(19) **DANMARK**

Patent- og
Varemærkestyrelsen

(10) **DK/EP 3762378 T3**

(12) Oversættelse af europæisk patentskrift

(51) Int.Cl.:
C 07 D 401/14 (2006.01)
C 07 D 221/20 (2006.01)
C 07 D 401/12 (2006.01)
C 07 D 413/04 (2006.01)
C 07 D 417/06 (2006.01)
A 01 N 43/42 (2006.01)
C 07 D 401/04 (2006.01)
C 07 D 405/06 (2006.01)
C 07 D 413/06 (2006.01)
A 01 P 13/00 (2006.01)
C 07 D 401/06 (2006.01)
C 07 D 409/06 (2006.01)
C 07 D 413/12 (2006.01)

(45) Oversættelsen bekendtgjort den: **2022-08-01**

(80) Dato for Den Europæiske Patentmyndigheds
bekendtgørelse om meddelelse af patentet: **2022-05-18**

(86) Europæisk ansøgning nr.: **19712694.9**

(86) Europæisk indleveringsdag: **2019-03-06**

(87) Den europæiske ansøgnings publiceringsdag: **2021-01-13**

(86) International ansøgning nr.: **EP2019055570**

(87) Internationalt publikationsnr.: **WO2019170745**

(30) Prioritet: **2018-03-08 GB 201803736**

(84) Designerede stater: **AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR**

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Fortsættes ...

(54) Benævnelse: **HERBICIDE FORBINDELSER**

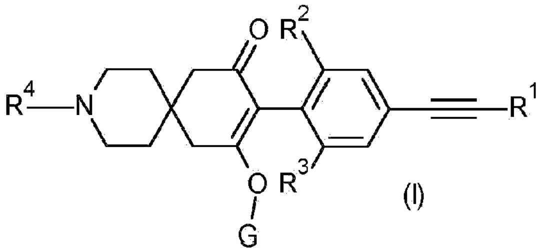
(56) Fremdragne publikationer:
WO-A1-2015/197468
WO-A2-2014/096289

DESCRIPTION

[0001] The present invention relates to novel herbicidal cyclohexanedione compounds, to processes for their preparation, to herbicidal compositions which comprise the novel compounds, and to their use for controlling weeds.

[0002] Herbicidal cyclic dione compounds substituted by a phenyl which has an alkynyl-containing substituent are disclosed in, for example, WO2014/096289, WO2014/191534 and WO2015/197468. The present invention relates to novel herbicidal cyclohexanedione derivatives with improved properties.

[0003] Thus, according to the present invention there is provided a compound of Formula (I)



(I)

wherein

R^1 is methyl;

R^2 is methyl or methoxy;

R^3 is methyl or methoxy;

R^4 is selected from the group consisting of $-S(O)_nC_1$-C_6alkyl, $-S(O)_nC_1$-C_6haloalkyl, $-S(O)_n$-$(CH_2)_n$-C_3-C_6cycloalkyl, $-S(O)_nC(R^{11})R^{12}R^{13}$, -C(O)H,-C(O)-$(CH_2)_n$-$C_3$-$C_6$cycloalkyl, -C(O)$C_2$-$C_4$alkenyl,-C(O)$(CR^9R^{10})$CN, -C(O)$(CR^9R^{10})(CR^9R^{10})$CN, -C(O)$CH_2$C(O)-$C_1$-$C_6$alkyl,-C(O)$CH_2$OC(O)-$C_1$-$C_6$alkyl, C(O)O$C_1$-$C_6$alkyl, -C(O)O$C_1$-$C_6$haloalkyl,-C(O)$(R^9R^{10})_nS(O)_nC_1$-$C_6$alkyl, -C(O)$C_1$-$C_3$alkoxy$C_1$-$C_6$alkyl, -C(O)$C_1$-$C_3$alkoxy$C_2$-$C_6$alkenyl, -C(O)$C_1$-$C_3$alkoxy$C_2$-$C_6$alkynyl, -C(O)$C_1$-$C_3$alkoxy$C_1$-$C_6$haloalkyl, -C(O)$C_1$-$C_3$alkoxy$C_3$-$C_6$cycloalkyl, -C(O)O$C_1$-$C_3$alkoxy$C_1$-$C_6$alkyl, -C(O)$C_1$-$C_3$alkoxy$C_1$-$C_3$alkoxy$C_1$-$C_6$alkyl, -C(O)$(CH_2)_nNR^5R^6$, -C(O)-$(CH_2)_n$-$NR^7C(O)R^8$, -C(O)-$(CH_2)_n$-O-N=$CR^5R^5$, -CN, -$(CH_2)_n$-phenyl, -C(O)-$(CH_2)_n$-phenyl, -$S(O)_n$-$(CH_2)_n$-phenyl, -heterocyclyl, -C(O)-$(CH_2)_n$-heterocyclyl,-C(O)$(CH_2)_n$O-$(CH_2)_n$-heterocyclyl, $-S(O)_n$-$(CH_2)_n$-heterocyclyl, wherein each heterocyclyl is a 5- or 6- membered heterocyclyl which may be aromatic, saturated or partially saturated and can contain from 1 to 4 heteroatoms each independently selected from the group consisting of oxygen, nitrogen and sulphur, and wherein said heterocyclyl or phenyl groups are optionally substituted by one, two or three substituents independently selected from the group consisting of C_1-C_3alkyl, C_1-C_3haloalkyl, C_1C_3alkoxy, C_2-C_3alkenyl, C_2-C_3alkynyl, halogen, cyano and nitro;

R^5 is selected from the group consisting of hydrogen and C_1-C_6 alkyl;

R^6 is selected from the group consisting of hydrogen, C_1-C_6alkyl, C2-C_6alkenyl, C_2-C_6alkynyl, C_1-C_6haloalkyl, hydroxyl-, C_1-C_6alkoxy, C_3-C_6cycloalkyl, -C_1-C_4alkoxyC_1-C_6alkyl, -C_1-C_3alkoxyC_1-C_6haloalkyl,-(CR^9R^{10})C_1-C_6haloalkyl, -(CR^9R^{10})C(O)NR^5R^5, phenyl, -pyridyl, wherein the phenyl and pyridyl are optionally substituted by one, two or three substituents independently selected from the group consisting of C_1-C_3 alkyl, C_1-C_3 haloalkyl, C_1-C_3 alkoxy, C_2-C_3 alkenyl, C_2-C_3 alkynyl, halogen, cyano and nitro; or

R^5 and R^6 together form -$CH_2CH_2OCH_2CH_2$-; and

R^7 is selected from the group consisting of hydrogen and C_1-C_6 alkyl;

R^8 is selected from the group consisting of hydrogen, C_1-C_6 alkyl, C_1-C_6 alkoxy, C_3-C_6 cycloalkyl, phenyl, -pyridyl, wherein the phenyl and pyridyl are optionally substituted by one, two or three substituents independently selected from the group consisting of C_1-C_3 alkyl, C_1-C_3 haloalkyl, C_1-C_3 alkoxy, C_2-C_3 alkenyl, C_2-C_3 alkynyl, halogen, cyano and nitro;

R^9 is hydrogen or methyl;

R^{10} is hydrogen or methyl; or

R^9 and R^{10} together form -CH_2CH_2-; and

R^{11} is hydrogen or methyl;

R^{12} is selected from the group consisting of hydrogen, C_1-C_6 alkyl, hydroxyl and C_1-C_6 alkoxy-;

R^{13} is selected from the group consisting of hydrogen, C_1-C_6 alkyl, hydroxyl and C_1-C_6 alkoxy; or

R^{12} and R^{13} together form -CH_2-X-CH_2-; and

X is selected from the group consisting of O, S and N-R^{14};

R^{14} is selected from the group consisting of hydrogen, C_1-C_3 alkyl and C_1-C_3 alkoxy-;

n is 0, 1 or 2;

G is selected from the group consisting of hydrogen, -$(CH_2)_nR^8$, -C(O)-R^a,-C(O)-$(CR^cR^d)_n$-O-R^b, -C(O)-$(CR^cR^d)_n$-S-R^b, -C(O)NR^8R^8, -$S(O)_2$-R^a and C_1-C_8alkoxy-C_1-C_3alkyl-;

R^a is independently selected from the group consisting of hydrogen, C_1-C_8alkyl, C_1-C_3haloalkyl, C_2-C_8alkenyl, C_2-C_8alkynyl, C_3-C_6cycloalkyl, heterocyclyl and phenyl wherein said heterocyclyl and phenyl groups are optionally substituted by one, two or three substituents independently selected from the group consisting of C_1-C_3alkyl, C_1-C_3haloalkyl, C_1-C_3alkoxy, C_2-C_3alkenyl, C_2-C_3alkynyl, halogen, cyano and nitro;

R^b is selected from the group consisting of C_1-C_8alkyl, C_1-C_3haloalkyl, C_2-C_8alkenyl, C_2-C_8alkynyl, C_3-C_6 cycloalkyl, heterocyclyl and phenyl wherein said heterocyclyl and phenyl groups are optionally substituted by one, two or three substituents independently selected from the group consisting of C_1-C_3alkyl, C_1-C_3haloalkyl, C_1-C_3alkoxy, C_2-C_3alkenyl, C_2-C_3alkynyl, halogen, cyano and nitro;

R^c is hydrogen or C_1-C_3 alkyl; and

R^d is hydrogen or C_1-C_3 alkyl;

or an agriculturally acceptable salt thereof.

[0004] Alkyl groups (e.g C_1-C_6alkyl) include, for example, methyl (Me, CH_3), ethyl (Et, C_2H_5), n-propyl (n-Pr), isopropyl (*i*-Pr), n-butyl (n-Bu), isobutyl (*i*-Bu), sec-butyl (s-Bu) and *tert*-butyl (*t*-Bu).

[0005] Alkenyl and alkynyl moieties can be in the form of straight or branched chains, and the alkenyl moieties, where appropriate, can be of either the (E)- or (Z)-configuration. Examples are vinyl, allyl and propargyl. Alkenyl and alkynyl moieties can contain one or more double and/or triple bonds in any combination.

[0006] Halogen (or halo) encompasses fluorine, chlorine, bromine or iodine. The same correspondingly applies to halogen in the context of other definitions, such as haloalkyl.

[0007] Haloalkyl groups (e.g C_1-C_6haloalkyl) are, for example, fluoromethyl, difluoromethyl, trifluoromethyl, chloromethyl, dichloromethyl, trichloromethyl, 2,2,2-trifluoroethyl, 2-fluoroethyl, 2-chloroethyl, pentafluoroethyl, 1,1-difluoro-2,2,2-trichloroethyl, 2,2,3,3-tetrafluoroethyl and 2,2,2-trichloroethyl, heptafluoro-n-propyl and perfluoro-n-hexyl.

[0008] Alkoxy groups (e.g C_1-C_4alkoxy-) are, for example, methoxy, ethoxy, propoxy, isopropoxy, n-butoxy, isobutoxy, sec-butoxy or tert-butoxy, preferably methoxy and ethoxy.

[0009] Alkoxyalkyl groups (e.g C_1-C_8alkoxy-C_1-C_3alkyl-) includes, for example, methoxymethyl, methoxyethyl, ethoxymethyl, ethoxyethyl, n-propoxymethyl, n-propoxyethyl, isopropoxymethyl or isopropoxyethyl.

[0010] Cycloalkyl groups (e.g C_3-C_6cycloalkyl-) include, for example cyclopropyl (c-propyl, c-Pr), cyclobutyl (c-butyl, c-Bu), cyclopentyl (c-pentyl) and cyclohexyl (c-hexyl) and may be substituted or unsubstituted as indicated.

[0011] C_1-C_6alkyl-S- (alkylthio) is, for example, methylthio, ethylthio, propylthio, isopropylthio, n-butylthio, isobutylthio, sec-butylthio or tert-butylthio, preferably methylthio or ethylthio.

[0012] C_1-C_6alkyl-S(O)- (alkylsulfinyl) is, for example, methylsulfinyl, ethylsulfinyl, propylsulfinyl, isopropylsulfinyl, n-butylsulfinyl, isobutylsulfinyl, sec-butylsulfinyl or tert-butylsulfinyl, preferably methylsulfinyl or ethylsulfinyl.

[0013] C_1-C_6alkyl-S(O)$_2$- (alkylsulfonyl) is, for example, methylsulfonyl, ethylsulfonyl, propylsulfonyl, isopropylsulfonyl, n-butylsulfonyl, isobutylsulfonyl, sec-butylsulfonyl or tert-butylsulfonyl, preferably methylsulfonyl or ethylsulfonyl.

[0014] Heterocyclyl is a 5- or 6- membered heterocyclyl which may be aromatic, saturated or partially saturated and can contain from 1 to 4 heteroatoms each independently selected from the group consisting of oxygen, nitrogen and sulphur.

[0015] The invention also relates agriculturally acceptable salts of the compounds of Formula (I). Such salts include those which are able to form with amines, alkali metal and alkaline earth metal bases or quaternary ammonium bases. Among the alkali metal and alkaline earth metal hydroxides as salt formers, special mention should be made of the hydroxides of lithium, sodium, potassium, magnesium and calcium, but especially the hydroxides of sodium and potassium. The compounds of Formula (I) according to the invention also include hydrates which may be formed during the salt formation.

[0016] Examples of amines suitable for ammonium salt formation include ammonia as well as primary, secondary and tertiary C_1-C_{18}alkylamines, C_1-C_4hydroxyalkylamines and C_2-C_4alkoxyalkylamines, for example methylamine, ethylamine, n-propylamine, isopropylamine, the four butylamine isomers, n-amylamine, isoamylamine, hexylamine, heptylamine, octylamine, nonylamine, decylamine, pentadecylamine, hexadecylamine, heptadecylamine, octadecylamine, methylethylamine, methylisopropylamine, methylhexylamine, methylnonylamine, methylpentadecylamine, methyloctadecylamine, ethylbutylamine, ethylheptylamine, ethyloctylamine, hexylheptylamine, hexyloctylamine, dimethylamine, diethylamine, din-propylamine, diisopropylamine, di-n-butylamine, di-n-amylamine, diisoamylamine, dihexylamine, diheptylamine, dioctylamine, ethanolamine, n-propanolamine, isopropanolamine, *N*,*N*-diethanolamine, *N*-ethylpropanolamine, *N*-butylethanolamine, allylamine, n-but-2-enylamine, n-pent-2-enylamine, 2,3-dimethylbut-2-enylamine, dibut-2-enylamine, n-hex-2-enylamine, propylenediamine, trimethylamine, triethylamine, tri-n-propylamine, triisopropylamine, tri-n-butylamine, triisobutylamine, tri-sec-butylamine, tri-n-amylamine, methoxyethylamine and ethoxyethylamine; heterocyclic amines, for example pyridine, quinoline, isoquinoline, morpholine, piperidine, pyrrolidine, indoline, quinuclidine and azepine; primary arylamines, for example anilines, methoxyanilines, ethoxyanilines, *o*-, m- and p-toluidines, phenylenediamines, benzidines, naphthylamines and *o*-, m- and p-chloroanilines; but especially triethylamine, isopropylamine and diisopropylamine.

[0017] In one embodiment of the present invention there is provided a compound of Formula (I) wherein:

R^1 is methyl;

R^2 is methyl or methoxy;

R^3 is methyl or methoxy;

R^4 is selected from the group consisting of $-S(O)_nC_1$-C_6alkyl, $-S(O)_nC_1$-C_6haloalkyl, $-S(O)_n$-$(CH_2)_n$-C_3-C_6cycloalkyl, $-S(O)_nC(R^{11})R^{12}R^{13}$, -C(O)H,-C(O)-$(CH_2)_n$-$C_3$-$C_6$cycloalkyl, -C(O)$C_2$-$C_4$alkenyl,-C(O)$(CR^9R^{10})$CN, -C(O)O$C_1$-$C_6$alkyl, -C(O)O$C_1$-$C_6$haloalkyl,-C(O)$(CH_2)_nS(O)_nC_1$-$C_6$alkyl, -C(O)$C_1$-$C_3$alkoxy$C_1$-$C_6$alkyl, -C(O)$NR^5R^6$, -C(O)-$(CH_2)_n$-$NR^7C(O)R^8$, -CN, -$(CH_2)_n$-phenyl, -C(O)-$(CH_2)_n$-phenyl, -$S(O)_n$-$(CH_2)_n$-phenyl, -heterocyclyl, -C(O)-$(CH_2)_n$-heterocyclyl, -$S(O)_n$-$(CH_2)_n$-heterocyclyl, wherein each heterocyclyl is a 5- or 6- membered heterocyclyl which may be aromatic, saturated or partially saturated and can contain from 1 to 4 heteroatoms each independently selected from the group consisting of oxygen, nitrogen and sulphur, and wherein said heterocyclyl or phenyl groups are optionally substituted by one, two or three substituents independently selected from the group consisting of C_1-C_3alkyl, C_1-C_3haloalkyl, C_1-C_3alkoxy, C_2-C_3alkenyl, C_2-C_3alkynyl, halogen, cyano and nitro;

R^5 is selected from the group consisting of hydrogen and C_1-C_6 alkyl;

R^6 is selected from the group consisting of hydrogen, C_1-C_6alkyl, C_1-C_6alkoxy, C_3-C_6cycloalkyl, phenyl, -pyridyl, wherein the phenyl and pyridyl are optionally substituted by one, two or three substituents independently selected from the group consisting of C_1-C_3 alkyl, C_1-C_3 haloalkyl, C_1-C_3 alkoxy, C_2-C_3 alkenyl, C_2-C_3 alkynyl, halogen, cyano and nitro; or

R^5 and R^6 together form $-CH_2CH_2OCH_2CH_2-$; and

R^7 is selected from the group consisting of hydrogen and C_1-C_6 alkyl;

R^8 is selected from the group consisting of hydrogen, C_1-C_6 alkyl, C_1-C_6 alkoxy, C_3-C_6 cycloalkyl, phenyl, -pyridyl, wherein the phenyl and pyridyl are optionally substituted by one, two or three substituents independently selected from the group consisting of C_1-C_3 alkyl, C_1-C_3 haloalkyl, C_1-C_3 alkoxy, C_2-C_3 alkenyl, C_2-C_3 alkynyl, halogen, cyano and nitro;

R^9 is hydrogen or methyl;

R^{10} is hydrogen or methyl; or

R^9 and R^{10} together form $-CH_2CH_2-$; and

R^{11} is hydrogen or methyl;

R^{12} and R^{13} together form $-CH_2-X-CH_2-$;

X is selected from the group consisting of O, S and N-R^{14};

R^{14} is selected from the group consisting of hydrogen, C_1-C_3 alkyl and C_1-C_3 alkoxy-;

n is 0, 1 or 2;

G is selected from the group consisting of hydrogen, $-(CH_2)_nR^a$, $-C(O)-R^a$,$-C(O)-(CR^cR^d)_n-O-R^b$, $-C(O)NR^aR^a$, $-S(O)2-R^a$ and C_1-C_8alkoxy-C_1-C_3alkyl-;

R^a is independently selected from the group consisting of hydrogen, C_1-C_8alkyl, C_1-C_3haloalkyl, C_2-C_8alkenyl, C_2-C_8alkynyl, C_3-C_6cycloalkyl, heterocyclyl and phenyl wherein said heterocyclyl and phenyl groups are optionally substituted by one, two or three substituents independently selected from the group consisting of C_1-C_3alkyl, C_1-C_3haloalkyl, C_1-C_3alkoxy, C_2-C_3alkenyl, C_2-C_3alkynyl, halogen, cyano and nitro;

R^b is selected from the group consisting of C_1-C_8alkyl, C_1-C_3haloalkyl, C_2-C_8alkenyl, C_2-C_8alkynyl, C_3-C_6 cycloalkyl, heterocyclyl and phenyl wherein said heterocyclyl and phenyl groups are optionally substituted by one, two or three substituents independently selected from the group consisting of C_1-C_3alkyl, C_1-C_3haloalkyl, C_1-C_3alkoxy, C_2-C_3alkenyl, C_2-C_3alkynyl, halogen, cyano and nitro;

R^c is hydrogen or C_1-C_3 alkyl; and

R^d is hydrogen or C_1-C_3 alkyl;

or an agriculturally acceptable salt thereof.

