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4-Alkyl-6-amino-4-N^3,N^5-diaryl-2-thioxo-1,2,3,4-tetrahydropyridine-3,5-dicarboxamides: I. Tandem Synthesis and Alkylation. Molecular and Crystal Structure of 6-Allylsulfanyl-2-amino-4-isobutyl-N^3,N^5-di-*m*-tolyl-3,4-dihydropyridine-3,5-dicarboxamide

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Abstract—4-Alkyl-6-amino-4-N^3,N^5-diaryl-2-thioxo-1,2,3,4-tetrahydropyridine-3,5-dicarboxamides were obtained via tandem synthesis involving the Knoevenagel reaction, Michael reaction and intramolecular condensation. Alkylation of the obtained dicarboxamides proceeds regioselectively at the S atom to form the corresponding thioethers. Structure of 6-allylsulfanyl-2-amino-4-isobutyl-N^3,N^5-di-*m*-tolyl-3,4-dihydropyridine-3,5-dicarboxamide was uniquely determined by XRD analysis.

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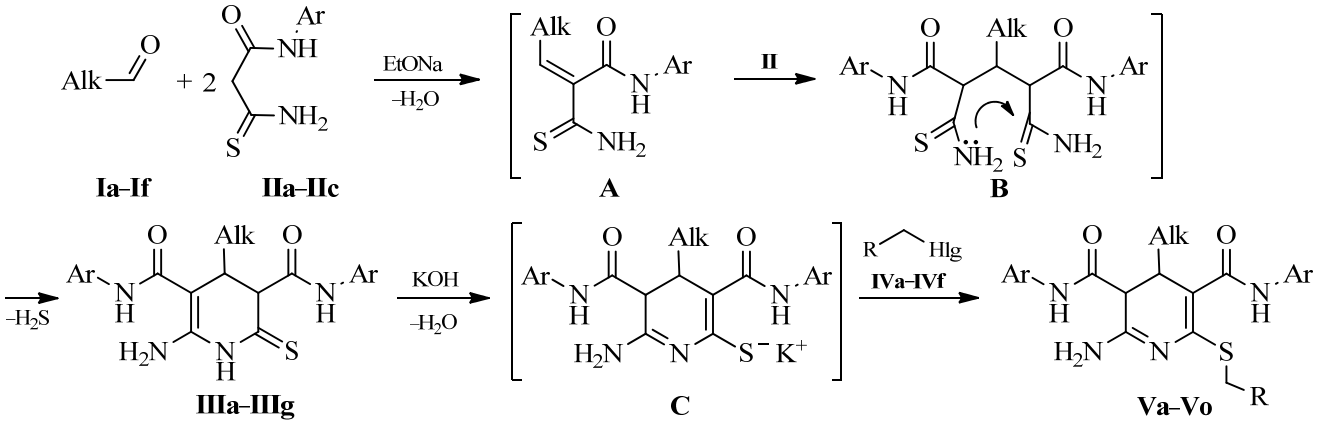
Currently tandem reactions are widely used in organic synthesis [1–3]. This approach to construct complex structures from simple molecules has been previously used by us to obtain the nitrogen-containing heterocyclic compounds: pyrrolines [4], pyridines [5], dihydropyridines [6], and fused pyrimidines [7].

In the present work we examined a condensation of aliphatic aldehydes **Ia**–**If** with a double excess of 3-amino-3-thioxopropaneanilides **IIa**–**IIc** in anhydrous ethanol at 20°C in the presence of sodium ethoxide. This condensation consists in a tandem of several reactions and results in new 4-alkyl-6-amino-N^3,N^5-



I, Alk = *i*-Bu (**a**), Et (**b**), *i*-Pr (**c**), Me (**d**), *n*-C_6H_{13} (**e**), CH((Ph)CH_3 (**f**); **II**, Ar = Ph (**a**), 2-MeC_6H_4 (**b**), 3-MeC_6H_4 (**c**); **III**, Alk = *i*-Bu, Ar = 2-MeC_6H_4 (**a**); *i*-Bu, 3-MeC_6H_4 (**b**); *i*-Pr, 2-MeC_6H_4 (**c**); Et, 2-MeC_6H_4 (**d**); *n*-C_6H_{13}, 2-MeC_6H_4 (**e**); CH(Ph)CH_3, Ph (**f**); Me, Ph (**g**); **IV**, R = COOEt (**a**), Ph (**b**), 4-$BrC_6H_4NHC(O)$ (**c**), 4-$MeOC_6H_4NHC(O)$ (**d**), $CH=CH_2$ (**e**), *n*-C_8H_{17} (**f**); **V**, Alk = *i*-Bu, Ar = 2-MeC_6H_4, R = $CH=CH_2$ (**a**); *i*-Bu, 2-MeC_6H_4, COOEt (**b**); *i*-Bu, 2-MeC_6H_4, 4-$MeOC_6H_4NHC(O)$ (**c**); *i*-Bu, 3-MeC_6H_4, $CH=CH_2$ (**d**); *i*-Bu, 3-MeC_6H_4, Ph (**e**); *i*-Pr, 2-MeC_6H_4, $CH=CH_2$ (**f**); Et, 2-MeC_6H_4, $CH=CH_2$ (**g**); Et, 2-MeC_6H_4, COOEt (**h**); *n*-C_6H_{13}, 2-MeC_6H_4, $CH=CH_2$ (**i**); *n*-C_6H_{13}, 2-MeC_6H_4, Ph (**j**); CH(Ph)CH_3, Ph, $CH=CH_2$ (**k**); CH(Ph)CH_3, Ph, 4-$BrC_6H_4NHC(O)$ (**l**); Me, Ph, 4-$MeOC_6H_4NHC(O)$ (**m**); Me, Ph, $CH=CH_2$ (**n**); Me, Ph, *n*-C_8H_{17} (**o**).

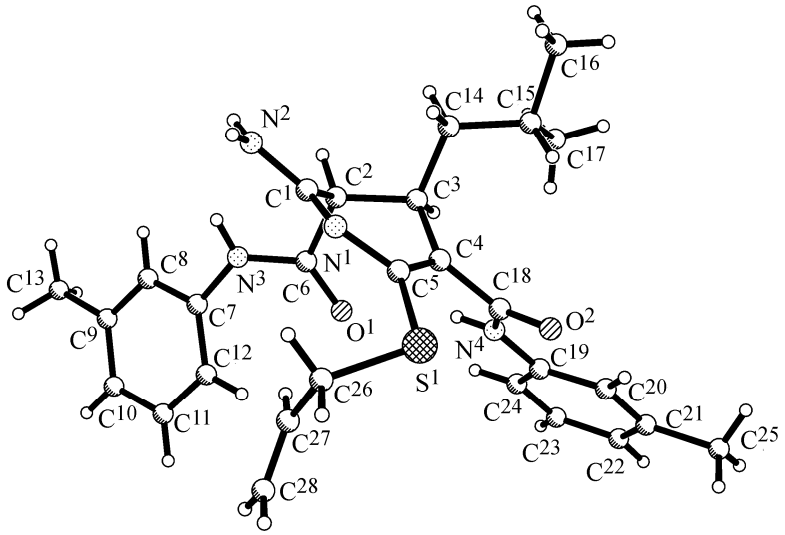
diaryl-2-thioxo-1,2,3,4-tetrahydropyridine-3,5-dicarboxamides **IIIa**–**IIIg**. Apparently, alkene **A** was initially formed as a result of the Knoevenagel reaction. Then the Michael reaction occurs to form the corresponding adduct **B**. The latter was chemoselectively transformed into the final product **III** via an intramolecular cyclocondensation.

