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LETTERS TO THE EDITOR

Synthesis and Some Reactions of 2-[4-(2-Chlorobenzyl)-6,6-dimethyltetrahydropyran-4-yl]ethylamine

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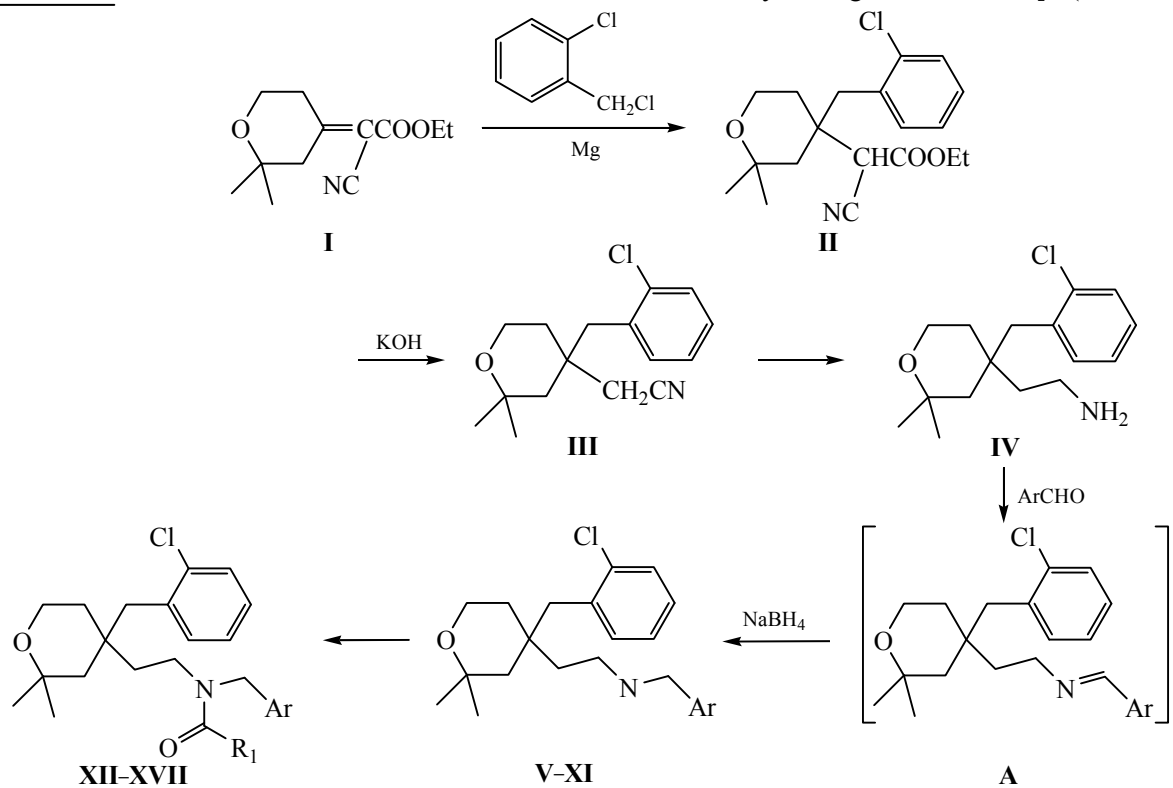
In extension of the search for biologically active compounds, 4-aryl-substituted amines of tetrahydropyran series have been synthesized [1, 2].