[0018] In one embodiment of the present invention R^2 is methyl.

[0019] In one embodiment of the present invention R^3 is methyl.

[0020] In another embodiment of the present invention R^3 is methoxy.

[0021] In one embodiment of the present invention R^2 is methyl and R^3 is methyl.

[0022] In one embodiment of the present invention R^2 is methyl and R^3 is methoxy.

[0023] In one embodiment of the present invention R^2 is methoxy and R^3 is methoxy.

[0024] In one embodiment of the present invention, R^4 is $-S(O)_nC_1$-C_6alkyl especially -$S(O)_2$methyl or -$S(O)_2$ethyl

[0025] In another embodiment R^4 is $-S(O)_nC_1$-C_6haloalkyl, for example-$S(O)_2$chloromethyl.

[0026] In another embodiment R^4 is $-S(O)_n-(CH_2)_n-C_3$-C_6cycloalkyl, for example-$S(O)_2-(CH_2)$-*c*-propyl.

[0027] In another embodiment of the present invention, R^4 is $-C(O)OC_1$-C_6alkyl, especially -C(O)-O-methyl.

[0028] In another embodiment of the present invention, R^4 is $-S(O)_nC(R^{11})R^{12}R^{13}$ wherein R^{11} is hydrogen or methyl and $R^{12}R^{13}$ taken together are-CH_2OCH_2- (oxetan-3-yl).

[0029] In another embodiment of the present invention, R^4 is $-C(O)-(CH_2)_n-C_3$-C_6cycloalkyl, for example -C(O)-*c*-propyl or -C(O)-(CH_2)-*c*-propyl.

[0030] In another embodiment of the present invention, R^4 is $-C(O)(CR^9R^{10})CN$, for example -$C(O)CH_2CN$, -$C(O)CH(CH_3)CN$ or -$C(O)C(CH_3)_2CN$.

[0031] In another embodiment of the present invention, R^4 is $-C(O)(CH_2)_nS(O)_nC_1$-C_6alkyl, for example -$C(O)CH_2S(O)_2$methyl.

[0032] In another embodiment of the present invention, R^4 is $-C(O)C_1$-C_3alkoxyC_1-C_6alkyl, for example -$C(O)CH_2CH_2$-O-CH_3 or -$C(O)CH(CH_3)$-O-CH_3.

[0033] In another embodiment of the present invention, R^4 is $-C(O)C_1$-C_3alkoxyC_1-C_6haloalkyl, for example -$C(O)CH_2$-O-CHF_2 or -$C(O)CH_2$-O-CF_3.

[0034] In another embodiment of the present invention, R^4 is $-C(O)NR^5R^6$, especially wherein

R^5 is hydrogen and R^6 is C_1-C_6 alkyl e.g *t*-butyl.

[0035] In another embodiment of the present invention, R^4 is -C(O)-$(CH_2)_n$-$NR^7C(O)R^8$, for example -C(O)-(CH_2)-$NR^7C(O)R^8$ or -C(O)$NR^7C(O)R^8$, for example-C(O)NHC(O)-*t*-butyl.

[0036] In another embodiment of the present invention, R^4 is selected from the group consisting of -phenyl, -C(O)-phenyl, -$S(O)_n$phenyl wherein each phenyl is optionally substituted as defined previously.

[0037] In another embodiment of the present invention R^4 is heterocyclyl, -C(O)-heterocyclyl or -$S(O)_n$-heterocyclyl. In another embodiment, each aforementioned heterocyclyl is an aromatic heterocyclyl (i.e heteroaryl), more preferably selected from the group consisting of furanyl, pyrrolyl, thiophenyl, imidazolyl, pyrazolyl, oxazolyl, isoxazolyl, thiazolyl, pyranyl, pyridyl, pyrazinyl, pyrimidinyl, pyridazinyl, and triazolyl more preferably selected from the group consisting of pyridyl, pyridazinyl, pyrimidinyl and pyrazinyl each of which is optionally substituted as defined previously. In another embodiment, each aforementioned heterocyclyl is a partially saturated heterocyclyl, more preferably selected from the group consisting of imidazolinyl, isoxazolinyl and thiazolinyl each of which is optionally substituted as defined previously. In another embodiment, each aforementioned heterocyclyl is a saturated heterocyclyl more preferably selected from the group consisting of morpholinyl, tetrahydrofuryl and tetrahydropyranyl each of which is optionally substituted as defined previously.

[0038] In one embodiment of the present invention, G is selected from the group consisting of hydrogen, C_1-C_8alkyl (e.g methyl, ethyl, n-propyl, *i*-propyl, n-butyl, *t*-butyl, -C_2-C_8alkenyl (e.g vinyl), C_2-C_8alkynyl (e.g propargyl), -C(O)C_1-C_8alkyl (more preferably -C(O)C_1-C_6alkyl e.g -C(O)*i*-propyl and -C(O)*t*-butyl) and -C(O)-O-C_1-C_8alkyl (more preferably -C(O)-O-C_1-C_6alkyl e.g -C(O)-O-methyl). In a preferred embodiment, G is hydrogen.

[0039] Depending on the nature of the substituents, compounds of Formula (I) may exist in different isomeric forms, as long as the compounds fall within the appended claims. When G is hydrogen, for example, compounds of Formula (I) may exist in different tautomeric forms.

[0040] This invention covers all such isomers and tautomers and mixtures thereof in all proportions. Also, when substituents contain double bonds, *cis*- and trans-isomers can exist. These isomers, too, are within the scope of the claimed compounds of the Formula (I). Compounds of Formula (I) may contain asymmetric centres and may be present as a single enantiomer, pairs of enantiomers in any proportion or, where more than one asymmetric centre are present, contain diastereoisomers in all possible ratios. Typically one of the enantiomers has enhanced biological activity compared to the other possibilities.

[0041] The compounds of Formula (I) according to the invention can be used as herbicides by themselves, but they are generally formulated into herbicidal compositions using formulation adjuvants, such as carriers, solvents and surface-active agents (SFAs). Thus, the present invention further provides a herbicidal composition comprising a herbicidal compound according to any one of the previous claims and an agriculturally acceptable formulation adjuvant. The composition can be in the form of concentrates which are diluted prior to use, although ready-to-use compositions can also be made. The final dilution is usually made with water, but can be made instead of, or in addition to, water, with, for example, liquid fertilisers, micronutrients, biological organisms, oil or solvents.

[0042] The herbicidal compositions generally comprise from 0.1 to 99 % by weight, especially from 0.1 to 95 % by weight, compounds of Formula (I) and from 1 to 99.9 % by weight of a formulation adjuvant which preferably includes from 0 to 25 % by weight of a surface-active substance.

[0043] The compositions can be chosen from a number of formulation types, many of which are known from the Manual on Development and Use of FAO Specifications for Plant Protection Products, 5th Edition, 1999. These include dustable powders (DP), soluble powders (SP), water soluble granules (SG), water dispersible granules (WG), wettable powders (WP), granules (GR) (slow or fast release), soluble concentrates (SL), oil miscible liquids (OL), ultra low volume liquids (UL), emulsifiable concentrates (EC), dispersible concentrates (DC), emulsions (both oil in water (EW) and water in oil (EO)), micro-emulsions (ME), suspension concentrates (SC), aerosols, capsule suspensions (CS) and seed treatment formulations. The formulation type chosen in any instance will depend upon the particular purpose envisaged and the physical, chemical and biological properties of the compound of Formula (I).

[0044] Dustable powders (DP) may be prepared by mixing a compound of Formula (I) with one or more solid diluents (for example natural clays, kaolin, pyrophyllite, bentonite, alumina, montmorillonite, kieselguhr, chalk, diatomaceous earths, calcium phosphates, calcium and magnesium carbonates, sulphur, lime, flours, talc and other organic and inorganic solid carriers) and mechanically grinding the mixture to a fine powder.

[0045] Soluble powders (SP) may be prepared by mixing a compound of Formula (I) with one or more water-soluble inorganic salts (such as sodium bicarbonate, sodium carbonate or magnesium sulphate) or one or more water-soluble organic solids (such as a polysaccharide) and, optionally, one or more wetting agents, one or more dispersing agents or a mixture of said agents to improve water dispersibility/solubility. The mixture is then ground to a fine powder. Similar compositions may also be granulated to form water soluble granules (SG).

[0046] Wettable powders (WP) may be prepared by mixing a compound of Formula (I) with one or more solid diluents or carriers, one or more wetting agents and, preferably, one or more dispersing agents and, optionally, one or more suspending agents to facilitate the dispersion in liquids. The mixture is then ground to a fine powder. Similar compositions may also be granulated to form water dispersible granules (WG).

[0047] Granules (GR) may be formed either by granulating a mixture of a compound of

Formula (I) and one or more powdered solid diluents or carriers, or from preformed blank granules by absorbing a compound of Formula (I) (or a solution thereof, in a suitable agent) in a porous granular material (such as pumice, attapulgite clays, fuller's earth, kieselguhr, diatomaceous earths or ground corn cobs) or by adsorbing a compound of Formula (I) (or a solution thereof, in a suitable agent) on to a hard core material (such as sands, silicates, mineral carbonates, sulphates or phosphates) and drying if necessary. Agents which are commonly used to aid absorption or adsorption include solvents (such as aliphatic and aromatic petroleum solvents, alcohols, ethers, ketones and esters) and sticking agents (such as polyvinyl acetates, polyvinyl alcohols, dextrins, sugars and vegetable oils). One or more other additives may also be included in granules (for example an emulsifying agent, wetting agent or dispersing agent).

[0048] Dispersible Concentrates (DC) may be prepared by dissolving a compound of Formula (I) in water or an organic solvent, such as a ketone, alcohol or glycol ether. These solutions may contain a surface active agent (for example to improve water dilution or prevent crystallisation in a spray tank).

[0049] Emulsifiable concentrates (EC) or oil-in-water emulsions (EW) may be prepared by dissolving a compound of Formula (I) in an organic solvent (optionally containing one or more wetting agents, one or more emulsifying agents or a mixture of said agents). Suitable organic solvents for use in ECs include aromatic hydrocarbons (such as alkylbenzenes or alkylnaphthalenes, exemplified by SOLVESSO 100, SOLVESSO 150 and SOLVESSO 200; SOLVESSO is a Registered Trade Mark), ketones (such as cyclohexanone or methylcyclohexanone) and alcohols (such as benzyl alcohol, furfuryl alcohol or butanol), N-alkylpyrrolidones (such as N-methylpyrrolidone or N-octylpyrrolidone), dimethyl amides of fatty acids (such as C_8-C_{10} fatty acid dimethylamide) and chlorinated hydrocarbons. An EC product may spontaneously emulsify on addition to water, to produce an emulsion with sufficient stability to allow spray application through appropriate equipment.

[0050] Preparation of an EW involves obtaining a compound of Formula (I) either as a liquid (if it is not a liquid at room temperature, it may be melted at a reasonable temperature, typically below 70°C) or in solution (by dissolving it in an appropriate solvent) and then emulsifying the resultant liquid or solution into water containing one or more SFAs, under high shear, to produce an emulsion. Suitable solvents for use in EWs include vegetable oils, chlorinated hydrocarbons (such as chlorobenzenes), aromatic solvents (such as alkylbenzenes or alkylnaphthalenes) and other appropriate organic solvents which have a low solubility in water.

[0051] Microemulsions (ME) may be prepared by mixing water with a blend of one or more solvents with one or more SFAs, to produce spontaneously a thermodynamically stable isotropic liquid formulation. A compound of Formula (I) is present initially in either the water or the solvent/SFA blend. Suitable solvents for use in MEs include those hereinbefore described for use in in ECs or in EWs. An ME may be either an oil-in-water or a water-in-oil system (which system is present may be determined by conductivity measurements) and may be suitable for mixing water-soluble and oil-soluble pesticides in the same formulation. An ME is suitable for dilution into water, either remaining as a microemulsion or forming a conventional oil-in-water emulsion.

[0052] Suspension concentrates (SC) may comprise aqueous or non-aqueous suspensions of finely divided insoluble solid particles of a compound of Formula (I). SCs may be prepared by ball or bead milling the solid compound of Formula (I) in a suitable medium, optionally with one or more dispersing agents, to produce a fine particle suspension of the compound. One or more wetting agents may be included in the composition and a suspending agent may be included to reduce the rate at which the particles settle. Alternatively, a compound of Formula (I) may be dry milled and added to water, containing agents hereinbefore described, to produce the desired end product.

[0053] Aerosol formulations comprise a compound of Formula (I) and a suitable propellant (for example n-butane). A compound of Formula (I) may also be dissolved or dispersed in a suitable medium (for example water or a water miscible liquid, such as n-propanol) to provide compositions for use in non-pressurised, hand-actuated spray pumps.

[0054] Capsule suspensions (CS) may be prepared in a manner similar to the preparation of EW formulations but with an additional polymerisation stage such that an aqueous dispersion of oil droplets is obtained, in which each oil droplet is encapsulated by a polymeric shell and contains a compound of Formula (I) and, optionally, a carrier or diluent therefor. The polymeric shell may be produced by either an interfacial polycondensation reaction or by a coacervation procedure. The compositions may provide for controlled release of the compound of Formula (I) and they may be used for seed treatment. A compound of Formula (I) may also be formulated in a biodegradable polymeric matrix to provide a slow, controlled release of the compound.

[0055] The composition may include one or more additives to improve the biological performance of the composition, for example by improving wetting, retention or distribution on surfaces; resistance to rain on treated surfaces; or uptake or mobility of a compound of Formula (I). Such additives include surface active agents (SFAs), spray additives based on oils, for example certain mineral oils or natural plant oils (such as soy bean and rape seed oil), and blends of these with other bio-enhancing adjuvants (ingredients which may aid or modify the action of a compound of Formula (I).

[0056] Wetting agents, dispersing agents and emulsifying agents may be SFAs of the cationic, anionic, amphoteric or non-ionic type.

[0057] Suitable SFAs of the cationic type include quaternary ammonium compounds (for example cetyltrimethyl ammonium bromide), imidazolines and amine salts.

[0058] Suitable anionic SFAs include alkali metals salts of fatty acids, salts of aliphatic monoesters of sulphuric acid (for example sodium lauryl sulphate), salts of sulphonated aromatic compounds (for example sodium dodecylbenzenesulphonate, calcium dodecylbenzenesulphonate, butylnaphthalene sulphonate and mixtures of sodium di-*i*sopropyl- and tri-*i*sopropyl-naphthalene sulphonates), ether sulphates, alcohol ether sulphates (for example sodium laureth-3-sulphate), ether carboxylates (for example sodium laureth-3-carboxylate), phosphate esters (products from the reaction between one or more fatty alcohols and phosphoric acid (predominately mono-esters) or phosphorus pentoxide (predominately di-esters), for example the reaction between lauryl alcohol and tetraphosphoric acid; additionally these products may be ethoxylated), sulphosuccinamates, paraffin or olefine sulphonates, taurates and lignosulphonates.

[0059] Suitable SFAs of the amphoteric type include betaines, propionates and glycinates.

[0060] Suitable SFAs of the non-ionic type include condensation products of alkylene oxides, such as ethylene oxide, propylene oxide, butylene oxide or mixtures thereof, with fatty alcohols (such as oleyl alcohol or cetyl alcohol) or with alkylphenols (such as octylphenol, nonylphenol or octylcresol); partial esters derived from long chain fatty acids or hexitol anhydrides; condensation products of said partial esters with ethylene oxide; block polymers (comprising ethylene oxide and propylene oxide); alkanolamides; simple esters (for example fatty acid polyethylene glycol esters); amine oxides (for example lauryl dimethyl amine oxide); and lecithins.

[0061] Suitable suspending agents include hydrophilic colloids (such as polysaccharides, polyvinylpyrrolidone or sodium carboxymethylcellulose) and swelling clays (such as bentonite or attapulgite).

