is disordered over two positions with each 0.5 occupancy. The disordered structure was refined with SIMU and DELU restraints and anisotropic displacement parameters of the fragments are refined with EADP constraint. The molecular structure with the atomic scheme is shown in Figure S3 as thermal displacement ellipsoid plot.

Discussion

The compound 3f crystallized in the orthorhombic crystal system with the eight molecules in the unit cell. The attached nitrobenzene and phenyl rings are oriented with the angles of 4.6 (3) and 8.5 (3)° with the central furan ring, respectively. However, another phenyl ring is making a dihedral angle of 75.3(2)° with the central furan ring and acetamide group is making an angle of 76.0(2)° with the central five-membered ring. Figure S4 shows the packing diagram of the molecules viewed down along \(a\)-axis of the unit cell. The molecular structure features characteristic intramolecular classical O-H...O hydrogen bond between hydroxyl and carbonyl O atoms leading to self associated S(6) motif. Two classical N-H...O hydrogen bonds are connecting the molecules and stabilize the crystal structure. Ring \(R_2^2(8)\) motif is observed around inversion centre of the unit cell and these rings are further connected through another N-H...O hydrogen bond making chain along \(bc\)-diagonal of the unit cell (Figure S5).
**Table S3a**  
Crystallographic data of 3f

| Property                              | Value                                           |
|---------------------------------------|-------------------------------------------------|
| Empirical formula                     | C_{26}H_{17}N_{3}O_{5}                          |
| Formula weight                        | 451.42                                          |
| Wavelength                            | 0.71073 Å                                       |
| Crystal system, Space group           | Orthorhombic, P bca                             |
| Unit cell dimensions                  |                                                |
| a                                     | 13.19(5) Å                                      |
| b                                     | 16.96(6) Å                                      |
| c                                     | 20.32(7) Å                                      |
| Volume, Z                             | 4547(29) Å³, 8                                 |
| Density (calculated)                  | 1.319 Mg/m³                                     |
| Absorption coefficient                | 0.093 mm⁻¹                                      |
| F(000)                                | 1872                                            |
| Crystal size                          | 0.22 × 0.20 × 0.17 mm³                          |
| Theta range for data collection       | 2.198 to 24.997°                                |
| Index ranges                          | -15 ≤ h ≤ 15, -20 ≤ k ≤ 20, -24 ≤ l ≤ 24       |
| Reflections collected                 | 29742                                           |
| Independent reflections               | 4004 [R(int) = 0.0511]                          |
| Completeness to theta = 25.242°       | 97.30%                                          |
| Refinement method                     | Full-matrix least-squares on F²                 |
| Data / restraints / parameters        | 4004 / 20 / 315                                 |
| Goodness-of-fit on F²                 | 1.086                                           |
| Final R indices [I>2sigma(I)]         | R1 = 0.0546, wR2 = 0.1261                       |
| R indices (all data)                  | R1 = 0.0803, wR2 = 0.1410                       |
|Extinction coefficient                 | 0.0075(6)                                       |
| Largest diff. peak and hole           | 0.273 and -0.191 e.Å⁻³                         |

**Table S3b**  
Hydrogen bonds geometries in 3f

| D-H...A (Å, °) | d(D-H) (Å) | d(H...A) (Å) | d(D...A) (Å) | <(DHA) (°) |
|----------------|------------|--------------|--------------|------------|
| N(2)-H(14)...O(4)#1 | 0.86       | 2.02         | 2.879(10)    | 176.5      |
| N(2)-H(15)...O(2)#2 | 0.86       | 2.17         | 2.870(10)    | 138.3      |
| O(5)-H(5O)...O(4)  | 0.99(4)    | 1.50(4)      | 2.452(7)     | 158(3)     |

Equivalent position: #1 -x+1,-y+1,-z+1  #2 x+1/2,y,-z+3/2
**Figure S3.** The molecular structure of the compound 3f with the numbering scheme for the atoms and 30% probability displacement ellipsoids.

**Figure S4.** Packing diagram of the molecule 3f viewed down along $a$-axis of the unit cell. H-bonds are shown as dashed lines.
**Figure S5.** Self associated S(6) and ring R_2^2(8) motifs around center of inversion of the unit cell and connected through another N-H...O hydrogen bond making a chain along bc-diagonal the unit cell. H-bonds are shown as dashed lines.

**Analytical data for compounds 3:**

![Chemical structure](image)

**3a. (Z)-2-(4-cyano-2,5-diphenylfuran-3-yl)-3-hydroxy-3-phenylacrylamide:** White solid (106 mg, 76% yield). mp 235-238 °C. ^1^H NMR (CDCl_3, 400 MHz) δ 15.75 (s, 1H), 8.00 (d, J = 8.0 Hz, 2H), 7.85 (d, J = 7.2 Hz, 2H), 7.49-7.45 (m, 5H), 7.42-7.38 (m, 3H), 7.29 (t, J = 7.2 Hz, 1H), 7.21 (t, J = 8.0 Hz, 2H), 5.51 (s, 2H). ^13^C NMR (125 MHz, CDCl_3) δ 174.9, 173.2, 158.3, 150.2, 134.5, 130.6, 130.4, 129.3, 129.2, 129.2, 128.4, 128.1, 128.0, 127.4, 125.4, 125.0, 117.5, 113.4, 97.0, 91.3. IR (CHCl_3, cm\(^{-1}\)) ν 3468, 3360, 2923, 2851, 2226, 1641, 1489, 1445, 1415, 1330, 1156, 937, 768, 689. LC-MS (ESI) m/z [M + H]^+ Calcd for C_{26}H_{18}N_{2}O_{3} 407.1 found 407.1; HRMS (TOF) m/z [M + H]^+ Calcd for C_{26}H_{18}N_{2}O_{3} 407.1390 found 407.1375.
3b. (Z)-2-(2-(4-chlorophenyl)-4-cyano-5-phenylfuran-3-yl)-3-hydroxy-3-phenylacrylamide:
White solid (105 mg, 70% yield). mp 225-228 °C. \(^1\)H NMR (CDCl\(_3\), 400 MHz) \(\delta\) 15.75 (s, 1H), 8.00 (d, \(J = 8.0\) Hz, 2H), 7.76 (d, \(J = 8.8\) Hz, 2H), 7.51 (m, 3H), 7.44 (d, \(J = 8.4\) Hz, 2H), 7.36 (d, \(J = 7.2\) Hz, 2H), 7.30 (t, \(J = 7.2\) Hz, 1H), 7.22 (d, \(J = 7.6\) Hz, 2H), 5.47 (s, 2H). \(^{13}\)C NMR (CDCl\(_3\), 100 MHz) \(\delta\) 175.2, 173.3, 158.6, 149.3, 135.4, 134.4, 131.5, 130.7, 130.5, 129.5, 129.2, 128.8, 128.1, 127.9, 127.3, 126.8, 126.2, 125.4, 117.9, 113.2, 97.2, 91.0. IR (CHCl\(_3\), cm\(^{-1}\)) \(\nu\) 3359, 3063, 2955, 2923, 2852, 2227, 1691, 1648, 1572, 1490, 1447, 1403, 1326, 1277, 1180, 1094, 1013, 937, 832, 770, 691, 606. LC-MS (ESI) m/z [M + H]\(^+\) Calcd for C\(_{26}\)H\(_{18}\)ClN\(_2\)O\(_3\) 441.1 found 441.1; HRMS (TOF) m/z [M + H]\(^+\) Calcd for C\(_{26}\)H\(_{18}\)ClN\(_2\)O\(_3\) 441.1000 found 441.0926.