The structures of compounds **IIIa**–**IIIg** were confirmed by the spectral methods and also by chemical transformations. Thus, their alkylation with alkyl halides **IVa**–**IVf** results in the corresponding thioethers **Va**–**Vo**. This reaction proceeds smoothly in ethanol at 20°C in the presence of an equimolar amount of an aqueous KOH solution and apparently includes the formation of an intermediate salt **C**.

The ^{1}H NMR spectra of compounds **IIIa**–**IIIg** contain characteristic proton signals of the substituents of tetrahydropyridine ring in the respective areas and the signals of N^1H, C^3H and C^4H proton in the range of 12.45–13.25, 3.74–4.10 and 3.69–3.98 ppm, respectively. In the ^{1}H NMR spectra of compounds **Va**–**Vo** there are characteristic proton signals of C^3H and C^4H groups at δ 3.43–4.34 ppm, and the signals of amino group and a SCH_2 fragment. It should be noted that the nature of the proton signals of the last groups indicates the absence of free rotation. Thus, the signal of amino group is split in two broadened singlets instead of the expected one broad singlet, which may indicate the formation of a hydrogen bond confirmed by X-ray diffraction analysis for compound **Vd**. The absence of free rotation of alkylsulfanyl groups and nonequivalence of the SCH_2-protons is also confirmed by the presence of two doublet signals with the coupling constants ^2J of 12–16 Hz characteristic of this type of compounds [8, 9]. The doubling with equal intensity of the signals from C^3H, C^4H, and CHMe protons in the ^{1}H NMR spectrum of compound **IIIf** indicates the presence of a chiral center in a phenylethyl moiety.

The structure of 6-allylsulfanyl-2-amino-4-isobutyl-N^3,N^5-di-*m*-tolyl-3,4-dihydropyridine-3,5-dicarboxamide **Vd** was studied by XRD in order to establish unambiguously the chemoselectivity of cyclization of the Michael adduct **B** and the regioselectivity of alkylation of compounds **IIIa**–**IIIg** and also to determine the position of double bonds in the dihydropyridine ring (commonly 2,5 location in the fully substituted 2-alkylsulfanyldihydropyridines [10–12]).

The molecule of compound **Vd** contains two chiral centers, the C^2 and C^3 atoms, with the same absolute configuration. The dihydropyridine ring has an intermediate conformation between a *semi-chair* and *twist-boat* (see figure). The fragment $C^1N^1C^5C^4$ is nonplanar [torsion angle 20.6(5)°], the C^2 and C^3 atoms are out of the median plane of this fragment by 0.404(7) and –0.343(7) Å, respectively. The substituents at the C^2 and C^3 atoms have axial orientation [$\angle C^1C^2C^3C^{14}$ –70.3(4)°, $\angle N^2C^1C^2C^6$ –99.5(4)°]. The carbonyl group of the $O^1C^6N^3$ amide fragment has *sc*-orientation with respect to the bond C^2–C^3 [$\angle C^3C^2C^6O^1$ 7.1(5)°], which is probably due to formation of an intramolecular hydrogen bond N^4–$H^4\cdots O^1$ (H···O 2.24°, N–H···O 147°). Tolyl substituent at the N^3 atom is slightly turned with respect to the plane of the amide group [torsion angle is $C^6N^3C^7C^{12}$ 35.2(6)°]. Due to steric



General view of the molecule of **Vd** according to XRD data.

hindrances (a short intramolecular contact $H^{3a}\cdots H^4$ 2.07 Å against the sum of the van der Waals radii of 2.32 Å [13]) and also due to the intramolecular hydrogen bond N^4–$H^4\cdots O^1$ there is a rotation of the amide group O^2–C^{18}–N^4 relative to the plane of the double bond $C^4{=}C^5$ [$\angle C^5C^4C^{18}O^2$ –49.7(5)°]. Tolyl substituent at the N^4 atom is in the plane of the amide group [$\angle C^{18}N^4C^{19}C^{20}$ –6.9(6)°]. This orientation is additionally stabilized by the formation of an intramolecular hydrogen bond C^{20}–$H^{20}\cdots O^2$ (H···O 2.35 Å, C–H···O 122°). The bond S^1–C^{26} is non-coplanar with the heterocycle plane [$\angle C^{26}S^1C^5N^1$ 39.8(3)°], which should lead to some disruption of conjugation between the lone electron pairs of the sulfur atom and the π-system of the heterocycle. Probably, this is compensated by the formation of the shortened intramolecular contacts $N^1\cdots H^{26b}$ 2.48 Å (sum of the van der Waals radii 2.66 Å [13]). In the crystal, the molecules form dimers by hydrogen bonds N^2–$H^{2a}\cdots N^{1i}$ [*i*: 1/2 – *x*, 1/2 – *y*, *z*] (H···N 2.31 Å, N–H···N 146°). These dimers form the chains along the axis *a* due to the weak hydrogen bonding N^3–$H^3\cdots O^{2ii}$ [*ii*: 1 + *x*, *y*, *z*] (H···O 2.47 Å, N–H···O 128°) and N^2–$H^{2b}\cdots S^{1ii}$ (H···S 2.97 Å, N–H···S 132°).

EXPERIMENTAL

Crystals of compound **Vd** are rhombic, $C_{28}H_{34}N_4O_2S$; at 298 K: *a* 8.1384(5), *b* 36.179(3), *c* 18.5955(16) Å; *V* 5475.3(7) Å^3, *M* 490.65, *Z* 8, space group *Pccn*, d_{calc} 1.19 g cm^{-3}, μ(MoK_α) 0.149 mm^{-1}, *F*(000) 2096. The unit cell parameters and intensities of 40295 reflections (4857 independent, R_{int} 0.125) were measured on a Xcalibur 3 four-circle automatic diffractometer (MoK_α, graphite monochromator, CCD-detector, ω-scanning, $2\theta_{max}$ 50.0°). The structure was solved by the direct method using SHELX-97 program [14]. Positions of the hydrogen atoms were calculated geometrically and refined in a *rider* model with U_{iso} = nU_{eq} of the carrier atom (*n* = 1.5 for methyl groups, *n* = 1.2 for the other hydrogen atoms). The structure was refined with respect to F^2 using a full-matrix anisotropic approximation for nonhydrogen atoms to wR_2 0.173 for 4857 reflections [R_1 0.067 for 2443 reflections with $F > 4\sigma(F)$, *S* 0.99]. In the crystal a disordered solvent molecule, apparently ethanol, is present whose contribution to the electron density was removed from F_0^2 at the final refining step by means of SQUEEZE procedure in PLATON program [15]. The bond lengths and bond angles are listed in Tables 1 and 2, respectively.