Previously synthesized ethyl cyano(2,2-dimethyltetrahydropyran-4-ylidene)acetate **I** [3] reacts with 2-chlorobenzylmagnesium chloride to form ethyl cyano-[2,2-dimethyltetrahydropyran-4-yl-4-(2-chlorophenyl)]-acetate **II**. The decarbethoxylation of the latter results in 3-(2-chlorobenzyl)-6,6-dimethyltetrahydropyran-3-yl]acetonitrile **III**, the reduction of which with lithium aluminum hydride gives rise to 2-[4-(2-chlorobenzyl-



Ar = 4-$MeOC_6H_4$ (**V**), 4-*i*-$PrOC_6H_4$ (**VI**), 4-ClC_6H_4 (**VII**), 4-FC_6H_4 (**VIII**), 2-FC_6H_4 (**IX**), 2-furyl (**X**), 2-thiophenyl (**XI**); R = Me, Ar = 4-$MeOC_6H_4$ (**XII**); R = Me, Ar = 4-FC_6H_4 (**XIII**); R = Et, Ar = 2-FC_6H_4 (**XIV**); R = Me, Ar = 2-furyl (**XV**); R = Et, Ar = 2-furyl (**XVI**); R = Et, Ar = 2-thiophenyl (**XVII**).

6,6-dimethyltetrahydropyran-4-yl)ethylamine **IV**. The condensation of amine **IV** with various aromatic aldehydes affords azomethines **A**, which were reduced without their isolation with sodium borohydride into secondary amines **V**–**XI**. Also some acet- and propionamides **XII**–**XVII** were obtained.

Ethyl cyano-(2,2-dimethyltetrahydropyran-4-ylidene)-acetate **I** was prepared by the method [3].

Ethyl cyano[2,2-dimethyltetrahydropyran-4-yl-4-(2-chlorophenyl)]acetate (II). To an ether solution of the Grignard reagent prepared from 10.5 g (0.44 mol) of magnesium turnings and 64.41 g (0.4 mol) of 2-chlorobenzyl chloride was added with stirring at reflux a solution of 73.3 g (0.33 mol) of compound **I** in 90–100 mL of benzene. The reaction mixture was stirred for 2 h at 42–44°C. On the next day the mixture was cooled, acidified with 20% HCl, extracted with ether, the extract was washed with water, dried, and concentrated. The residue (80.8 g, 70%) was decarbethoxylated.

[4-(2-Chlorobenzyl)-6,6-dimethyltetrahydropyran-4-yl]acetonitrile (III). A solution of 33.6 g (0.6 mol) of potassium hydroxide in 180 mL of ethylene glycol was added to 105 g (0.3 mol) of cyanoester **II**. The mixture was refluxed for 3 h, and then cooled, diluted with 180 mL of water, extracted with diethyl ether, the extract was washed with water, dried, and concentrated. The residue was distilled at a reduced pressure. Yield 70 g (84%), bp 160–165°C (2 mm Hg). IR spectrum, ν, cm^{-1}: 2243 (CN); 1615, 1585 (C=C, Ar). ^{1}H NMR spectrum (300 MHz), δ, ppm (*J*, Hz): 1.21 s and 1.25 s (6H, 2-CH_3), 1.28–1.37 m (1H, H^{5a}), 1.53 d (1H, H^{3a}, ^2J 14.1), 1.66 d.d.d (1H, H^{5b}, ^2J 13.7, ^3J 9.4, ^3J 5.1), 1.69 d.d (1H, H^{3b}, ^2J 14.1, ^4J 1.5), 2.45 d and 2.66 d (2H, CH_2CN, ^2J 17.3), 2.85 d and 3.00 d (2H, $CH_2C_6H_4Cl$, ^2J 13.7), 3.57–3.71 m (2H, H^{6a} and H^{6b}), 7.13–7.39 m (4H, Ar). Found, %: C 69.15; H 7.28; N 5.02. $C_{16}H_{20}ClNO$. Calculated, %: C 69.18; H 7.26; N 5.04.