[0062] The composition of the present may further comprise at least one additional pesticide. For example, the compounds according to the invention can also be used in combination with other herbicides or plant growth regulators. In a preferred embodiment the additional pesticide is a herbicide and/or herbicide safener. Examples of such mixtures are (in which 'I' represents a compound of Formula (I)). I + acetochlor, I + acifluorfen, I + acifluorfen-sodium, I + aclonifen, I + acrolein, I + alachlor, I + alloxydim, I + ametryn, I + amicarbazone, I + amidosulfuron, I + aminopyralid, I + amitrole, I + anilofos, I + asulam, I + atrazine, I + azafenidin, I + azimsulfuron, I + BCPC, I + beflubutamid, I + benazolin, I + bencarbazone, I + benfluralin, I + benfuresate, I + bensulfuron, I + bensulfuron-methyl, I + bensulide, I + bentazone, I + benzfendizone, I + benzobicyclon, I + benzofenap, I + bicyclopyrone, I + bifenox, I + bilanafos, I + bispyribac, I + bispyribac-sodium, I + borax, I + bromacil, I + bromobutide, I + bromoxynil, I + butachlor, I + butamifos, I + butralin, I + butroxydim, I + butylate, I + cacodylic acid, I + calcium chlorate, I + cafenstrole, I + carbetamide, I + carfentrazone, I + carfentrazone-ethyl, I + chlorflurenol, I + chlorflurenol-methyl, I + chloridazon, I + chlorimuron, I + chlorimuron-ethyl, I + chloroacetic acid, I + chlorotoluron, I + chlorpropham, I + chlorsulfuron, I + chlorthal, I + chlorthal-dimethyl, I + cinidon-ethyl, I + cinmethylin, I + cinosulfuron, I + cisanilide, I + clethodim, I + clodinafop, I + clodinafop-propargyl, I + clomazone, I + clomeprop, I + clopyralid, I + cloransulam, I + cloransulam-methyl, I + cyanazine, I + cycloate, I + cyclopyranile, I + cyclosulfamuron, I + cycloxydim, I + cyhalofop, I + cyhalofop-butyl" I + 2,4-D, I + daimuron, I + dalapon, I + dazomet, I + 2,4-DB, I + I + desmedipham, I + dicamba, I + dichlobenil, I + dichlorprop, I + dichlorprop-P, I + diclofop, I + diclofop-methyl, I + diclosulam, I + difenzoquat, I + difenzoquat metilsulfate, I + diflufenican, I + diflufenzopyr, I + dimefuron, I + dimepiperate, I + dimethachlor, I + dimethametryn, I + dimethenamid, I + dimethenamid-P, I + dimethipin, I + dimethylarsinic acid, I + dinitramine, I + dinoterb, I + diphenamid, I + dipropetryn, I + diquat, I + diquat dibromide, I + dithiopyr, I + diuron, I + endothal, I + EPTC, I + esprocarb, I + ethalfluralin, I + ethametsulfuron, I + ethametsulfuron-methyl, I + ethephon, I + ethofumesate, I + ethoxyfen, I + ethoxysulfuron, I + etobenzanid, I + fenoxaprop-P, I + fenoxaprop-P-ethyl, I + fenquinotrione, I + fentrazamide, I + ferrous sulfate, I + flamprop-M, I + flazasulfuron, I + florpyrauxifen, I + florasulam, I + fluazifop, I + fluazifop-butyl, I + fluazifop-P, I + fluazifop-P-butyl, I + fluazolate, I + flucarbazone, I + flucarbazone-sodium, I + flucetosulfuron, I + fluchloralin, I + flufenacet, I + flufenpyr, I + flufenpyr-ethyl, I + flumetralin, I + flumetsulam, I + flumiclorac, I + flumiclorac-pentyl, I + flumioxazin, I + flumipropin, I + fluometuron, I + fluoroglycofen, I + fluoroglycofen-ethyl, I + fluoxaprop, I + flupoxam, I + flupropacil, I + flupropanate, I + flupyrsulfuron, I + flupyrsulfuron-methyl-sodium, I + flurenol, I + fluridone, I + flurochloridone, I + fluroxypyr, I + flurtamone, I + fluthiacet, I + fluthiacet-methyl, I + fomesafen, I + foramsulfuron, I + fosamine, I + glufosinate, I + glufosinate-ammonium, I + glyphosate, I + halauxifen, I + halosulfuron, I + halosulfuron-methyl, I + haloxyfop, I + haloxyfop-P, I + hexazinone, I + imazamethabenz, I + imazamethabenz-methyl, I + imazamox, I + imazapic, I + imazapyr, I + imazaquin, I + imazethapyr, I + imazosulfuron, I + indanofan, I + indaziflam, I + iodomethane, I + iodosulfuron, I + iodosulfuron-methyl-sodium, I + ioxynil, I + isoproturon, I + isouron, I + isoxaben, I + isoxachlortole, I + isoxaflutole, I + isoxapyrifop, I + karbutilate, I + lactofen, I + lenacil, I + linuron, I + mecoprop, I + mecoprop-P, I + mefenacet, I + mefluidide, I + mesosulfuron, I + mesosulfuron-methyl, I + mesotrione, I + metam, I + metamifop, I + metamitron, I + metazachlor, I + methabenzthiazuron, I + methazole, I + methylarsonic acid, I + methyldymron, I + methyl isothiocyanate, I + metolachlor, I + S-metolachlor, I + metosulam, I + metoxuron, I + metribuzin, I + metsulfuron, I + metsulfuron-methyl, I + molinate, I + monolinuron, I + naproanilide, I + napropamide, I + napropamide-M, I + naptalam, I + neburon, I + nicosulfuron, I + n-methyl glyphosate, I + nonanoic acid, I + norflurazon, I + oleic acid (fatty acids), I + orbencarb, I + orthosulfamuron, I + oryzalin, I + oxadiargyl, I + oxadiazon, I + oxasulfuron, I + oxaziclomefone, I + oxyfluorfen, I + paraquat, I + paraquat dichloride, I + pebulate, I + pendimethalin, I + penoxsulam, I + pentachlorophenol, I + pentanochlor, I + pentoxazone, I + pethoxamid, I + phenmedipham, I + picloram, I + picolinafen, I + pinoxaden, I + piperophos, I + pretilachlor, I + primisulfuron, I + primisulfuron-methyl, I + prodiamine, I + profoxydim, I + prohexadione-calcium, I + prometon, I + prometryn, I + propachlor, I + propanil, I + propaquizafop, I + propazine, I + propham, I + propisochlor, I + propoxycarbazone, I + propoxycarbazone-sodium, I + propyzamide, I + prosulfocarb, I + prosulfuron, I + pyraclonil, I + pyraflufen, I + pyraflufen-ethyl, I + pyrasulfotole, I + pyrazolynate, I + pyrazosulfuron, I + pyrazosulfuron-ethyl, I + pyrazoxyfen, I + pyribenzoxim, I + pyributicarb, I + pyridafol, I + pyridate, I + pyriftalid, I + pyriminobac, I + pyriminobac-methyl, I + pyrimisulfan, I + pyrithiobac, I + pyrithiobac-sodium, I + pyroxasulfone, I + pyroxsulam, I + quinclorac, I + quinmerac, I + quinoclamine, I + quizalofop, I + quizalofop-P, I + rimsulfuron, I + saflufenacil, I + sethoxydim, I + siduron, I + simazine, I + simetryn, I + sodium chlorate, I + sulcotrione, I + sulfentrazone, I + sulfometuron, I + sulfometuron-methyl, I + sulfosate, I + sulfosulfuron, I + sulfuric acid, I + tebuthiuron, I + tefuryltrione, I + tembotrione, I + tepraloxydim, I + terbacil, I + terbumeton, I +

terbuthylazine, I + terbutryn, I + thenylchlor, I + thiazopyr, I + thifensulfuron, I + thiencarbazone, I + thifensulfuron-methyl, I + thiobencarb, I + tolpyralate, I + topramezone, I + tralkoxydim, I + tri-allate, I + triasulfuron, I + triaziflam, I + tribenuron, I + tribenuron-methyl, I + triclopyr, I + trietazine, I + trifloxysulfuron, I + trifloxysulfuron-sodium, I + trifludimoxazin, I + trifluralin, I + triflusulfuron, I + triflusulfuron-methyl, I + trihydroxytriazine, I + trinexapac-ethyl, I + tritosulfuron, I + [3-[2-chloro-4-fluoro-5-(1-methyl-6-trifluoromethyl-2,4-dioxo-1,2,3,4-tetrahydropyrimidin-3-yl)phenoxy]-2-pyridyloxy]acetic acid ethyl ester (CAS RN 353292-31-6). The compounds of the present invention may also be combined with herbicidal compounds disclosed in WO06/024820 and/or WO07/096576.

[0063] The mixing partners of the compound of Formula (I) may also be in the form of esters or salts, as mentioned e.g. in The Pesticide Manual, Sixteenth Edition, British Crop Protection Council, 2012.

[0064] The compound of Formula (I) can also be used in mixtures with other agrochemicals such as fungicides, nematicides or insecticides, examples of which are given in The Pesticide Manual.

[0065] The mixing ratio of the compound of Formula (I) to the mixing partner is preferably from 1: 100 to 1000:1.

[0066] The mixtures can advantageously be used in the above-mentioned formulations (in which case "active ingredient" relates to the respective mixture of compound of Formula (I) with the mixing partner).

[0067] The compounds of Formula (I) according to the invention can also be used in combination with one or more safeners. Likewise, mixtures of a compound of Formula (I) according to the invention with one or more further herbicides can also be used in combination with one or more safeners. The safeners can be AD 67 (MON 4660), benoxacor, cloquintocet-mexyl, cyprosulfamide (CAS RN 221667-31-8), dichlormid, fenchlorazole-ethyl, fenclorim, fluxofenim, furilazole and the corresponding R isomer, isoxadifen-ethyl, mefenpyr-diethyl, oxabetrinil, N-isopropyl-4-(2-methoxy-benzoylsulfamoyl)-benzamide (CAS RN 221668-34-4). Other possibilities include safener compounds disclosed in, for example, EP0365484 e.g N-(2-methoxybenzoyl)-4-[(methylaminocarbonyl)amino]benzenesulfonamide. Particularly preferred are mixtures of a compound of Formula (I) with cyprosulfamide, isoxadifen-ethyl, cloquintocet-mexyl and/or N-(2-methoxybenzoyl)-4-[(methylaminocarbonyl)amino]benzenesulfonamide.

[0068] The safeners of the compound of Formula (I) may also be in the form of esters or salts, as mentioned e.g. in The Pesticide Manual, 16th Edition (BCPC), 2012. The reference to cloquintocet-mexyl also applies to a lithium, sodium, potassium, calcium, magnesium, aluminium, iron, ammonium, quaternary ammonium, sulfonium or phosphonium salt thereof as disclosed in WO 02/34048, and the reference to fenchlorazole-ethyl also applies to fenchlorazole, etc.

[0069] Preferably the mixing ratio of compound of Formula (I) to safener is from 100:1 to 1:10, especially from 20:1 to 1:1.

[0070] The mixtures can advantageously be used in the above-mentioned formulations (in which case "active ingredient" relates to the respective mixture of compound of Formula (I) with the safener).

[0071] The present invention still further provides a method of controlling weeds at a locus comprising crop plants and weeds, wherein the method comprises application to the locus of a weed controlling amount of a composition according to the present invention. 'Controlling' means killing, reducing or retarding growth or preventing or reducing germination. Generally the plants to be controlled are unwanted plants (weeds). 'Locus' means the area in which the plants are growing or will grow.

[0072] The rates of application of compounds of Formula (I) may vary within wide limits and depend on the nature of the soil, the method of application (pre- or post-emergence; seed dressing; application to the seed furrow; no tillage application etc.), the crop plant, the weed(s) to be controlled, the prevailing climatic conditions, and other factors governed by the method of application, the time of application and the target crop. The compounds of Formula (I) according to the invention are generally applied at a rate of from 10 to 2000 g/ha, especially from 50 to 1000 g/ha.

[0073] The application is generally made by spraying the composition, typically by tractor mounted sprayer for large areas, but other methods such as dusting (for powders), drip or drench can also be used.

[0074] Useful plants in which the composition according to the invention can be used include crops such as cereals, for example barley and wheat, cotton, oilseed rape, sunflower, maize, rice, soybeans, sugar beet, sugar cane and turf.

[0075] Crop plants can also include trees, such as fruit trees, palm trees, coconut trees or other nuts. Also included are vines such as grapes, fruit bushes, fruit plants and vegetables.

[0076] Crops are to be understood as also including those crops which have been rendered tolerant to herbicides or classes of herbicides (e.g. ALS-, GS-, EPSPS-, PPO-, ACCase- and HPPD-inhibitors) by conventional methods of breeding or by genetic engineering. An example of a crop that has been rendered tolerant to imidazolinones, e.g. imazamox, by conventional methods of breeding is Clearfield® summer rape (canola). Examples of crops that have been rendered tolerant to herbicides by genetic engineering methods include e.g. glyphosate- and glufosinate-resistant maize varieties commercially available under the trade names RoundupReady® and LibertyLinK®.

[0077] Crops are also to be understood as being those which have been rendered resistant to harmful insects by genetic engineering methods, for example Bt maize (resistant to European corn borer), Bt cotton (resistant to cotton boll weevil) and also Bt potatoes (resistant to Colorado beetle). Examples of Bt maize are the Bt 176 maize hybrids of NK® (Syngenta Seeds). The Bt toxin is a protein that is formed naturally by *Bacillus thuringiensis* soil bacteria. Examples of toxins, or transgenic plants able to synthesise such toxins, are described in EP-A-451 878, EP-A-374 753, WO 93/07278, WO 95/34656, WO 03/052073 and EP-A-427 529. Examples of transgenic plants comprising one or more genes that code for an insecticidal resistance and express one or more toxins are KnockOut® (maize), Yield Gard® (maize), NuCOTIN33B® (cotton), Bollgard® (cotton), NewLeaf® (potatoes), NatureGard® and Protexcta®. Plant crops or seed material thereof can be both resistant to herbicides and, at the same time, resistant to insect feeding ("stacked" transgenic events). For example, seed can have the ability to express an insecticidal Cry3 protein while at the same time being tolerant to glyphosate.

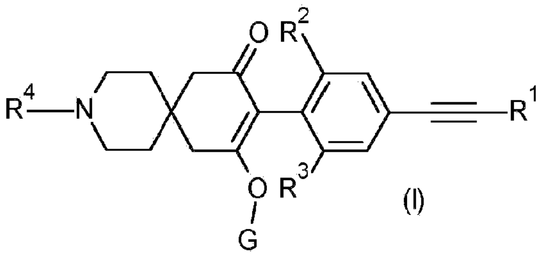
[0078] Crops are also to be understood to include those which are obtained by conventional methods of breeding or genetic engineering and contain so-called output traits (e.g. improved storage stability, higher nutritional value and improved flavour).

[0079] Other useful plants include turf grass for example in golf-courses, lawns, parks and roadsides, or grown commercially for sod, and ornamental plants such as flowers or bushes.

[0080] The compositions can be used to control unwanted plants (collectively, 'weeds'). The weeds to be controlled may be both monocotyledonous species, for example Agrostis, Alopecurus, Avena, Brachiaria, Bromus, Cenchrus, Cyperus, Digitaria, Echinochloa, Eleusine, Lolium, Monochoria, Rottboellia, Sagittaria, Scirpus, Setaria and Sorghum, and dicotyledonous species, for example Abutilon, Amaranthus, Ambrosia, Chenopodium, Chrysanthemum, Conyza, Galium, Ipomoea, Nasturtium, Sida, Sinapis, Solanum, Stellaria, Veronica, Viola and Xanthium. The compounds of the present invention have been shown to exhibit particularly good activity against certain grass weed species, especially *Lolium Perenne.* Weeds can also include plants which may be considered crop plants but which are growing outside a crop area ('escapes'), or which grow from seed left over from a previous planting of a different crop ('volunteers'). Such volunteers or escapes may be tolerant to certain other herbicides.

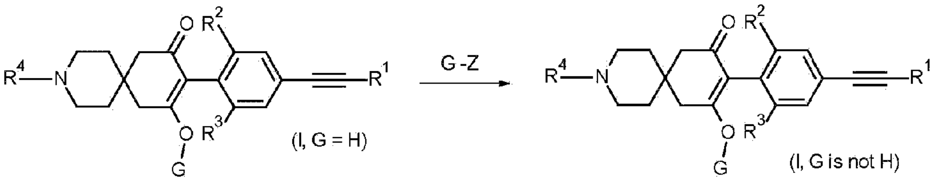
[0081] The compounds of the present invention can be prepared according to the following schemes.

[0082] The compounds of the present invention can be prepared according to the following schemes.



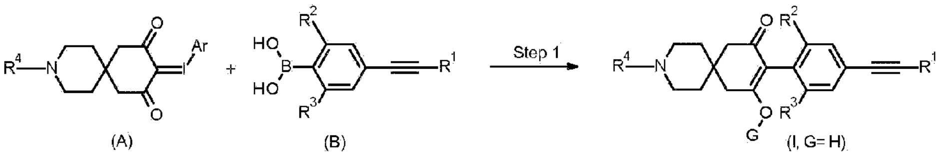
(I)

[0083] Compounds of formula (I) wherein G is other than hydrogen may be prepared by treating a compound of formula (I) wherein G is hydrogen, with a reagent G-Z, wherein G-Z is an alkylating agent such as an alkyl halide, acylating agent such as an acid chloride or anhydride, sulfonylating agent such as a sulfonyl chloride, carbamylating agent such as a carbamoyl chloride, or carbonating agent such as a chloroformate, using known methods.



Scheme 1

[0084] Compounds of formula (I) may be prepared by reacting an iodonium ylide of formula (A), wherein Ar is an optionally substituted phenyl group, and an aryl boronic acid of formula (B), in the presence of a suitable palladium catalyst, a base and in a suitable solvent.