Table 1. The bond lengths (Å) in the structure of **Vd**

Bond		*d*	Bond		*d*
S^1	C^5	1.775(3)	C^7	C^{12}	1.383(5)
S^1	C^{26}	1.822(5)	C^8	C^9	1.371(5)
O^1	C^6	1.223(4)	C^9	C^{10}	1.379(5)
O^2	C^{18}	1.241(4)	C^9	C^{13}	1.503(5)
N^1	C^1	1.298(4)	C^{10}	C^{11}	1.385(5)
N^1	C^5	1.401(4)	C^{11}	C^{12}	1.379(5)
N^2	C^1	1.332(4)	C^{14}	C^{15}	1.519(5)
N^3	C^6	1.351(4)	C^{15}	C^{16}	1.535(6)
N^3	C^7	1.418(4)	C^{15}	C^{17}	1.520(7)
N^4	C^{18}	1.347(4)	C^{19}	C^{20}	1.374(4)
N^4	C^{19}	1.418(4)	C^{19}	C^{24}	1.377(4)
C^1	C^2	1.508(5)	C^{20}	C^{21}	1.392(4)
C^2	C^3	1.524(4)	C^{21}	C^{22}	1.377(5)
C^2	C^6	1.527(5)	C^{21}	C^{25}	1.505(5)
C^3	C^4	1.529(4)	C^{22}	C^{23}	1.371(5)
C^3	C^{14}	1.543(5)	C^{23}	C^{24}	1.371(5)
C^4	C^5	1.334(4)	C^{26}	C^{27}	1.487(6)
C^4	C^{18}	1.482(4)	C^{27}	C^{28}	1.279(7)
C^7	C^8	1.377(5)			

The ^{1}H NMR spectra were recorded on a Bruker AVANCE DRX-500 (500 MHz) (**Vd**, **Vh**, **Vl**) and Bruker AVANCE II-400 (400 MHz) spectrometers (**IIIa**–**IIIg**, **Va**–**Vc**, **Ve**–**Vg**, **Vi**–**Vk**, **Vm**–**Vo**) in a DMSO-d_6 solution, internal reference TMS). The ^{13}C NMR spectrum of compound **Vd** was taken on a Bruker AVANCE DRX-500 spectrometer (125.75 MHz). Mass spectra were registered on a Chrommas GC/MS-Hewlett-Packard 5890/5972 instrument (column HP-5MS, chemical ionozation, 70 eV) in CH_2Cl_2 solutions. The IR spectra were recorded on a Perkin-Elmer Spectrum One FTIR instrument from KBr pellets. Melting points were measured on a Koeffler heating block. The reaction progress and purity of the compounds obtained were monitored by TLC (Silufol UV-254 plates) eluting with an acetone–hexane mixture (3:5) and detecting with iodine vapors.

Synthesis of 4-alkyl-6-amino-N^3,N^5-diaryl-2-thioxo-1,2,3,4-tetrahydropyridine-3,5-dicarboxamides (IIIa–

Table 2. Bond angles (deg) in the structure of **Vd**

Angle			deg	Angle			deg
C^5	S^1	C^{26}	100.78(19)	C^8	C^9	C^{10}	118.5(4)
C^1	N^1	C^5	117.1(3)	C^8	C^9	C^{13}	121.2(4)
C^6	N^3	C^7	128.5(3)	C^{10}	C^9	C^{13}	120.3(4)
C^{18}	N^4	C^{19}	130.9(3)	C^9	C^{10}	C^{11}	119.6(4)
N^1	C^1	N^2	119.2(3)	C^{12}	C^{11}	C^{10}	121.7(4)
N^1	C^1	C^2	122.6(3)	C^{11}	C^{12}	C^7	118.3(4)
N^2	C^1	C^2	118.1(3)	C^{15}	C^{14}	C^3	114.8(3)
C^1	C^2	C^3	107.3(3)	C^{14}	C^{15}	C^{16}	109.0(4)
C^1	C^2	C^6	111.7(3)	C^{14}	C^{15}	C^{17}	112.2(4)
C^3	C^2	C^6	112.0(3)	C^{17}	C^{15}	C^{16}	108.0(5)
C^2	C^3	C^4	108.0(3)	O^2	C^{18}	N^4	123.8(3)
C^2	C^3	C^{14}	111.0(3)	O^2	C^{18}	C^4	122.5(3)
C^4	C^3	C^{14}	111.8(3)	N^4	C^{18}	C^4	113.7(3)
C^5	C^4	C^3	117.5(3)	C^{20}	C^{19}	N^4	123.4(3)
C^5	C^4	C^{18}	122.3(3)	C^{20}	C^{19}	C^{24}	119.2(3)
C^{18}	C^4	C^3	120.0(3)	C^{24}	C^{19}	N^4	117.3(3)
N^1	C^5	S^1	114.2(3)	C^{19}	C^{20}	C^{21}	120.9(3)
C^4	C^5	S^1	122.2(2)	C^{20}	C^{21}	C^{25}	120.9(3)
C^4	C^5	N^1	123.5(3)	C^{22}	C^{21}	C^{20}	119.0(3)
O^1	C^6	N^3	122.6(3)	C^{22}	C^{21}	C^{25}	120.2(3)
O^1	C^6	C^2	123.2(3)	C^{23}	C^{22}	C^{21}	119.8(3)
N^3	C^6	C^2	114.1(3)	C^{22}	C^{23}	C^{24}	121.0(4)
C^8	C^7	N^3	118.0(3)	C^{23}	C^{24}	C^{19}	120.0(4)
C^8	C^7	C^{12}	119.5(3)	C^{27}	C^{26}	S^1	112.7(3)
C^{12}	C^7	N^3	122.4(3)	C^{28}	C^{27}	C^{26}	126.3(6)
C^9	C^8	C^7	122.3(4)				

IIIg) *(general procedure)*. To a solution of 5 mmol (0.115 g) of metallic sodium in 20 ml of anhydrous ethanol was added under stirring 5 mmol of appropriate 3-amino-*N*-aryl-3-thioxopropanamide **IIa**–**IIc** and 5 mmol of aldehyde **Ia**–**If**. After 10 min to the mixture was added another 5 mmol of appropriate 3-amino-*N*-aryl-3-thioxopropanamide **IIa**–**Iic**. The mixture was kept for 48 h at room temperature. The formed precipitate was filtered off, washed with water, cold ethanol, and hexane.

