Journal of the Serbian Chemical Society
JSCS-info@shd.org.rs • www.shd.org.rs/JSCS
J. Serb. Chem. Soc. 84 (10) S308–S316 (2019) *Supplementary material*

SUPPLEMENTARY MATERIAL TO

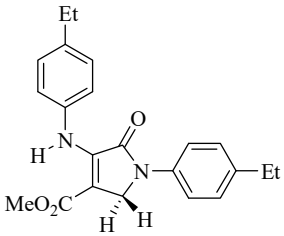
Glutamic acid as green and bio-based α-amino acid catalyst promoted one-pot access to polyfunctionalized dihydro-2-oxypyrroles

FARZANEH MOHAMADPOUR*

Young Researchers and Elite Club, Shiraz Branch, Islamic Azad University, Shiraz, Iran

J. Serb. Chem. Soc. 84 (10) (2019) 1083–1092

*Methyl 1-(4-ethylphenyl)-4-[(4-ethylphenyl)amino]-2,5-dihydro-5-oxo-1H-pyrrole-3-carboxylate (**5f**) (Table II, entry 6)*

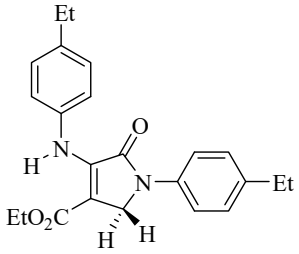


5f

Yield: 86 %; m.p. 125–127 °C; ^{1}H-NMR (400 MHz, $CDCl_3$): 1.26 (6H, *t*, *J*=2.4 Hz, $2CH_2C\underline{H}_3$), 2.67 (4H, *q*, *J*=7.2 Hz, $2C\underline{H}_2CH_3$), 3.76 (3H, *s*, $2OCH_3$), 4.53 (2H, *s*, $C\underline{H}_2$-N),7.09 (2H, *d*, *J*=8.4 Hz, ArH), 7.17 (2H, *d*, *J*=8.4 Hz, ArH), 7.24 (2H, *d*, *J*=8.8 Hz, ArH),7.70 (2H, *d*, *J*=8.8 Hz, ArH), 8.05(1H, *s*, NH) ppm.

* E-mail: mohamadpour.f.7@gmail.com

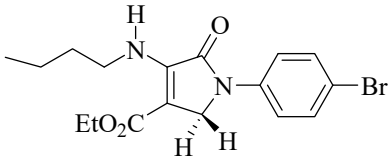
*Ethyl 1-(4-ethylphenyl)-4-[(4-ethylphenyl)amino]- 2,5-dihydro-5-oxo-1H-pyrrole-3-carboxylate (**5g**) (Table II, entry 7)*



5g

Yield: 87 %; m.p. 102–104 °C; ^{1}H NMR (400 MHz, $CDCl_3$): 1.24 (9H, *m*, 3 $CH_2\underline{CH_3}$), 2.67 (4H, *q*, *J*=7.2 Hz, 2C$\underline{H_2}CH_3$), 4.22 (2H, *q*, *J*=7.2 Hz, C$\underline{H_2}CH_3$), 4.54 (2H, *s*, C$\underline{H_2}$-N), 7.09 (2H, *d*, *J*=8.4 Hz, ArH), 7.16 (2H, *d*, *J*=8.4 Hz, ArH), 7.24 (2H, *d*, *J*=8.4 Hz, ArH), 7.71 (2H, *d*, *J*=8.8 Hz, ArH), 8.01 (1H, *s*, NH) ppm.

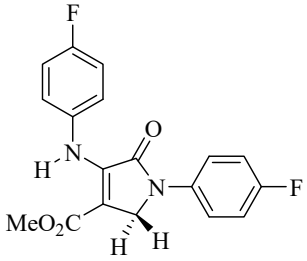
*Ethyl 1-(4-bromophenyl)-4-(butylamino)-2,5-dihydro-5-oxo-1H-pyrrole-3-carboxylate (**5k**) (Table II, entry 11)*



5k

Yield: 85 %; m.p. 96–98 °C; ^{1}H NMR (400 MHz, $CDCl_3$): 0.97 (3H, *t*, *J* = 7.2 Hz, CH_3), 1.35 (3H, *t*, *J* = 7.2 Hz, $OCH_2C\underline{H_3}$), 1.43 (2H, *sextet*, *J* = 7.6 Hz, CH_2), 1.61 (2H, *quintet*, *J* = 7.6 Hz, CH_2), 3.87 (2H, *t*, *J* = 7.2 Hz, C$\underline{H_2}$-NH), 4.28 (2H, *q*, *J* = 7.2 Hz, OC$\underline{H_2}CH_3$), 4.40 (2H, *s*, C$\underline{H_2}$-N), 6.72 (1H, *br s*, NH), 7.52 (2H, *d*, *J* = 8.8 Hz, ArH), 7.70 (2H, *d*, *J* = 8.8 Hz, ArH).