2-[4-(2-Chlorobenzyl)-6,6-dimethyltetrahydropyran-4-yl]ethylamine (IV). To a cooled solution of 18 g (0.48 mol) of $LiAlH_4$ in 250 mL of anhydrous ether was added dropwise an ether solution of 67 g (0.24 mol) of nitrile **III**, maintaining the temperature of the reaction mixture at 0±2°C. Then to the mixture was sequentially added dropwise 18 mL of water, 18 mL of 15% NaOH solution, and 54 mL of water. The reaction mixture was filtered. Inorganic precipitate was washed with ether. Organic layers were combined, dried, and evaporated. The residue was distilled at a reduced pressure. Yield 58.4 g (86%), bp 165–168°C (2.5 mm Hg). IR spectrum, ν, cm^{-1}: 3366, 3290 (NH_2); 1610, 1590 (C=C, Ar). ^{1}H NMR spectrum (300 MHz), δ, ppm (*J*, Hz): 1.11 s and 1.24 s (6H, 2-CH_3), 1.18–1.23 m (1H, H^{5a}), 1.28 d (1H, H^{3a}, ^2J 14.2), 1.35 br.s (2H, NH_2), 1.39–1.56 m (2H, H^{3b}, $\underline{CH_2}CH_2N$), 1.74 d.d.d (1H, H^{5b}, ^2J 14.1, ^3J 11.2, 5.4), 2.63–2.83 m (2H, $CH_2\underline{CH_2}N$), 2.70 d and 2.80 d (2H, $CH_2C_6H_4Cl$, ^2J 13.5), 3.55 d.d.d (1H, H^{6a} , ^2J 12.1, ^3J 4.6, 3.6), 3.67 d.d.d (1H, H^{6b}, ^2J 12.1, ^3J 10.8, 2.5), 7.13–7.34 m (4H, Ar). Found, %: C 68.15; H 8.48; N 5.02. $C_{16}H_{24}ClNO$. Calculated, %: C 68.19; H 8.58; N 4.97.

General procedure for the preparation of secondary amines V–XI. A mixture of equimolar amounts of aromatic aldehyde and amine **IV** in benzene was heated for 4 h with the Dean–Stark trap until all water separated. Then benzene was removed and the residue was dissolved in methanol (0.1 mol of azomethine **A** per 40 mL of methanol). To this mixture was added by portions an equimolar amount of $NaBH_4$ under stirring and cooling with ice water, maintaining the reaction temperature below 20°C. Then the reaction mixture was stirred for 1 h at room temperature. After distilling off methanol, the residue was alkalinized with 20% aqueous NaOH, extracted with ether, the extract was dried and concentrated. The residue was distilled.

{2-[4-(2-Chlorobenzyl)-6,6-dimethyltetrahydropyran-4-yl]ethyl}-(4-methoxybenzyl)amine (V). Yield 65%, bp 228–232°C (1.5 mm Hg). IR spectrum, ν, cm^{-1}: 3312 (NH); 1602, 1563 (C=C, Ar). ^{1}H NMR spectrum (300 MHz), δ, ppm (*J*, Hz): 1.09 s and 1.20 s (6H, 2-CH_3), 1.18–1.25 m (1H, H^{5a}), 1.27 d (1H, H^{3a}, ^2J 14.1), 1.42–1.58 m (3H, H^{3b} and $\underline{CH_2}CH_2N$), 1.80 d.d.d (1H, H^{5b}, ^2J 14.1, ^3J 11.1, 5.4), 2.54–2.73 m (2H, $CH_2\underline{CH_2}N$), 2.67 d and 2.79 d (2H, $CH_2C_6H_4Cl$, ^2J 13.5), 2.85 br.s (1H, NH), 3.54 d.d.d (1H, H^{6a}, ^2J 12.0, ^3J 4.5, 3.6), 3.65 d.d.d (1H, H^{6b}, ^2J 12.0, ^3J 10.8, 2.4), 3.66 s (2H, $NCH_2C_6H_4$), 3.77 s (3H, OCH_3), 6.73–6.78 m (2H, H-3',5', $C_6H_4OCH_3$), 7.11–7.31 m (4H, C_6H_4), 7.30–7.34 m (2H, H-2',6', $C_6H_4OCH_3$). Found, %: C 71.68; H 8.18; N 3.44. $C_{24}H_{32}ClNO_2$. Calculated, %: C 71.71; H 8.02; N 3.48.