3c. (Z)-2-(2-(4-bromophenyl)-4-cyano-5-phenylfuran-3-yl)-3-hydroxy-3-phenylacrylamide:
White solid (120 mg, 72% yield). mp 263-266 °C. \(^1\)H NMR (CDCl\(_3\), 400 MHz) \(\delta\) 15.76 (s, 1H), 8.01 (d, \(J = 8.4\) Hz, 2H), 7.70 (d, \(J = 8.4\) Hz, 2H) 7.60 (d, \(J = 8.4\) Hz, 2H)), 7.52-7.47 (m, 3H), 7.37 (d, \(J = 6.8\) Hz, 2H), 7.31 (t, \(J = 7.2\) Hz, 1H), 7.23 (t, \(J = 7.2\) Hz, 2H) 5.44 (s, 2H). \(^{13}\)C NMR (CDCl\(_3\), 100 MHz) \(\delta\) 175.2, 173.2, 158.1, 149.3, 132.4, 130.7, 130.4, 129.2, 128.1, 127.8, 127.3, 126.4, 125.4, 123.6, 118.1, 113.2, 97.3, 91.0. IR (CHCl\(_3\), cm\(^{-1}\)) \(\nu\) 3404, 2922, 2852, 2228, 1648, 1572, 1446, 1416, 1327, 1145, 938, 828, 768, 691. LC-MS (ESI) m/z [M + H]\(^+\) Calcd for C\(_{26}\)H\(_{18}\)BrN\(_2\)O\(_3\) 485.1, 487.1 found 485.1, 487.1; HRMS (TOF) m/z [M + H]\(^+\) Calcd for C\(_{26}\)H\(_{18}\)BrN\(_2\)O\(_3\) 485.0495, 487.0479 found 485.0498, 487.0482.

3d. (Z)-2-(4-cyano-2-(4-fluorophenyl)-5-phenylfuran-3-yl)-3-hydroxy-3-phenylacrylamide:
White solid (95 mg, 65% yield). mp 222-235 °C. \(^1\)H NMR (CDCl\(_3\), 400 MHz) \(\delta\) 15.74 (s, 1H), 8.01 (d, \(J = 8.0\) Hz, 2H), 7.81 (dd, \(J = 5.2, 3.2\) Hz, 2H), 7.52-7.47 (m, 3H) 7.37 (d, \(J = 7.2\) Hz,
2H), 7.31 (t, J = 6.4 Hz, 1H), 7.23-7.14 (m, 4H), 5.56 (s, 2H). $^{13}$C NMR (CDCl$_3$, 100 MHz) δ 175.2, 173.4, 158.4, 149.6, 134.5, 130.6, 130.4, 129.2, 128.0, 127.8, 127.4, 127.2, 127.1, 125.4, 117.1, 116.5, 116.2, 113.3, 97.1, 91.1. IR (CHCl$_3$, cm$^{-1}$) ν 3346, 3198, 2924, 2852, 2227, 1643, 1594, 1504, 1445, 1415, 1328, 1236, 1159, 938, 838, 768, 689. LC/MS (ESI) m/z [M + H]$^+$ Calcd for C$_{26}$H$_{18}$FN$_2$O$_3$ 425.0 found 425.0; HRMS (TOF) m/z [M + H]$^+$ Calcd for C$_{26}$H$_{18}$FN$_2$O$_3$ 425.1296 found 425.1299.

3e. (Z)-2-(4-cyano-5-phenyl-2-(4-(trifluoromethyl)phenyl)furan-3-yl)-3-hydroxy-3-phenylacrylamide: Pale yellow solid (89 mg, 55% yield). mp 238-241 °C. $^1$H NMR (CDCl$_3$, 400 MHz) δ 15.78 (s, 1H), 8.04 (d, J = 8.0 Hz, 2H), 7.94 (d, J = 8.0 Hz, 2H) 7.73 (d, J = 8.4 Hz, 2H)), 7.54-7.50 (m, 3H), 7.36 (d, J = 6.4 Hz, 2H), 7.32 (t, J = 7.6 Hz, 1H), 7.23 (t, J = 7.6 Hz, 2H) 5.52 (s, 2H). $^{13}$C NMR (CDCl$_3$, 100 MHz) δ 175.4, 173.1, 159.2, 148.7, 134.4, 131.0, 130.5, 129.3, 128.1, 127.8, 127.1, 126.19, 126.15, 126.11, 125.5, 125.1, 119.6, 113.0, 97.4, 90.8. IR (CHCl$_3$, cm$^{-1}$) ν 3347, 3198, 2921, 2851, 2228, 1647, 1554, 1490, 1324, 1236, 1124, 939, 829, 768, 688. LC/MS (ESI) m/z [M + H]$^+$ Calcd for C$_{27}$H$_{18}$F$_3$N$_2$O$_3$ 475.0 found 475.0; HRMS (TOF) m/z [M + H]$^+$ Calcd for C$_{27}$H$_{18}$F$_3$N$_2$O$_3$ 475.1264 found 475.1266.

