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Dipolar Cycloaddition of *N*-Aryl-*C*-(2,2-dichloro-1-phenylcyclopropyl)nitrones to *N*-Arylmaleimides

A. P. Molchanov[a], P. S. Sorokoumov[a], J. Kopf[b], and R. R. Kostikov[a]

[a] *St. Petersburg State University, Universitetskii pr. 26, St. Petersburg, 198504 Russia*
e-mail: s.lab@pobox.spbu.ru

[b] *Institut für Anorganische Chemie, Martin-Luter-King Platz 6, Hamburg, D-20146 Germany*

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Abstract—1,3-Dipolar cycloaddition of *N*-aryl-*C*-(2,2-dichloro-1-phenylcyclopropyl)nitrones to *N*-arylmaleimides stereoselectively gives substituted pyrrolo[3,4-*d*]isoxazolidines as mixtures of two diastereoisomers differing by configuration at the $C^{1'}$ atom of the cyclopropane ring in the substituent on C^3. Substituents in the aromatic rings of the initial nitrone and maleimide do not affect the stereochemistry of the process.

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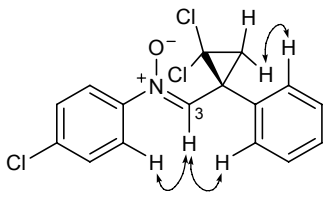
1,3-Dipolar cycloaddition of nitrones to unsaturated compounds underlies one of the most important methods for building up five-membered heterocyclic systems [1]. A necessary condition for the synthesis of compounds with required properties is the possibility to control the reaction stereochemistry, which may be achieved by proper selection of the corresponding substrates and reaction conditions (solvent and catalyst). It is known that in reactions of *C*,*N*-diaryl nitrones with *N*-arylmaleimides the ratio of the resulting *endo*/*exo* diastereoisomers changes from 1.4 to 3.9, depending on the substituent in the aromatic ring of the initial nitrone and mealeimide [2]. Enhanced diastereoselectivity was observed in reactions of *C*-aryl-*N*-(arylmethyl)nitrones with maleimides having both electron-withdrawing and electron-donating substituents in the aromatic ring of the imide [3], as well as with *o,o′*-disubstituted *N*-arylmaleimides due to increase of steric interaction in the transition state [4]. The selectivity of cycloaddition also changed in the presence of $ZnBr_2$ [3] and upon variation of the solvent [5].

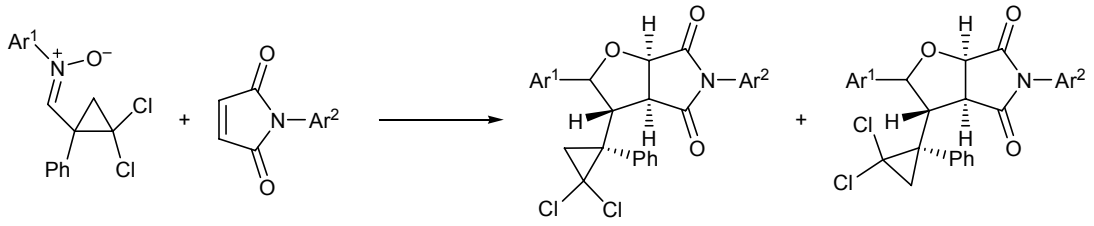
Compounds containing a cyclopropyl group attract interest due to broad spectrum of their biologically important properties [6, 7]. However, published data on cycloaddition of nitrones having a cyclopropyl group to unsaturated compounds are very limited [8, 9], whereas nitrones containing a geminal dihalocyclopropane fragment have not been reported. We previously found that nitrones react with compounds possessing a strained three-membered ring (e.g., cyclopropenes [10] and 2-methylidenecyclopropane-1,3-dicarboxylates [11]) to form adducts which readily undergo secondary processes involving opening of the strained ring.

In the present work we examined the reaction of *N*-aryl-*C*-(2,2-dichloro-1-phenylcyclopropyl)nitrones **Ia**–**Ic** with *N*-arylmaleimides **IIa**–**IIe**. Nitrones **Ia**–**Ic** were synthesized by reaction of 2,2-dichloro-1-phenylcyclopropane-1-carbaldehyde with *N*-arylhydroxylamines. Nitrones readily undergo hydrolysis, and their ^1H NMR spectra recorded after several hours contained signals from protons of the corresponding aromatic amine and initial aldehyde. The steric configuration of nitrones **Ia**–**Ic** was determined on the basis of the NOESY spectrum of compound **Ic** which displayed cross peaks between the 3-H proton and *ortho*-protons in both aromatic rings, as well as between one *ortho*-proton in the unsubstituted aromatic ring and one proton in the cyclopropane fragment (see the structure shown below). These findings allowed us to assign *Z*-configuration at the C=N bond of nitrone **Ic**.

In the reaction of nitrones **Ia**–**Ic** with maleimides in methylene chloride or benzene at room temperature,



Scheme 1.



Ia–Ic **IIa–IIe** **IIIa–IIIo** **IVa–IVo**

I, Ar^1 = Ph (**a**), 4-MeC_6H_4 (**b**), 4-ClC_6H_4 (**c**); **II**, Ar^2 = Ph (**a**), 4-MeC_6H_4 (**b**), 4-$MeOC_6H_4$ (**c**), 4-FC_6H_4 (**d**), 3-$O_2NC_6H_4$ (**e**); **III**, **IV**, Ar^1 = Ph (**a**–**e**), 4-MeC_6H_4 (**f**–**j**), 4-ClC_6H_4 (**k**–**o**), Ar^2 = Ph (**a**, **f**, **k**), 4-MeC_6H_4 (**b**, **g**, **l**), 4-$MeOC_6H_4$ (**c**, **h**, **m**), 4-FC_6H_4 (**d**, **i**, **n**), 3-$O_2NC_6H_4$ (**e**, **j**, **o**).

a solid separated from the reaction mixture in several hours; it was filtered off and subjected to column chromatography on silica gel. ^{1}H NMR analysis of the reaction mixtures revealed the presence of two compounds at a ratio of ~3 : 1 to 4 : 1 (Scheme 1). The major products were isolated as individual substances and completely characterized, whereas the minor products in some cases were characterized only by spectral parameters.

The structure of compounds **IIIa**–**IIIo** and **IVa**–**IVo** was determined on the basis of their elemental compositions and spectral parameters. The ^{1}H NMR spectra of **IIIa**–**IIIo** contained doublet signals from protons in the cyclopropane ring at δ 2.2 and 2.5 ppm with a coupling constant *J* of 8.0 Hz, a singlet from proton on C^3 at δ 5.2 ppm, and doublets from protons at C^{3a} (δ 4.3–4.6 ppm) and C^{6a} (δ 3.8–4.0 ppm, *J* = 7–8 Hz). In the ^{13}C NMR spectra of these compounds we observed signals at δ_C 53.7 (C^{3a}), 71.5 (C^6), and 77.4 ppm (C^{6a}). In the ^{1}H NMR spectra of adducts **IVa**–**IVo** in $CDCl_3$, doublet signals from protons in the cyclopropane ring appeared at δ 2.10 and 2.20 ppm, and signals from protons in the isoxazolidine ring were singlets at δ 3.95 (2H) and 4.90 ppm (1H). The ^{1}H NMR spectra of the same compounds in C_6D_6 contained signals from protons in the cyclopropane ring as doublets at δ 1.65 and 1.76 ppm (*J* = 8 Hz); protons in the isoxazolidine ring resonated as doublets at δ 3.16 (*J* = 7.3 Hz) and 3.62 ppm (*J* = 8 Hz) and a singlet at δ 4.99 ppm (3a-H, 6a-H, and 3-H, respectively).