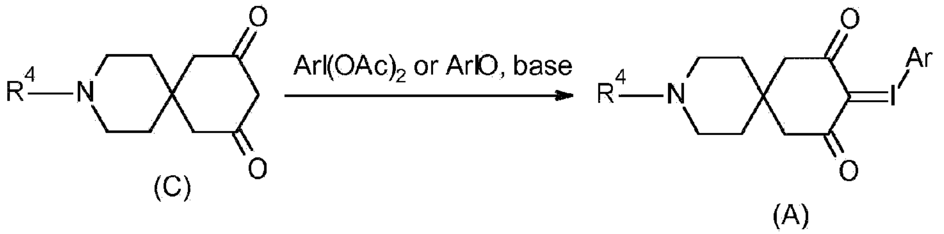


Scheme 2

[0085] Suitable palladium catalysts are generally palladium(II) or palladium(0) complexes, for example palladium(II) dihalides, palladium(II) acetate, palladium(II) sulfate, bis(triphenylphosphine)-palladium(II) dichloride, bis(tricyclopentylphosphine)-palladium(II) dichloride, bis(tricyclohexyl-phosphine)palladium(II) dichloride, bis(dibenzylideneacetone)palladium(0) or tetrakis-(triphenylphosphine)palladium(0). The palladium catalyst can also be prepared "*in situ*" from palladium(II) or palladium(0) compounds by complexing with the desired ligands, by, for example, combining the palladium(II) salt to be complexed, for example palladium(II) dichloride ($PdCl_2$) or palladium(II) acetate ($Pd(OAc)_2$), together with the desired ligand, for example triphenylphosphine (PPh_3), tricyclopentylphosphine, tricyclohexylphosphine, 2-dicyclohexylphosphino-2',6'-dimethoxybiphenyl or 2-dicyclohexylphosphino-2',4',6'-triisopropylbiphenyl and the selected solvent, with a compound of formula (N), the arylboronic acid of formula (O), and a base. Also suitable are bidendate ligands, for example 1,1'-bis(diphenylphosphino)ferrocene or 1,2-bis(diphenylphosphino)ethane. By heating the reaction medium, the palladium(II) complex or palladium(0) complex desired for the C-C coupling reaction is thus formed "*in situ*", and then initiates the C-C coupling reaction.

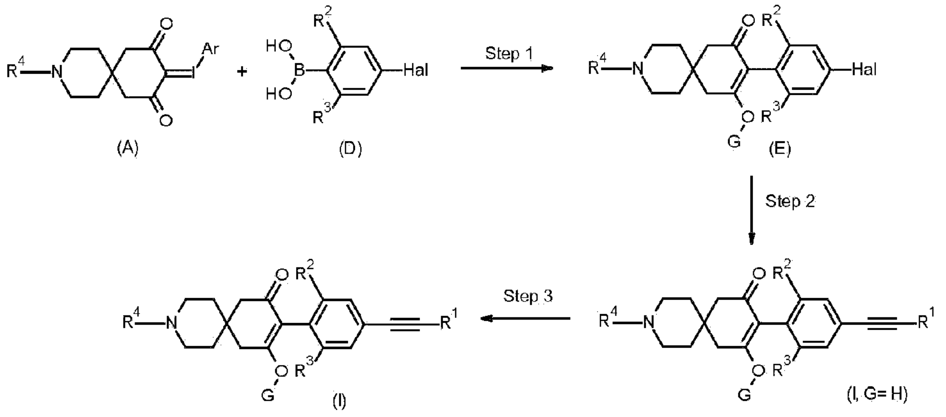
[0086] The palladium catalysts are used in an amount of from 0.001 to 50 mol %, preferably in an amount of from 0.1 to 15 mol %, based on the compound of formula (N). The reaction may also be carried out in the presence of other additives, such as tetralkylammonium salts, for example, tetrabutylammonium bromide. Preferably the palladium catalyst is palladium acetate, the base is lithium hydroxide and the solvent is aqueous 1,2-dimethoxyethane.

[0087] A compound of formula (A) may be prepared from a 1,3 dione compound of formula (C) by treatment with a hypervalent iodine reagent such as a (diacetoxy)iodobenzene or an iodosylbenzene and a base such as aqueous sodium carbonate, lithium hydroxide or sodium hydroxide in a solvent such as water or an aqueous alcohol such as aqueous ethanol using known procedures.



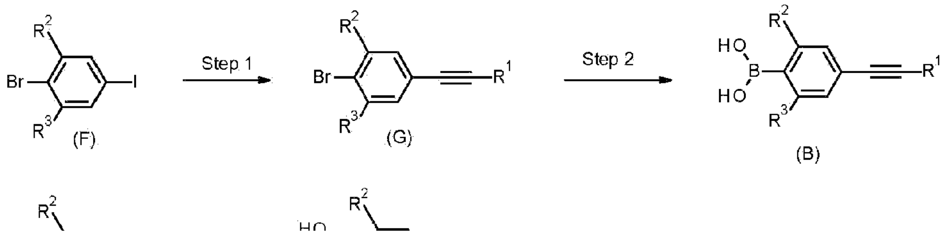
Scheme 3

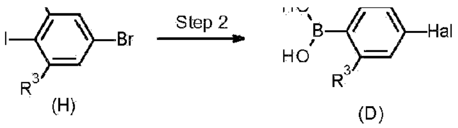
[0088] Alternatively, the propyne group may be added later in the synthetic sequence by decarboxylative propynylation such as in step 2 below.



Scheme 4

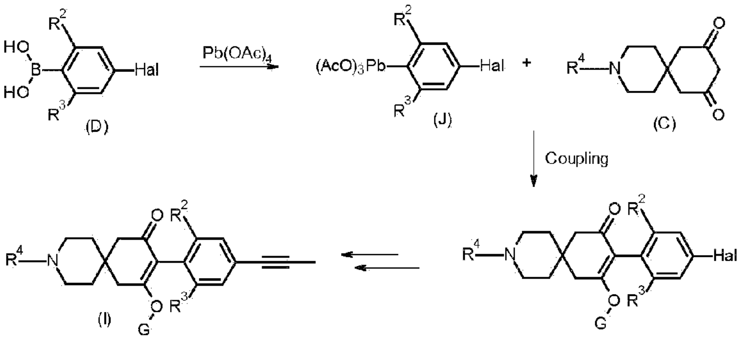
[0089] Boronic acids can be prepared by methods such as below in Scheme 5. For example, a compound of formula (B) or (D) may be prepared from an aryl halide of formula (F) or (H) by known methods. For example, an aryl halide of formula (F) or (H) may be treated with an alkyl lithium or alkyl magnesium halide in a suitable solvent, preferably diethyl ether or tetrahydrofuran, at a temperature of between -80 °C and 30 °C, and the aryl magnesium or aryl lithium reagent obtained may then be reacted with a trialkyl borate (preferably trimethylborate) to give an aryl dialkylboronate which may be hydrolysed to provide a boronic acid of formula (B) or (D) under acidic conditions.





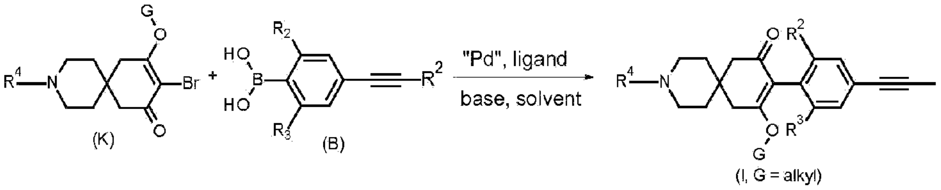
Scheme 5

[0090] Compounds of formula (I) can also be prepared via Pb coupling as shown in the scheme below by reacting a compound of formula (D), to form an organolead reagent of formula (J) and subsequent reaction with 1,3 dione (C) under conditions described, for example, by J. Pinhey, Pure and Appl. Chem., (1996), 68 (4), 819 and by M. Moloney et al., Tetrahedron Lett., (2002), 43, 3407. A suitable triarylbismuth compound under conditions described, for example, by A. Yu. Fedorov et al., Russ. Chem. Bull. Int. Ed., (2005), 54 (11), 2602, and by P. Koech and M. Krische, J. Am. Chem. Soc., (2004), 126 (17), 5350 and references therein may be used as a related procedure.



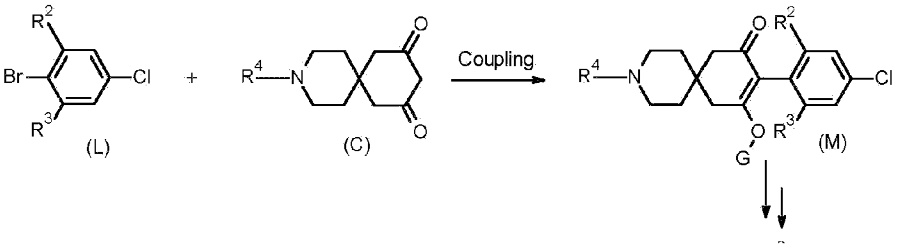
Scheme 6

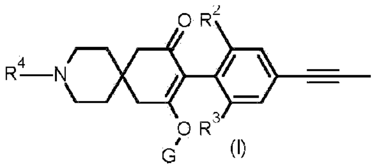
[0091] The compounds of type (I) can also be prepared via palladium coupling as shown in the scheme below, where boronic acid of type (B) is coupled to the suitably protected halo-alkene of type (K) in a Suzuki type coupling.



Scheme 7

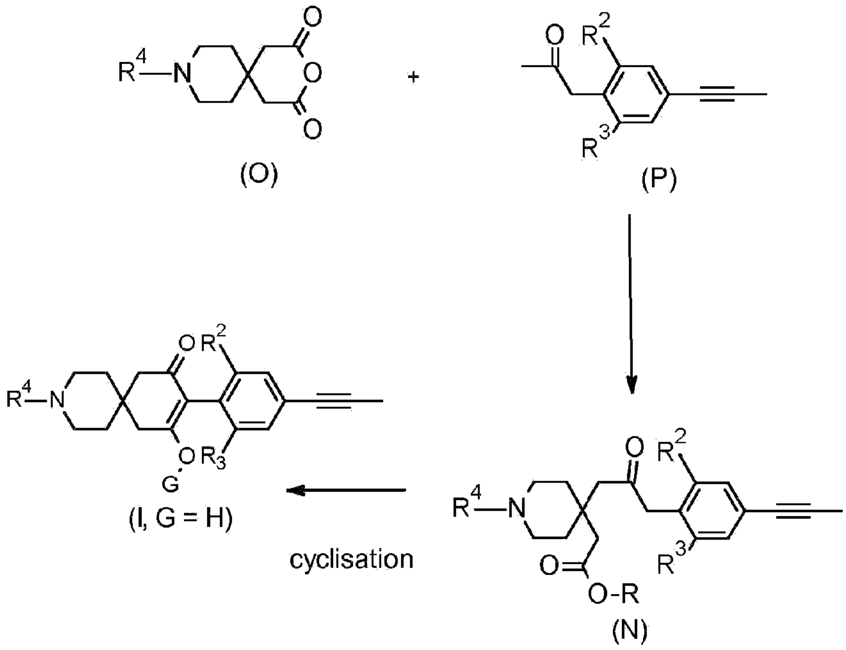
[0092] With suitable conditions, a suitable 1,3 dione may also be directly coupled to a Halo-compound (for example of formula (L)) with palladium catalysis. Propynylation of intermediate (M) as described earlier gives compounds of type (I).





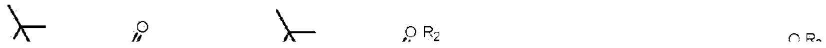
Scheme 8

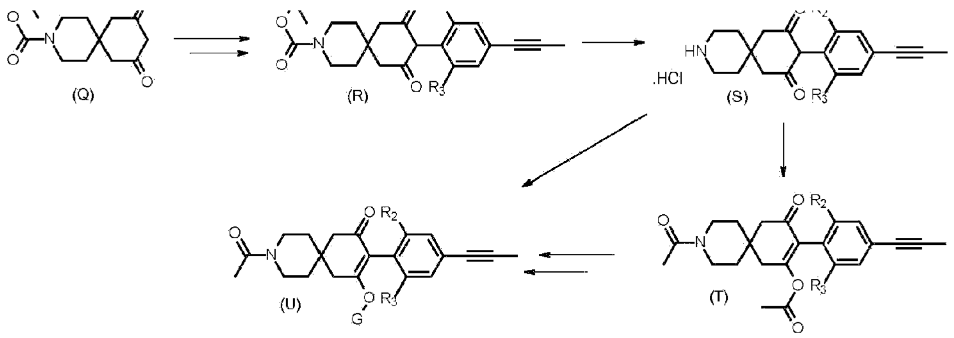
[0093] A compound of formula (I, G= H) may be prepared by the cyclisation of a compound of formula (N), wherein R is hydrogen or an alkyl group, preferably in the presence of an acid or base, and optionally in the presence of a suitable solvent, by analogous methods to those described by T. Wheeler, US 4,209,532. The compounds of formula (N) have been particularly designed as intermediates in the synthesis of the compounds of the Formula (I). A compound of formula (N) wherein R is hydrogen may be cyclised under acidic conditions, preferably in the presence of a strong acid such as sulfuric acid, polyphosphoric acid or Eaton's reagent, optionally in the presence of a suitable solvent such as acetic acid, toluene or dichloromethane.



Scheme 9

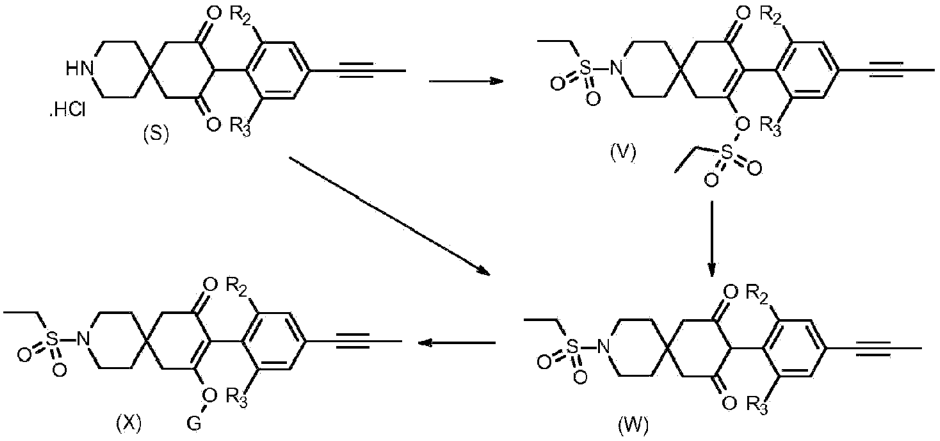
[0094] Compounds of type (I) can also be made by late stage functionalisation with use of a suitable protecting group as shown in the scheme below. Compound (Q) can be converted to intermediate (R) by the methods described and then the protecting group (such as the BOC group shown) can be removed (under acidic conditions in this example). Intermediate (S) can then be directly converted to compounds (for example (U) or doubly reacted on both oxygen and nitrogen atoms to give compounds of type (T). Compounds of type (T) can readily be converted to any compound of type (I) - for example the enol-ester of (T) can be selectivity hydrolysed to give (U, G=H), (not according to the invention) which can be then converted to (U, G is other than H) by the methods described earlier.





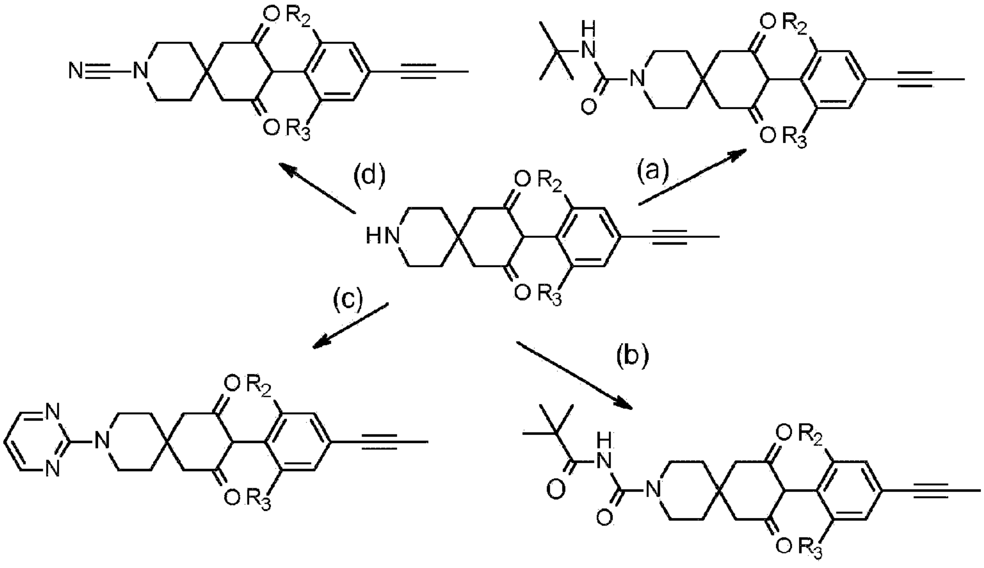
Scheme 10

[0095] Alternatively, the sequence can be perfomed with sulfonylation rather than acylation.



Scheme 11

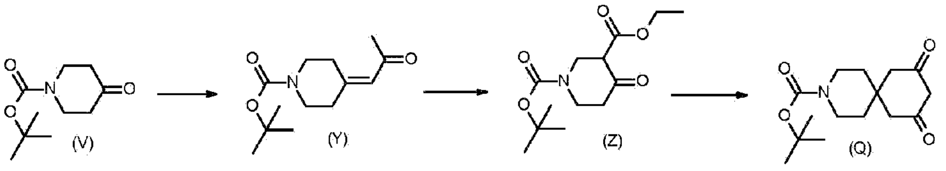
[0096] Ureas, acyl ureas, N-Heteroaryl and N-cyano compounds can be made from intermediate (S), also by standard literature methods as known to someone skilled in the art, such as in scheme 12.



(a) 2-isocyanato-2-methyl-propane, NEt_3, DCM; (b) 2,2-dimethylpropanoyl isocyanate, NEt_3, DCM; (c) 2-fluoropyrimidine, NEt_3, DMSO, 180°C, microwave; (d) Cyanogen bromide, DIPEA, DCM.