3f. (Z)-2-(4-cyano-2-(4-nitrophenyl)-5-phenylfuran-3-yl)-3-hydroxy-3-phenylacrylamide: Yellow solid (82 mg, 53% yield). mp 228-231 °C. $^1$H NMR (400 MHz, CDCl$_3$) δ 15.83 (s, 1H), 8.30 (d, J = 8.9 Hz, 2H), 8.03 (d, J = 7.8 Hz, 2H), 7.95 (d, J = 8.9 Hz, 2H), 7.53 (d, J = 5.1 Hz, 3H), 7.36-7.26 (m, 3H), 7.20 (t, J = 7.5 Hz, 2H), 5.51 (s, 2H). $^{13}$C NMR (125 MHz, CDCl$_3$) δ 175.6, 172.9, 159.8, 147.8, 147.4, 134.2, 133.9, 131.3, 130.7, 129.3, 128.2, 127.7, 126.9, 125.71, 125.4, 124.5, 121.3, 112.8, 97.8, 90.6. IR (CHCl$_3$, cm$^{-1}$) ν 3349, 2923, 2852, 2229, 1600, 1520, 1491, 1446, 1418, 1343, 1110, 938, 853, 756, 693. LC/MS (ESI) m/z [M + H]$^+$ Calcd for C$_{26}$H$_{18}$N$_5$O$_5$ 452.0 found 452.0; HRMS (TOF) m/z [M + H]$^+$ Calcd for C$_{26}$H$_{18}$N$_5$O$_5$ 452.1241 found 452.1216.
3g. \((Z)-2-(2-(benzo[d][1,3]dioxol-5-yl)-4-cyano-5-phenylfuran-3-yl)-3-hydroxy-3-phenylacrylamide\): White solid (105 mg, 68% yield). mp 223-226 °C. \(^1\)H NMR (400 MHz, CDCl\(_3\)) \(\delta\) 15.72 (s, 1H), 7.96 (d, \(J = 6.7\) Hz, 2H), 7.51-7.43 (m, 3H), 7.42-7.34 (m, 3H), 7.32-7.27 (m, 2H), 7.22 (t, \(J = 7.4\) Hz, 2H), 6.90 (d, \(J = 8.2\) Hz, 1H), 6.04 (s, 2H), 5.48 (s, 2H). 

\(^{13}\)C NMR (125 MHz, CDCl\(_3\)) \(\delta\) 174.9, 173.3, 157.7, 150.1, 148.6, 148.4, 134.5, 130.4, 129.1, 128.0, 127.9, 127.5, 125.2, 122.5, 119.7, 116.1, 113.4, 109.1, 105.4, 101.6, 97.0, 91.3. IR (CHCl\(_3\), cm\(^{-1}\)) \(\nu\) 3386, 2923, 2852, 2228, 1642, 1446, 1418, 1253, 1035, 938, 853, 755, 690. LC-MS (ESI) m/z [M + H]\(^+\) Calcd for C\(_{27}\)H\(_{19}\)N\(_2\)O\(_5\) 451.0 found 451.0; HRMS (TOF) m/z [M + H]\(^+\) Calcd for C\(_{27}\)H\(_{19}\)N\(_2\)O\(_5\) 451.1288 found 451.1289.

3h. \((Z)-2-(4-cyano-2-(4-hydroxyphenyl)-5-phenylfuran-3-yl)-3-hydroxy-3-phenylacrylamide\): Pale brownish solid (84 mg, 58% yield). mp 232-235 °C. \(^1\)H NMR (CDCl\(_3\), 400 MHz) \(\delta\) 16.69 (s, 1H), 8.90 (brs, 1H), 8.02 (d, \(J = 7.6\) Hz, 2H), 7.76 (d, \(J = 8.4\) Hz, 2H) 7.56-7.43 (m, 5H) 7.30-7.25 (m, 2H), 7.05-6.92 (m, 3H). \(^{13}\)C NMR (Acetone-d\(_6\), 100 MHz) \(\delta\) 174.5, 173.9, 158.4, 156.8, 151.3, 135.5, 131.8, 130.0, 129.8, 129.2, 128.1, 127.8, 126.9, 124.8, 120.8, 115.9, 113.8, 97.4, 92.0. IR (CHCl\(_3\), cm\(^{-1}\)) \(\nu\) 3349, 2923, 2852, 2229, 1600, 1520, 1446, 1418, 1343, 1110, 938, 853, 756, 693. HRMS (TOF) m/z [M + H]\(^+\) Calcd for C\(_{26}\)H\(_{19}\)N\(_2\)O\(_4\) 423.1339 found 423.1344.

3i. \((Z)-2-(4-cyano-2-(3,4-dimethylphenyl)-5-phenylfuran-3-yl)-3-hydroxy-3-phenylacrylamide\): White solid (92 mg, 62% yield). mp 231-234 °C. \(^1\)H NMR (CDCl\(_3\), 400 MHz) \(\delta\) 15.71 (s, 1H), 7.98 (d, \(J = 6.8\) Hz, 2H), 7.59 (d, \(J = 4.8\) Hz, 2H), 7.49-7.40 (m, 5H), 7.29 (t, \(J = 8.8\) Hz, 1H), 7.30-7.27 (m, 2H), 5.46 (s, 2H), 2.33 (s, 3H), 2.31 (s, 3H). \(^{13}\)C NMR (CDCl\(_3\),
100 MHz) δ 174.8, 173.4, 157.9, 150.7, 138.4, 137.3, 134.7, 130.4, 130.37, 130.32, 129.1, 128.06, 128.03, 127.6, 126.1, 126.0, 125.3, 122.6, 116.6, 113.5, 97.0, 91.5, 20.0, 19.7. IR (CHCl₃, cm⁻¹ ) ν 3347, 3019, 2921, 2851, 2227, 1643, 1573, 1492, 1448, 1445, 1327, 1150, 954, 853, 756, 689. LC-MS (ESI) m/z [M + H]^+ Calcd for C_{28}H_{23}N_{2}O_{4} 435.0 found 435.0; HRMS (TOF) m/z [M + H]^+ Calcd for C_{28}H_{23}N_{2}O_{4} 435.1703 found 435.1699.

3j. (Z)-2-(4-cyano-5-phenyl-2-(p-tolyl)furan-3-yl)-3-hydroxy-3-phenylacrylamide: White solid (103 mg, 73% yield). mp 254-256 °C. ¹H NMR (CDCl₃, 400 MHz) δ 15.73 (s, 1H), 8.00 (t, J = 8.4 Hz, 2H), 7.76 (d, J = 8.0 Hz, 2H), 7.50-7.40 (m, 5H), 7.23 (d, J = 7.6 Hz, 2H), 5.44 (s, 2H), 2.42 (s, 3H). ¹³C NMR (CDCl₃, 100 MHz) δ 174.9, 173.4, 158.0, 150.6, 139.6, 130.4, 129.9, 129.1, 128.03, 128.01, 125.7, 125.3, 125.0, 116.7, 113.4, 97.0, 91.4, 21.4. IR (CHCl₃, cm⁻¹ ) ν 3458, 3310, 2921, 2851, 2224, 1648, 1572, 1446, 1411, 1322, 1114, 937, 770, 687. LC-MS (ESI) m/z [M + H]^+ Calcd for C_{27}H_{21}N_{2}O_{3} 421.0 found 421.0; HRMS (TOF) m/z [M + H]^+ Calcd for C_{27}H_{21}N_{2}O_{3} 421.1547 found 421.1527.