The spectral parameters of compounds **IIIa**–**IIIo** and **IVa**–**IVo** allowed us to assign them *trans*-orientation of 3-H with respect to 3a-H and 6a-H. Insofar as nitrones **Ia**–**Ic** possess a chiral center at the C^1 atom in the three-membered ring, the formation of two diastereoisomeric products differing by relative configurations of that center and chiral C^3 atom of the pyrrolo[3,4-*d*]isoxazolidine system might be expected, as in reactions of other nitrones with maleimides [2–4]. The configuration of compounds **III** and **IV** was determined by X-ray analysis. The X-ray diffraction data were obtained for compounds **IIIa** and **IVc** (Figs. 1, 2). As follows from these data, compounds **III** and **IV** both are characterized by *trans* configuration of the pyrrolo[3,4-*d*]isoxazolidine skeleton, and the only dif-

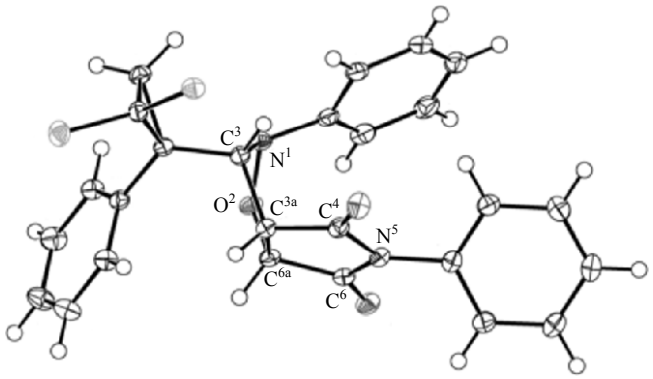


Fig. 1. Structure of the molecule of (3*RS*,3a*SR*,6a*RS*)-3-[(*RS*)-2,2-dichloro-1-phenylcyclopropyl]-2,5-diphenyltetrahydropyrrolo[3,4-*d*]isoxazole-4,6-dione (**IIIa**) according to the X-ray diffraction data.

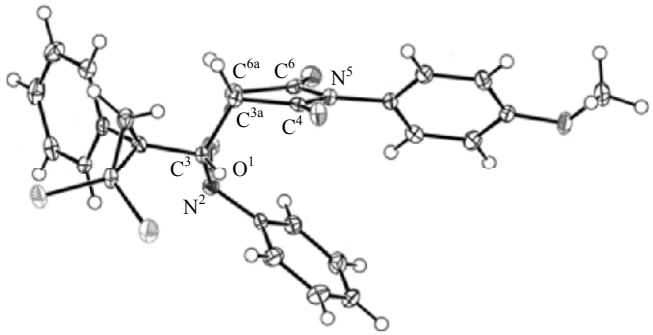


Fig. 2. Structure of the molecule of (3*RS*,3a*SR*,6a*RS*)-3-[(*SR*)-2,2-dichloro-1-phenylcyclopropyl]-5-(4-methoxyphenyl)-2-phenyltetrahydropyrrolo[3,4-*d*]isoxazole-4,6-dione (**IVc**) according to the X-ray diffraction data.

ference is configuration of $C^{1'}$ in the cyclopropane ring with respect to the substituents on C^3.

Thus the addition of nitrones **Ia**–**Ic** to substituted maleimides **IIa**–**IIe** is *cis*-stereoselective, and the imide fragment is oriented *endo* with respect to (*Z*)-nitrone in the transition state. Analogous stereochemistry of adducts with *trans* orientation of protons in the pyrrolo[3,4-*d*]isoxazolidine ring was observed previously in reactions of maleimides with sterically hindered nitrones [12]. Diastereoisomeric adducts **III** and **IV** are formed at a ratio different from equimolar. According to the ^{1}H NMR spectra of the reaction mixtures the ratio **III**:**IV** weakly depends on the substituent in the aromatic ring in both nitrone **Ia**–**Ic** and maleimide **IIa**–**IIe**. It is the same for the following couples: **IIIa/IVa**, **IIIe/IVe**, 3.3; **IIIb/IVb**, 3.2; **IIIc/IVc**, **IIIh/IVh**, **IIIm/IVm**, 3.7; **IIId/IVd**, 3.1; **IIIf/IVf**, **IIIi/IVi**, **IIIl/IVl**, 4.0; **IIIg/IVg**, **IIIj/IVj**, **IIIo/IVo**, 3.6; **IIIk/IVk**, 3.8; **IIIn/IVn** 3.0. Presumably, preferential formation of diastereoisomers **III** is related to their higher stability as compared to isomers **IV**. In fact, van der Waals repulsion between the chlorine atoms and *N*-phenyl group is inherent to the latter. Estimation of the enthalpies of formation of diastereoisomers **IIIa** and **IVa** in terms of the MM2 approximation showed that the former is more stable by 1 kcal/mol; this value is close to 0.7 kcal/mol, calculated on the basis of the ratio of diastereoisomers **IIIa** and **IVa** in the reaction mixture.

EXPERIMENTAL

The elemental compositions were determined on a Hewlett–Packard 185-B CHN analyzer. The IR spectra were measured from 2% solutions in chloroform on a UR-20 spectrometer. The ^{1}H and ^{13}C NMR spectra were recorded on a Bruker DPX-300 instrument at 300 and 75 MHz, respectively. X-Ray analysis of single crystals of compounds **IIIa** and **IVc** was performed on an ApexCCD diffractometer using SHELXL97 software package. The purity of compounds was checked, and the progress of reactions was monitored, by thin-layer chromatography on Silufol UV-254 plates.

***N*-(2,2-Dichloro-1-phenylcyclopropylmethylidene)aniline *N*-oxide (Ia).** A solution of 2.4 g (18 mmol) of *N*-phenylhydroxylamine in ethanol was added to a solution of 2.5 g (12 mmol) of 2,2-dichloro-1-phenylcyclopropane-1-carbaldehyde in 30 ml of ethanol, and the mixture was left to stand for 12 h at 4°C. The precipitate was filtered off and recrystallized from ethanol. Yield 2.3 g (62%). IR spectrum ($CHCl_3$), ν, cm^{-1}: 3060, 1600, 1560, 1490, 1380, 1100, 1050. ^{1}H NMR spectrum (acetone-d_6), δ, ppm: 2.36 d (1H, CH_2, J = 8.7 Hz), 2.58 d (1H, CH_2, J = 8.7 Hz), 7.27–7.47 (6H, H_{arom}), 7.67 m (2H_{arom}), 7.75 m (2H, H_{arom}), 8.06 s (1H, =CH). ^{13}C NMR spectrum (acetone-d_6), δ_C, ppm: 31.5 (CH_2), 38.1 (C), 65.8 (CCl_2), 121.8 (CH), 128.4 (CH), 128.6 (CH), 129.4 (C), 148.3 (N–C=).

Compounds **Ib** and **Ic** were synthesized in a similar way. As noted above, nitrones **Ia**–**Ic** readily undergo hydrolysis with atmospheric moisture; therefore, they were not isolated as analytically pure substances.

***N*-(2,2-Dichloro-1-phenylcyclopropylmethylidene)-4-methylaniline *N*-oxide (Ib).** Yield 73%. ^{1}H NMR spectrum, δ, ppm: in acetone-d_6: 2.34 d (1H, CH_2, J = 8.0 Hz), 2.37 s (3H, CH_3), 2.56 d (1H, CH_2, J = 8.0 Hz), 7.26–7.47 (6H, H_{arom}), 7.62–7.69 (3H, H_{arom}), 8.02 s (1H, =CH); in $CDCl_3$: 2.39 s (3H), 2.41 d (1H, J = 8.0 Hz), 2.50 d (1H, J = 8.0 Hz), 7.17–7.44 (6H), 7.50–7.60 (3H), 7.67 s (1H). ^{13}C NMR spectrum ($CDCl_3$), δ_C, ppm: 21.1 (CH_3), 31.7 (CH_2), 37.5 (C), 65.0 (C), 121.4 (CH), 128.2 (CH), 128.5 (CH), 129.5 (CH), 129.9 (CH), 133.1 (C), 135.4 (C), 140.8 (N–C=).