{2-[4-(2-Chlorobenzyl)-6,6-dimethyltetrahydropyran-4-yl]ethyl}-(4-isopropoxybenzyl)amine (VI). Yield 63%, bp 240–245°C (1 mm Hg). IR spectrum, ν, cm^{-1}: 3300 (NH); 1600, 1590 (C=C, Ar). ^{1}H NMR spectrum (300 MHz), δ, ppm (*J*, Hz): 1.10 s and 1.20 s

(6H, 2-CH_3), 1.19–1.25 m (1H, H^{5a}), 1.28 d (1H, H^{3a}, ^2J 14.0), 1.31 d (6H, CH_3, *i*-Pr, ^3J 6.1), 1.43–1.57 m (3H, H-3^b and $\underline{CH_2}CH_2N$). 1.80 d.d.d (1H, H^{5b}, ^2J 14.2, ^3J 10.8, 5.4), 2.54–2.73 m (2H, $CH_2\underline{CH_2}N$), 2.68 d and 2.80 d (2H, $CH_2C_6H_4Cl$, ^2J 13.5), 2.85 br.s (1H, NH), 3.54 d.d.d (1H, H^{6a}, ^2J 12.0, ^3J 4.6, 3.5), 3.65 d.d.d (1H, H^{6b}, ^2J 12.0, ^3J 10.9, 2.2), 3.65 s (2H, $NCH_2C_6H_4$), 4.51 s (1H, CH, *i*-Pr, ^3J 6.1), 6.73–6.78 m [2H, H-3',5', $C_6H_4OCH(CH_3)_2$], 7.12–7.32 m [6H, C_6H_4 и H-2',6', $C_6H_4OCH(CH_3)_2$]. Found, %: C 72.59; H 8.42; N 3.18. $C_{26}H_{36}ClNO_2$. Calculated, %: C 72.62; H 8.44; N 3.26.

(4-Chlorobenzyl)-{2-[4-(2-chlorobenzyl)-6,6-dimethyltetrahydropyran-4-yl]ethyl}amine (VII). Yield 67%, bp 225–230°C (1 mm Hg). IR spectrum, ν, cm^{-1}: 3315 (NH); 1597, 1580 (C=C, Ar). ^{1}H NMR spectrum (300 MHz), δ, ppm (*J*, Hz): 1.10 s and 1.20 s (6H, 2-CH_3), 1.20–1.25 m (1H, H^{5a}), 1.28 d (1H, H^{3a}, ^2J 14.1), 1.42–1.58 m (3H, H^{3b} and $\underline{CH_2}CH_2N$), 1.51 br.s (1H, NH), 1.81 d.d.d (1H, H^{5b}, ^2J 14.1, ^3J 11.1, 5.4), 2.53–2.71 m (2H, $CH_2\underline{CH_2}N$), 2.68 d and 2.79 d (2H, $CH_2C_6H_4Cl$, ^2J 13.5), 3.55 d.d.d (1H, H^{6a}, ^2J 12.2, ^3J4.5, 3.6), 3.66 d.d.d (1H, H^{6b}, ^2J 12.2, ^3J 10.8, 2.5), 3.72 s (2H, $NCH_2C_6H_4$), 7.12–7.34 m (8H, Ar). Found, %: C 67.95; H 7.15; N 3.38. $C_{23}H_{29}Cl_2NO$. Calculated, %: C 67.98; H 7.19; N 3.45.