6-Amino-4-isobutyl-2-thioxo-N^3,N^5-di-*o*-tolyl-1,2,3,4-tetrahydropyridine-3,5-dicarboxamide (IIIa). Yield 1.18 g (52%), yellow powder, mp 162–164°C (EtOH). IR spectrum, ν, cm^{-1}: 3235–3412 (NH, NH_2), 1672 (CONH), 1646 [δ(NH_2)], 1211 (C=S). ^{1}H NMR spectrum, δ, ppm: 0.93 d (3H, CH_3, *J* 6.2 Hz), 0.97 d (3H, CH_3, *J* 6.2 Hz), 1.11–1.32 m (2H, CH_2), 1.51–1.77 m (1H, $\underline{CH}Me_2$), 2.12 s (3H, CH_3), 2.34 s (3H, CH_3), 3.83 s (1H, C^3H), 3.97 t (1H, C^4H, *J* 7.0 Hz), 6.87 t (1H, H_{arom}, *J* 7.3 Hz), 6.96–7.28 m (8H, $6H_{arom}$, NH_2), 8.20 d (1H, H_{arom}, *J* 7.9 Hz), 9.72 br.s (1H, NHCO), 10.18 br.s (1H, NHCO), 12.45 br.s (1H, N^1H). Mass spectrum, *m/z* (I_{rel}, %): 451.2 (100) $[M + 1]^+$. Found, %: C 66.52; H 6.65; N 12.29. $C_{25}H_{30}N_4O_2S$. Calculated, %: C 66.64; H 6.71; N 12.43. *M* 450.608.

6-Amino-4-isobutyl-2-thioxo-N^3,N^5-di-*m*-tolyl-1,2,3,4-tetrahydropyridine-3,5-dicarboxamide (IIIb). Yield 1.23 g (55%), yellow powder, mp 180–182°C

(EtOH). IR spectrum, ν, cm^{-1}: 3228–3411 (NH, NH_2), 1670 (CONH), 1640 [δ(NH_2)], 1191 (C=S). ^{1}H NMR spectrum, δ, ppm: 0.88 d (3H, CH_3, *J* 5.6 Hz), 0.96 d (3H, CH_3, *J* 5.6 Hz), 1.08–1.29 m (2H, CH_2), 1.56–1.72 m (1H, CHMe$_2$), 2.26 s (6H, 2CH_3), 3.71–3.81 m (1H, C^{4}H), 3.84 s (1H, C^{3}H), 6.73 d (1H, H_{arom}, *J* 6.9 Hz), 6.87 d (1H, H_{arom}, *J* 7.0 Hz), 7.10 t (1H, H_{arom}, *J* 7.2 Hz), 7.17 t (1H, H_{arom}, *J* 7.2 Hz), 7.25–7.36 m (2H, H_{arom}), 7.36–7.48 m (2H, H_{arom}), 8.56 br.s (1H, NH_2), 9.48 br.s (1H, NH_2), 10.27 br.s (2H, 2NHCO), 13.18 br.s (1H, N^{1}H). Mass spectrum, *m/z* (I_{rel}, %): 451.2 (82) [*M* + 1]$^+$. Found, %: C 66.50; H 6.64; N 12.37. $C_{25}H_{30}N_4O_2S$. Calculated, %: C 66.64; H 6.71; N 12.43. *M* 450.608.

6-Amino-4-isopropyl-2-thioxo-N^3,N^5-di-*o*-tolyl-1,2,3,4-tetrahydropyridine-3,5-dicarboxamide (IIIc). Yield 0.46 g (21%), white powder, mp 188–190°C (EtOH). IR spectrum, ν, cm^{-1}: 3195–3340 (NH, NH_2), 1681 (CONH), 1653 [δ(NH_2)], 1200 (C=S). ^{1}H NMR spectrum, δ, ppm: 0.94 d (6H, 2CH_3, *J* 6.3 Hz), 1.55–1.62 m (1H, CHMe$_2$), 2.10 s (3H, CH_3), 2.34 s (3H, CH_3), 3.70 d (1H, C^{4}H, *J* 7.4 Hz), 4.03 s (1H, C^{3}H), 6.88 t (1H, H_{arom}, *J* 7.2 Hz), 6.95–7.31 m (6H, H_{arom}), 8.19 d (1H, H_{arom}, *J* 8.0 Hz), 8.51 br.s (H, NH_2), 9.36 br.s (H, NH_2), 9.81 br.s (1H, NHCO), 10.25 br.s (1H, NHCO), 12.55 br.s (1H, N^{1}H). Mass spectrum, *m/z* (I_{rel}, %): 437.2 (100) [*M* + 1]$^+$. Found, %: C 66.18; H 6.35; N 12.74. $C_{24}H_{28}N_4O_2S$. Calculated, %: C 66.03; H 6.47; N 12.83. *M* 436.581.

6-Amino-2-thioxo-N^3,N^5-di-*o*-tolyl-4-ethyl-1,2,3,4-tetrahydropyridine-3,5-dicarboxamide (IIId). Yield 0.50 g (47%), white powder, mp 178–180°C (EtOH). IR spectrum, ν, cm^{-1}: 3314–3158 (NH, NH_2), 1668 (CONH), 1638 [δ(NH_2)], 1195 (C=S). ^{1}H NMR spectrum, δ, ppm: 0.92 t (3H, CH_3, *J* 6.9 Hz), 1.23–1.38 m (1H, CH_2), 1.40–1.51 m (1H, CH_2), 2.12 s (3H, CH_3), 2.34 s (3H, CH_3), 3.84 s (1H, C^{3}H), 3.86–3.91 m (1H, C^{4}H), 6.88 t (1H, H_{arom}, *J* 7.3 Hz), 7.00–7.25 m (6H, H_{arom}), 8.19 s (1H, H_{arom}), 8.21 br.s (1H, NH_2), 9.50 br.s (1H, NH_2), 9.73 br.s (1H, NHCO), 10.29 br.s (1H, NHCO), 12.45 br.s (1H, N^{1}H). Mass spectrum, *m/z* (I_{rel}, %): 423.2 (100) [*M* + 1]$^+$. Found, %: C 65.49; H 6.07; N 13.10. $C_{23}H_{26}N_4O_2S$. Calculated, %: C 65.38; H 6.20; N 13.26. *M* 422.53.

6-Amino-4-*n*-hexyl-N^3,N^5-di-*o*-tolyl-2-thioxo-1,2,3,4-tetrahydropyridine-3,5-dicarboxamide (IIIe). Yield 1.27 g (53%), yellow powder, mp 188–190°C (EtOH). IR spectrum, ν, cm^{-1}: 3188–3415 (NH, NH_2), 1670 (CONH), 1635 [δ(NH_2)], 1198 (C=S). ^{1}H NMR spectrum, δ, ppm: 0.82 t (3H, CH_3, *J* 6.4 Hz), 1.10–1.48 m (10H, 5CH_2), 2.11 s (3H, CH_3), 2.33 s (3H, CH_3), 3.81–3.94 br.s (2H, C^{3}H and C^{4}H), 6.84–6.91 m (1H, H_{arom}), 7.00–7.25 m (8H, 6H_{arom}, NH_2), 8.19 d (1H, H_{arom}, *J* 8.0 Hz), 9.75 br.s (1H, NHCO), 10.30 br.s (1H, NHCO), 12.46 br.s (1H, N^{1}H). Mass spectrum, *m/z* (I_{rel}, %): 479.2 (100) [*M* + 1]$^+$. Found, %: C 67.69; H 7.22; N 11.58. $C_{27}H_{34}N_4O_2S$. Calculated, %: C 67.75; H 7.16; N 11.71. *M* 478.663.