4-Chloro-*N*-(2,2-dichloro-1-phenylcyclopropylmethylidene)aniline *N*-oxide (Ic). Yield 75%. ^{1}H NMR spectrum ($CDCl_3$), δ, ppm: 2.40 d (1H, CH_2, J = 8.0 Hz), 2.51 d (1H, CH_2, J = 8.0 Hz), 7.35–7.46 m (5H, H_{arom}), 7.53 m (2H, H_{arom}), 7.62 m (2H, H_{arom}), 7.67 s (1H, =CH). ^{13}C NMR spectrum ($CDCl_3$), δ_C, ppm: 31.7 (CH_2), 37.4 (C), 64.8 (C), 122.9 (CH), 128.4 (CH), 128.6 (CH), 129.2 (CH), 129.9 (CH), 130.7 (C), 135.0 (C), 136.4 (N–C=).

Compounds IIIa–IIIo and IVa–IVo (*general procedure*). Maleimide **IIa**–**IIe**, 1 mmol, was added to a solution of 1 mmol of nitrone **Ia**–**Ic** in 20 ml of methylene chloride (or benzene). The mixture was left to stand for 12 h at room temperature, the solvent was evaporated, and the residue was recrystallized from ethanol or subjected to column chromatography on silica gel using hexane–ethyl acetate as eluent.

(3*RS*,3a*SR*,6a*RS*)-3-[(*RS*)-2,2-Dichloro-1-phenylcyclopropyl]-2,5-diphenyltetrahydropyrrolo[3,4-*d*]-isoxazole-4,6-dione (IIIa). Yield 166 mg (35%), mp 195°C. IR spectrum ($CHCl_3$), ν, cm^{-1}: 3070, 1720 v.s, 1600, 1500 s, 1380, 1310, 1240 s, 1190. ^{1}H NMR spectrum (DMSO-d_6), δ, ppm: 2.22 d (1H, CH_2, J = 8.0 Hz), 2.48 d (1H, CH_2, J = 8.0 Hz), 4.00 d (1H, CH, J = 7.3 Hz), 4.56 d (1H, CH, J = 7.3 Hz), 5.09 s (1H, CH), 6.33 m (2H, H_{arom}), 6.94–7.55 (12H, H_{arom}), 7.78 m (1H, H_{arom}). ^{13}C NMR spectrum ($CDCl_3$), δ_C, ppm: 32.0 (CH_2), 41.5 (C), 53.8 (CH), 64.5 (C),

71.6 (CH), 77.4 (CH), 113.7 (CH), 123.1 (CH), 125.9 (CH), 128.6 (CH), 128.8 (CH), 128.9 (CH), 129.6 (CH), 130.6 (CH), 136.6 (C), 148.9 (C), 172.3 (C=O), 173.7 (C=O). Found, %: C 64.95; H 4.30; N 5.81. $C_{26}H_{20}Cl_2N_2O_3$. Calculated, %: C 65.15; H 4.21; N 5.84.

(3*RS*,3a*SR*,6a*RS*)-3-[(*SR*)-2,2-Dichloro-1-phenylcyclopropyl]-2,5-diphenyltetrahydropyrrolo[3,4-*d*]isoxazole-4,6-dione (IVa). ^{1}H NMR spectrum ($CDCl_3$), δ, ppm: 2.06 d (1H, CH_2, J = 7.3 Hz), 2.20 d (1H, CH_2, J = 7.3 Hz), 3.97 s (2H, CH), 4.89 s (1H, CH), 6.30 m (2H, H_{arom}), 7.04 m (1H, H_{arom}), 7.20–7.53 (11H, H_{arom}), 7.87 m (1H, H_{arom}). ^{13}C NMR spectrum ($CDCl_3$), δ_C, ppm: 32.2 (CH_2), 43.3 (C), 53.8 (CH), 64.5 (C), 71.6 (CH), 77.4 (CH), 113.7 (CH), 123.1 (CH), 125.9 (CH), 128.6 (CH), 128.8 (CH), 128.9 (CH), 129.6 (CH), 130.6 (C), 136.6 (C), 148.9 (C), 172.3 (C=O), 173.7 (C=O).

(3*RS*,3a*SR*,6a*RS*)-3-[(*RS*)-2,2-Dichloro-1-phenylcyclopropyl]-5-(4-methylphenyl)-2-phenyltetrahydropyrrolo[3,4-*d*]isoxazole-4,6-dione (IIIb). Yield 200 mg (56%), mp 168°C. IR spectrum ($CHCl_3$), ν, cm^{-1}: 3080, 1720 v.s, 1600, 1530, 1500, 1385 s, 1310, 1230. ^{1}H NMR spectrum ($CDCl_3$), δ, ppm: 2.12 d (1H, CH_2, J = 8.0 Hz), 2.27 s (3H, CH_3), 2.32 d (1H, CH_2, J = 8.0 Hz), 3.89 d (1H, CH, J = 7.3 Hz), 4.37 d (1H, CH, J = 7.3 Hz), 5.21 s (1H, CH), 6.23 d (2H, H_{arom}, J = 8.7 Hz), 6.96–7.65 (12H, H_{arom}). ^{13}C NMR spectrum ($CDCl_3$), δ_C, ppm: 21.1 (CH_3), 32.0 (CH_2), 41.4 (C), 53.7 (CH), 64.4 (C), 71.4 (CH), 77.4 (CH), 113.7 (CH), 123.0 (CH), 125.6 (CH), 128.0 (CH), 128.6 (CH), 129.5 (CH), 129.6 (CH), 130.6 (CH), 136.6 (C), 139.0 (C), 148.8 (C), 172.3 (C=O), 173.8 (C=O). Found, %: C 65.57; H 4.65; N 5.54. $C_{27}H_{22}Cl_2N_2O_3$. Calculated, %: C 65.73; H 4.49; N 5.68.

(3*RS*,3a*SR*,6a*RS*)-3-[(*SR*)-2,2-Dichloro-1-phenylcyclopropyl]-5-(4-methylphenyl)-2-phenyltetrahydropyrrolo[3,4-*d*]isoxazole-4,6-dione (IVb). ^{1}H NMR spectrum ($CDCl_3$), δ, ppm: 2.10 d (1H, CH_2, J = 7.3 Hz), 2.21 d (1H, CH_2, J = 7.3 Hz), 2.41 s (3H, CH_3), 3.95 s (2H, CH), 4.89 s (1H, CH), 6.37 m (2H, H_{arom}), 6.95–7.65 (12H, H_{arom}). ^{13}C NMR spectrum ($CDCl_3$), δ_C, ppm: 21.1 (Me), 32.2 (CH_2), 43.3 (C), 54.1 (CH), 65.6 (C), 73.8 (CH), 77.4 (CH), 114.3 (CH), 123.2 (CH), 125.7 (CH), 126.0 (CH), 127.9 (CH), 128.6 (CH), 129.8 (CH), 134.2 (CH), 134.6 (C), 138.1 (C), 149.6 (C), 169.7 (C=O), 172.5 (C=O).