{2-[4-(2-Chlorobenzyl)-6,6-dimethyltetrahydropyran-4-yl]ethyl}(4-fluorobenzyl)amine (VIII). Yield 73%, bp 210–215°C (2 mm Hg). IR spectrum, ν, cm^{-1}: 3310 (NH); 1601, 1590 (C=C, Ar). ^{1}H NMR spectrum (300 MHz), δ, ppm (*J*, Hz): 1.10 s and 1.19 s (6H, 2-CH_3), 1.20–1.25 m (1H, H^{5a}), 1.28 d (1H, H^{3a}, ^2J14.0), 1.43–1.58 m (3H, H^{3b} and $\underline{CH_2}CH_2N$), 1.50 br.s (1H, NH), 1.81 d.d.d (1H, H^{5b}, ^2J 14.0, ^3J 11.0, 5.4), 2.53–2.72 m (2H, $CH_2\underline{CH_2}N$), 2.68 d and 2.79 d (2H, $CH_2C_6H_4Cl$, ^2J 13.5), 3.54 d.d.d (1H, H^{6a}, ^2J 12.1, ^3J 4.6, 3.6), 3.66 d.d.d (1H, H^{6b}, ^2J 12.1, ^3J 10.8, 2.4), 3.71 s (2H, $NCH_2C_6H_4F$), 6.98 s (2H, H-3',5', C_6H_4F), 7.12–7.33 m (6H, C_6H_4Cl and H-2',6', C_6H_4F). Found, %: C 70.82; H 7.45; N 3.56. $C_{23}H_{29}ClFNO$. Calculated, %: C 70.84; H 7.50; N 3.59.

{2-[4-(2-Chlorobenzyl)-6,6-dimethyltetrahydropyran-4-yl]ethyl}-(2-fluorobenzyl-)amine (IX). Yield 72%, bp 205–208°C (1.5 mm Hg). IR spectrum, ν, cm^{-1}: 3310 (NH); 1610, 1580 (C=C, Ar). ^{1}H NMR spectrum (300 MHz), δ, ppm (*J*, Hz): 1.10 s and 1.20 c (6H, 2-CH_3), 1.20–1.25 m (1H, H^{5a}), 1.28 d (1H, H^{3a}, ^2J 14.1), 1.43–1.58 m (3H, H^{3b} and $\underline{CH_2}CH_2N$), 1.50 br.s (1H, NH), 1.81 d.d.d (1H, H^{5b}, ^2J 14.2, ^3J 11.0, 5.4), 2.56–2.75 m (2H, $CH_2\underline{CH_2}N$), 2.68 d and 2.79 d (2H, $CH_2C_6H_4Cl$, ^2J 13.5), 3.55 d.d.d (1H, H^{6a}, ^2J 12.1, ^3J 4.5, 3.6), 3.66 d.d.d (1H, H^{6b}, ^2J 12.1, ^3J 10.7, 2.3), 3.79 s (2H, $NCH_2C_6H_4F$), 6.97–7.32 m (7H, Ar), 7.40 t. d (1H, Ar, ^1J 7.5, ^2J 1.8). Found, %: C 70.82; H 7.45; N 3.56. $C_{23}H_{29}ClFNO$. Calculated, %: C 70.84; H 7.50; N 3.59.

{2-[4-(2-Chlorobenzyl)-6,6-dimethyltetrahydropyran-4-yl]ethyl}furan-2-ylmethylamine (X). Yield 80%, bp 200–203°C (1.5 mm Hg). IR spectrum, ν, cm^{-1}: 3310 (NH); 1600, 1590 (C=C, Ar). ^{1}H NMR spectrum (300 MHz), δ, ppm (*J*, Hz): 1.10 s and 1.21 s (6H, 2-CH_3), 1.20–1.25 m (1H, H^{5a}), 1.28 d (1H, H^{3a}, ^2J 14.0), 1.43–1.56 m (3H, H^{3b} and $\underline{CH_2}CH_2N$), 1.48 br.s (1H, NH), 1.78 d.d.d (1H, H^{5b}, ^2J 14.1, ^3J 11.2, 5.4), 2.54–2.74 m (2H, $CH_2\underline{CH_2}N$), 2.68 d and 2.79 d (2H, $CH_2C_6H_4Cl$, ^2J 13.5), 3.54 d.d.d (1H, H^{6a}, ^2J 12.1, ^3J 4.5, 3.5), 3.66 d.d.d (1H, H^{6b}, ^2J 12.1, ^3J 10.8, 2.5), 3.70 s (2H, NCH_2), 6.14 d.d (1H, H-3', furan, ^3J 3.2, ^4J 0.8), 6.28 d.d (1H, H-4', furan, ^3J 3.2, 1.8), 7.12–7.32 m (5H, Ar). Found, %: C 69.66; H 7.75; N 3.86. $C_{21}H_{28}ClNO_2$. Calculated, %: C 69.69; H 7.80; N 3.87.