Scheme 12

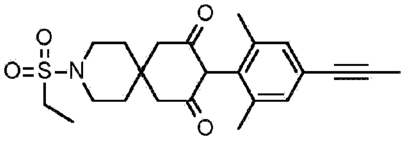
1,3 Diones such as these may be prepared using methods such as that shown below. So commercially available ketones (for example of type (V)) can be converted into intermediate (W) and then converted to intermediate (X) and finally decarboxylation gives intermediate (Q) (these methods are described in WO2008/110308).

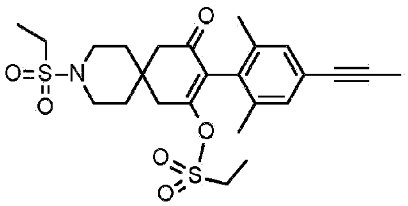


Scheme 13

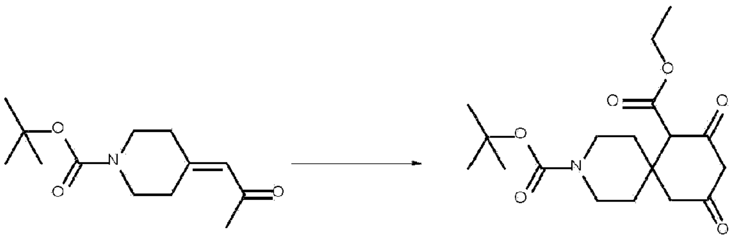
[0097] The following non-limiting examples provide specific synthesis methods for representative compounds of the present invention, as referred to in Tables 1 & 2 below.

[0098] Example 1: Synthesis of 9-(2,6-dimethyl-4-prop-1-ynyl-phenyl)-3-ethylsulfonyl-3-azaspiro[5.5]undecane-8,10-dione (Compound A3) and [9-(2,6-dimethyl-4-prop-1-ynyl-phenyl)-3-ethylsulfonyl-10-oxo-3-azaspiro[5.5]undec-8-en-8-yl] ethanesulfonate (Compound P8).





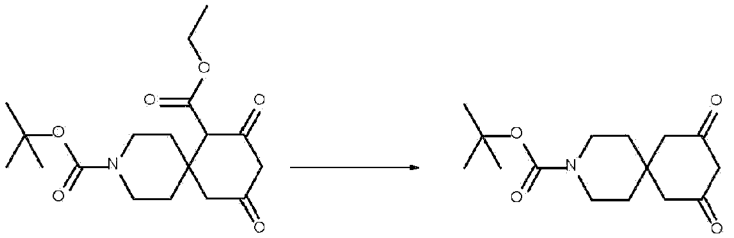
[0099] Step 1: Synthesis of O3-tert-butyl O11-ethyl 8,10-dioxo-3-azaspiro[5.5]undecane-3,11-dicarboxylate



[0100] *Tert*-Butyl 4-acetonylidenepiperidine-1-carboxylate (12.9 g, 54.0 mmol) was dissolved in ethanol (100 mL) and diethyl propanedioate (54.12 mmol) was added. The reaction mixture was treated with a solution of sodium ethoxide which had been prepared by the addition of sodium (54.1 mmol) to ethanol (30ml) at room temperature. The reaction mixture was stirred at room temperature for 3 hours then heated to reflux for 1 hour. Upon cooling the reaction mixture was *concentrated in vacuo* to give O3-tert-butyl O11-ethyl 8,10-dioxo-3-azaspiro[5.5]undecane-3,11-dicarboxylate as an oil, which was used in the next step without further purification.

Step 2: Synthesis of tert-butyl 8,10-dioxo-3-azaspiro[5.5]undecane-3-carboxylate

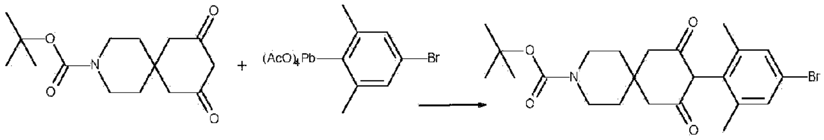
[0101]



[0102] Crude O3-tert-butyl O11-ethyl 8,10-dioxo-3-azaspiro[5.5]undecane-3,11-dicarboxylate from step 1 was dissolved in aqueous NaOH (12M, 5 mL) and stirred for 5 hours. The reaction mixture was was acidified to pH 6 by the addition of conc HCl at 0°C, and extracted with EtOAc. The organics were dried and *concentrated in vacuo* to leave a yellow solid which on trituration yielded a pale pink powder of *tert*-butyl 8,10-dioxo-3-azaspiro[5.5]undecane-3-carboxylate. The aqueous layer was further acidified to pH 2 by the addition of conc HCl and extracted with EtOAc. The organics were dried and and concentrated *in vacuo* to leave a pale yellow solid which on trituration with ether gave a further batch of pale yellow powder of tert-butyl 8,10-dioxo-3-azaspiro[5.5]undecane-3-carboxylate (3.914 g, 13.91 mmol). 1H NMR (400 MHz, $CDCl_3$) 3.51 - 3.25 (m, 6H), 2.69 - 2.54 (m, 4H), 1.47 - 1.43 (m, 9H), 1.44 - 1.39 (m, 4H).

Step 3: Synthesis of tert-butyl 9-(4-bromo-2,6-dimethyl-phenyl)-8,10-dioxo-3-azaspiro[5.5]undecane-3-carboxylate

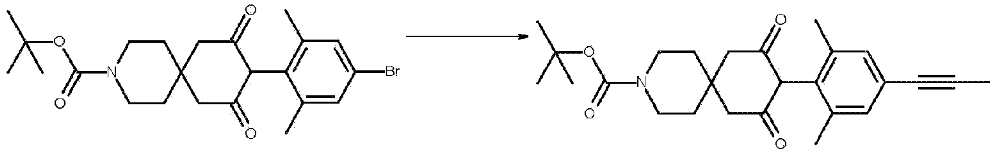
[0103]



[0104] *Tert*-Butyl 8,10-dioxo-3-azaspiro[5.5]undecane-3-carboxylate (0.5 g, 1.8 mmol) and DMAP (1.1 g, 8.9 mmol) were dissolved in chloroform (20 mL). The reaction mixture was stirred under nitrogen for 10 minutes and toluene (5 mL) was added followed by [diacetoxy-(4-bromo-2,6-dimethyl-phenyl)plumbyl] acetate (1.2 g, 2.1 mmol). The resulting suspension was heated under nitrogen at 75°C for 3 hours and then allowed to cool to room temperature. The reaction mixture was treated with 2 M HCl (50 mL) and white precipitate formed on stirring. The mixture was filtered and the organic phase was separated and the aqueous layer was extracted with DCM. The combined organics were dried ($MgSO_4$), evaporated and purified by flash column chromatography (gradient elution: 5 - 100% EtOAc:iso-hexane) to give *tert*-butyl 9-(4-bromo-2,6-dimethyl-phenyl)-8,10-dioxo-3-azaspiro[5.5]undecane-3-carboxylate (0.51 g, 1.1 mmol). 1H NMR (400 MHz, CD_3OD) 7.25 - 7.10 (m, 2H), 3.54 - 3.43 (m, 4H), 2.61 - 2.52 (m, 4H), 2.05 - 1.98 (m, 6H), 1.72 - 1.56 (m, 4H), 1.48 - 1.39 (m, 9H).

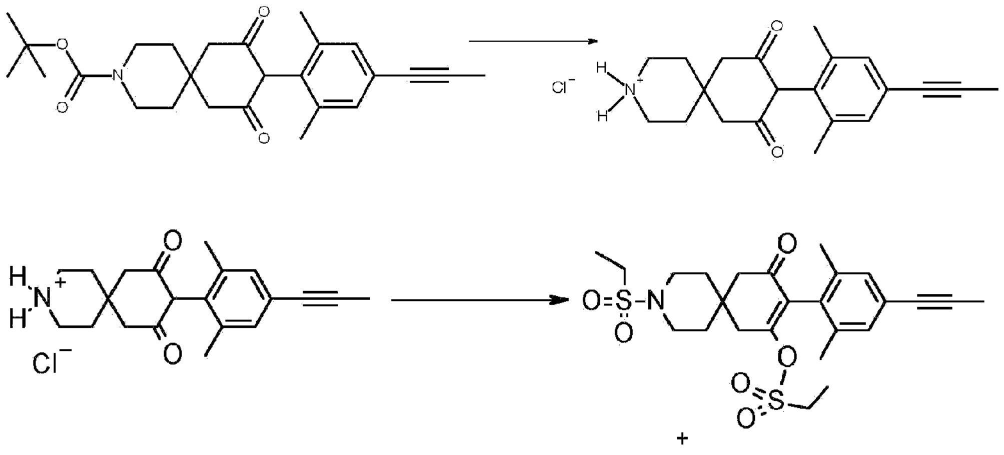
Step 4: Synthesis of *tert*-butyl 9-(2,6-dimethyl-4-prop-1-ynyl-phenyl)-8,10-dioxo-3-azaspiro[5.5]undecane-3-carboxylate (Compound A12).

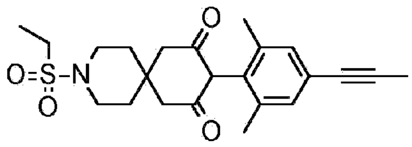
[0105]



[0106] 4-diphenylphosphanylbutyl(diphenyl)phosphane (32 mg, 0.075 mmol), dichlorobis(triphenylphosphine)palladium(II) (26 mg, 0.0373 mmol) and but-2-ynoic acid (346 mg, 0.894 mmol) were placed into a microwave vial. A solution of *tert*-butyl 9-(4-bromo-2,6-dimethyl-phenyl)-8,10-dioxo-3-azaspiro[5.5]undecane-3-carboxylate (0.346 g, 0.745 mmol) in DMSO (6 mL/mmol) was added followed by DBU (0.34 g, 2.24 mmol) and the reaction mixture was heated under microwave irradiation at 110°C for 45 minutes. The reaction was diluted with 2M HCl and extracted with DCM. The organics were dried and concentrated *in vacuo* to leave an orange gum which purified by flash chromatography to give (gradient elution: 10 - 100% EtOAc in isohexane) tert-butyl 9-(2,6-dimethyl-4-prop-1-ynyl-phenyl)-8,10-dioxo-3-azaspiro[5.5]undecane-3-carboxylate (0.193 g, 0.456 mmol). 1H NMR (400 MHz, CD_3OD) 7.07 - 6.93 (m, 2H), 3.52 - 3.45 (m, 4H), 2.62 - 2.53 (m, 4H), 2.02 - 1.98 (m, 9H), 1.70 - 1.60 (m, 4H), 1.51 - 1.42 (m, 9H).

[0107] Step 5: Synthesis of 9-(2,6-dimethyl-4-prop-1-ynyl-phenyl)-3-ethylsulfonyl-3-azaspiro[5.5]undecane-8,10-dione (Compound A3) and [9-(2,6-dimethyl-4-prop-1-ynyl-phenyl)-3-ethylsulfonyl-10-oxo-3-azaspiro[5.5]undec-8-en-8-yl] ethanesulfonate (Compound P8).



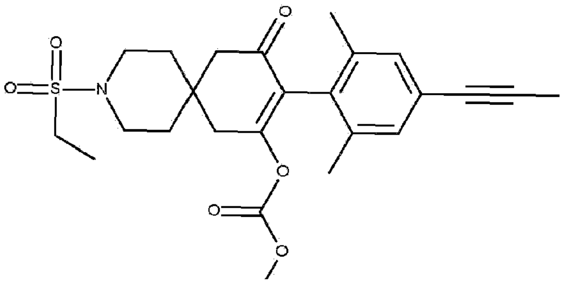


[0108] tert-Butyl 9-(2,6-dimethyl-4-prop-1-ynyl-phenyl)-8,10-dioxo-3-azaspiro[5.5]undecane-3-carboxylate (0.193 g, 0.456 mmol) was stirred for 1 hour at room temperature in 4 M HCl in 1,4-dioxane (4 mL, 16 mmol). The reaction mixture was concentrated *in vacuo* to leave 9-(2,6-dimethyl-4-prop-1-ynyl-phenyl)-3-azaspiro[5.5]undecane-8,10-dione hydrochloride as a white solid.

[0109] 9-(2,6-dimethyl-4-prop-1-ynyl-phenyl)-3-azaspiro[5.5]undecane-8,10-dione hydrochloride (0.250 g, 0.695 mmol) was taken up into DCM. Triethylamine (2.84 equiv., 1.97 mmol) was added and the reaction mixture was stirred for a few minutes before ethanesulfonyl chloride (1.02 equiv., 0.709 mmol) was added. The reaction mixture was stirred at room temperature for 2 hours during which time some solids crashed out of solution. After a further hour, additional ethanesulfonyl chloride (1.02 equiv., 0.709 mmol) was added. The reaction mixture was stirred for 1 hour then left to stand over night. Triethylamine (2.84 equiv., 1.97 mmol) was added upon which a significant amount of solids crashed out of solution. After stirring for 1 hour, the reaction mixture was poured into 2M HCl upon which all solids went into solution. The reaction mixture was extracted twice with DCM and the organics were dried and evaporated to leave a pale brown gummy solid which was pre-absorbed onto silica and purified by flash chromatography using a gradient from 5- 100% EtOAc in iHex to give 9-(2,6-dimethyl-4-prop-1-ynyl-phenyl)-3-ethylsulfonyl-3-azaspiro[5.5]undecane-8,10-dione (Compound A3) (0.026 g, 0.063 mmol). 1H NMR (400MHz, Methanol-d4) δ = 7.06 - 6.99 (m, 2H), 3.38 - 3.32 (m, 4H), 3.12 - 3.01 (m, 2H), 2.64 - 2.48 (m, 4H), 2.03 - 1.97 (m, 9H), 1.82 - 1.70 (m, 4H), 1.37 - 1.30 (m, 3H) and [9-(2,6-dimethyl-4-prop-1-ynyl-phenyl)-3-ethylsulfonyl-10-oxo-3-azaspiro[5.5]undec-8-en-8-yl] ethanesulfonate (Compound P8) (0.061 g, 0.14 mmol). 1H NMR (400MHz, CDCl3) δ = 7.12 - 7.07 (m, 2H), 3.47 - 3.28 (m, 4H), 3.02 - 2.93 (m, 4H), 2.71 - 2.63 (m, 2H), 2.62 - 2.54 (m, 2H), 2.10 - 1.98 (m, 9H), 1.90 - 1.74 (m, 4H), 1.44 - 1.33 (m, 3H), 1.00 - 0.88 (m, 3H).

Example 2: Synthesis of [9-(2,6-dimethyl-4-prop-1-ynyl-phenyl)-3-ethylsulfonyl-10-oxo-3-azaspiro[5.5]undec-8-en-8-yl] methyl carbonate (Compound P7)

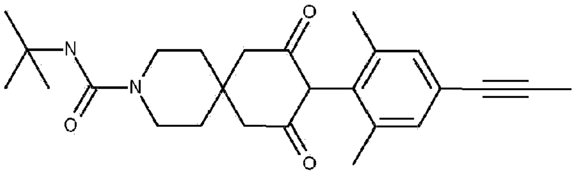
[0110]



[0111] 9-(2,6-dimethyl-4-prop-1-ynyl-phenyl)-3-ethylsulfonyl-3-azaspiro[5.5]undecane-8,10-dione (Compound A3) (0.1350 g, 0.3249 mmol) was dissolved in DCM then N,N-diethylethanamine (1.5 equiv., 0.4874 mmol) was added followed by methyl carbonochloridate (1.200 equiv., 0.390 mmol). After stirring at room temperature for 2.5 hours the reaction mixture was evaporated to leave a brown solid which was pre-absorbed onto silica and purified by flash chromatography using a gradient from 10-100% EtOAc in iHex to give [9-(2,6-dimethyl-4-prop-1-ynyl-phenyl)-3-ethylsulfonyl-10-oxo-3-azaspiro[5.5]undec-8-en-8-yl] methyl carbonate (Compound P7) (0.139 g, 0.293 mmol). 1H NMR (400MHz, CDCl3) δ = 7.12 - 7.00 (m, 2H), 3.72 - 3.59 (m, 3H), 3.42 - 3.29 (m, 4H), 3.02 - 2.92 (m, 2H), 2.79 - 2.74 (m, 2H), 2.66 - 2.52 (m, 2H), 2.02 (m, 9H), 1.91 - 1.74 (m, 4H), 1.41 - 1.30 (m, 3H).

Example 3: Synthesis of N-*tert*-butyl-9-(2,6-dimethyl-4-prop-1-ynyl-phenyl)-8,10-dioxo-3-azaspiro[5.5]undecane-3-carboxamide (Compound A5)

[0112]

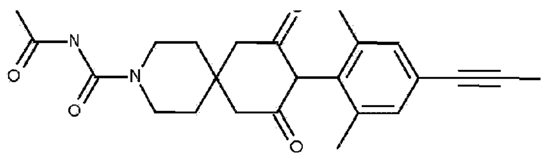


[0113] 9-(2,6-dimethyl-4-prop-1-ynyl-phenyl)-8-hydroxy-3-azaspiro[5.5]undec-8-en-10-one (0.131 g, 0.405 mmol) was taken up in dichloromethane (5 mL) and 2-isocyanato-2-methyl-propane (0.154 g, 1.56 mmol) was added at 0°C followed by triethylamine (0.282 mL, 2.03 mmol), upon which all solids went immediately into solution. After stirring for 16h the reaction mixture was then diluted with water and acidified with 10% citric acid, then extracted with DCM (2 x 15 mL). Organics were washed with brine and dried over Na_2SO_4, filtered, evaporated and the crude residue was purified by preparative HPLC chromatography to give N-*tert*-butyl-9-(2,6-dimethyl-4-prop-1-ynyl-phenyl)-8,10-dioxo-3-azaspiro[5.5]undecane-3-carboxamide (Compound A5) as a white solid (29 mg, 0.069 mmol).

[0114] 1H NMR (400MHz, Methanol-d4) δ = 7.02 (s, 2H), 3.39 (t, J = 5.5 Hz, 4H), 2.56 (s, 4H), 1.98-2.00 (9H), 1.65 (t, J = 5.5 Hz, 4H), 1.32 (s, 9H).