(3*RS*,3a*SR*,6a*RS*)-3-[(*RS*)-2,2-Dichloro-1-phenylcyclopropyl]-5-(4-methoxyphenyl)-2-phenyltetrahydropyrrolo[3,4-*d*]isoxazole-4,6-dione (IIIc). Yield 215 mg (42%), mp 169°C. IR spectrum ($CHCl_3$), ν, cm^{-1}: 3070, 1715 v.s, 1600, 1520, 1490, 1390, 1305, 1270, 1030. ^{1}H NMR spectrum, δ, ppm: in $CDCl_3$: 2.11 d (1H, CH_2, J = 8.0 Hz), 2.32 d (1H, CH_2, J = 8.0 Hz), 3.75 s (3H, CH_3), 3.88 d (1H, CH, J = 7.3 Hz), 4.37 d (1H, CH, J = 7.3 Hz), 5.21 s (1H, CH), 6.28 d (2H, H_{arom}, J = 8.7 Hz), 6.76 d (2H, H_{arom}, J = 9.4 Hz), 6.96–7.66 (10H, H_{arom}); in C_6D_6: 1.77 d (1H, CH_2, J = 8.0 Hz), 2.11 d (1H, CH_2, J = 8.0 Hz), 3.25 s (3H, CH_3), 3.29 d (1H, CH, J = 7.3 Hz), 3.95 d (1H, CH, J = 7.3 Hz), 5.29 s (1H, CH), 6.25 d (2H, H_{arom}, J = 8.0 Hz), 7.05 m (2H, H_{arom}), 7.15 d (2H, H_{arom}, J = 8.0 Hz), 7.35–7.40 (4H, H_{arom}), 7.42–7.60 (4H, H_{arom}). ^{13}C NMR spectrum ($CDCl_3$), δ_C, ppm: 32.0 (CH_2), 41.4 (C), 53.7 (CH), 55.3 (Me), 64.4 (C), 71.4 (CH), 77.4 (CH), 113.7 (CH), 114.1 (CH), 123.0 (CH), 123.2 (CH), 127.1 (CH), 128.5 (CH), 129.5 (CH), 130.6 (CH), 136.6 (C), 148.8 (C), 159.6 (C), 172.5 (C=O), 173.9 (C=O). Found, %: C 63.68; H 4.31; N 5.35. $C_{27}H_{22}Cl_2N_2O_4$. Calculated, %: C 63.66; H 4.35; N 5.50.

(3*RS*,3a*SR*,6a*RS*)-3-[(*SR*)-2,2-Dichloro-1-phenylcyclopropyl]-5-(4-methoxyphenyl)-2-phenyltetrahydropyrrolo[3,4-*d*]isoxazole-4,6-dione (IVc). ^{1}H NMR spectrum (C_6D_6), δ, ppm: 1.65 d (1H, CH_2, J = 8.0 Hz), 1.76 d (1H, CH_2, J = 8.0 Hz), 3.16 d (1H, CH, J = 7.3 Hz), 3.25 s (3H, CH_3), 3.62 d (1H, CH, J = 7.3 Hz), 4.99 s (1H, CH), 6.63 d (2H, H_{arom}, J = 8.0 Hz), 6.72–7.35 (9H, H_{arom}), 7.51 d (2H, H_{arom}, J = 8.0 Hz), 8.02 m (1H, H_{arom}). ^{13}C NMR spectrum ($CDCl_3$), δ_C, ppm: 32.2 (CH_2), 43.3 (C), 54.0 (CH), 55.4 (Me), 65.5 (C), 73.8 (CH), 77.4 (CH), 114.2 (CH), 123.2 (CH), 127.2 (CH), 127.8 (CH), 128.0 (CH), 128.7 (CH), 129.4 (CH), 134.5 (C), 134.6 (C), 149.6 (C), 159.7 (C), 172.6 (C=O), 174.2 (C=O).

(3*RS*,3a*SR*,6a*RS*)-3-[(*RS*)-2,2-Dichloro-1-phenylcyclopropyl)-5-(4-fluorophenyl)-2-phenyltetrahydropyrrolo[3,4-*d*]isoxazole-4,6-dione (IIId). Yield 190 mg (44%), mp 204°C. IR spectrum ($CHCl_3$), ν, cm^{-1}: 3080, 1720 v.s, 1600, 1515 s, 1390 s, 1245, 1200. ^{1}H NMR spectrum ($CDCl_3$), δ, ppm: 2.13 d (1H, CH_2, J = 8.0 Hz), 2.33 d (1H, CH_2, J = 8.0 Hz), 3.94 d (1H, CH, J = 7.3 Hz), 4.43 d (1H, CH, J = 7.3 Hz), 5.26 s (1H, CH), 6.83 d (1H, H_{arom}, J = 8.0 Hz), 6.95–7.65 (12H, H_{arom}), 8.16 m (1H, H_{arom}). ^{13}C NMR spectrum ($CDCl_3$), δ_C, ppm: 31.8 (CH_2), 41.4 (C), 53.7 (CH), 64.4 (C), 71.5 (CH), 77.4 (CH), 113.7 (CH), 115.9 (CH, J_{CF} = 22.8 Hz), 123.1 (CH), 126.5 (CH), 127.7 (CH), 127.9 (CH), 128.3 (CH), 129.3 (CH), 130.5 (CH), 136.5 (C), 148.8 (C), 162.5 (C, J_{CF} = 248 Hz), 172.1 (C=O), 173.6 (C=O). Found, %:

C 62.68; H 3.85; N 5.75. $C_{26}H_{19}Cl_2FN_2O_3$. Calculated, %: C 62.79; H 3.85; N 5.63.

(3*RS*,3a*SR*,6a*RS*)-3-[(*SR*)-2,2-Dichloro-1-phenylcyclopropyl)-5-(4-fluorophenyl)-2-phenyltetrahydropyrrolo[3,4-*d*]isoxazole-4,6-dione (IVd). ^{1}H NMR spectrum (C_6D_6), δ, ppm: 1.64 d (1H, CH_2, J = 8.0 Hz), 1.72 d (1H, CH_2, J = 8.0 Hz), 3.11 d (1H, CH, J = 7.5 Hz), 3.57 d (1H, CH, J = 7.5 Hz), 4.95 s (1H, CH), 6.50 m (2H, H_{arom}), 6.67–7.05 m (6H, H_{arom}), 7.10–7.20 m (4H, H_{arom}), 7.45 m (2H, H_{arom}). ^{13}C NMR spectrum ($CDCl_3$), δ_C, ppm: 32.2 (CH_2), 43.2 (C), 54.0 (CH), 65.5 (C), 73.9 (CH), 77.4 (CH), 114.3 (CH), 116.0 (CH, J_{CF} = 22.8 Hz), 123.2 (CH), 127.8 (CH), 128.0 (CH), 128.7 (CH), 129.5 (CH), 134.2 (CH), 134.5 (C), 149.5 (C), 162.3 (C, J_{CF} = 248 Hz), 172.3 (C=O), 174.0 (C=O).

(3*RS*,3a*SR*,6a*RS*)-3-[(*RS*)-2,2-Dichloro-1-phenylcyclopropyl]-5-(3-nitrophenyl)-2-phenyltetrahydropyrrolo[3,4-*d*]isoxazole-4,6-dione (IIIe). Yield 210 mg (40%), mp 179°C. IR spectrum ($CHCl_3$), ν, cm^{-1}: 3070, 1720 v.s, 1595, 1530, 1500, 1380, 1360, 1240, 1200. ^{1}H NMR spectrum ($CDCl_3$), δ, ppm: 2.13 d (1H, CH_2, J = 8.0 Hz), 2.33 d (1H, CH_2, J = 8.0 Hz), 3.94 d (1H, CH, J = 7.3 Hz), 4.43 d (1H, CH, J = 7.3 Hz), 5.26 s (1H, CH), 6.83 d (1H, H_{arom}, J = 8.0 Hz), 6.95–7.65 (12H, H_{arom}), 8.16 m (1H, H_{arom}). ^{13}C NMR spectrum ($CDCl_3$), δ_C, ppm: 31.9 (CH_2), 41.2 (C), 53.8 (CH), 64.4 (C), 71.6 (CH), 77.4 (CH), 113.7 (CH), 121.3 (CH), 123.7 (CH), 128.4 (CH), 128.7 (CH), 129.3 (CH), 129.7 (CH), 130.5 (CH), 131.5 (CH), 131.9 (CH), 136.5 (C), 148.2 (C), 148.5 (C), 171.6 (C=O), 173.2 (C=O). Found, %: C 59.91; H 3.60; N 8.07. $C_{26}H_{19}Cl_2N_3O_5$. Calculated, %: C 59.56; H 3.65; N 8.01.

(3*RS*,3a*SR*,6a*RS*)-3-[(*SR*)-2,2-Dichloro-1-phenylcyclopropyl]-5-(3-nitrophenyl)-2-phenyltetrahydropyrrolo[3,4-*d*]isoxazole-4,6-dione (IVe). ^{1}H NMR spectrum ($CDCl_3$), δ, ppm (in a mixture with compound **IIIe**): 2.08 d (1H, CH_2, J = 8.0 Hz), 2.22 d (1H, CH_2, J = 8.0 Hz), 4.01 m (2H, CH), 4.92 s (1H, CH).