3k. (Z)-2-(4-cyano-5-phenyl-2-(o-tolyl)furan-3-yl)-3-hydroxy-3-phenylacrylamide: White solid (93 mg, 62% yield); mp 234-236 °C. ¹H NMR (400 MHz, CDCl₃) δ 15.47 (s, 1H), 8.01 (d, J = 8.2 Hz, 2H), 7.55-7.43 (m, 3H), 7.30-7.24 (m, 3H), 7.08 (t, J = 9.3 Hz, 3H), 5.56 (s, 2H), 1.97 (s, 3H). ¹³C NMR (125 MHz, CDCl₃) δ 175.4, 173.9, 159.0, 152.9, 137.1, 134.9, 130.9, 129.87, 129.85, 129.7, 129.2, 129.1, 128.6, 127.92, 127.91, 127.6, 126.0, 125.2, 118.6, 114.0, 95.8, 91.3, 20.2. IR (CHCl₃, cm⁻¹ ) ν 3417, 2924, 2852, 2226, 1643, 1448, 1418, 1326, 1180, 938, 829, 768, 691. HRMS (TOF) m/z [M + H]^+ Calcd for C_{27}H_{21}N_{2}O_{3} 421.1543 found 421.1496.
3l. (Z)-2-(4-cyano-2-(4-ethylphenyl)-5-phenylfuran-3-yl)-3-hydroxy-3-phenylacrylamide:
White solid (112 mg, 75% yield). mp 239-242 °C. $^1$H NMR (CDCl$_3$, 400 MHz) δ 15.65 (s, 1H), 7.92 (d, J = 8.4 Hz, 2H), 7.70 (d, J = 8.4 Hz, 2H) 7.42-7.36 (m, 3H), 7.34 (d, J = 7.2 Hz, 2H), 7.22-7.18 (m, 3H), 7.14 (t, J = 8.0 Hz, 2H), 5.46 (s, 2H), 2.66 (q, J = 7.6 Hz, 2H), 1.22 (t, J = 8.4 Hz, 3H). $^{13}$C NMR (CDCl$_3$, 100 MHz) δ 174.8, 173.9, 158.0, 150.6, 145.9, 134.6, 130.9, 130.3, 129.1, 128.7, 127.6, 125.9, 125.3, 125.1, 116.7, 113.5, 97.0, 91.5, 28.7, 15.2. IR (CHCl$_3$, cm$^{-1}$) ν 3469, 3337, 3188, 3063, 2966, 2931, 1644, 1572, 1491, 1445, 1415, 1328, 1286, 1151, 938, 837, 767, 689. LC-MS (ESI) m/z [M + H]$^+$ Calcd for C$_{28}$H$_{23}$N$_2$O$_3$ 435.0 found 435.0; HRMS (TOF) m/z [M + H]$^+$ Calcd for C$_{28}$H$_{23}$N$_2$O$_3$ 435.1703 found 435.1691.

3m. (Z)-2-(4-cyano-2-phenyl-5-(p-tolyl)furan-3-yl)-3-hydroxy-3-(p-tolyl)acrylamide: White solid (107 mg, 72% yield). mp 202-205 °C. $^1$H NMR (CDCl$_3$, 400 MHz) δ 15.73 (s, 1H), 7.92 (d, J = 8.4 Hz, 2H), 7.86 (d, J = 8.8 Hz, 2H), 7.49 (t, J = 7.2 Hz, 2H), 7.41 (t, J = 7.2 Hz, 1H), 7.32 (m, 4H) 7.01 (t, J = 8.4 Hz, 2H), 5.44 (s, 2H), 2.42 (m, 3H), 2.42 (m, 3H). $^{13}$C NMR (CDCl$_3$, 100 MHz) δ 175.0, 173.4, 158.6, 149.8, 141.0, 140.6, 131.8, 129.8, 129.1, 128.7, 128.6, 127.9, 125.4, 124.99, 124.94, 117.7, 113.5, 96.4, 90.9, 21.5, 21.3. IR (CHCl$_3$, cm$^{-1}$) ν 3469, 3337, 3188, 3063, 2966, 2931, 2227, 1644, 1572, 1491, 1445, 1415, 1328, 1286, 1151, 938, 837, 767, 689. LC-MS (ESI) m/z [M + H]$^+$ Calcd for C$_{28}$H$_{23}$N$_2$O$_3$ 435.0 found 435.0; HRMS (TOF) m/z [M + H]$^+$ Calcd for C$_{28}$H$_{23}$N$_2$O$_3$ 435.1703 found 435.1721.

3n. (Z)-3-(4-bromophenyl)-2-(5-(4-bromophenyl)-4-cyano-2-phenylfuran-3-yl)-3-hydroxyacrylamide: Pale yellow solid (135 mg, 70% yield). mp 207-210 °C. $^1$H NMR (CDCl$_3$, 400 MHz) δ 15.79 (s, 1H), 7.87 (d, J = 8.4 Hz, 2H), 7.80 (d, J = 7.2 Hz, 2H), 7.63 (d, J = 8.4 Hz,
2H), 7.49 (m, 3H), 7.34 (d, \( J = 8.4 \) Hz, 2H), 7.23 (d, \( J = 8.4 \) Hz, 2H), 5.53 (s, 2H). \(^{13}\)C NMR (CDCl\(_3\), 100 MHz) \( \delta \) 173.8, 173.1, 157.4, 150.7, 133.4, 132.5, 131.4, 129.7, 129.5, 129.3, 128.1, 126.7, 126.2, 126.1, 125.1, 125.0, 117.2, 113.1, 97.3, 91.4. IR (CHCl\(_3\), cm\(^{-1}\) ) \( \nu \) 3345, 2923, 2852, 2227, 1620, 1483, 1419, 1323, 1152, 1071, 935, 828, 758, 690. LC-MS (ESI) m/z [M + H]\(^{+}\) Calcd for C\(_{26}\)H\(_{17}\)Br\(_2\)N\(_2\)O\(_3\) 564.0 found 564.0; HRMS (TOF) m/z [M + H]\(^{+}\) Calcd for C\(_{26}\)H\(_{17}\)Br\(_2\)N\(_2\)O\(_3\) 564.9582 found 564.9580.