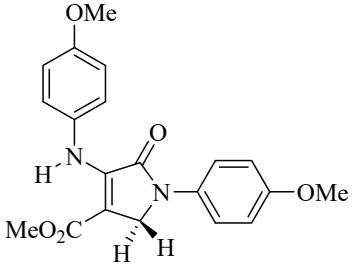
*Methyl 1-(4-fluorophenyl)-4-[(4-fluoroyphenyl)amino]-2,5-dihydro-5-oxo-1*H-*-pyrrole-3-carboxylate (**5l**) (Table II, entry 12)*



5l

Yield: 94 %; m.p. 161–163 °C; ^{1}H NMR (400 MHz, $CDCl_3$): 3.79 (3H, *s*, OCH_3), 4.52 (2H, *s*, C$\underline{H}_2$-N), 7.04 (2H, *t*, *J*=8.4 Hz, ArH), 7.08-7.16 (4H, *m*, ArH), 7.73–7.76 (2H, *m*, ArH), 8.05 (1H, *s*, NH).

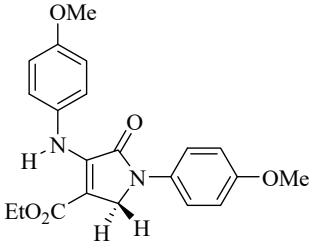
*Methyl 1-(4-methoxyphenyl)-4-[(4-methoxyphenyl)amino]-2,5-dihydro-5-oxo-1*H-*pyrrole-3-carboxylate (**5o**) (Table II, entry 15)*



5o

Yield: 87 %; m.p. 171–173 °C; ^{1}H NMR (400 MHz, $CDCl_3$): 3.77 (3H, *s*, CH_3), 3.83 (6H, *s*, 2OCH_3), 4.50 (2H, *s*, C$\underline{H}_2$-N), 6.89 (4H, *d*, *J*=17.6 Hz, ArH), 7.13 (1H, *s*, ArH), 7.68 (1H, *s*, ArH), 8.03 (1H, *s*, NH).

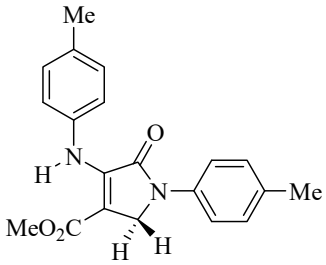
*Ethyl 1-(4-methoxyphenyl)-4-[(4-methoxyphenyl)amino]-2,5-dihydro-5-oxo-1*H-*-pyrrole-3-carboxylate (**5p**) (Table II, entry 16)*



5p

Yield: 86 %; m.p. 153–155 °C; ^{1}H NMR (400 MHz, $CDCl_3$): 1.26 (3H, *t*, *J*=7.2Hz, $CH_2C\underline{H}_3$), 3.83 (6H, *s*, $2OCH_3$), 4.23 (2H, *q*, *J*=7.2 Hz, $C\underline{H}_2CH_3$), 4.50 (2H, *s*, $C\underline{H}_2$-N), 6.87 (2H, *d*, *J*=8.8 Hz, ArH), 6.93 (2H, *d*, *J*=8.8 Hz, ArH), 7.12 (2H, *d*, *J*=8.8 Hz, ArH), 7.69 (2H, *d*, *J*=8.8 Hz, ArH), 8.02 (1H, *s*, NH).

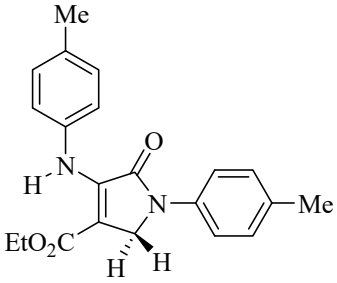
*Methyl 1-(4-methylphenyl)-4-[(4-methylphenyl)amino]-2,5-dihydro-5-oxo-1*H-*-pyrrole-3-carboxylate (**5r**) (Table II, entry 18)*



5r

Yield: 90 %; n.p. 175–176 °C; ^{1}H NMR (400 MHz, $CDCl_3$): 2.36 (6H, *s*, $2CH_3$), 3.77 (3H, *s*, OCH_3), 4.52 (2H, *s*, $C\underline{H}_2$-N), 7.06 (2H, *d*, *J* = 8.4 Hz, ArH), 7.14 (2H, *d*, *J*=8.4 Hz, ArH), 7.21(2H, *d*, *J*=8.4 Hz, ArH), 7.68 (2H, *d*, *J* = 8.8 Hz, ArH), 8.03 (1H, *s*, NH).