(3*RS*,3a*SR*,6a*RS*)-3-[(*RS*)-2,2-Dichloro-1-phenylcyclopropyl]-2-(4-methylphenyl)-5-phenyltetrahydropyrrolo[3,4-*d*]isoxazole-4,6-dione (IIIf). Yield 213 mg (43%), mp 161°C. ^{1}H NMR spectrum ($CDCl_3$), δ, ppm: 2.11 d (1H, CH_2, J = 7.8 Hz), 2.27 s (3H, CH_3), 2.33 d (1H, CH_2, J = 7.8 Hz), 3.88 d (1H, CH, J = 7.4 Hz), 4.38 d (1H, CH, J = 7.4 Hz), 5.20 s (1H, CH), 6.35 m (2H, H_{arom}), 7.00–7.10 (4H, H_{arom}), 7.20–7.30 (3H, H_{arom}), 7.33–7.54 (4H, H_{arom}), 7.62 m (1H, H_{arom}). ^{13}C NMR spectrum ($CDCl_3$), δ_C, ppm: 20.3 (CH_3), 31.9 (CH_2), 41.4 (C), 53.8 (CH), 64.5 (C), 71.4 (CH), 77.4 (CH), 114.0 (CH), 121.0 (CH), 128.6 (CH), 128.8 (CH), 128.9 (CH), 130.0 (CH), 130.6 (CH), 132.8 (C), 136.7 (C), 146.5 (C), 172.4 (C=O), 173.8 (C=O). Found, %: C 65.44; H 4.31; N 5.80. $C_{27}H_{22}Cl_2N_2O_3$. Calculated, %: C 65.73; H 4.49; N 5.68.

(3*RS*,3a*SR*,6a*RS*)-3-[(*SR*)-2,2-Dichloro-1-phenylcyclopropyl]-2-(4-methylphenyl)-5-phenyltetrahydropyrrolo[3,4-*d*]isoxazole-4,6-dione (IVf). ^{1}H NMR spectrum ($CDCl_3$), δ, ppm: 2.05 d (1H, CH_2, J = 7.6 Hz), 2.18 d (1H, CH_2, J = 7.8 Hz), 2.26 s (3H, CH_3), 3.93 s (2H, CH), 4.84 s (1H, CH), 6.29 m (2H, H_{arom}), 6.99–7.18 (4H, H_{arom}), 7.20–7.31 (4H, H_{arom}), 7.34–7.47 (3H, H_{arom}), 7.86 m (1H, H_{arom}). ^{13}C NMR spectrum ($CDCl_3$), δ_C, ppm: 20.3 (CH_3), 32.3 (CH_2), 43.2 (C), 54.1 (CH), 65.5 (C), 74.0 (CH), 77.4 (CH), 114.5 (CH), 126.0 (CH), 127.8 (CH), 128.0 (CH), 128.7 (CH), 129.0 (CH), 130.7 (CH), 134.6 (C), 134.7 (C), 147.2 (C), 172.5 (C=O), 174.1 (C=O).

(3*RS*,3a*SR*,6a*RS*)-3-[(*RS*)-2,2-Dichloro-1-phenylcyclopropyl]-2,5-bis(4-methylphenyl)tetrahydropyrrolo[3,4-*d*]isoxazole-4,6-dione (IIIg). Yield 248 mg (48%), mp 180°C. ^{1}H NMR spectrum ($CDCl_3$), δ, ppm: 2.10 d (1H, CH_2, J = 7.6 Hz), 2.28 s (3H, CH_3), 2.30 s (3H, CH_3), 2.33 d (1H, CH_2, J = 7.6 Hz), 3.85 d (1H, CH, J = 7.3 Hz), 4.41 d (1H, CH, J = 7.3 Hz), 5.20 s (1H, CH), 6.22 m (2H, H_{arom}), 6.97–7.11 (6H, H_{arom}), 7.32–7.7 (5H, H_{arom}). ^{13}C NMR spectrum ($CDCl_3$), δ_C, ppm: 20.3 (CH_3), 21.2 (CH_3), 31.8 (CH_2), 41.4 (C), 53.8 (CH), 64.5 (C), 71.3 (CH), 77.4 (CH), 114.0 (CH), 125.7 (CH), 128.1 (CH), 128.5 (CH), 129.4 (CH), 130.0 (CH), 130.5 (CH), 132.7 (C), 136.7 (C), 139.0 (C), 146.5 (C), 172.5 (C=O), 173.9 (C=O). Found, %: C 65.94; H 4.60; N 5.85. $C_{28}H_{24}Cl_2N_2O_3$. Calculated, %: C 66.28; H 4.77; N 5.52.

(3*RS*,3a*SR*,6a*RS*)-3-[(*SR*)-2,2-Dichloro-1-phenylcyclopropyl]-2,5-bis(4-methylphenyl)tetrahydropyrrolo[3,4-*d*]isoxazole-4,6-dione (IVg). ^{1}H NMR spectrum ($CDCl_3$), δ, ppm: 2.02 d (1H, CH_2, J = 7.3 Hz), 2.20 d (1H, CH_2, J = 7.3 Hz), 2.28 s (3H, CH_3), 2.30 s (3H, CH_3), 3.93 s (2H, CH), 4.85 s (1H, CH), 6.19 m (2H, H_{arom}), 7.03–7.22 (7H, H_{arom}), 7.31–7.50 (3H, H_{arom}), 7.90 m (1H, H_{arom}). ^{13}C NMR spectrum ($CDCl_3$), δ_C, ppm: 20.4 (CH_3), 21.2 (CH_3), 32.3 (CH_2), 43.2 (C), 54.1 (CH), 65.5 (C), 77.1 (CH), 114.5 (CH), 125.8 (CH), 127.8 (CH), 128.0 (CH), 128.6 (CH), 129.5 (CH), 129.9 (CH), 132.8 (C), 134.5 (CH), 134.7 (C), 139.1 (C), 147.2 (C), 172.6 (C=O), 174.2 (C=O).

(3*RS*,3a*SR*,6a*RS*)-3-[(*RS*)-2,2-Dichloro-1-phenylcyclopropyl]-5-(4-methoxyphenyl)-2-(4-methylphenyl)tetrahydropyrrolo[3,4-*d*]isoxazole-4,6-dione (IIIh). Yield 230 mg (44%), mp 191°C. ^{1}H NMR spectrum ($CDCl_3$), δ, ppm: 2.10 d (1H, CH_2, J = 8.0 Hz), 2.30 s (3H, CH_3), 2.33 d (1H, CH_2, J = 8.0 Hz), 3.76 s (3H, CH_3), 3.84 d (1H, CH, J = 7.3 Hz), 4.37 d (1H, CH, J = 7.3 Hz), 5.19 s (1H, CH), 6.25 m (2H, H_{arom}), 6.75 m (2H, H_{arom}), 6.97–7.08 (4H, H_{arom}), 7.37–7.62 (5H, H_{arom}). ^{13}C NMR spectrum ($CDCl_3$), δ_C, ppm: 20.4 (CH_3), 31.8 (CH_2), 41.4 (C), 53.7 (CH), 55.4 (CH_3), 64.5 (C), 71.3 (CH), 77.4 (CH), 114.0 (CH), 114.1 (CH), 123.3 (CH), 125.7 (CH), 128.3 (CH), 128.5 (CH), 129.2 (CH), 132.7 (C), 136.7 (C), 146.5 (C), 159.6 (C), 172.6 (C=O), 174.0 (C=O). Found, %: C 64.61; H 4.82; N 5.41. $C_{28}H_{24}Cl_2N_2O_4$. Calculated, %: C 64.25; H 4.62; N 5.35.