{2-[4-(2-Chlorobenzyl)-6,6-dimethyltetrahydropyran-4-yl]ethyl}thiophen-2-ylmethylamine (XI). Yield 80%, bp 218–223°C (1.5 mm Hg). IR spectrum, ν, cm^{-1}: 3307 (NH); 1600, 1563 (C=C, Ar). ^{1}H NMR spectrum (300 MHz), δ, ppm (*J*, Hz): 1.10 s and 1.21 s (6H, 2-CH_3), 1.20–1.25 m (1H, H^{5a}), 1.29 d (1H, H^{3a}, ^2J 14.1), 1.50 br.s (1H, NH), 1.49–1.59 m (3H, H^{3b} и $\underline{CH_2}CH_2N$), 1.82 d.d.d (1H, H^{5b}, ^2J 14.2, ^3J 11.0, 5.5), 2.60–2.78 m (2H, $CH_2\underline{CH_2}N$), 2.69 d and 2.80 d (2H, $CH_2C_6H_4Cl$, ^2J 13.5), 3.55 d.d.d (1H, H^{6a}, ^2J 12.2, ^3J 4.6, 3.7), 3.66 d.d.d (1H, H^{6b}, ^2J 12.2, ^3J 10.8, 2.4). 3.93 s (2H, NCH_2), 6.87–6.91 m (2H, H-3',4', thiophene), 7.12–7.32 m (5H, Ar). Found, %: C 66.71; H 7.45; N 3.68. $C_{21}H_{28}ClNOS$. Calculated, %: C 66.73; H 7.47; N 3.71.

General procedure for the preparation of acet- and propionamide (XII–XVII). To a solution of 0.03 mol of amine **V**–**XI** and 0.032 mol of triethylamine in 30 mL of anhydrous benzene was added an equimolar amount of acetyl chloride. The mixture was refluxed for 4 h, then cooled, washed with water, extracted with benzene, dried, and concentrated. The residue was distilled.

***N*-{2-[4-(2-Chlorobenzyl)-6,6-dimethyltetrahydropyran-4-yl]ethyl}-*N*-(4-methoxybenzyl)acetamide (XII)** (diastereomers mixture, 70:30). Yield 58%, bp 238–240°C (1 mm Hg). IR spectrum, ν, cm^{-1}: 1640

(CO). ^{1}H NMR spectrum (300 MHz), δ, ppm (*J*, Hz): (hereafter in parentheses are minor isomer signals): 1.06 s and 1.16 s (6H, 2-CH_3), 1.16–1.96 m (6H, H-3,5, $\underline{CH_2}CH_2N$), 2.05 (2.06) s (3H, CH_3CO), 2.65 (2.66) d and 2.81 (2.86) d (2H, $CH_2C_6H_4Cl$, ^2J 13.6), 3.17–3.64 m (4H, H-6 and $CH_2\underline{CH_2}N$), 3.78 (3.77) s (3H, OCH_3), 4.41 (4.33) d and 4.47 (4.50) d [2H, $N\underline{CH_2}C_6H_4OCH_3$, ^2J 16.7 (14.9)], 6.78–6.85 m (2H, H-3',5', $C_6H_4OCH_3$), 7.06–7.35 m (6H, Ar). Found, %: C 70.31; H 7.69; N 3.12. $C_{26}H_{34}ClNO_3$. Calculated, %: C 70.33; H 7.72; N 3.15.