*Ethyl 1-(4-methylphenyl)-4-[(4-methylphenyl)amino]-2,5-dihydro-5-oxo-1*H*-pyrrole-3-carboxylate (**5s**) (Table II, entry 19)*



5s

Yield: 88 %; m.p. 131–133 °C; ^{1}H NMR (400 MHz, $CDCl_3$): 1.25 (3H, *t*, *J*=7.2 Hz, $CH_2C\underline{H}_3$), 2.37 (6H, *s*, $2CH_3$), 4.23 (2H, *q*, *J*=7.2 Hz, $2C\underline{H}_2CH_3$), 4.53 (2H, *s*, $C\underline{H}_2$-N),7.06 (2H, *d*, *J*=8.4 Hz, ArH), 7.14 (2H, *d*, *J*=8.4 Hz, ArH), 7.21 (2H, *d*, *J*=8.4 Hz, ArH), 7.68 (2H, *d*, *J*=8.4 Hz, ArH), 8.01 (1H, *s*, NH).

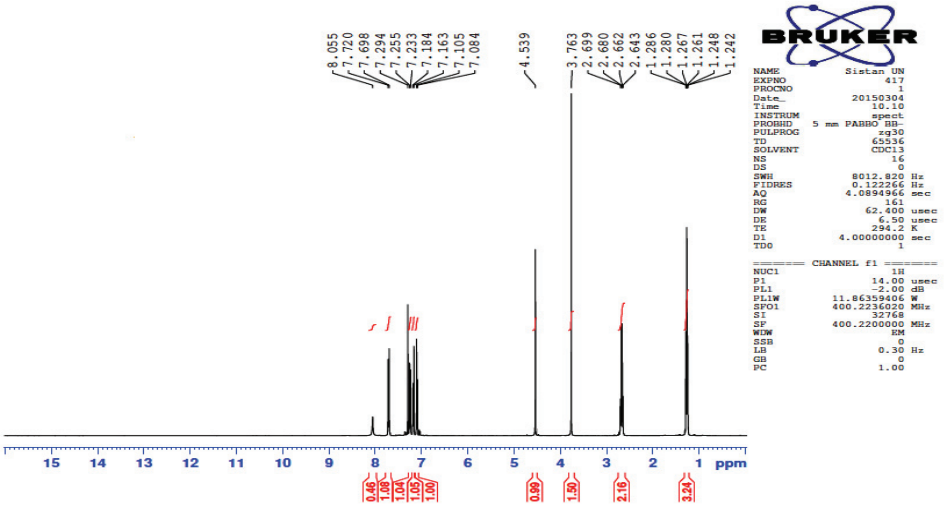


Fig. S-1.^{1}H-NMR spectrum of compound **5f** (400 MHz, $CDCl_3$).

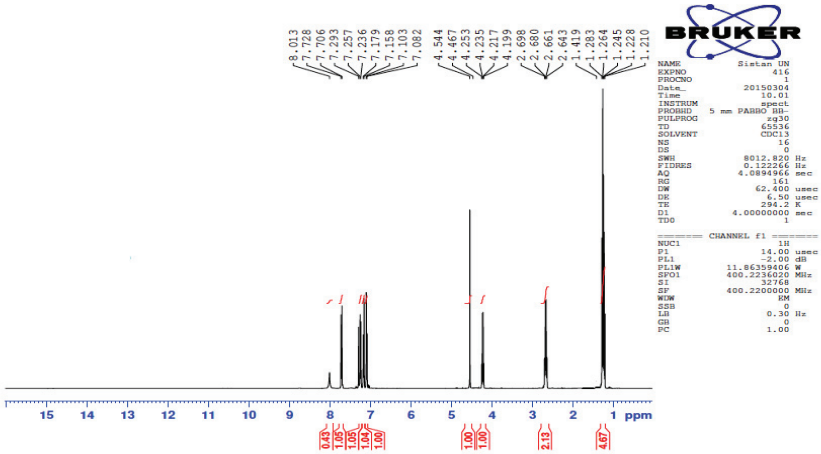


Fig. S-2. ^{1}H-NMR spectrum of compound **5g** (400 MHz, $CDCl_3$).