6-Amino-2-thioxo-N^3,N^5-diphenyl-4-(1-phenylethyl)-1,2,3,4-tetrahydropyridine-3,5-dicarboxamide (IIIf). Yield 0.65 g (28%), yellow powder, mp 188–190°C (EtOH). IR spectrum, ν, cm^{-1}: 2930–3444 (NH, NH_2), 1683 (CONH), 1601 [δ(NH_2)], 1167 (C=S). ^{1}H NMR spectrum, δ, ppm: 1.08 d (3H, CH_3, *J* 6.5 Hz), 2.83 br.s and 2.97 br.s (1H, CHMe), 3.98 br.s and 4.10 br.s (1H, C^{3}H), 4.27 br.s and 4.36 br.s (1H, C^{4}H), 6.70–7.65 m (17H, 15H_{arom}, NH_2), 9.68 br.s (1H, NHCO), 10.41 br.s (1H, NHCO), 13.24 br.s (1H, N^{1}H). Mass spectrum, *m/z* (I_{rel}, %): 471.2 (100) [*M* + 1]$^+$. Found, %: C 68.86; H 5.42; N 11.84. $C_{27}H_{26}N_4O_2S$. Calculated, %: C 68.91; H 5.57; N 11.91. *M* 470.598.

6-Amino-4-methyl-2-thioxo-N^3,N^5-diphenyl-1,2,3,4-tetrahydropyridine-3,5-dicarboxamide (IIIg). Yield 0.65 g (34%), yellow powder, mp 211–213°C (EtOH). IR spectrum, ν, cm^{-1}: 3188–3398 (NH, NH_2), 1674 (CONH), 1615 [δ(NH_2)], 1173 (C=S). ^{1}H NMR spectrum, δ, ppm: 1.02 d (3H, CH_3, *J* 6.4 Hz), 3.75 d (1H, C^{4}H, *J* 6.4 Hz), 3.80 s (1H, C^{3}H), 6.92 t (1H, H_{arom}, *J* 7.2 Hz), 7.05 t (1H, H_{arom}, *J* 6.8 Hz), 7.22 t (2H, H_{arom}, *J* 7.2 Hz), 7.30 t (2H, H_{arom}, *J* 7.2 Hz), 7.45–7.72 m (4H, H_{arom}), 9.20 br.s (2H, NH_2), 10.44 br.s (2H, 2NHCO), 13.25 br.s (1H, N^{1}H). Mass spectrum, *m/z* (I_{rel}, %): 381.1 (100) [*M* + 1]$^+$. Found, %: C 63.22; H 5.37; N 14.84. $C_{20}H_{20}N_4O_2S$. Calculated, %: C 63.14; H 5.30; N 14.73. *M* 380.463.

Synthesis of compounds (Va–Vo) *(general procedure).* To a suspension of 0.5 mmol of compound **IIIa–IIIg** in 15 ml of ethanol under stirring was added 0.26 ml (0.5 mmol) of 10% aqueous KOH solution. After 10 min to the reaction mixture was added 0.5 mmol of appropriate alkyl halide **IVa–IVf**. The mixture was kept for 24 h. The formed precipitate was filtered off, washed with water, cold methanol and ethanol, then dried in a vacuum.

6-Allylsulfanyl-2-amino-4-isobutyl-N^3,N^5-di-*o*-tolyl-3,4-dihydropyridine-3,5-dicarboxamide (Va). Yield 0.12 g (50%), white powder, mp 224–226°C (EtOH). IR spectrum, ν, cm^{-1}: 3211–3412 (NH, NH_2), 1666 (CONH), 1641 [δ(NH_2)]. ^{1}H NMR spectrum, δ,

ppm: 0.93 d (6H, 2CH_3, *J* 5.3 Hz), 1.06–1.20 m (1H, CH_2), 1.28–1.40 m (1H, CH_2), 1.66–1.81 m (1H, CHMe$_2$), 2.16 s (3H, CH_3), 2.23 s (3H, CH_3), 3.39 br.s (2H, C^3H and C^4H), 3.47 d.d (1H, SCH_2, ^2J 13.2, ^3J 6.3 Hz), 3.74 d.d (1H, SCH_2, ^2J 13.3, ^3J 6.4 Hz), 4.87 d (1H, =CH_2, J_{cis} 9.4 Hz), 5.11 d (1H, =CH_2, J_{trans} 16.6 Hz), 5.76–5.90 m (1H, CH=), 7.02 t (1H, H_{arom}, *J* 8.0 Hz), 7.15–7.24 m (5H, H_{arom}), 7.34 d (1H, H_{arom}, *J* 7.6 Hz), 7.47 br.s (2H, NH_2), 7.65 d (1H, H_{arom}, *J* 7.7 Hz), 8.74 br.s (1H, NHCO), 8.88 br.s (1H, NHCO). Mass spectrum, *m/z* (I_{rel}, %): 491.2 (100) $[M + 1]^+$. Found, %: C 68.37; H 6.84; N 11.37. $C_{28}H_{34}N_4O_2S$. Calculated, %: C 68.54; H 6.98; N 11.42. *M* 490.674.

Ethyl-2-[6-amino-4-isobutyl-3,5-di(*o*-tolylcarbamoyl)-4,5-dihydropyridine-2-ylsulfanyl]acetate (Vb). Yield 0.086 g (32%), white powder, mp 161–163°C (EtOH). IR spectrum, ν, cm^{-1}: 3214–3433 (NH, NH_2), 1712 (C=O), 1666 (CONH), 1635 [δ(NH_2)]. ^1H NMR spectrum, δ, ppm: 0.80–1.05 m (6H, 2CH_3), 1.11 t (3H, CH_3, *J* 7.0, Hz), 1.20–1.37 m (2H, CH_2), 1.66–1.77 m (1H, CHMe$_2$), 2.15 s (3H, CH_3), 2.22 s (3H, CH_3), 3.35 br.s (2H, C^3H and C^4H), 3.68 d (1H, SCH_2, ^2J 15.9 Hz), 3.85 d (1H, SCH_2, ^2J 15.9 Hz), 3.97 m (2H, OCH_2), 7.00–7.35 m (7H, H_{arom}), 7.51 d (1H, H_{arom}, *J* 8.0 Hz), 7.54 br.s (1H, NH_2), 7.61 br.s (1H, NH_2), 8.64 br.s (1H, NHCO), 8.72 br.s (1H, NHCO). Mass spectrum, *m/z* (I_{rel}, %): 537.4 (100) $[M + 1]^+$. Found, %: C 64.73; H 6.64; N 10.38. $C_{29}H_{36}N_4O_4S$. Calculated, %: C 64.90; H 6.76; N 10.44. *M* 536.70.