Example 4: Synthesis of N-*tert*-butyl-9-(2,6-dimethyl-4-prop-1-ynyl-phenyl)-8,10-dioxo-3-azaspiro[5.5]undecane-3-carboxamide (Compound A6)

[0115]

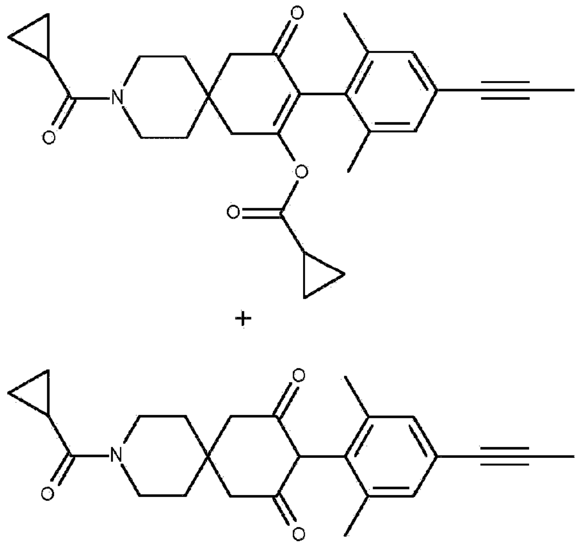


[0116] 9-(2,6-dimethyl-4-prop-1-ynyl-phenyl)-3-azaspiro[5.5]undecane-8,10-dione hydrochloride (0.200 g, 0.556 mmol) was taken up into DCM (8 mL). Triethylamine (2.84 equiv., 1.58 mmol) was added and the reaction mixture was stirred for a few minutes before 2,2-dimethylpropanoyl isocyanate (2.200 equiv., 1.22 mmol) was added. The reaction mixture was stirred for 2 hours and was then diluted with 2M HCl and extracted twice with DCM. The organics were dried and evaporated to leave a yellow gum which was pre-absorbed onto silica and purified by flash chromatography using a gradient from 5- 100% EtOAc in iHex to give N-*tert*-butyl-9-(2,6-dimethyl-4-prop-1-ynyl-phenyl)-8,10-dioxo-3-azaspiro[5.5]undecane-3-carboxamide (Compound A6) as a white solid (0.061 g, 0.14 mmol).

[0117] 1H NMR (400MHz, Methanol-d4) δ = 7.07 - 6.97 (m, 2H), 3.61 - 3.49 (m, 4H), 2.62 - 2.51 (m, 4H), 2.02 - 2.00 (m, 6H), 2.00 - 1.98 (m, 3H), 1.79 - 1.70 (m, 4H), 1.26 - 1.22 (m, 9H).

Example 5: Synthesis of [3-(cyclopropanecarbonyl)-9-(2,6-dimethyl-4-prop-1-ynyl-phenyl)-10-oxo-3-azaspiro[5.5]undec-8-en-8-yl] cyclopropanecarboxylate (Compound P1) and 3-(cyclopropanecarbonyl)-9-(2,6-dimethyl-4-prop-1-ynyl-phenyl)-3-azaspiro[5.5]undecane-8,10-dione (Compound A8)

[0118]



[0119] 9-(2,6-dimethyl-4-prop-1-ynyl-phenyl)-3-azaspiro[5.5]undecane-8,10-dione hydrochloride was taken up in dichloromethane (5 mL) and cyclopropanecarbonyl chloride (2.5 equiv., 2.30 mmol) was added followed by N,N-diethylethanamine (2 equiv., 1.84 mmol) upon which all solids went immediately into solution. After stirring at room temperature for 1.5 hours, a further portion of N,N-diethylethanamine (2 equiv., 1.84 mmol) and cyclopropanecarbonyl chloride (2.5 equiv., 2.30 mmol) was added and the reaction mixture was stirred for a further 3 hours, then diluted with 2M HCl and extracted twice with DCM. The organics were dried and evaporated to leave an orange gum which was pre-absorbed onto silica and purified by flash chromatography using a gradient from 5% EtOAc in iHex to 100% EtOAc to give [3-(cyclopropanecarbonyl)-9-(2,6-dimethyl-4-prop-1-ynyl-phenyl)-10-oxo-3-azaspiro[5.5]undec-8-en-8-yl] cyclopropanecarboxylate (Compound P1) as an off-white foam (0.279 g, 0.607 mmol).

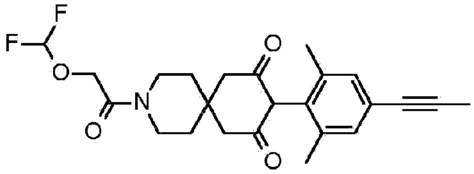
[0120] 1H NMR (400MHz, CDCl3) δ = 7.12 - 6.95 (m, 2H), 3.81 - 3.52 (m, 4H), 2.79 - 2.57 (m, 4H), 2.07 - 1.98 (m, 9H), 1.90 - 1.66 (m, 5H), 1.44 - 1.37 (m, 1H), 1.01 - 0.93 (m, 2H), 0.81 - 0.67 (m, 6H)

[0121] [3-(cyclopropanecarbonyl)-9-(2,6-dimethyl-4-prop-1-ynyl-phenyl)-10-oxo-3-azaspiro[5.5]undec-8-en-8-yl] cyclopropanecarboxylate (Compound P1) (0.202 g, 0.440 mmol) was dissolved in methanol (8 mL) and to this was added K_2CO_3 (2 equiv., 0.879 mmol). The reaction mixture was stirred at room temperature for 1 hour 30mins, then was poured into 2M HCl (effervescence) then extracted twice with EtOAc. The organics were dried and evaporated to leave a white solid, which was pre-absorbed onto silica and purified flash chromatography using DCM to 20% MeOH in DCM to give 3-(cyclopropanecarbonyl)-9-(2,6-dimethyl-4-prop-1-ynyl-phenyl)-3-azaspiro[5.5]undecane-8,10-dione (Compound A8) as a white solid (0142 g, 0.363 mmol).

[0122] 1H NMR (400MHz, Methanol-d4) δ = 7.06 - 6.95 (m, 2H), 3.87 - 3.74 (m, 2H), 3.69 - 3.59 (m, 2H), 2.67 - 2.58 (m, 4H), 2.02 - 1.96 (m, 10H), 1.83 - 1.74 (m, 2H), 1.70 - 1.62 (m, 2H), 0.91 - 0.75 (m, 4H).

Example 6: Synthesis of 3-[2-(difluoromethoxy)acetyl]-9-(2,6-dimethyl-4-prop-1-ynyl-phenyl)-3-azaspiro[5.5]undecane-8,10-dione (Compound A197)

[0123]

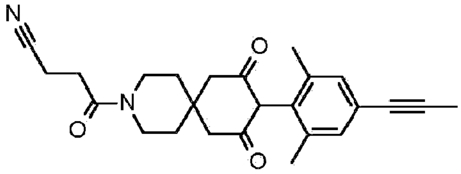


[0124] To a stirred solution of 2-(difluoromethoxy)acetic acid (0.7321 g) in DCM (26.40 mL), was added 1-(3-dimethylaminopropyl)-3-ethylcarbodiimide hydrochloride (1.136 g), 1-hydroxy-7-azabenzotriazole (0.807 g) and 9-(2,6-dimethyl-4-prop-1-ynyl-phenyl)-3-azaspiro[5.5]undecane-8,10-dione hydrochloride (2 g) at 0°C. Then triethylamine (2.94 mL) was added dropwise and the reaction was left stirring to slowly warm to room temperature. After 4 h, the reaction was quenched with 2M HCl, extracted with dichloromethane (x2), washed with HCl 2M (x1) and dried over $MgSO_4$. The crude product was directly dry-loaded on silica gel and purified using column chromatography (30-80% EtOAc in dichloromethane) and triturated with diethyl ether to give 3-[2-(difluoromethoxy)acetyl]-9-(2,6-dimethyl-4-prop-1-ynyl-phenyl)-3-azaspiro[5.5]undecane-8,10-dione as a white solid (1.412 g).

[0125] 1H NMR (400MHz, Methanol-d4) δ = 7.03 (s, 2H), 6.50 (t, J = 74.9 Hz, 1H), 4.63 (s, 2H), 3.69 - 3.62 (m, 2H), 3.53 - 3.46 (m, 2H), 2.67 - 2.59 (m, 4H), 2.01 (s, 6H), 2.00 - 1.98 (m, 3H), 1.81 - 1.73 (m, 2H), 1.72 - 1.65 (m, 2H)

Example 7: Synthesis of 4-[9-(2,6-dimethyl-4-prop-1-ynyl-phenyl)-8,10-dioxo-3-azaspiro[5.5]undecan-3-yl]-4-oxo-butanenitrile (Compound A198)

[0126]

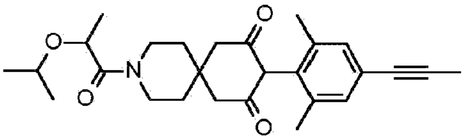


[0127] To a stirred solution of 3-cyanopropanoic acid (0.02753 g) in DCM (1.4 mL) was added HATU (0.117 g) at room temperature and the mixture was left to stir for 1 h. Then 9-(2,6-dimethyl-4-prop-1-ynyl-phenyl)-3-azaspiro[5.5]undecane-8,10-dione hydrochloride (100 mg) was added followed by triethylamine (0.116 mL) and the mixture was left to stir at rt overnight. Dilute aqueous HCl was added and the resultant mixture was extracted with DCM. Combined organic extracts were dried and concentrated *in vacuo.* Purification via flash column chromatography (EtOAc in Hexane 50-100%) gave 4-[9-(2,6-dimethyl-4-prop-1-ynyl-phenyl)-8,10-dioxo-3-azaspiro[5.5]undecan-3-yl]-4-oxo-butanenitrile (72 mg) as a white solid.

[0128] 1H NMR (400MHz, Methanol-d4) δ = 7.03 (s, 2H), 3.68 - 3.63 (m, 2H), 3.58 - 3.53 (m, 2H), 2.83 - 2.78 (m, 2H), 2.70 - 2.65 (m, 2H), 2.59 (s, 4H), 2.02 (s, 6H), 1.99 (s, 3H), 1.78 - 1.73 (m, 2H), 1.70 - 1.66 (m, 2H)

Example 8: Synthesis of 9-(2,6-dimethyl-4-prop-1-ynyl-phenyl)-3-(2-isopropoxypropanoyl)-3-azaspiro[5.5]undecane-8,10-dione (Compound A211)

[0129]

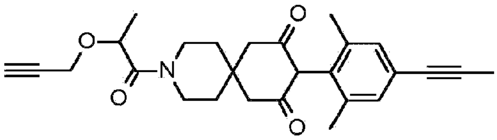


[0130] 9-(2,6-dimethyl-4-prop-1-ynyl-phenyl)-3-azaspiro[5.5]undecane-8,10-dione hydrochloride (206 mg) and 2-isopropoxypropanoic acid (79.4 mg) were dissolved in DMF (1.1 mL), cooled in ice/water and then triethylamine (194 µL) was added with stirring, followed by HATU (229 mg) in one portion. The reaction mixture was stirred without cooling for 60mins. Reaction was quenched with 2M HCl (118.4 µl) and purified by reverse phase flash chromatography to give 9-(2,6-dimethyl-4-prop-1-ynyl-phenyl)-3-(2-isopropoxypropanoyl)-3-azaspiro[5.5]undecane-8,10-dione as a pale beige fluffy solid.

[0131] 1H NMR (400MHz, Methanol-d4) δ = 1.35 (d, J=6.72 Hz, 3 H) 1.71 (dt, J=18.13, 5.73 Hz, 4 H) 2.00 (d, J=8.07 Hz, 9 H) 2.61 (d, J=4.89 Hz, 4 H) 3.55 - 3.76 (m, 4 H) 3.86 - 3.96 (m, 1 H) 3.98 - 4.08 (m, 1 H) 4.41 (d, J=6.72 Hz, 1 H) 5.17 (dq, J=10.39, 1.39 Hz, 1 H) 5.29 (dq, J=17.25, 1.67 Hz, 1 H) 5.93 (dd, J=17.24, 10.39 Hz, 1 H) 7.04 (s, 2 H).

Example 9: Synthesis of 9-(2,6-dimethyl-4-prop-1-ynyl-phenyl)-3-(2-prop-2-ynoxypropanoyl)-3-azaspiro[5.5]undecane-8,10-dione (Compound A215)

[0132]

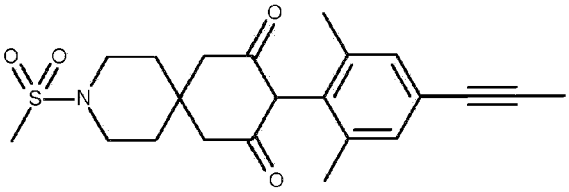
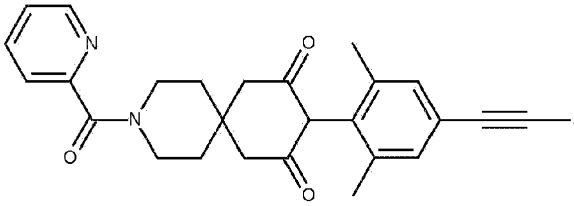
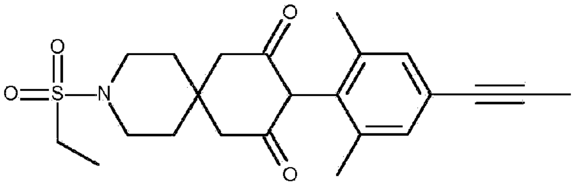
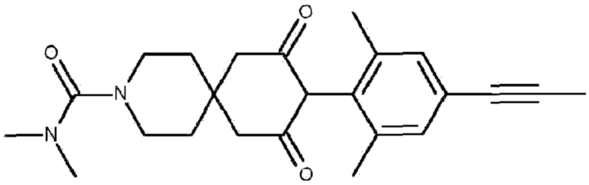
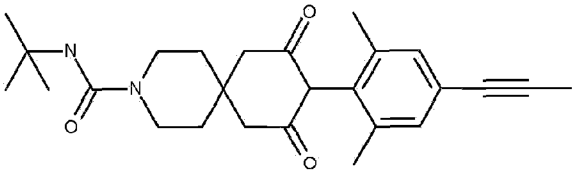


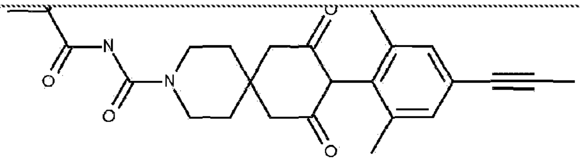
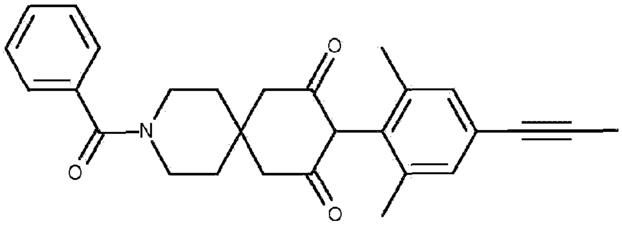
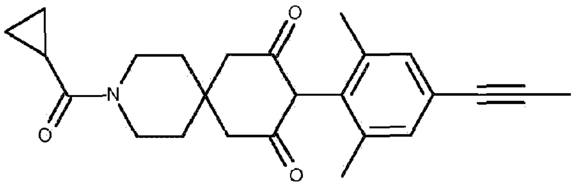
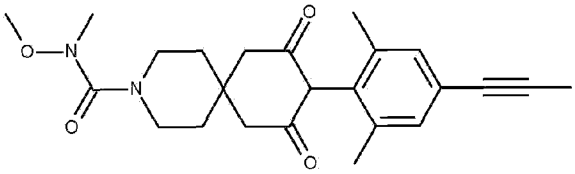
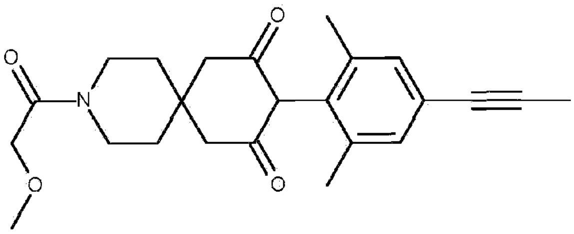
[0133] 9-(2,6-dimethyl-4-prop-1-ynyl-phenyl)-3-azaspiro[5.5]undecane-8,10-dione hydrochloride (206 mg, 0.5552 mmol) and 2-prop-2-ynoxypropanoic acid (77.0 mg, 0.583 mmol) were dissolved in DMF (1.1 mL), cooled in ice/water and then triethylamine (194 µL) added with stirring, followed by HATU (229 mg) in one portion. The reaction mixture was stirred without cooling for 50minsand then quenched with 2M HCl (118.4 µl) and purified by reverse phase flash chromatography to give 9-(2,6-dimethyl-4-prop-1-ynyl-phenyl)-3-(2-prop-2-ynoxypropanoyl)-3-azaspiro[5.5]undecane-8,10-dione was a fluffy light beige solid (105 mg)

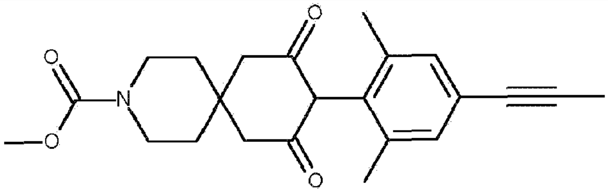
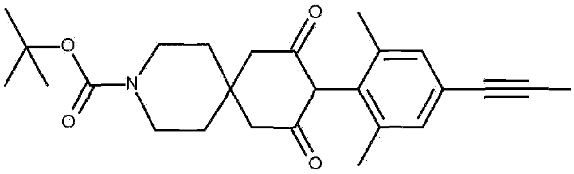
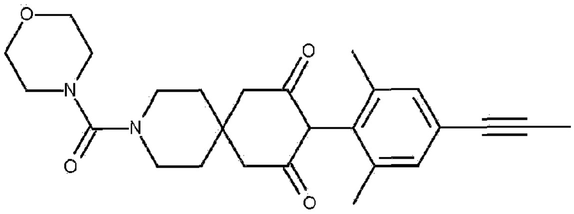
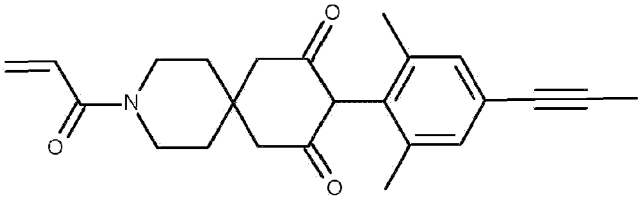
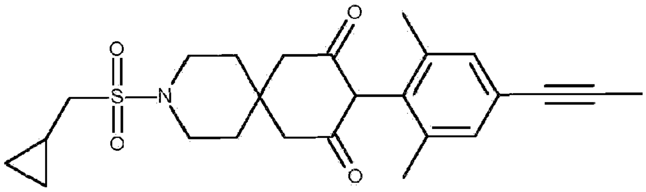
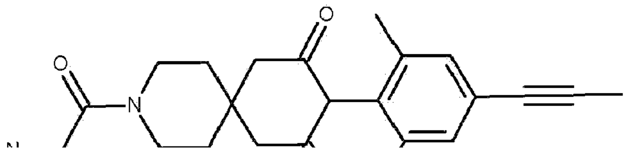
[0134] 1H NMR (400MHz, Methanol-d4) δ = 1.35 (d, J=6.72 Hz, 3 H) 1.64 - 1.81 (m, 4 H) 2.00 (d, J=8.44 Hz, 9 H) 2.62 (d, J=9.17 Hz, 4 H) 3.54 - 3.80 (m, 4 H) 4.07 - 4.28 (m, 2 H) 4.63 (d, J=6.72 Hz, 1 H) 7.04 (s, 2 H).