(3*RS*,3a*SR*,6a*RS*)-3-[(*SR*)-2,2-Dichloro-1-phenylcyclopropyl]-5-(4-methoxyphenyl)-2-(4-methylphenyl)tetrahydropyrrolo[3,4-*d*]isoxazole-4,6-dione (IVh). ^{1}H NMR spectrum ($CDCl_3$), δ, ppm (in a mixture with compound **IIIh**): 3.93 s (2H, CH), 4.84 s (1H, CH).

(3*RS*,3a*SR*,6a*RS*)-3-[(*RS*)-2,2-Dichloro-1-phenylcyclopropyl]-5-(4-fluorophenyl)-2-(4-methylphenyl)-tetrahydropyrrolo[3,4-*d*]isoxazole-4,6-dione (IIIi). Yield 220 mg (44%), mp 190°C. ^{1}H NMR spectrum ($CDCl_3$), δ, ppm: 2.11 d (1H, CH_2, J = 8.0 Hz), 2.27 s (3H, CH_3), 2.32 d (1H, CH_2, J = 8.0 Hz), 3.86 d (1H, CH, J = 7.3 Hz), 4.38 d (1H, CH, J = 7.3 Hz), 5.20 s (1H, CH), 6.38 m (2H, H_{arom}), 6.90–7.08 (6H, H_{arom}), 7.33–7.55 (4H, H_{arom}), 7.62 m (1H, H_{arom}). ^{13}C NMR spectrum ($CDCl_3$), δ_C, ppm: 20.3 (CH_3), 31.8 (CH_2), 41.3 (C), 53.7 (CH), 64.5 (C), 71.4 (CH), 77.3 (CH), 114.0 (CH), 116.2 d (CH, J_{CF} = 23 Hz), 126.6 (CH), 127.9 (CH), 128.6 (CH), 130.0 (CH), 130.5 (CH), 132.8 (C), 136.6 (C), 146.5 (C), 162.2 d (C, J_{CF} = 250 Hz), 172.3 (C=O), 173.8 (C=O). Found, %: C 63.82; H 4.48; N 5.76. $C_{27}H_{21}Cl_2FN_2O_3$. Calculated, %: C 63.42; H 4.14; N 5.48.

(3*RS*,3a*SR*,6a*RS*)-3-[(*SR*)-2,2-Dichloro-1-phenylcyclopropyl]-5-(4-fluorophenyl)-2-(4-methylphenyl)-tetrahydropyrrolo[3,4-*d*]isoxazole-4,6-dione (IVi). ^{1}H NMR spectrum ($CDCl_3$), δ, ppm: 2.06 d (1H, CH_2, J = 8.0 Hz), 2.20 d (1H, CH_2, J = 8.0 Hz), 2.27 s (3H, CH_3), 3.94 s (2H, CH), 4.85 s (1H, CH), 6.30 m (2H, H_{arom}), 6.90–7.12 (6H, H_{arom}), 7.30–7.50 (4H, H_{arom}), 7.87 m (1H, H_{arom}). ^{13}C NMR spectrum ($CDCl_3$), δ_C, ppm: 20.3 (CH_3), 32.3 (CH_2), 43.2 (C), 54.0 (CH), 65.5 (C), 76.9 (CH), 114.5 (CH), 116.0 d (CH, J_{CF} = 20 Hz), 127.9 (CH), 128.0 (CH), 128.7 (CH), 129.9 (CH), 132.9 (C), 134.2 (CH), 147.2 (C), 162.2 d (C, J_{CF} = 250 Hz), 169.4 (C=O), 174.1 (C=O).

(3*RS*,3a*SR*,6a*RS*)-3-[(*RS*)-2,2-Dichloro-1-phenylcyclopropyl]-2-(4-methylphenyl)-5-(3-nitrophenyl)-tetrahydropyrrolo[3,4-*d*]isoxazole-4,6-dione (IIIj). Yield 285 mg (53%), mp 173°C. ^{1}H NMR spectrum ($CDCl_3$), δ, ppm: 2.11 d (1H, CH_2, J = 7.8 Hz), 2.22 s (3H, CH_3), 2.33 d (1H, CH_2, J = 7.8 Hz), 3.90 d (1H, CH, J = 7.6 Hz), 4.41 d (1H, CH, J = 7.6 Hz), 5.23 s (1H, CH), 6.89 d (1H, H_{arom}, J = 8.0 Hz), 6.99–7.10 (4H, H_{arom}), 7.24 s (1H, H_{arom}), 7.32–7.54 (5H, H_{arom}), 7.62 m (1H, H_{arom}), 7.80 d (1H, H_{arom}, J = 8.0 Hz). ^{13}C NMR spectrum ($CDCl_3$), δ_C, ppm: 20.4 (CH_3), 31.8 (CH_2), 41.3 (C), 53.9 (CH), 64.4 (C), 71.5 (CH), 77.3 (CH), 113.9 (CH), 121.3 (CH), 123.7 (CH), 128.7 (CH), 129.3 (CH), 129.6 (CH), 130.1 (CH), 133.5 (CH), 136.6 (C), 146.2 (C), 148.2 (C), 171.7 (C=O), 173.3 (C=O). Found, %: C 60.62; H 3.78; N 7.70. $C_{27}H_{21}Cl_2N_3O_5$. Calculated, %: C 60.24; H 3.93; N 7.80.

(3*RS*,3a*SR*,6a*RS*)-3-[(*SR*)-2,2-Dichloro-1-phenylcyclopropyl]-2-(4-methylphenyl)-5-(3-nitrophenyl)-tetrahydropyrrolo[3,4-*d*]isoxazole-4,6-dione (IVj). ^{1}H NMR spectrum ($CDCl_3$), δ, ppm: 2.08 d (1H, CH_2, J = 7.3 Hz), 2.21 d (1H, CH_2, J = 7.3 Hz), 2.23 s (3H, CH_3), 3.97 d (1H, CH, J = 7.3 Hz), 4.00 d (1H, CH, J = 7.8 Hz), 4.90 s (1H, CH), 6.84 d (1H, H_{arom}, J = 7.8 Hz), 7.07–7.18 (4H, H_{arom}), 7.18–7.26 (2H, H_{arom}), 7.30–7.51 (4H, H_{arom}), 7.90 m (1H, H_{arom}), 8.25 m (1H, H_{arom}). ^{13}C NMR spectrum ($CDCl_3$), δ_C, ppm: 20.3 (CH_3), 32.4 (CH_2), 43.1 (C), 54.1 (CH), 65.1 (C), 77.1 (CH), 114.4 (CH), 121.4 (CH), 123.7 (CH), 128.1 (CH), 128.8 (CH), 129.6 (CH), 130.1 (CH), 132.0 (C), 133.6 (C), 134.6 (CH), 147.0 (C), 171.8 (C=O), 173.6 (C=O).

(3*RS*,3a*SR*,6a*RS*)-2-(4-Chlorophenyl)-3-[(*RS*)-2,2-dichloro-1-phenylcyclopropyl]-5-phenyltetrahydropyrrolo[3,4-*d*]isoxazole-4,6-dione (IIIk). Yield 205 mg (40%), mp 181°C. ^{1}H NMR spectrum ($CDCl_3$), δ, ppm: 2.12 d (1H, CH_2, J = 7.8 Hz), 2.32 d (1H, CH_2, J = 7.8 Hz), 3.89 d (1H, CH, J = 7.3 Hz), 4.42 d (1H, CH, J = 7.3 Hz), 5.17 s (1H, CH), 6.39 m (2H, H_{arom}), 7.06 d (2H, H_{arom}, J = 8.9 Hz), 7.22 d (2H, H_{arom}, J = 8.9 Hz), 7.25–7.66 (8H, H_{arom}). ^{13}C NMR spectrum ($CDCl_3$), δ_C, ppm: 31.7 (CH_2), 41.2 (C), 53.7 (CH), 64.3 (C), 71.5 (CH), 77.4 (CH), 115.2 (CH), 125.6 (CH), 128.4 (CH), 128.7 (CH), 129.0 (CH), 129.4 (CH), 130.5 (C), 136.4 (C), 147.4 (C), 172.0 (C=O), 173.5 (C=O). Found, %: C 60.78; H 3.69; N 5.46. $C_{26}H_{19}Cl_3N_2O_3$. Calculated, %: C 60.78; N 3.73; N 5.45.