2-Amino-4-isobutyl-6-[2-(4-methoxyphenylamino)-2-oxoethylsulfanyl]-N^3,N^5-di-*o*-tolyl-3,4-dihydropyridine-3,5-dicarboxamide (Vc). Yield 0.163 g (53%), yellowish green powder, mp 198–200°C (EtOH). IR spectrum, ν, cm^{-1}: 3212–3415 (NH, NH_2), 1682 (CONH), 1633 [δ(NH_2)]. ^1H NMR spectrum, δ, ppm: 0.93 d (6H, 2CH_3, *J* 5.8 Hz), 1.09–1.22 m (1H, CH_2), 1.26–1.40 m (1H, CH_2), 1.68–1.82 m (1H, CHMe$_2$), 2.14 s (3H, CH_3), 2.20 s (3H, CH_3), 3.42 t (1H, C^4H, *J* 7.6 Hz), 3.48 s (1H, C^3H), 3.64 d (1H, SCH_2, ^2J 14.2 Hz), 3.69 s (3H, OCH_3), 3.89 d (1H, SCH_2, ^2J 14.2 Hz), 6.73 d (2H, H_{arom}, *J* 8.5 Hz), 6.98–7.27 m (7H, H_{arom}), 7.32 d (2H, H_{arom}, *J* 8.5 Hz), 7.46 d (1H, H_{arom}, *J* 7.6 Hz), 7.77 br.s (2H, NH_2), 8.86 br.s (1H, NHCO), 9.11 br.s (1H, NHCO), 9.95 br.s (1H, NHCO). Mass spectrum, *m/z* (I_{rel}, %): 614.4 (100) $[M + 1]^+$. Found, %: C 66.63; H 6.32; N 11.47. $C_{34}H_{39}N_5O_4S$. Calculated, %: C 66.53; H 6.41; N 11.41. *M* 613.782.

6-Allylsulfanyl-2-amino-4-isobutyl-N^3,N^5-di-*m*-tolyl-3,4-dihydropyridine-3,5-dicarboxamide (Vd). Yield 0.19 g (79%) of yellow crystals, mp 158–160°C (EtOH). IR spectrum, ν, cm^{-1}: 3154, 3304, 3429 (NH, NH_2), 1675 (CONH), 1627 [δ(NH_2)]. ^1H NMR spectrum, δ, ppm: 0.88 d (6H, 2CH_3, *J* 5.7 Hz), 1.03–1.11 m (1H, CH_2), 1.26–1.36 m (1H, CH_2), 1.63–1.73 m (1H, CHMe$_2$), 2.27 s (3H, CH_3), 2.28 s (3H, CH_3), 3.24 s (1H, C^3H), 3.28–3.45 m (2H, C^4H, SCH_2), 3.73 d.d (1H, SCH, ^2J 13.5, ^3J 6.3 Hz), 4.86 d (1H, =CH_2, J_{cis} 9.8 Hz), 5.07 d (1H, =CH_2, J_{trans} 16.7 Hz), 5.77–5.87 m (1H, CH=), 6.83 d (1H, H_{arom}, *J* 7.1 Hz), 6.89 d (1H, H_{arom}, *J* 7.2 Hz), 7.15 t (1H, H_{arom}, *J* 7.7 Hz), 7.20 t (1H, H_{arom}, *J* 7.8 Hz), 7.29–7.51 m (6H, 4H_{arom}, NH_2), 9.21 br.s (1H, NHCO), 9.60 br.s (1H, NHCO). ^{13}C NMR spectrum, δ_C, ppm: 21.62, 21.67, 22.92, 23.94, 25.03, 33.17, 34.62, 42.91, 48.76, 111.45, 116.48, 117.10, 117.29, 120.39, 120.63, 123.91, 124.63, 128.81, 129.00, 136.47, 138.08, 138.30, 139.31, 139.90, 149.26, 159.04, 167.03, 167.08. Mass spectrum, *m/z* (I_{rel}, %): 491.2 (100) $[M + 1]^+$. Found, %: C 68.38; H 6.87; N 11.30. $C_{28}H_{34}N_4O_2S$. Calculated, %: C 68.54; H 6.99; N 11.42. *M* 490.674.

2-Amino-6-benzylsulfanyl-4-isobutyl-N^3,N^5-di-*m*-tolyl-3,4-dihydropyridine-3,5-dicarboxamide (Ve). Yield 0.16 g (58%), white powder, mp 192–194°C (EtOH). IR spectrum, ν, cm^{-1}: 3198–3413 (NH, NH_2), 1677 (CONH), 1640 [δ(NH_2)]. ^1H NMR spectrum, δ, ppm: 0.89 d (6H, 2CH_3, *J* 4.3 Hz), 1.05–1.19 m (1H, CH_2), 1.23–1.37 m (1H, CH_2), 1.60–1.76 m (1H, CHMe$_2$), 2.25 s (3H, CH_3), 2.29 s (3H, CH_3), 3.36 t (1H, C^4H, *J* 6.4 Hz), 3.43 s (1H, C^3H), 4.07 d (1H, SCH_2, ^2J 13.2 Hz), 4.33 d (1H, SCH_2, ^2J 13.3 Hz), 6.80 d (1H, H_{arom}, *J* 7.3 Hz), 6.89 d (1H, H_{arom}, *J* 7.3 Hz), 7.01–7.65 m (13H, 11H_{arom}, NH_2), 8.96 br.s (1H, NHCO), 9.86 br.s (1H, NHCO). Mass spectrum, *m/z* (I_{rel}, %): 541.2 (100) $[M + 1]^+$. Found, %: C 71.12; H 6.67; N 10.40. $C_{32}H_{36}N_4O_2S$. Calculated, %: C 71.08; H 6.71; N 10.36. *M* 540.73.

6-Allylsulfanyl-2-amino-4-isopropyl-N^3,N^5-di-*o*-tolyl-3,4-dihydropyridine-3,5-dicarboxamide (Vf). Yield 0.09 g (37%), yellowish green powder, mp 192–194°C (EtOH). IR spectrum, ν, cm^{-1}: 3208–3444 (NH, NH_2), 1666 (CONH), 1634 [δ(NH_2)]. ^1H NMR spectrum, δ, ppm: 0.93 d (3H, CH_3, *J* 6.3 Hz), 0.97 d (3H, CH_3, *J* 6.3 Hz), 1.56–1.74 m (1H, CHMe$_2$), 2.16 s (3H, CH_3), 2.22 s (3H, CH_3), 3.09 d (1H, C^4H, *J* 7.2 Hz), 3.45 d.d (1H, SCH_2, ^2J 13.4, ^3J 6.6 Hz), 3.55 s (1H, C^3H), 3.73 d.d (1H, CH_2, ^2J 13.4, ^3J 6.6 Hz), 4.85 d (1H, =CH_2, J_{cis} 9.4 Hz), 5.10 d (1H, =CH_2, J_{trans} 17.3 Hz), 5.73–5.90 m (1H, CH=), 7.02 t (1H, H_{arom}, *J* 7.2 Hz), 7.05–7.27 m (5H, H_{arom}), 7.34 d (1H, H_{arom},

J 7.6 Hz), 7.49 br.s (2H, NH_2), 7.57 d (1H, H_{arom}, *J* 7.6 Hz), 8.72 br.s (1H, NHCO), 8.86 br.s (1H, NHCO). Mass spectrum, *m/z* (I_{rel}, %): 477.2 (100) $[M + 1]^+$. Found, %: C 68.11; H 6.82; N 11.59. $C_{27}H_{32}N_4O_2S$. Calculated, %: C 68.04; H 6.77; N 11.76. *M* 476.636.