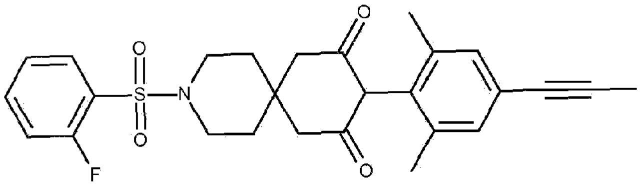
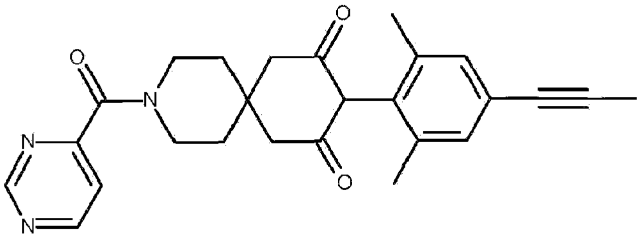
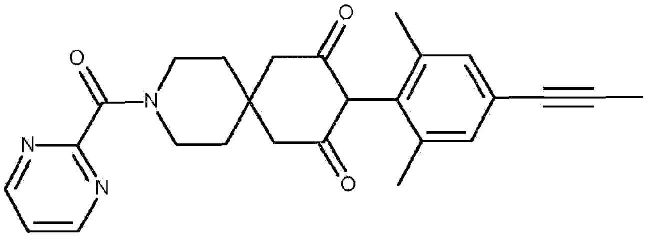
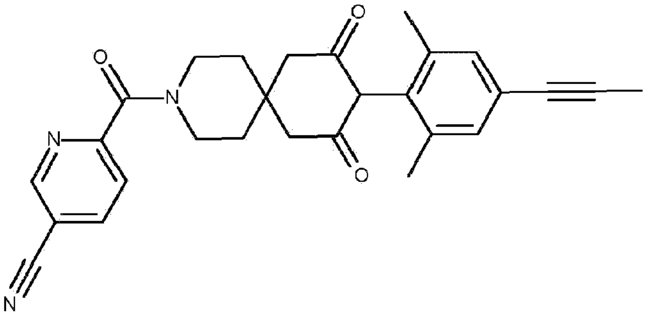
[0135] Examples of herbicidal compounds of the present invention. Compounds A59, A146, A155, A156, A207 and A230 are not part of the invention.

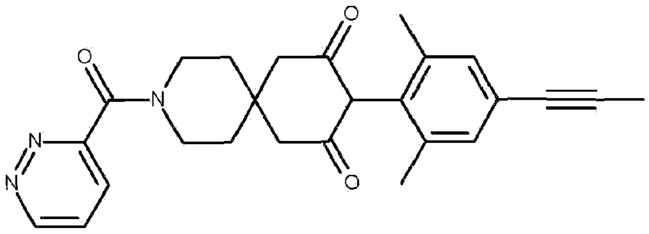
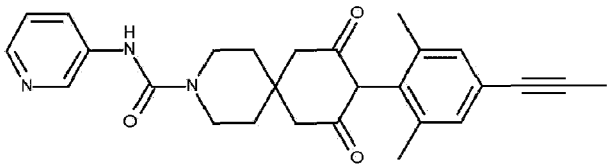
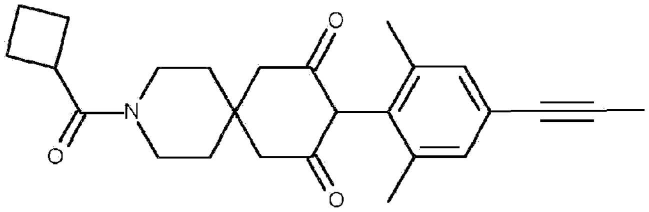
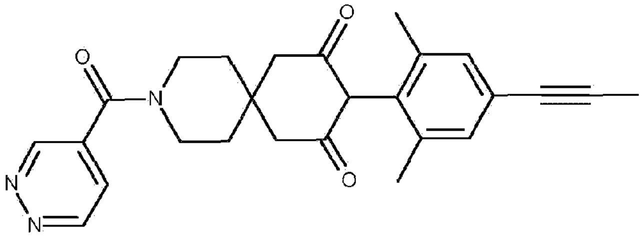
Table 1

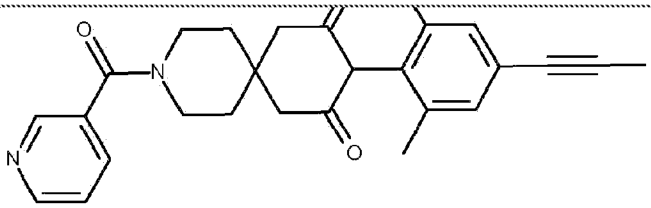
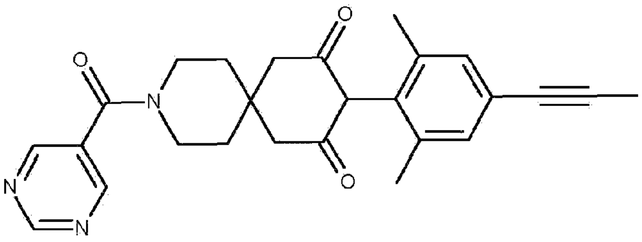
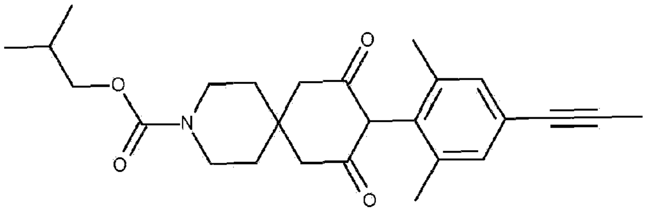
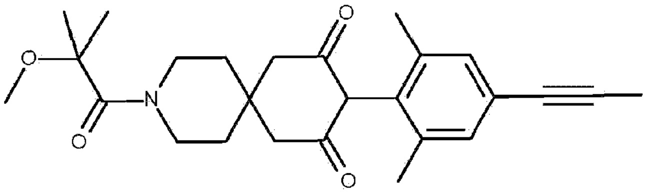
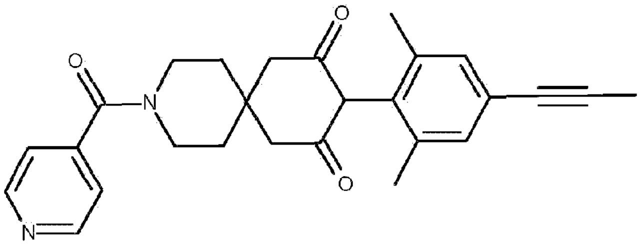
CMP	Structure	NMR or LCMS
A1		1H NMR (400 MHz, Methanol-d4) δ = 7.03(s, 2H), 3.27(4H, merged with MeOD residual peak), 2.85(s, 3H), 2.59(s, 4H), 2.00(s, 6H), 1.98(s, 3H), 1.80(t, J = 5.5 Hz, 4H)
A2		1H NMR (400MHz, Methanol-d4) δ = 8.59(d, J = 4.36 Hz, 1H), 7.93-7.95(m, 1H), 7.58(d, J = 7.4 Hz, 1H), 7.48-7.51 (m,1 H), 7.02(d, J = 5.36 Hz, 2H), 3.83(brs, 2H), 3.46 (brs, 2H),2.63(s, 4H), 1.97-2.02((9H), 1.82 (brs, 2H), 1.72 (brs, 2H)
A3		1H NMR (400MHz, Methanol-d4) δ = 7.06 - 6.99 (m, 2H), 3.38 - 3.32 (m, 4H), 3.12 - 3.01 (m, 2H), 2.64 - 2.48 (m, 4H), 2.03 - 1.97 (m, 9H), 1.82 - 1.70 (m, 4H), 1.37 - 1.30 (m, 3H)
A4		1H NMR (400MHz, Methanol-d4) δ = 6.96(s, 2H), 3.11 (brs 4H), 2.71 (s, 6H), 2.40(s, 4H), 1.93-2.01(9H), 1.54(brs, 4H)
A5		1H NMR (400MHz, Methanol-d4) δ = 7.02 (s, 2H), 3.39 (t, J = 5.5 Hz, 4H), 2.56 (s, 4H), 1.98-2.00 (9H), 1.65 (t, J = 5.5 Hz, 4H), 1.32 (s, 9H)
A6		1H NMR (400MHz, Methanol-d4) δ =

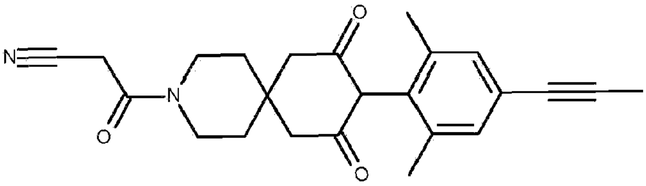
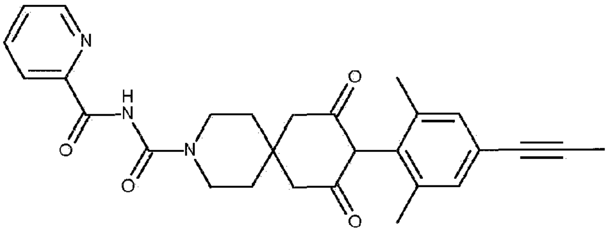
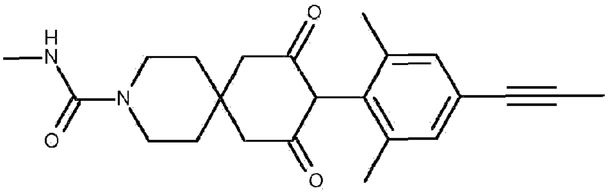
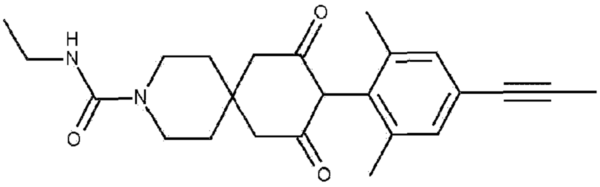
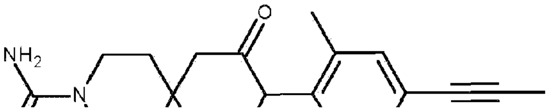
CMP	Structure	NMR or LCMS
		7.07 - 6.97 (m, 2H), 3.61 - 3.49 (m, 4H), 2.62 - 2.51 (m, 4H), 2.02 - 2.00 (m, 6H), 2.00 - 1.98 (m, 3H), 1.79 - 1.70 (m, 4H), 1.26 - 1.22 (m, 9H)
A7		1H NMR (400MHz, DMSO-d6) δ = 7.49 - 7.42 (m, 3H), 7.41 - 7.33 (m, 2H), 7.04 - 6.89 (m, 2H), 3.93 - 3.84 (m, 4H), 3.52 - 3.28 (m, 4H), 2.06 - 1.97 (m, 3H), 1.96 - 1.89 (m, 6H), 1.70 - 1.49 (m, 4H)
A8		1H NMR (400MHz, Methanol-d4) δ = 7.06 - 6.95 (m, 2H), 3.87 - 3.74 (m, 2H), 3.69 - 3.59 (m, 2H), 2.67 - 2.58 (m, 4H), 2.02 - 1.96 (m, 10H), 1.83 - 1.74 (m, 2H), 1.70 - 1.62 (m, 2H), 0.91 - 0.75 (m, 4H)
A9		1H NMR (400MHz, Methanol-d4) δ = 7.06 - 6.94 (m, 2H), 3.62 - 3.57 (m, 3H), 3.55 - 3.46 (m, 4H), 2.97 - 2.89 (m, 3H), 2.65 - 2.59 (m, 4H), 2.04 - 1.92 (m, 9H), 1.77 - 1.49 (m, 4H)
A10		1H NMR (400MHz, Methanol-d4) δ = 7.03(s, 2H), 4.15(s, 2H), 3.63-3.64(ill, res, t, 2H), 3.50(t, J= 5.2 Hz, 2H), 3.39(s,3H), 2.60(s, 4H), 1.98 - 2.00(9H), 1.73(t, J = 5.3 Hz, 2H), 1.68(t, J = 5.7 Hz, 2H)
A11		1H NMR (400MHz,

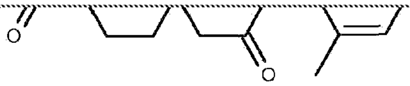
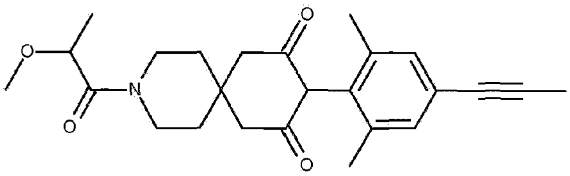
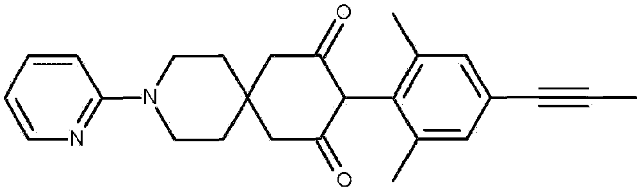
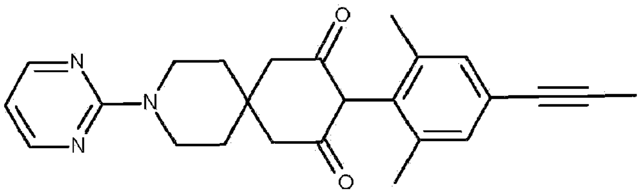
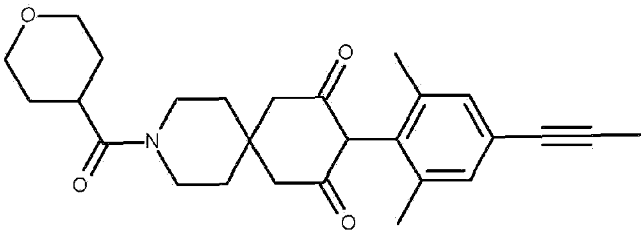
CMP	Structure	NMR or LCMS
		Methanol-d4) δ = 7.02(s, 2H), 3.68(s, 3H), 3.52(br.s, 4H), 2.58(s, 4H), 2.00(s, 9H), 1.66(brs. 4H)
A12		1H NMR (400 MHz, CD3OD) 7.07 - 6.93 (m, 2H), 3.52- 3.45 (m, 4H), 2.62 - 2.53 (m, 4H), 2.02 -1.98 (m, 9H), 1.70-1.60 (m, 4H), 1.51 - 1.42 (m, 9H).
A13		1H NMR (400MHz, Methanol-d4) δ = 7.06-6.93 (m, 2H), 3.68 - 3.59 (m, 4H), 3.36 - 3.33 (m, 4H), 3.27 - 3.21 (m, 4H), 2.61 - 2.50 (m, 5H), 2.02 - 1.99 (m, 9H), 1.74-1.60 (m, 4H)
A14		1H NMR (400MHz, Methanol-d4) δ = 7.07-6.98 (m, 2H), 6.83 - 6.72 (m, 1H), 6.23 - 6.13 (m, 1H), 5.79-5.66 (m, 1H), 3.75- 3.62 (m, 4H), 2.67 - 2.59 (m, 4H), 2.03-1.98 (m, 9H), 1.77 - 1.68 (m, 4H)
A15		1H NMR (400MHz, Methanol-d4) δ = 7.03 (s, 2H), 3.42 - 3.34 (m, 4H), 2.99 (d, J=7.1 Hz, 2H), 2.59 (s, 4H), 2.01 (s, 6H), 1.99 (s, 3H), 1.82- 1.74 (m, 4H), 0.73 - 0.64 (m, 2H), 0.43-0.36 (m, 2H)
A16		1H NMR (400MHz, Methanol-d4) δ = 8.86-8.80 (m, 1H), 8.72 - 8.68 (m, 1H), 8.66-8.60 (m, 1H),