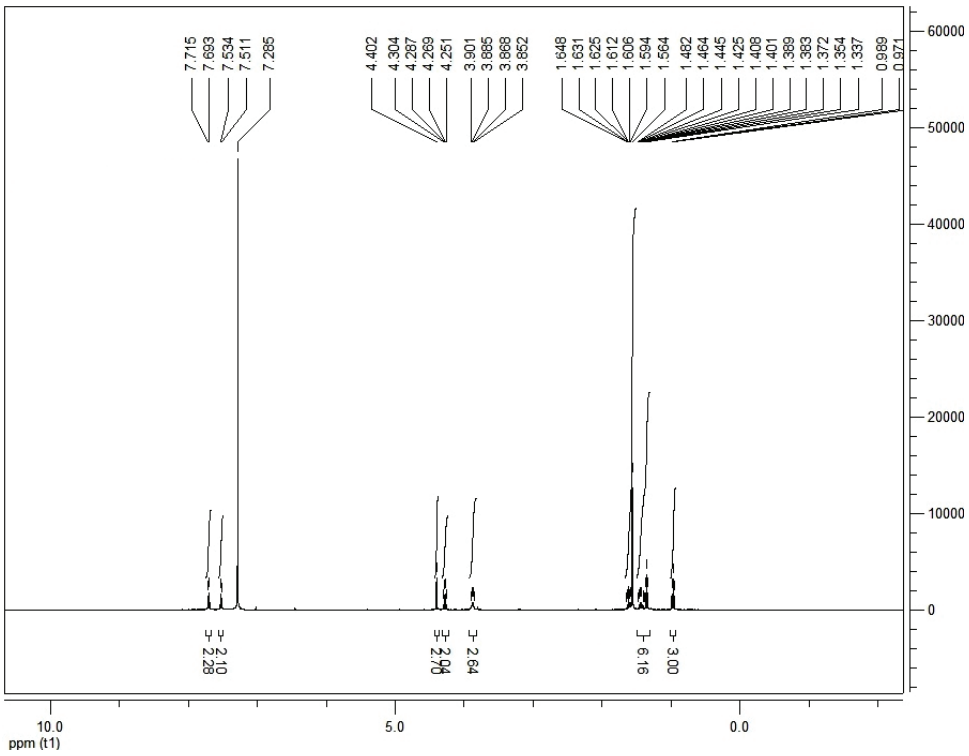


Fig. S-3. ^{1}H-NMR spectrum of compound **5k** (400 MHz, $CDCl_3$).

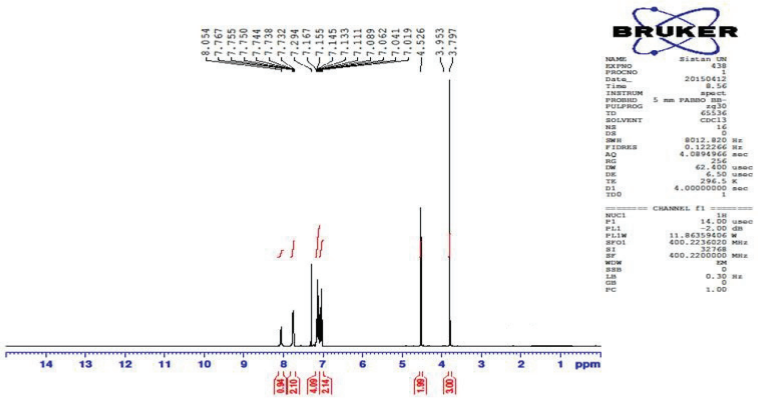


Fig. S-4. ^{1}H-NMR spectrum of compound **5l** (400 MHz, $CDCl_3$).

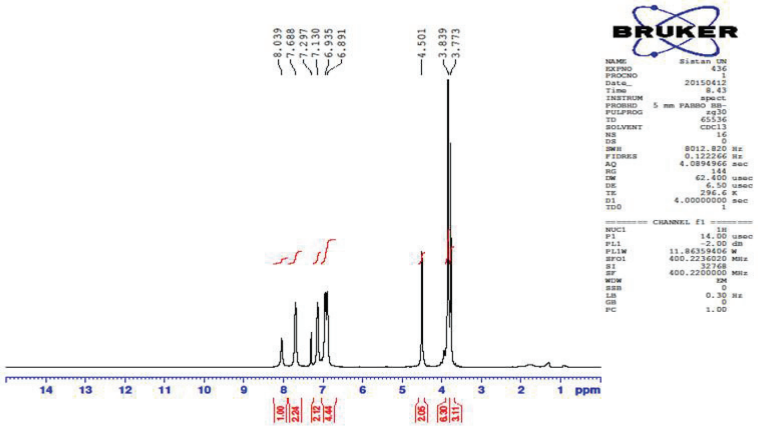


Fig. S-5. ^{1}H-NMR spectrum of compound **5o** (400 MHz, $CDCl_3$).