6-Allylsulfanyl-2-amino-4-ethyl-N^3,N^5-di-*o*-tolyl-3,4-dihydropyridine-3,5-dicarboxamide (Vl). Yield 0.17 g (73%), white powder, mp 151–153°C (EtOH). IR spectrum, ν, cm^{-1}: 3295–3416 (NH, NH_2), 1665 (CONH), 1639 [δ(NH_2)]. ^{1}H NMR spectrum, δ, ppm: 0.97 t (3H, CH_3, *J* 6.4 Hz), 1.25–1.40 m (1H, CH_2), 1.44–1.58 m (1H, CH_2), 2.15 s (3H, CH_3), 2.22 s (3H, CH_3), 3.39–3.54 m (3H, C^3H, C^4H and SCH_2), 3.75 d.d (1H, SCH_2, ^2J 13.2, ^3J 6.3 Hz), 4.89 d (1H, =CH_2, J_{cis} 9.9 Hz), 5.12 d (1H, =CH_2, J_{trans} 17.0 Hz), 5.78–5.93 m (1H, CH=), 7.02 t (1H, H_{arom}, *J* 7.1 Hz), 7.06–7.25 m (5H, H_{arom}), 7.31 d (1H, H_{arom}, *J* 7.6 Hz), 7.50 d (2H, NH_2, *J* 19.6 Hz), 7.58 d (1H, H_{arom}, *J* 7.9 Hz), 8.70 br.s (1H, NHCO), 8.95 br.s (1H, NHCO). Mass spectrum, *m/z* (I_{rel}, %): 463.2 (100) $[M + 1]^+$. Found, %: C 67.42; H 6.37; N 12.09. $C_{26}H_{30}N_4O_2S$. Calculated, %: C 67.51; H 6.54; N 12.11. *M* 462.619.

Ethyl-2-[6-amino-3,5-di(*o*-tolylcarbamoyl)-4-ethyl-4,5-dihydropyridine-2-ylsulfanyl]acetate (Vh). Yield 0.09 g (36%), white powder, mp 158–160°C (EtOH). IR spectrum, ν, cm^{-1}: 3211–3408 (NH, NH_2), 1715 (C=O), 1661 (CONH), 1632 [δ(NH_2)]. ^{1}H NMR spectrum, δ, ppm: 0.96 t (3H, CH_3, *J* 7.1 Hz), 1.13 t (3H, CH_3, *J* 7.1 Hz), 1.23–1.35 m (1H, CH_2), 1.46–1.57 m (1H, CH_2), 2.16 s (3H, CH_3), 2.20 s (3H, CH_3), 3.31 t (1H, C^4H, *J* 6.5 Hz), 3.49 s (1H, C^3H), 3.66 d (1H, SCH_2, ^2J 15.8 Hz), 3.84 d (1H, SCH_2, ^2J 15.8 Hz), 3.91–4.04 m (2H, OCH_2), 6.99–7.24 m (6H, H_{arom}), 7.28 d (1H, H_{arom}, *J* 7.9 Hz), 7.41 d (1H, H_{arom}, *J* 7.9 Hz), 7.50 br.s (1H, NH_2), 7.66 br.s (1H, NH_2), 8.66 br.s (1H, NHCO), 8.69 br.s (1H, NHCO). Mass spectrum, *m/z* (I_{rel}, %): 509.1 (100) $[M + 1]^+$. Found, %: C 63.60; H 6.27; N 11.18. $C_{27}H_{32}N_4O_4S$. Calculated, %: C 63.76; H 6.34; N 11.02. *M* 508.646.

6-Allylsulfanyl-2-amino-4-*n*-hexyl-N^3,N^5-di-*o*-tolyl-3,4-dihydropyridine-3,5-dicarboxamide (Vi). Yield 0.07g (27%), yellowish green powder, mp 147–149°C (EtOH). IR spectrum, ν, cm^{-1}: 3225–3407 (NH, NH_2), 1669 (CONH), 1641 [δ(NH_2)]. ^{1}H NMR spectrum, δ, ppm: 0.86 t (3H, CH_3, *J* 6.6 Hz), 1.05–1.60 m (10H, $5CH_2$), 2.15 s (3H, CH_3), 2.22 s (3H, CH_3), 3.26–3.55 m (3H, C^3H, C^4H and SCH_2), 3.75 d.d (1H, SCH_2, ^2J 13.2, ^3J 6.5 Hz), 4.88 d (1H, =CH_2, J_{cis} 9.5 Hz), 5.11 d (1H, =CH_2, J_{trans} 16.9 Hz), 5.74–5.90 m (1H, CH=), 6.90–7.65 m (10H, $8H_{arom}$, NH_2), 8.71 br.s (1H, NHCO), 8.98 br.s (1H, NHCO). Mass spectrum, *m/z* (I_{rel}, %): 519.3 (100) $[M + 1]^+$. Found, %: C 69.52; H 7.25; N 10.71. $C_{30}H_{38}N_4O_2S$. Calculated, %: C 69.46; H 7.38; N 10.80. *M* 518.729.

2-Amino-6-benzylsulfanyl-4-*n*-hexyl-N^3,N^5-di-*o*-tolyl-3,4-dihydropyridine-3,5-dicarboxamide (Vj). Yield 0.16g (58%), yellowish green crystals, mp 173–175°C (EtOH). IR spectrum, ν, cm^{-1}: 3198–3446 (NH, NH_2), 1672 (CONH), 1630 [δ(NH_2)]. ^{1}H NMR spectrum, δ, ppm: 0.86 t (3H, CH_3, *J* 6.8 Hz), 1.10–1.55 m (10H, $5CH_2$), 2.11 s (6H, $2CH_3$), 3.45 m (1H, C^4H), 3.50 s (1H, C^3H), 4.12 d (1H, SCH_2, ^2J 13.2 Hz), 4.32 d (1H, SCH_2, ^2J 13.2 Hz), 7.00 t (1H, H_{arom}, *J* 7.2 Hz), 7.02–7.38 m (11H, H_{arom}), 7.53 d (1H, H_{arom}, *J* 7.6 Hz), 7.67 br.s (2H, NH_2), 8.63 br.s (1H, NHCO), 8.94 br.s (1H, NHCO). Mass spectrum, *m/z* (I_{rel}, %): 569.2 (100) $[M + 1]^+$. Found, %: C 71.64; H 7.13; N 9.68. $C_{34}H_{40}N_4O_2S$. Calculated, %: C 71.80; H 7.09; N 9.85. *M* 568.784.