3o. (Z)-3-(3-chlorophenyl)-2-(5-(3-chlorophenyl)-4-cyano-2-phenylfuran-3-yl)-3-hydroxyacrylamide: Pale yellow solid (107 mg, 65% yield). mp 188-190 °C. \(^{1}\)H NMR (CDCl\(_3\), 400 MHz) \( \delta \) 15.74 (s, 1H), 7.93 (s, 1H), 7.91 (t, \( J = 6.0 \) Hz, 1H), 7.79 (d, \( J = 7.2 \) Hz, 2H), 7.50-7.42 (m, 5H), 7.34 (s, 1H), 7.26 (d, \( J = 7.2 \) Hz, 1H), 7.18 (d, \( J = 7.6 \) Hz, 1H), 7.12 (t, \( J = 8.0 \) Hz, 1H), 5.59 (s, 2H). \(^{13}\)C NMR (CDCl\(_3\), 100 MHz) \( \delta \) 173.4, 173.2, 156.8, 151.3, 136.1, 135.4, 134.2, 130.6, 130.5, 130.4, 129.8, 129.3, 129.1, 128.9, 128.1, 128.0, 125.9,125.2, 123.5, 117.0, 112.9, 97.9, 91.8. IR (CHCl\(_3\), cm\(^{-1}\) ) \( \nu \) 3345, 3069, 3021, 2923, 2852, 2229, 1643, 1553, 1475, 1426, 1322, 1156, 942, 756, 694. LC-MS (ESI) m/z [M + H]\(^{+}\) Calcd for C\(_{26}\)H\(_{17}\)Cl\(_2\)N\(_2\)O\(_3\) 475.0 found 475.0; HRMS (TOF) m/z [M + H]\(^{+}\) Calcd for C\(_{26}\)H\(_{17}\)Cl\(_2\)N\(_2\)O\(_3\) 475.0611 found 475.0594.

3p. (Z)-3-(4-chlorophenyl)-2-(5-(4-chlorophenyl)-4-cyano-2-phenylfuran-3-yl)-3-hydroxyacrylamide: Pale brownis solid (117 mg, 72% yield). mp 210-213 °C. \(^{1}\)H NMR (CDCl\(_3\), 400 MHz) \( \delta \) 15.77 (s, 1H), 7.96 (t, \( J = 8.8 \) Hz, 2H), 7.82 (d, \( J = 7.2 \) Hz, 2H), 7.51-7.41 (m, 5H), 7.33 (d, \( J = 7.6 \) Hz, 2H), 7.20 (d, \( J = 8.4 \) Hz, 2H), 5.52 (s, 2H). \(^{13}\)C NMR (CDCl\(_3\), 100 MHz) \( \delta \) 173.8, 173.1, 157.3, 150.6, 136.8, 133.0, 129.6, 129.5, 129.3, 128.4, 128.1, 126.6, 125.8,125.0, 117.2, 113.1, 97.3, 91.4. IR (CHCl\(_3\), cm\(^{-1}\) ) \( \nu \) 3339, 3069, 3021, 2923, 2852, 2229, 1643, 1553, 1475, 1419, 1324, 1271, 1093, 1013, 935, 833, 757, 691. LC-MS (ESI) m/z [M + H]\(^{+}\) Calcd for C\(_{26}\)H\(_{17}\)Cl\(_2\)N\(_2\)O\(_3\) 475.0 found 475.0; HRMS (TOF) m/z [M + H]\(^{+}\) Calcd for C\(_{26}\)H\(_{17}\)Cl\(_2\)N\(_2\)O\(_3\) 475.0611 found 475.0586.
3q. **(Z)-2-(2-(3-bromophenyl)-4-cyano-5-(p-tolyl)furan-3-yl)-3-hydroxy-3-(p-tolyl)acrylamide:** White solid (113 mg, 65% yield). mp 222-235 °C. $^1$H NMR (CDCl$_3$, 400 MHz) $\delta$ 15.64 (s, 1H), 7.82 (d, $J = 8.0$ Hz, 2H), 7.74 (dd, $J = 5.6$, 2.4 Hz, 2H), 7.22-7.18 (m, 5H), 7.09 (t, $J = 8.4$ Hz, 2H), 6.90 (d, $J = 8.0$ Hz, 2H) 5.38 (s, 2H), 2.34 (s, 3H), 2.18 (s, 3H). $^{13}$C NMR (CDCl$_3$, 100 MHz) $\delta$ 175.2, 173.4, 158.7, 149.0, 141.1, 140.7, 131.7, 129.8, 128.7, 127.9, 127.08, 127.00, 125.3, 124.8, 117.3, 116.4, 116.2, 113.5, 96.4, 90.6, 21.5, 21.3. IR (CHCl$_3$, cm$^{-1}$) $\nu$ 3346, 3206, 2922, 2851, 2227, 1643, 1614, 1504, 1418, 1328, 1184, 1150, 1116, 1020, 941, 821, 763, 688. LC-MS (ESI) m/z [M + H]$^+$ Calcd for C$_{28}$H$_{21}$BrN$_2$O$_3$ 513.0, 515.0 found 513.0, 515.0; HRMS (TOF) m/z [M + H]$^+$ Calcd for C$_{28}$H$_{21}$BrN$_2$O$_3$ 513.0808, 515.0788 found 513.0793, 515.0783.

3r. **(Z)-2-(4-cyano-2,5-di-p-tolylfuran-3-yl)-3-hydroxy-3-(p-tolyl)acrylamide:** White solid (115 mg, 74% yield). mp 214-216 °C. $^1$H NMR (CDCl$_3$, 400 MHz) $\delta$ 15.72 (s, 1H), 7.91 (d, $J = 8.0$ Hz, 2H), 7.77 (d, $J = 8.0$ Hz, 2H) 7.34-7.27 (m, 7H), 7.02 (d, $J = 8.0$ Hz, 2H), 5.47 (s, 2H), 2.427 (s 3H), 21.421 (s, 3H), 2.27 (s, 3H). $^{13}$C NMR (CDCl$_3$, 100 MHz) $\delta$ 174.8, 173.5, 158.3, 150.0, 140.9, 140.6, 139.4, 131.8, 129.89, 129.81, 128.7, 128.0, 125.9, 125.3, 125.0, 124.9, 116.9, 113.6, 96.3, 91.0, 21.8, 21.39, 21.38. IR (CHCl$_3$, cm$^{-1}$) $\nu$ 3342, 3031, 2922, 2852, 2227, 1643, 1613, 1504, 1418, 1329, 1184, 1116, 941, 821, 758, 688. LC-MS (ESI) m/z [M + H]$^+$ Calcd for C$_{29}$H$_{25}$N$_2$O$_3$ 449.0 found 449.0; HRMS (TOF) m/z [M + Na]$^+$ Calcd for C$_{29}$H$_{24}$NaN$_2$O$_3$ 471.1679 found 471.1674.