***N*-{2-[4-(2-Chlorobenzyl)-6,6-dimethyltetrahydropyran-4-yl]ethyl}-*N*-(4-fluorobenzyl)acetamide (XIII)** (diastereomers mixture, 60:40). Yield 63%, bp 238–240°C (2 mm Hg). IR spectrum, ν, cm^{-1}: 1654 (CO). ^{1}H NMR spectrum (300 MHz), δ, ppm (*J*, Hz): 1.07 s and 1.17 s (6H, 2-CH_3), 1.08–1.97 m (6H, H-3,5, $\underline{CH_2}CH_2N$), 2.04 (2.08) s (3H, CH_3CO), 2.66 (2.67) d and 2.82 (2.87) d (2H, $CH_2C_6H_4Cl$, ^2J 13.7), 3.17–3.65 m (4H, H-6 and $CH_2\underline{CH_2}N$), 4.47 (4.39) d and 4.53 (4.54) d [2H, $NCH_2C_6H_4F$, ^2J 17.1 (15/0)], 6.96–7.35 m (8H, Ar). Found, %: C 69.48; H 7.19; N 3.21. $C_{25}H_{31}ClFNO_2$. Calculated, %: C 69.51; H 7.23; N 3.24.

***N*-{2-[4-(2-Chlorobenzyl)-6,6-dimethyltetrahydropyran-4-yl]ethyl}-*N*-(2-fluorobenzyl)propionamide (XIV)** (diastereomers mixture, 75:25). Yield 63%, bp 245–250°C (2 mm Hg). IR spectrum, ν, cm^{-1}: 1646 (CO). ^{1}H NMR spectrum (300 MHz), δ, ppm (*J*, Hz): 1.08 (1.17) s (3H, 2-CH_3), 1.08 (1.10) t (3H, $\underline{CH_3}CH_2CO$, ^3J 7.4), 1.21–1.95 m (6H, H-3,5, $\underline{CH_2}CH_2N$), 2.31 (2.32) q (2H, $CH_3\underline{CH_2}CO$, ^3J 7.4), 2.66 (2.69) d and 2.82 (2.88) d (2H, $CH_2C_6H_4Cl$, ^2J 13.8), 3.21–3.66 m (4H, H-6 and $CH_2\underline{CH_2}N$), 4.55 s (4.52 and 4.60 d) [2H, $NCH_2C_6H_4$ (^2J 15.6)], 7.00–7.34 m (8H, Ar). Found, %: C 69.88; H 7.36; N 3.12. $C_{26}H_{33}ClFNO_2$. Calculated, %: C 70.02; H 7.46; N 3.14.

***N*-{2-[4-(2-Chlorobenzyl)-6,6-dimethyltetrahydropyran-4-yl]ethyl}-*N*-furan-2-ylmethylacetamide (XV)** (diastereomers mixture, 70:30). Yield 64%, bp 230–235°C (2 mm Hg). IR spectrum, ν, cm^{-1}: 1650 (CO). ^{1}H NMR spectrum (300 MHz), δ, ppm (*J*, Hz): 1.09 s and 1.23 s (6H, 2-CH_3), 1.19–1.92 m (6H, H-3,5, $\underline{CH_2}CH_2N$), 2.14 (2.03) s (3H, CH_3CO), 2.68 (2.69) d and 2.85 (2.90) d (2H, $CH_2C_6H_4Cl$, ^2J 13.7), 3.23–3.67 m (4H, H-6 and $CH_2\underline{CH_2}N$), 4.42 (4.43) d and 4.46 (4.50) d [2H, NCH_2, ^2J 15.4 (17.0)], 6.24 (6.20) d.d (1H, H-3', furan, ^3J 3.2, ^4J 0.8), 6.34 (6.30) d.d (1H, H-4', furan, ^3J 3.2, 1.9), 7.12–7.38 m (4H, C_6H_4Cl), 7.44 (7.36) d.d (1H, H-5', furan, ^3J 1.9, ^4J 0.8). Found, %: C 68.35; H 7.46; N 3.42. $C_{23}H_{30}ClNO_3$. Calculated, %: C 68.39; H 7.49; N 3.47.