(3*RS*,3a*SR*,6a*RS*)-2-(4-Chlorophenyl)-3-[(*SR*)-2,2-dichloro-1-phenylcyclopropyl]-5-phenyltetrahydropyrrolo[3,4-*d*]isoxazole-4,6-dione (IVk). Yield 46 mg (9%), mp 194°C. ^{1}H NMR spectrum, δ, ppm: in $CDCl_3$: 2.08 d (1H, CH_2, J = 7.6 Hz), 2.21 d (1H, CH_2, J = 7.6 Hz), 3.97 s (2H, CH), 4.82 s (1H, CH), 6.38 m (2H, H_{arom}), 7.12–7.52 (11H, H_{arom}), 7.37 m (1H, H_{arom}); in C_6D_6: 1.61 d (1H, CH_2, J = 7.3 Hz), 1.69 d (1H, CH_2, J = 7.3 Hz), 3.05 d (1H, CH, J = 7.3 Hz), 3.51 d (1H, CH, J = 7.3 Hz), 4.31 s (1H, CH), 6.71 m (2H, H_{arom}), 6.83 m (2H, H_{arom}), 7.92 d (1H, H_{arom}) (the other signals were overlapped by those of residual protons in the solvent). ^{13}C NMR spectrum ($CDCl_3$), δ_C, ppm: 32.3 (CH_2), 43.2 (C), 54.1 (CH), 65.5 (C), 74.0 (CH), 77.4 (CH), 114.5 (CH), 126.0 (CH), 127.8 (CH), 128.0 (CH), 128.7 (CH), 129.0 (CH), 130.7 (CH), 134.6 (C), 134.7 (C), 147.2 (C), 172.5 (C=O), 174.1 (C=O). Found, %: C 60.67; H 3.78; N 5.55. $C_{26}H_{19}Cl_3N_2O_3$. Calculated, %: C 60.78; H 3.73; N 5.45.

(3*RS*,3a*SR*,6a*RS*)-2-(4-Chlorophenyl)-3-[(*RS*)-2,2-dichloro-1-phenylcyclopropyl]-5-(4-methylphenyl)tetrahydropyrrolo[3,4-*d*]isoxazole-4,6-dione (IIIl). Yield 210 mg (40%), mp 183°C. ^{1}H NMR spectrum ($CDCl_3$), δ, ppm: 2.12 d (1H, CH_2, J = 7.3 Hz), 2.30 d (1H, CH_2, J = 7.3 Hz), 2.32 s (3H, CH_3), 3.85 d (1H, CH, J = 8.0 Hz), 4.42 d (1H, CH, J = 8.0 Hz), 5.16 s (1H, CH), 6.26 m (2H, H_{arom}), 7.05 d (2H, H_{arom}, J = 8.7 Hz), 7.10 m (2H, H_{arom}), 7.22 d (2H, H_{arom}, J = 8.7 Hz), 7.25–7.63 (5H, H_{arom}). ^{13}C NMR spectrum ($CDCl_3$), δ_C, ppm: 21.2 (CH_3), 32.3 (CH_2), 43.5 (C), 54.3 (CH), 65.8 (C), 74.4 (CH), 77.5 (CH), 116.1 (CH), 125.6 (CH), 128.2 (CH), 128.3 (CH), 129.1 (CH), 129.4 (CH), 130.1 (C), 134.6 (C), 148.4 (C), 172.3 (C=O), 174.4 (C=O). Found, %: C 61.37; H 4.01; N 5.25. $C_{27}H_{21}Cl_3N_2O_3$. Calculated, %: C 61.44; H 4.01; N 5.31.

(3*RS*,3a*SR*,6a*RS*)-2-(4-Chlorophenyl)-3-[(*SR*)-2,2-dichloro-1-phenylcyclopropyl]-5-(4-methylphenyl)tetrahydropyrrolo[3,4-*d*]isoxazole-4,6-dione (IVl). Yield 52 mg (10%), mp 192°C. ^{1}H NMR spectrum ($CDCl_3$), δ, ppm: 2.07 d (1H, CH_2, J = 7.3 Hz), 2.20 d (1H, CH_2, J = 7.3 Hz), 2.32 s (3H, CH_3), 3.95 s (2H, CH), 4.80 s (1H, CH), 6.24 d (2H, H_{arom}, J = 8.0 Hz), 7.11 d (2H, H_{arom}, J = 8.0 Hz), 7.12–7.54 (8H, H_{arom}), 7.87 m (1H, H_{arom}). ^{13}C NMR spectrum ($CDCl_3$), δ_C, ppm: 21.1 (CH_3), 31.2 (CH_2), 43.2 (C), 54.0 (CH), 65.4 (C), 74.1 (CH), 77.1 (CH), 115.8 (CH), 125.4 (CH), 127.9 (CH), 129.3 (CH), 129.8 (CH), 134.4 (C), 139.3 (C), 147.2 (C), 148.4 (C), 172.3 (C=O), 173.9 (C=O). Found, %: C 61.33; H 4.02; N 5.28. $C_{27}H_{21}Cl_3N_2O_3$. Calculated, %: C 61.44; H 4.01; N 5.31.

(3*RS*,3a*SR*,6a*RS*)-2-(4-Chlorophenyl)-3-[(*RS*)-2,2-dichloro-1-phenylcyclopropyl]-5-(4-methoxyphenyl)tetrahydropyrrolo[3,4-*d*]isoxazole-4,6-dione (IIIm). Yield 206 mg (38%), mp 194°C. ^{1}H NMR spectrum ($CDCl_3$), δ, ppm: 2.11 d (1H, CH_2, J = 7.3 Hz), 2.31 d (1H, CH_2, J = 7.3 Hz), 3.77 s (3H, CH_3), 3.85 d (1H, CH, J = 7.3 Hz), 4.41 d (1H, CH, J = 7.3 Hz), 5.16 s (1H, CH), 6.31 d (2H, H_{arom}, J = 8.7 Hz), 6.80 d (2H, H_{arom}, J = 8.7 Hz), 7.05 d (2H, H_{arom}, J = 8.7 Hz), 7.22 d (2H, H_{arom}, J = 8.7 Hz), 7.27–7.65 (5H, H_{arom}). ^{13}C NMR spectrum ($CDCl_3$), δ_C, ppm: 31.7 (CH_2), 41.1 (C), 53.6 (CH), 55.4 (CH_3), 64.3 (C), 71.5 (CH), 77.3 (CH), 114.3 (CH), 115.2 (CH), 126.8 (CH), 128.3 (CH), 128.7 (CH), 129.4 (CH), 136.4 (C), 147.4 (C), 159.7 (C), 172.3 (C=O), 173.8 (C=O). Found, %: C 59.52; H 3.89; N 5.03. $C_{27}H_{21}Cl_3N_2O_4$. Calculated, %: C 59.63; H 3.89; N 5.15.

(3*RS*,3a*SR*,6a*RS*)-2-(4-Chlorophenyl)-3-[(*SR*)-2,2-dichloro-1-phenylcyclopropyl]-5-(4-methoxyphenyl)tetrahydropyrrolo[3,4-*d*]isoxazole-4,6-dione (IVm). Yield 54 mg (10%), mp 202°C. ^{1}H NMR spectrum ($CDCl_3$), δ, ppm: 2.16 d (1H, CH_2, J = 7.3 Hz), 2.34 d (1H, CH_2, J = 7.3 Hz), 3.80 s (3H, CH_3), 3.92 s (2H, CH), 5.20 s (1H, CH), 6.35 d (2H, H_{arom}, J = 8.7 Hz), 6.81 d (2H, H_{arom}, J = 8.7 Hz), 7.12 d (2H, H_{arom}, J = 8.7 Hz), 7.24 d (2H, H_{arom}, J = 8.7 Hz), 7.24–7.68 (5H, H_{arom}). ^{13}C NMR spectrum ($CDCl_3$), δ_C, ppm: 31.7 (CH_2), 41.0 (C), 53.6 (CH), 55.7 (CH_3), 64.4 (C), 71.8 (CH), 77.7 (CH), 114.2 (CH), 115.5 (CH), 123.0 (CH), 126.8 (CH), 128.8 (CH), 129.1 (CH), 130.0 (CH), 130.8 (CH), 136.7 (C), 147.4 (C), 150.1 (C), 171.9 (C=O), 174.3 (C=O). Found, %: C 59.54; H 3.99; N 5.06. $C_{27}H_{21}Cl_3N_2O_4$. Calculated, %: C 59.63; H 3.89; N 5.15.