3s. **(Z)-3-(4-bromophenyl)-2-(5-(4-bromophenyl)-2-(4-chlorophenyl)-4-cyano-3-yl)-3-hydroxyacrylamide:** Pale brown solid (138 mg, 68% yield). mp 203-206 °C. $^1$H NMR (CDCl$_3$,
400 MHz) δ 15.70 (s, 1H), 7.79 (d, J = 8.4 Hz, 2H), 7.66 (d, J = 8.8 Hz, 2H) 7.42-7.36 (m, 3H), 7.34 (d, J = 7.2 Hz, 2H), 7.22-7.18 (m, 3H), 7.14 (t, J = 8.0 Hz, 2H), 5.46 (s, 2H), 2.66 (q, J = 7.6 Hz, 2H), 1.22 (t, J = 8.4 Hz, 3H). 13C NMR (100 MHz, CDCl3) δ 174.1, 173.0, 157.6, 149.6, 135.8, 133.2, 132.5, 131.5, 129.6, 129.4, 126.8, 126.5, 126.2, 126.0, 125.3, 125.1, 117.6, 112.9, 97.4, 91.1. IR (CHCl3, cm⁻¹) ν 3356, 2923, 2851, 2228, 1649, 1483, 1419, 1323, 1010, 935, 830, 762. LC-MS (ESI) m/z [M + H]+ Calcd for C26H14Br2ClN2O3 595.0, 597.0 found 595.0, 597.0; HRMS (TOF) m/z [M + H]+ Calcd for C26H16Br2ClN2O3 596.9211, 598.9190 found 596.9212, 598.9193.

3t. (Z)-2-(4-cyano-2-(4-fluorophenyl)-5-(p-tolyl)furan-3-yl)-3-hydroxy-3-(p-tolyl)acrylamide: White solid (98 mg, 63% yield). mp 212-215 °C. 1H NMR (CDCl3, 400 MHz) δ 15.64 (s, 1H), 7.82 (d, J = 8.0 Hz, 2H), 7.74 (dd, J = 5.6, 2.4 Hz, 2H), 7.22-7.18 (m, 5H), 7.09 (t, J = 8.4 Hz, 2H), 6.90 (d, J = 8.0 Hz, 2H) 5.38 (s, 2H), 2.34 (s, 3H), 2.18 (s, 3H). 13C NMR (CDCl3, 100 MHz) δ 175.2, 173.4, 158.7, 149.0, 141.1, 140.7, 131.7, 129.8, 128.7, 127.9, 127.08, 127.00, 125.3, 124.8, 117.3, 116.4, 116.2, 113.5, 96.4, 90.6, 21.5, 21.3. IR (CHCl3, cm⁻¹) ν 3477, 3345, 3196, 2922, 2852, 2226, 1615, 1500, 1417, 1327, 1235, 1159, 1020, 935, 838, 756, 667. LC-MS (ESI) m/z [M + H]+ Calcd for C28H22FN2O3 453.0 found 453.0; HRMS (TOF) m/z [M + H]+ Calcd for C28H22FN2O3 453.1609 found 453.1649.

3u. (Z)-3-(4-chlorophenyl)-2-(5-(4-chlorophenyl)-4-cyano-2-(p-tolyl)furan-3-yl)-3-hydroxyacrylamide: Pale brown solid (110 mg, 65% yield) mp 210-212 °C. 1H NMR (CDCl3, 400 MHz) δ 15.66 (s, 1H), 7.86 (d, J = 8.8 Hz, 2H), 7.64 (d, J = 8.0 Hz, 2H), 7.39 (d, J = 8.8 Hz, 2H) 7.25-7.18 (m, 4H), 7.11 (d, J = 8.8 Hz, 2H), 5.47 (s, 2H), 2.34 (s, 3H). 13C NMR (CDCl3, 100 MHz) δ 173.6, 173.2, 157.0, 150.9, 140.0, 136.6, 136.5, 133.0, 130.0, 129.0, 129.0, 128.4, 126.5, 125.9, 125.0, 116.4, 113.2, 97.2, 91.6, 21.4. IR (CHCl3, cm⁻¹) ν 3473, 3346, 3202, 2922, 2852, 2227, 1642, 1486, 1418, 1325, 1178, 1093, 1013, 935, 832, 757, 677. LC-MS (ESI) m/z
3v. \((Z)-2-(4\text{-cyano-5-phenyl-2-(thiophen-2-yl)furan-3-yl})-3\text{-hydroxy-3-phenylacrylamide}\): Pale brown solid (65 mg, 46% yield) mp 189-191 °C. \(^1\)H NMR (CDCl\(_3\), 400 MHz) \(\delta\) 15.74 (s, 1H), 7.98 (d, \(J = 7.2\) Hz, 2H), 7.72 (s, 1H), 7.51-7.44 (m, 5H), 7.40 (d, \(J = 7.2\) Hz, 2H), 7.29 (t, \(J = 8.4\) Hz, 1H), 7.23 (t, \(J = 7.2\) Hz, 2H) 5.50 (s, 2H). \(^{13}\)C NMR (CDCl\(_3\), 100 MHz) \(\delta\) 175.4, 173.4, 157.9, 148.3, 134.5, 130.5, 130.4, 129.5, 129.1, 128.4, 128.09, 128.00, 127.8, 127.2, 125.3, 124.6, 122.9, 116.2, 113.4, 96.6, 90.8. IR (CHCl\(_3\), cm\(^{-1}\)) \(\nu\) 3346, 3110, 2924, 2853, 2228, 1667, 1509, 1448, 1415, 1264, 1178, 1074, 929, 842, 756, 690. HRMS (TOF) m/z [M + H]\(^+\) Calcd for C\(_{27}\)H\(_{19}\)ClN\(_2\)O\(_3\) 489.0 found 489.0; HRMS (TOF) m/z [M + H]\(^+\) Calcd for C\(_{27}\)H\(_{19}\)ClN\(_2\)O\(_3\) 489.0767 found 489.0807.

3w. \((Z)-2-(2-(5\text{-chlorothiophen-2-yl})-4\text{-cyano-5-phenylfuran-3-yl})-3\text{-hydroxy-3-phenylacrylamide}\): White solid (83 mg, 55% yield) mp 203-206 °C. \(^1\)H NMR (400 MHz, CDCl\(_3\)) \(\delta\) 15.86 (s, 1H), 7.97 (d, \(J = 7.7\) Hz, 2H), 7.53 – 7.45 (m, 3H), 7.41 (d, \(J = 7.3\) Hz, 2H), 7.34 – 7.28 (m, 1H), 7.29 – 7.19 (m, 3H), 6.93 (d, \(J = 3.9\) Hz, 1H), 5.50 (s, 1H). \(^{13}\)C NMR (101 MHz, CDCl\(_3\)) \(\delta\) 176.3, 173.2, 158.3, 146.4, 134.4, 132.7, 130.8, 130.6, 129.2, 128.2, 128.1, 127.8, 127.1, 126.9, 125.4, 124.6, 116.3, 113.2, 96.8, 89.8. IR (CHCl\(_3\), cm\(^{-1}\)) \(\nu\) 3395, 2921, 2851, 2229, 1649, 1454, 1415, 1267, 1146, 1114, 980, 771, 672. LC-MS (ESI) m/z [M + H]\(^+\) Calcd for C\(_{24}\)H\(_{17}\)N\(_2\)O\(_3\)S 413.0954 found 413.0956.