***N*-{2-[4-(2-Chlorobenzyl)-6,6-dimethyltetrahydropyran-4-yl]ethyl}-*N*-furan-2-ylmethylpropionamide (XVI)** (diastereomers mixture, 70:30). Yield 61%, bp 235–240°C (1 mm Hg). IR spectrum, ν, cm^{-1}: 1660 (CO). ^{1}H NMR spectrum (300 MHz), δ, ppm (*J*, Hz): 1.08 s and 1.23 s (6H, 2-CH_3), 1.09 (1.08) t (3H, $\underline{CH_3}CH_2CO$, ^3J 7.3), 1.20–1.86 m (6H, H-3,5, $\underline{CH_2}CH_2N$), 2.43 (2.26) q (2H, $CH_3\underline{CH_2}CO$, ^3J 7.3), 2.68 (2.69) d and 2.84 (2.85) d (2H, $CH_2C_6H_4Cl$, ^2J 13.6), 3.25–3.68 m (4H, H-6 and $CH_2\underline{CH_2}N$), 4.41 (4.43) d and 4.46 (4.52) d (2H, NCH_2, ^2J 17.1), 6.22 (6.18) d (1H, H-3', furan, ^3J 3.3), 6.33 (6.30) d.d (1H, H-4', furan, ^3J 3.3, 1.8), 7.12–7.23 m and 7.30–7.38 m (4H, C_6H_4), 7.42 (7.35) d (1H, H-5', furan, ^3J 1.8). Found, %: C 68.95; H 7.69; N 3.32. $C_{24}H_{32}ClNO_3$. Calculated, %: C 68.97; H 7.72; N 3.35.

***N*-{2-[4-(2-Chlorobenzyl)-6,6-dimethyltetrahydropyran-4-yl]ethyl}-*N*-thiophen-2-ylmethylpropionamide (XVII)** (diastereomers mixture, 60:40). Yield 73%, bp 210–215°C (2 mm Hg). IR spectrum, ν, cm^{-1}: 1647 (CO). ^{1}H NMR spectrum (300 MHz), δ, ppm (*J*, Hz): 1.08 s and 1.22 s (6H, 2-CH_3), 1.10 t (3H, $\underline{CH_3}CH_2CO$, ^3J 7.3), 1.19–1.98 m (6H, H-3,5, $\underline{CH_2}CH_2N$), 2.39 (2.27) q (2H, $CH_3\underline{CH_2}CO$, ^3J 7.3), 2.68 (2.85) d (2H, $CH_2C_6H_4Cl$, ^2J 14.3), 3.26–3.68 m (4H, H-6 and $CH_2\underline{CH_2}N$), 4.66 (14.52) s (2H, NCH_2), 6.87–6.97 m (2H, H-3',4', thiophene), 7.12–7.37 m (5H, Ar). Found, %: C 66.39; H 7.39; N 3.21. $C_{24}H_{32}ClNO_2S$. Calculated, %: C 66.41; H 7.43; N 3.23.

The IR spectra were recorded on a Nicolet Avatar 330 FT-IR spectrophotometer. ^{1}H NMR spectra were obtained on a Mercury VX-300 (300.08 MHz) spectrometer in a DMSO-d_6–CCl_4 solution, internal reference TMS.

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