(3*RS*,3a*SR*,6a*RS*)-2-(4-Chlorophenyl)-3-[(*RS*)-2,2-dichloro-1-phenylcyclopropyl]-5-(4-fluorophenyl)tetrahydropyrrolo[3,4-*d*]isoxazole-4,6-dione (IIIn). Yield 282 mg (53%), mp 185°C. ^{1}H NMR spectrum ($CDCl_3$), δ, ppm: 2.10 d (1H, CH_2, J = 7.3 Hz), 2.29 d (1H, CH_2, J = 7.3 Hz), 3.85 d (1H, CH, J = 7.3 Hz), 4.40 d (1H, CH, J = 7.3 Hz), 5.15 s (1H, CH), 6.36 m (2H, H_{arom}), 6.93–7.64 (11H, H_{arom}). Found, %: C 58.50; H 3.41; N 5.12. $C_{26}H_{18}Cl_3FN_2O_3$. Calculated, %: C 58.72; H 3.41; N 5.27.

(3*RS*,3a*SR*,6a*RS*)-2-(4-Chlorophenyl)-3-[(*SR*)-2,2-dichloro-1-phenylcyclopropyl]-5-(4-fluorophenyl)tetrahydropyrrolo[3,4-*d*]isoxazole-4,6-dione

(IVn). Yield 70 mg (13%), mp 196°C. ^{1}H NMR spectrum ($CDCl_3$), δ, ppm: 2.06 d (1H, CH_2, J = 7.2 Hz), 2.19 d (1H, CH_2, J = 7.2 Hz), 3.94 s (2H, CH), 4.79 s (1H, CH), 6.33 m (2H, H_{arom}), 6.92–7.52 (10H, H_{arom}), 7.83 m (1H, H_{arom}). Found, %: C 58.64; H 3.42; N 5.21. $C_{26}H_{18}Cl_3FN_2O_3$. Calculated, %: C 58.72; H 3.41; N 5.27.

(3*RS*,3a*SR*,6a*RS*)-2-(4-Chlorophenyl)-3-[(*RS*)-2,2-dichloro-1-phenylcyclopropyl]-5-(3-nitrophenyl)-tetrahydropyrrolo[3,4-*d*]isoxazole-4,6-dione (IIIo). Yield 200 mg (36%), mp 196°C. ^{1}H NMR spectrum ($CDCl_3$), δ, ppm: 2.13 d (1H, CH_2, J = 8.0 Hz), 2.32 d (1H, CH_2, J = 8.0 Hz), 3.92 d (1H, CH, J = 7.3 Hz), 4.47 d (1H, CH, J = 7.3 Hz), 5.21 s (1H, CH), 6.79 m (1H, H_{arom}), 7.06 d (2H, H_{arom}, J = 8.9 Hz), 7.23 d (2H, H_{arom}, J = 8.9 Hz), 7.27–7.66 (7H, H_{arom}), 8.18 m (1H, H_{arom}). ^{13}C NMR spectrum ($CDCl_3$), δ_C, ppm: 31.7 (CH_2), 41.0 (C), 53.7 (CH), 64.2 (C), 71.6 (CH), 77.3 (CH), 115.2 (CH), 121.0 (CH), 123.7 (CH), 128.5 (CH), 128.8 (CH), 129.8 (CH), 130.3 (C), 130.5 (CH), 131.4 (CH), 136.3 (C), 147.1 (C), 148.2 (C), 171.3 (C=O), 173.0 (C=O). Found, %: C 55.89; H 3.25; N 7.52. $C_{26}H_{18}Cl_3N_3O_5$. Calculated, %: C 55.88; H 3.25; N 7.52.

(3*RS*,3a*SR*,6a*RS*)-2-(4-Chlorophenyl)-3-[(*SR*)-2,2-dichloro-1-phenylcyclopropyl]-5-(3-nitrophenyl)-tetrahydropyrrolo[3,4-*d*]isoxazole-4,6-dione (IVo). Yield 56 mg (10%), mp 208°C. ^{1}H NMR spectrum ($CDCl_3$), δ, ppm: 2.20 d (1H, CH_2, J = 8.0 Hz), 2.32 d (1H, CH_2, J = 8.0 Hz), 4.06 s (2H, CH), 5.21 s (1H, CH), 6.79 m (1H, H_{arom}), 7.06 d (2H, H_{arom}, J = 9.0 Hz), 7.22 d (2H, H_{arom}, J = 9.0 Hz), 7.30–7.65 (7H, H_{arom}), 8.19 m (1H, H_{arom}). ^{13}C NMR spectrum ($CDCl_3$), δ_C, ppm: 31.7 (CH_2), 41.0 (C), 53.7 (CH), 64.2 (C), 71.5 (CH), 77.3 (CH), 115.2 (CH), 120.9 (CH), 123.7 (CH), 128.5 (CH), 128.8 (CH), 129.4 (CH), 129.8 (CH), 130.3 (C), 131.4 (CH), 136.3 (C), 140.0 (C), 147.2 (C), 148.2 (C), 171.3 (C=O), 173.0 (C=O). Found, %: C 55.89; H 3.25; N 7.52. $C_{26}H_{18}Cl_3N_3O_5$. Calculated, %: C 55.88; H 3.25; N 7.52.

X-Ray diffraction data for compound IIIa. Monoclinic crystal system; $C_{26}H_{20}Cl_2N_2O_3$; M 479.34; space group $P2_1/n$; unit cell parameters: a = 12.7788(6), b = 7.8648(4), c = 22.2761(10) Å; β = 91.3750(10)°; V = 2238.16(18) Å^3; Z = 4; d_{calc} = 1.423 g/cm^3; R_{all} = 0.034; MoK_a irradiation, λ = 0.71073 Å, graphite monochromator. Selected bond lengths, Å: O^1–N^2 1.4460(12), N^2–C^{3a} 1.4724(14), O^1–C^{6a} 1.4483(13), N^5–C^4 1.3910(15), N^5–C^6 1.4011(15); angles, deg: $N^2O^1C^{6a}$ 107.44(8), $O^1N^2C^3$ 103.972(8), $C^4N^5C^6$ 112.79(9).

X-Ray diffraction data for compound IVc. Monoclinic crystal system; $C_{27}H_{22}Cl_2N_2O_4$; M 509.37; space group $C2/c$; unit cell parameters: a = 28.679(4), b = 6.8631(10), c = 25.398(4) Å; β = 107.699(3)°; V = 4762.4(12) Å^3; Z = 8; d_{calc} = 1.421 g/cm^3; R_{all} = 0.071; MoK_a irradiation, λ = 0.71073 Å, graphite monochromator. Selected bond lengths, Å: O^1–N^2 1.451(2), N^2–C^3 1.468(2), O^1–C^{6a} 1.454(2), N^5–C^4 1.393(2), N^5–C^6 1.400(2); angles, deg: $N^2O^1C^{6a}$ 108.75(13), $O^1N^2C^3$ 104.19(14), $C^4N^5C^6$ 112.38(16).

The complete sets of crystallographic parameters of compounds **IIIa** and **IVc** were deposited to the Cambridge Crystallographic Data Centre (entry nos. CCDC 718571 and CCDC 718572, respectively) and are available at *http://www.ccdc.cam.ac.uk/deposit*.

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