2-Allylsulfanyl-6-amino-N^3,N^5-diphenyl-4-(1-phenylethyl)-3,4-dihydropyridine-3,5-dicarboxamide (Vk). Yield 0.10 g (39%), white powder, mp 215–217°C (EtOH). IR spectrum, ν, cm^{-1}: 3169–3403 (NH, NH_2), 1670 (CONH), 1631 [δ(NH_2)]. ^{1}H NMR spectrum, δ, ppm: 1.27 d (3H, CH_3, *J* 6.8 Hz), 2.64–2.77 m (1H, CHMe), 3.38–3.44 m (1H, SCH_2), 3.50 d (1H, C^4H), 3.57 s (1H, C^3H), 3.71 d.d (1H, SCH_2, ^2J 13.4, ^3J 6.5 Hz), 4.86 d (1H, =CH_2, J_{cis} 9.9 Hz), 5.07 d (1H, =CH_2, J_{trans} 17.0 Hz), 5.72–5.86 m (1H, CH=), 6.95 t (1H, H_{arom}, *J* 7.2 Hz), 7.05 t (2H, H_{arom}, *J* 7.2 Hz), 7.09–7.74 m (14H, $12H_{arom}$, NH_2), 8.48 br.s (1H, NHCO), 9.52 br.s (1H, NHCO). Mass spectrum, *m/z* (I_{rel}, %): 511.2 (100) $[M + 1]^+$. Found, %: C 70.42; H 5.80; N 10.84. $C_{30}H_{30}N_4O_2S$. Calculated, %: C 70.56; H 5.92; N 10.97. *M* 510.664.

2-Amino-6-[2-(4-bromophenylamino)-2-oxoethylsulfanyl]-N^3,N^5-diphenyl-4-(1-phenylethyl)-3,4-dihydropyridine-3,5-dicarboxamide (Vl). Yield 0.17 g (51%), yellowish green powder, mp 216–218°C (EtOH). IR spectrum, ν, cm^{-1}: 3176–3447 (NH, NH_2), 1666 (CONH), 1633 [δ(NH_2)]. ^{1}H NMR spectrum, δ, ppm: 1.27 d (3H, CH_3, *J* 6.9 Hz), 2.73–2.81 m (1H, CHMe), 3.55–3.65 m (2H, C^3H and C^4H), 3.80 d (1H, SCH_2, ^2J 15.0 Hz), 3.90 d (1H, SCH_2, ^2J 15.0 Hz), 6.91–7.61 m (21H, $19H_{arom}$, NH_2), 9.14 br.s (1H, NHCO), 9.50 br.s (1H, NHCO), 10.29 br.s (1H, NHCO). Mass spectrum, *m/z* (I_{rel}, %): 684.2 (100) $[M + 2]^+$. Found, %: C 61.63; H 4.67; N 10.18.

$C_{35}H_{32}BrN_5O_3S$. Calculated, %: C 61.58; H 4.73; N 10.26. *M* 682.64.

2-Amino-4-methyl-6-[2-(4-methoxyphenylamino)-2-oxoethylsulfanyl]-N^3,N^5-diphenyl-3,4-dihydropyridine-3,5-dicarboxamide (Vm). Yield 0.15 g (54%), yellowish green powder, mp 194–196°C (EtOH). IR spectrum, ν, cm^{-1}: 3198–3456 (NH, NH_2), 1668 (CONH), 1632 [δ(NH_2)]. ^{1}H NMR spectrum, δ, ppm: 1.03 d (3H, CH_3, *J* 6.6 Hz), 3.43 s (1H, C^3H), 3.45–3.49 m (1H, C^4H), 3.71 s (3H, OCH_3), 3.77 d (1H, SCH_2, ^2J 14.6 Hz), 3.86 d (1H, SCH_2, ^2J 14.6 Hz), 6.84 d (2H, H_{arom}, *J* 8.7 Hz), 6.99 t (1H, H_{arom}, *J* 7.1 Hz), 7.04 t (1H, H_{arom}, *J* 7.1 Hz), 7.15–7.33 m (4H, H_{arom}), 7.47 d (2H, H_{arom}, *J* 8.7 Hz), 7.58 d (2H, H_{arom}, *J* 8.0 Hz), 7.65 d (2H, H_{arom}, *J* 8.4 Hz), 7.79 br.s (2H, NH_2), 9.45 br.s (1H, NHCO), 9.93 br.s (1H, NHCO), 10.06 br.s (1H, NHCO). Mass spectrum, *m/z* (I_{rel}, %): 544.2 (100) $[M + 1]^+$. Found, %: C 64.01; H 5.22; N 12.97. $C_{29}H_{29}N_5O_4S$. Calculated, %: C 64.07; H 5.38; N 12.88. *M* 543.65.

6-Allylsulfanyl-2-amino-4-methyl-N^3,N^5-diphenyl-3,4-dihydropyridine-3,5-dicarboxamide (Vp). Yield 0.09 g (44%), yellowish green powder, mp 155–157°C (EtOH). IR spectrum, ν, cm^{-1}: 3202–3415 (NH, NH_2), 1672 (CONH), 1638 [δ(NH_2)]. ^{1}H NMR spectrum, δ, ppm: 1.02 d (3H, CH_3, *J* 6.5 Hz), 3.25–3.34 m (2H, C^3H and C^4H), 3.52 d.d (1H, SCH_2, ^2J 13.0, ^3J 7.7 Hz), 3.75 d.d (1H, SCH_2, ^2J 13.0, ^3J 7.7 Hz), 4.96 d (1H, $=CH_2$, J_{cis} 9.8 Hz), 5.15 d (1H, $=CH_2$, J_{trans} 17.0 Hz), 5.82–6.02 m (1H, CH=), 6.99 t (1H, H_{arom}, *J* 7.0 Hz), 7.03 t (1H, H_{arom}, *J* 7.0 Hz), 7.26 t (2H, H_{arom}, *J* 7.7 Hz), 7.31 t (2H, H_{arom}, *J* 7.7 Hz), 7.40 br.s (1H, NH_2), 7.48 br.s (1H, NH_2), 7.52–7.68 m (4H, H_{arom}), 9.10 br.s (1H, NHCO), 9.83 br.s (1H, NHCO). Mass spectrum, *m/z* (I_{rel}, %): 421.2 (100) $[M + 1]^+$. Found, %: C 65.74; H 5.52; N 13.28. $C_{23}H_{24}N_4O_2S$. Calculated, %: C 65.69; H 5.75; N 13.32. *M* 420.537.

2-Amino-4-methyl-6-*n*-nonylsulfanyl-N^3,N^5-diphenyl-3,4-dihydropyridine-3,5-dicarboxamide (Vo). Yield 0.05 g (20%), yellowish green powder, mp 156–158°C (EtOH). IR spectrum, ν, cm^{-1}: 3199–3418 (NH, NH_2), 1664 (CONH), 1641 [δ(NH_2)]. ^{1}H NMR spectrum, δ, ppm: 0.85 d (3H, CH_3, *J* 6.4 Hz), 1.03 t (3H, CH_3, *J* 6.8 Hz), 1.15–1.71 m (14H, $7CH_2$), 2.71–2.84 m (2H, SCH_2), 3.00–3.15 m (2H, C^3H and C^4H), 6.90–7.11 m (2H, H_{arom}), 7.18–7.44 m (4H, H_{arom}), 7.48–7.69 m (4H, H_{arom}), 8.40 br.s (1H, NH_2), 9.32 br.s (1H, NH_2), 9.85 br.s (1H, NHCO), 10.02 br.s (1H, NHCO). Mass spectrum, *m/z* (I_{rel}, %): 507.4 (100) $[M + 1]^+$. Found, %: C 68.61; H 7.62; N 11.11. $C_{29}H_{38}N_4O_2S$. Calculated, %: C 68.74; H 7.56; N 11.06. *M* 506.70.

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