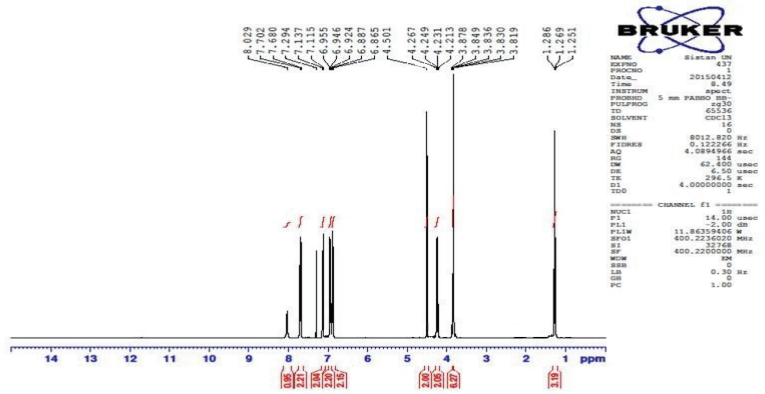


Fig. S-6. ^{1}H-NMR spectrum of compound **5p** (400 MHz, $CDCl_3$).

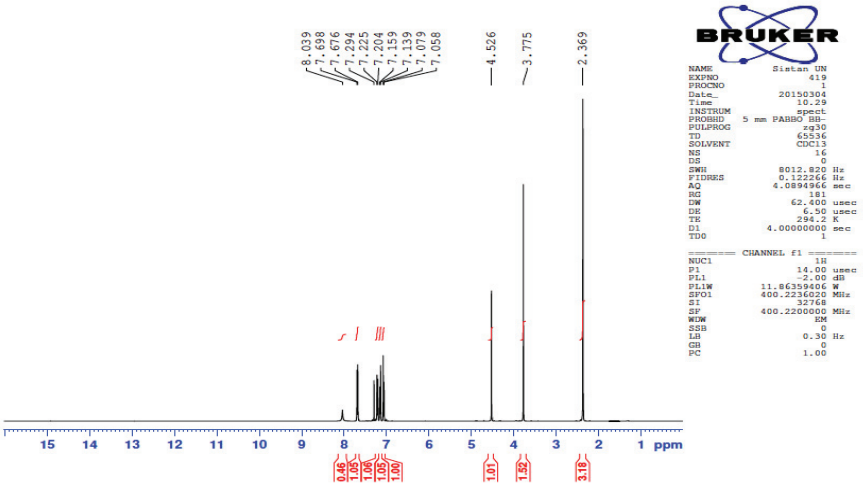


Fig. S-7. ^{1}H-NMR spectrum of compound **5r** (400 MHz, $CDCl_3$).

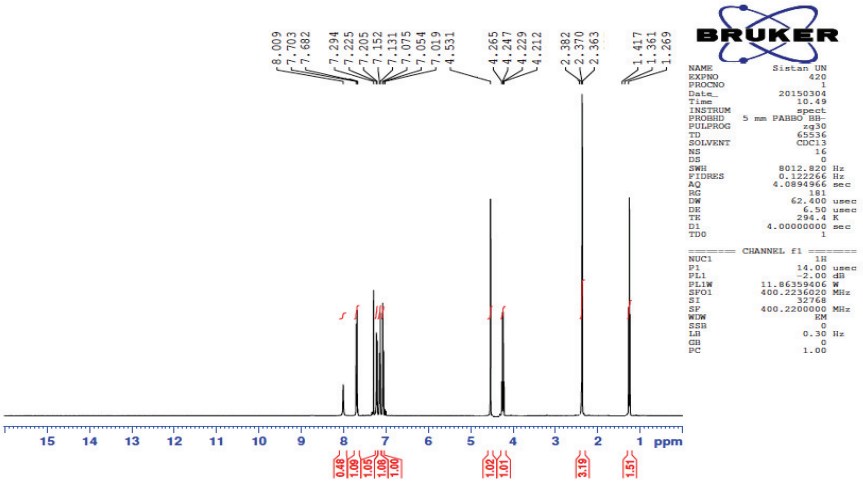


Fig. S-8. ^{1}H-NMR spectrum of compound **5s** (400 MHz, $CDCl_3$).