3x. \((Z)-2-(2-(5\text{-bromothiophen-2-yl})-4\text{-cyano-5-phenylfuran-3-yl})-3\text{-hydroxy-3-phenylacrylamide}\): Pale brown solid (108 mg, 65% yield) mp 190-194 °C. \(^1\)H NMR (CDCl\(_3\),
400 MHz) δ 15.91 (s, 1H), 8.01 (d, J = 8.4 Hz, 2H), 7.45 (d, J = 7.2 Hz, 2H), 7.36 (t, J = 7.2 Hz, 1H) 7.29 (d, J = 8.8 Hz, 2H) 7.25 (d, J = 4.0 Hz, 1H) 7.10 (d, J = 4.0 Hz, 1H), 5.46 (s, 2H). 13C NMR (CDCl3, 100 MHz) δ 176.3, 173.2, 158.3, 146.4, 134.4, 131.1, 130.8, 130.7, 130.6, 129.2, 128.1, 127.8, 127.1, 125.5, 125.4, 116.5, 115.2, 113.2, 96.8, 89.8. IR (CHCl3, cm⁻¹) ν 3345, 3194, 2851, 2228, 1643, 1572, 1490, 1444, 1406, 1328, 1263, 1150, 1028, 967, 798, 768, 688. HRMS (TOF) m/z [M + H]+ Calcd for C24H16BrN2O3S 491.0060, 493.0039 found 490.9960, 492.9952.

3y. **(Z)-2-(2-(5-bromothiophen-2-yl)-4-cyano-5-(p-tolyl)furan-3-yl)-3-hydroxy-3-(p-tolyl)acrylamide:** White solid (110 mg, 63% yield) mp 233-236 °C. 1H NMR (CDCl3, 400 MHz) δ 15.90 (s, 1H), 7.91 (d, J = 8.0 Hz, 2H), 7.35 (m, 4H), 7.24 (d, J = 4.0, 1H), 7.09-7.05 (m, 3H), 5.40 (s, 2H), 2.45 (s, 3H), 2.30 (s, 3H). 13C NMR (101 MHz, CDCl3) δ 176.3, 173.2, 141.4, 140.9, 131.3, 130.6, 129.9, 128.8, 127.8, 125.3, 125.2, 124.5, 119.4, 115.0, 113.4, 96.1, 94.7, 21.6, 21.4. IR (CHCl3, cm⁻¹) ν 3362, 2922, 2851, 2229, 1681, 1605, 1503, 1453, 1250, 1185, 976, 869, 820, 754, 720, 673. HRMS (TOF) m/z [M + H]+ Calcd for C26H20BrN2O3S 519.0373, 521.0352 found 519.0327, 521.0313.

3z. **(Z)-2-(2-(5-bromothiophen-2-yl)-5-(4-chlorophenyl)-4-cyanofuran-3-yl)-3-(4-chlorophenyl)-3-hydroxyacrylamide:** Pale brown solid (99 mg, 53% yield). mp 235-238 °C. 1H NMR (CDCl3, 400 MHz) δ 15.92 (s, 1H), 7.92 (d, J = 8.4 Hz, 2H), 7.48 (d, J = 8.8 Hz, 2H), 7.34 (d, J = 8.8 Hz, 2H), 7.23-7.21 (m, 3H), 7.08 (d, J = 3.6, 1H), 5.46 (s, 2H). 13C NMR (100 MHz, CDCl3) δ 175.1, 173.0, 157.3, 146.7, 137.0, 136.8, 132.7, 130.8, 130.6, 129.6, 129.2, 128.6, 126.6, 125.8, 125.4, 116.0, 115.7, 112.9, 96.9, 89.9. IR (CHCl3, cm⁻¹) ν 3334, 2957, 2924, 2852, 2230, 1649, 1589, 1486, 1405, 1320, 1259, 1174, 1093, 1013, 980, 834, 757, 610. HRMS (TOF) m/z [M + H]+ Calcd for C24H16BrCl2N2O3S 558.9280, 560.9260 found 558.9204, 560.9211.
3aa. (Z)-3-(4-bromophenyl)-2-(5-(4-bromophenyl)-2-(5-bromothiophen-2-yl)-4-cyanofuran-3-yl)-3-hydroxyacrylamide: White solid (128 mg, 58% yield). mp 252−255 °C. ¹H NMR (CDCl₃, 400 MHz) δ 15.93 (s, 1H), 7.84 (d, J = 8.8 Hz, 2H), 7.64 (d, J = 8.8 Hz, 2H), 7.39 (d, J = 8.8 Hz, 1H) 7.27-7.25 (m, 5H), 7.22 (d, J = 4.0 Hz, 1H) 5.39 (s, 2H); ¹³C NMR (Acetone) δ 174.3, 174.0, 156.9, 146.7, 134.2, 131.4, 131.4, 131.1, 129.6, 126.8, 126.6, 126.1, 124.3, 124.2, 116.6, 114.1, 113.2, 97.6, 90.3, 78.3. IR (CHCl₃, cm⁻¹) ν 3396, 2921, 2850, 2227, 1649, 1454, 1249, 1215, 1010, 827, 755, 666. HRMS (TOF) m/z [M + H]⁺ Calcd for C₂₄H₁₄Br₃N₂O₃S 648.8249, 650.8229 found 648.8193, 650.8179.

References:
1. Deshpande, S. J.; Leger, P. R.; Sieck, S. R. *Tetrahedron Lett.* 2012, 53, 1772.
2. G.M. Sheldrick, *Acta Cryst.* 2015, C71, 3-8.
\(^1\text{H} \text{NMR} \text{ and} \ ^{13}\text{C} \text{NMR spectra of compounds 3}\)

Figure S6. \(^1\text{H}, \text{NMR of (Z)-2-(4-cyano-2,5-diphenylfuran-3-yl)-3-hydroxy-3-phenylacrylamide 3a.}\)

Figure S7. \(^{13}\text{C} \text{NMR of 3a.}\)
Figure S8. $^1$H NMR of (Z)-2-(2-(4-chlorophenyl)-4-cyano-5-phenylfuran-3-yl)-3-hydroxy-3-phenylacrylamide 3b.

Figure S9. $^{13}$C NMR of 3b.
Figure S10. $^1$H NMR of (Z)-2-(2-(4-bromophenyl)-4-cyano-5-phenylfuran-3-yl)-3-hydroxy-3-phenylacrylamide 3c.

Figure S11. $^{13}$C NMR of 3c.
Figure S12. $^1$H NMR of (Z)-2-(4-cyano-2-(4-fluorophenyl)-5-phenylfuran-3-yl)-3-hydroxy-3-phenylacrylamide 3d.

Figure S13. $^{13}$C NMR of 3d.
Figure S14. $^1$H NMR of (Z)-2-(4-cyano-5-phenyl-2-(4-(trifluoromethyl)phenyl)furan-3-yl)-3-hydroxy-3-phenylacrylamide 3e.

Figure S15. $^{13}$C NMR of 3e.
Figure S16. $^1$H NMR of (Z)-2-(4-cyano-2-(4-nitrophenyl)-5-phenylfuran-3-yl)-3-hydroxy-3-phenylacrylamide 3f.

Figure S17. $^{13}$C NMR of 3f.
Figure S18. $^1$H NMR of (Z)-2-(2-(benzo[1,3]dioxol-5-yl)-4-cyano-5-phenylfuran-3-yl)-3-hydroxy-3-phenylacrylamide 3g.

Figure S19. $^{13}$C NMR of 3g.
Figure S20. $^1$H NMR of (Z)-2-(4-cyano-2-(4-hydroxyphenyl)-5-phenylfuran-3-yl)-3-hydroxy-3-phenylacrylamide 3h.

Figure S21. $^{13}$C NMR of 3h.
Figure S22. $^1$H NMR of (Z)-2-(4-cyano-2-(3,4-dimethylphenyl)-5-phenylfuran-3-yl)-3-hydroxy-3-phenylacrylamide 3i.

Figure S23. $^{13}$C NMR of 3i.
Figure S24. $^1$H NMR of (Z)-2-(4-cyano-5-phenyl-2-(p-tolyl)furan-3-yl)-3-hydroxy-3-phenylacrylamide 3j.

Figure S25. $^{13}$C NMR of 3j.
Figure S26. $^1$H NMR of (Z)-2-(4-cyano-5-phenyl-2-(o-tolyl)furan-3-yl)-3-hydroxy-3-phenylacrylamide 3k.

Figure S27. $^{13}$C NMR of 3k.
Figure S28. $^1$H NMR of (Z)-2-(4-cyano-2-(4-ethylphenyl)-5-phenylfuran-3-yl)-3-hydroxy-3-phenylacrylamide 3l.

Figure S29. $^{13}$C NMR of 3j.
Figure S30. \(^1\)H NMR of (Z)-2-(4-cyano-2-phenyl-5-(p-tolyl)furan-3-yl)-3-hydroxy-3-(p-tolyl)acrylamide 3m.

Figure S31. \(^13\)C NMR of 3m.
Figure S32. $^1$H NMR of (Z)-3-(4-bromophenyl)-2-(5-(4-bromophenyl)-4-cyano-2-phenylfuran-3-yl)-3-hydroxyacrylamide 3n.

Figure S33. $^{13}$C NMR of 3n.
Figure S34. \(^1\)H NMR of (Z)-3-(3-chlorophenyl)-2-(5-(3-chlorophenyl)-4-cyano-2-phenylfuran-3-yl)-3-hydroxyacrylamide 3o.

![1H NMR of (Z)-3-(3-chlorophenyl)-2-(5-(3-chlorophenyl)-4-cyano-2-phenylfuran-3-yl)-3-hydroxyacrylamide 3o.](image)

Figure S35. \(^{13}\)C NMR of 3o.

![\(^{13}\)C NMR of 3o.](image)
Figure S36. $^1$H NMR of (Z)-3-(4-chlorophenyl)-2-(5-(4-chlorophenyl)-4-cyano-2-phenylfuran-3-yl)-3-hydroxyacrylamide 3p.

Figure S37. $^{13}$C NMR of 3p.
Figure S38. $^1$H NMR of (Z)-2-(2-(3-bromophenyl)-4-cyano-5-(p-tolyl)furan-3-yl)-3-hydroxy-3-(p-tolyl)acrylamide 3q.

Figure S39. $^{13}$C NMR of 3q.
Figure S40. $^1$H NMR of (Z)-2-(4-cyano-2,5-di-p-tolylfuran-3-yl)-3-hydroxy-3-(p-tolyl)acrylamide 3r.

Figure S41. $^{13}$C NMR of 3r.
Figure S42. $^1$H NMR of (Z)-3-(4-bromophenyl)-2-(5-(4-bromophenyl)-2-(4-chlorophenyl)-4-cyanofuran-3-yl)-3-hydroxyacrylamide 3s.

Figure S43. $^{13}$C NMR of 3s.
Figure S44. $^1$H NMR of (Z)-2-(4-cyano-2-(4-fluorophenyl)-5-(p-tolyl)furan-3-yl)-3-hydroxy-3-(p-tolyl)acrylamide 3t.

![NMR Spectrum](image)

Figure S45. $^{13}$C NMR of 3t.

![NMR Spectrum](image)
Figure S46. $^1$H NMR of (Z)-3-(4-chlorophenyl)-2-(5-(4-chlorophenyl)-4-cyano-2-(p-tolyl)furan-3-yl)-3-hydroxyacrylamide 3u.

Figure S47. $^{13}$C NMR of 3u.
Figure S48. $^1$H NMR of (Z)-2-(4-cyano-5-phenyl-2-(thiophen-2-yl)furan-3-yl)-3-hydroxy-3-phenylacrylamide 3v.

Figure S49. $^{13}$C NMR of 3v.
Figure S50. $^1$H NMR of (Z)-2-(2-(5-chlorothiophen-2-yl)-4-cyano-5-phenylfuran-3-yl)-3-hydroxy-3-phenylacrylamide 3w.

Figure S51. $^{13}$C NMR of 3w.
Figure S52. $^1$H NMR of (Z)-2-(2-(5-bromothiophen-2-yl)-4-cyano-5-phenylfuran-3-yl)-3-hydroxy-3-phenylacrylamide 3x.

Figure S53. $^{13}$C NMR of 3x.
Figure S54. $^1$H NMR of (Z)-2-(2-(5-bromothiophen-2-yl)-4-cyano-5-(p-tolyl)furan-3-yl)-3-hydroxy-3-(p-tolyl)acrylamide 3y.

Figure S55. $^{13}$C NMR of 3y.
Figure S56. $^1$H NMR of (Z)-2-(2-(5-bromothiophen-2-yl)-5-(4-chlorophenyl)-4-cyanofuran-3-yl)-3-(4-chlorophenyl)-3-hydroxyacrylamide 3z.

Figure S57. $^{13}$C NMR of 3z.
Figure S58. $^1$H NMR of (Z)-3-(4-bromophenyl)-2-(5-(4-bromophenyl)-2-(5-bromothiophen-2-yl)-4-cyanofuran-3-yl)-3-hydroxyacrylamide 3aa.

Figure S59. $^{13}$C NMR of 3aa.