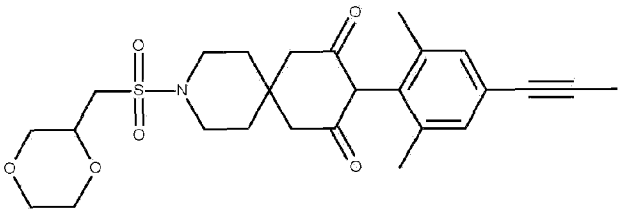
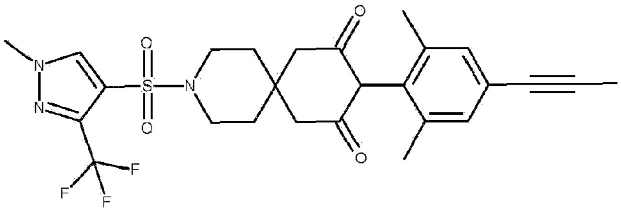
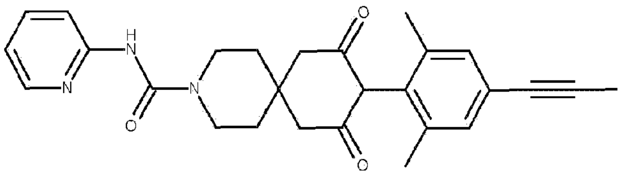
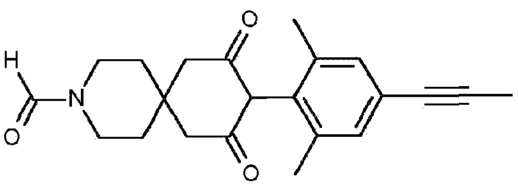
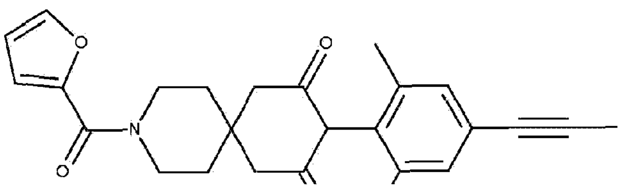
CMP	Structure	NMR or LCMS
		7.05-6.99 (m, 2H), 3.88 - 3.81 (m, 2H), 3.63 - 3.53 (m, 2H), 2.72-2.60 (m, 4H), 2.04 - 1.94 (m, 9H), 1.86 - 1.72 (m, 4H)
A17		1H NMR (400MHz, Methanol) δ = 7.89-7.81 (m, 1H), 7.75 - 7.66 (m, 1H), 7.42 - 7.32 (m, 2H), 7.01 (s, 2H), 3.28-3.21 (m, 4H), 2.49 (s, 4H), 1.98 (s, 3H), 1.98 (s, 6H), 1.81 - 1.73 (m, 4H)
A18		1H NMR (400MHz, Methanol-d4) δ = 9.25-9.21 (m, 1H), 8.96 - 8.88 (m, 1H), 7.71 - 7.58 (m, 1H), 7.06 - 6.86 (m, 2H), 3.87 - 3.73 (m, 2H), 3.53 - 3.41 (m, 2H), 2.71-2.54 (m, 4H), 2.04 - 1.96 (m, 9H), 1.85 - 1.70 (m, 4H)
A19		1H NMR (400MHz, Methanol-d4) δ = 8.94-8.78 (m, 2H), 7.60 - 7.53 (m, 1H), 7.07 - 6.97 (m, 2H), 3.92 - 3.69 (m, 2H), 3.39 - 3.35 (m, 2H), 2.72 - 2.47 (m, 4H), 2.05-1.96 (m, 9H), 1.87 - 1.72 (m, 4H)
A20		1H NMR (400MHz, Methanol-d4) δ = 8.97-8.89 (m, 1H), 8.35 - 8.28 (m, 1H), 7.83 - 7.69 (m, 1H), 7.07 - 6.93 (m, 2H), 3.89 - 3.73 (m, 2H), 3.55 - 3.40 (m, 2H), 2.73-2.59 (m, 4H), 2.06 - 1.94 (m, 9H), 1.88 - 1.69 (m, 4H)

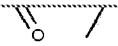
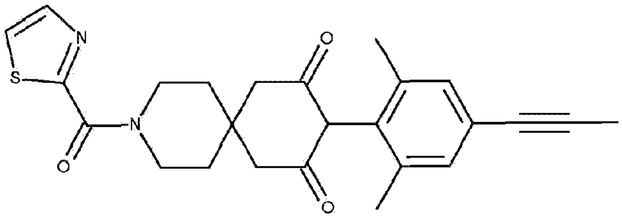
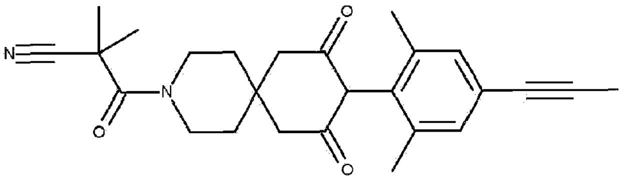
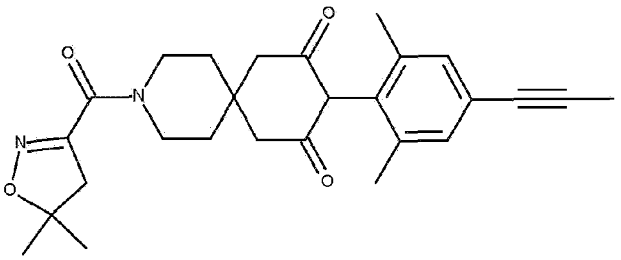
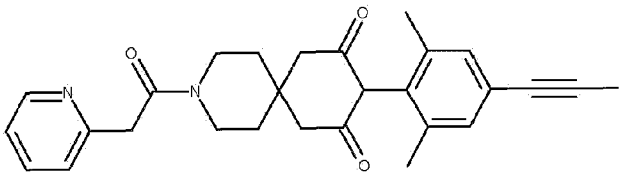
CMP	Structure	NMR or LCMS
A21		1H NMR (400MHz, Methanol-d4) δ = 9.31-9.14 (m, 1H), 7.94 - 7.83 (m, 2H), 7.07 - 6.96 (m, 2H), 3.92 - 3.78 (m, 2H), 3.58 - 3.47 (m, 2H), 2.73 - 2.56 (m, 4H), 2.04 - 1.95 (m, 9H), 1.91 - 1.73 (m, 4H)
A22		1H NMR (400MHz, Methanol-d4) δ = 8.58 (d, J=2.2 Hz, 1H), 8.17 (dd, J=1.3, 4.8 Hz, 1H), 7.91 (br ddd, J=1.5, 2.6, 8.4 Hz, 1H), 7.35 (br ddd, J=0.6, 4.8, 8.4 Hz, 1H), 7.04 (s, 2H), 3.68-3.56 (m, 4H), 2.63 (s, 4H), 2.02 (s, 6H), 1.99 (s, 3H), 1.82 - 1.70 (m, 4H)
A23		1H NMR (400MHz, Methanol-d4) δ = 7.06-6.99 (m, 2H), 3.64 - 3.56 (m, 2H), 3.49 - 3.42 (m, 3H), 2.63 - 2.56 (m, 4H), 2.33 - 2.17 (m, 4H), 2.04 -1.94 (m, 9H), 1.74-1.55 (m, 4H)
A24		1H NMR (400MHz, Methanol-d4) δ = 9.35-9.29 (m, 1H), 9.29 - 9.19 (m, 1H), 7.79 - 7.65 (m, 1H), 7.07 - 6.98 (m, 2H), 3.88 - 3.79 (m, 2H), 3.50 - 3.40 (m, 2H), 2.74-2.56 (m, 4H), 2.04 - 2.02 (m, 3H), 2.00 - 1.94 (m, 6H), 1.86 - 1.80 (m, 2H), 1.76 - 1.66 (m, 2H)
A25		1H NMR (400MHz, Methanol-d4) δ =

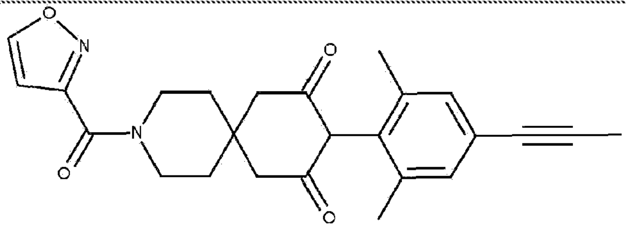
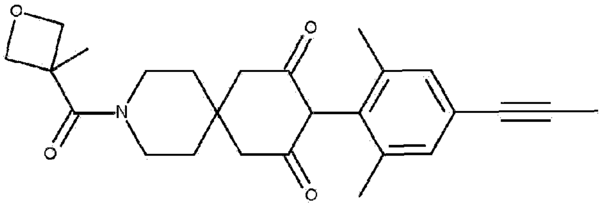
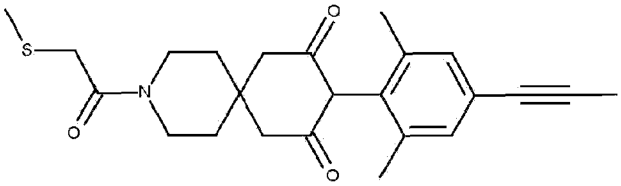
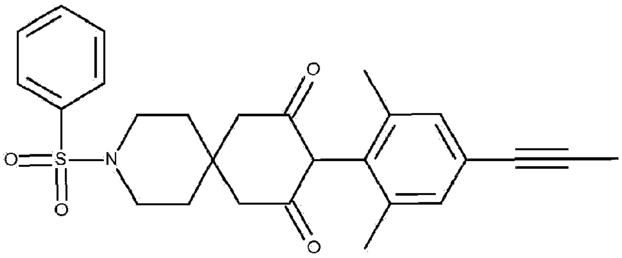
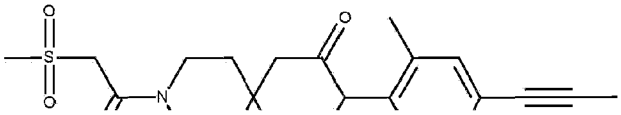
CMP	Structure	NMR or LCMS
		8.75-8.57 (m, 2H), 8.11 - 8.02 (m, 1H), 7.69 - 7.59 (m, 1H), 7.07 - 6.97 (m, 2H), 3.90 - 3.75 (m, 2H), 3.54 -3.39 (m,2H), 2.71-2.52 (m, 4H), 2.05 - 1.96 (m, 9H), 1.87 - 1.68 (m, 4H)
A26		1H NMR (400MHz, Methanol-d4) δ = 9.25 - 9.20 (m, 1H), 8.95 - 8.84 (m, 2H), 7.07 - 6.94 (m, 2H), 3.92 - 3.79 (m, 2H), 3.60 - 3.47 (m, 2H), 2.69 - 2.58 (m, 4H), 2.07 - 1.95 (m, 9H), 1.87 - 1.69 (m, 4H)
A27		1H NMR (400MHz, Methanol-d4) δ = δ ppm 0.95 (d, J=6.72 Hz, 6 H) 1.62 - 1.73 (m, 4 H) 1.87 - 1.98 (m, 1 H) 1.98-2.00 (m, 3 H) 2.00 - 2.02 (m, 7 H) 2.58 (s, 4 H) 3.53 (br s, 4 H) 3.85 (d, J=6.60 Hz, 2 H) 7.03 (s, 2 H)
A28		1H NMR (400MHz, Methanol-d4) δ = 1.41 (s, 6 H) 1.72 (br s, 4 H) 1.99 (s, 3 H) 2.01 (s, 6 H) 2.61 (s, 4 H) 3.24 (s, 3 H) 3.59-3.74 (m, 2 H) 4.01 - 4.10 (m, 2 H) 7.04 (s, 2 H)
A29		1H NMR (400MHz, Methanol-d4) δ = 8.71-8.58 (m, 2H), 7.50 - 7.37 (m, 2H), 7.05 - 6.98 (m, 2H), 3.85 - 3.79 (m, 2H), 3.47 - 3.39 (m, 2H), 2.71 - 2.57 (m, 4H), 2.05-2.00 (m, 3H),

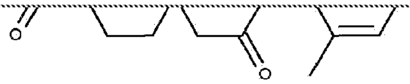
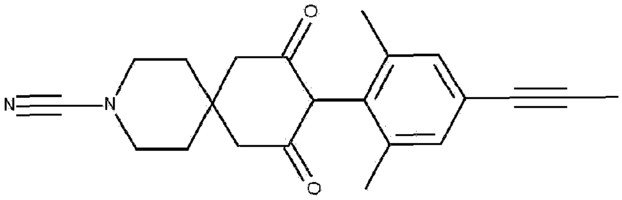
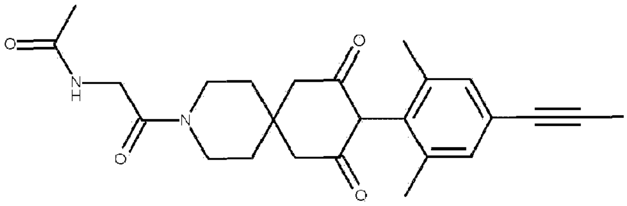
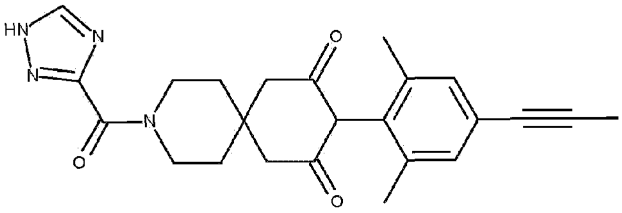
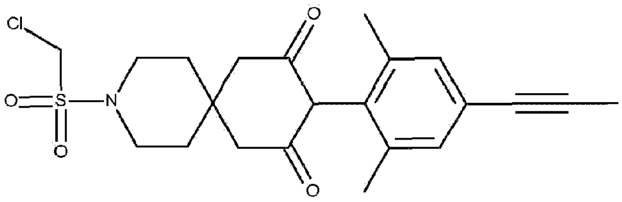
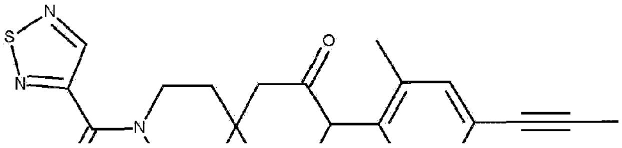
CMP	Structure	NMR or LCMS
		2.00 - 1.94 (m, 6H), 1.86 - 1.67 (m, 4H)
A30		1H NMR (400MHz, Methanol-d4) δ = 7.10-6.97 (m, 2H), 3.92 - 3.86 (m, 2H), 3.69 - 3.61 (m, 2H), 3.53 - 3.46 (m, 2H), 2.65 - 2.56 (m, 4H), 2.02 - 2.00 (m, 6H), 2.00-1.98 (m, 3H), 1.81 - 1.74 (m, 2H), 1.73 - 1.67 (m, 2H)
A31		1H NMR (400MHz, Methanol-d4) δ = 8.71-8.65 (m, 1H), 8.19 (td, J=1.0, 7.9 Hz, 1H), 8.02 (brdt, J=1.7, 7.7 Hz, 1H), 7.63 (ddd, J=1.2, 4.8, 7.6 Hz, 1H), 7.04 (s, 2H), 3.72 - 3.60 (m, 4H), 2.64 (s, 4H), 2.02 (s, 6H), 1.99 (s, 3H), 1.85-1.76 (m, 4H)
A32		1H NMR (400MHz, Methanol-d4) δ = 7.03 (s, 2H), 3.48 - 3.38 (m, 4H), 2.72 (s, 3H), 2.58 (s, 4H), 2.01 (s, 6H), 1.99 (s, 3H), 1.72 - 1.61 (m, 4H)
A33		1H NMR (400MHz, Methanol-d4) δ = 7.08-6.98 (m, 2H), 3.47 - 3.40 (m, 4H), 3.18 (q, J=7.1 Hz, 2H), 2.58 (s, 4H), 2.01 (s, 6H), 1.99 (s, 3H), 1.70- 1.64 (m, 4H), 1.11 (t, J=7.2 Hz, 3H)
A34		1H NMR (400 MHz, DMSO-d6) δ = 1.51 (br s, 4 H) 1.86 - 1.98 (m, 6 H) 1.98 -

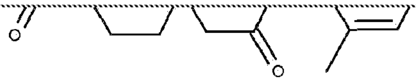
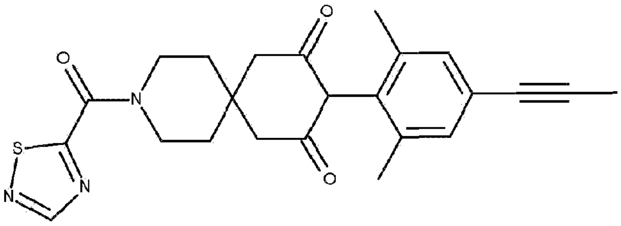
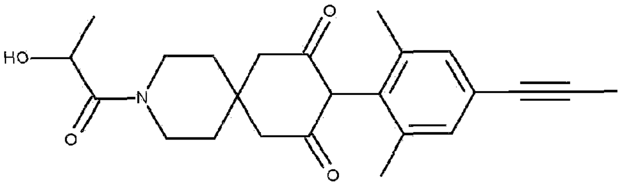
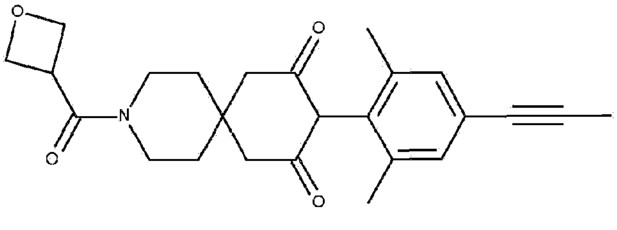
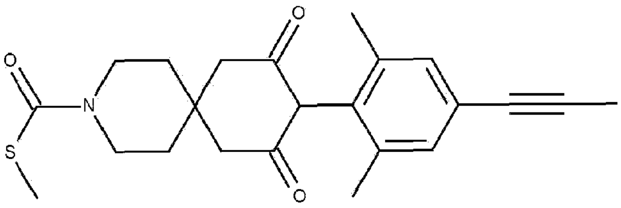
CMP	Structure	NMR or LCMS
		2.08 (m, 3 H) 3.34 (br s, 12 H) 5.91 (br s, 2 H) 7.01 (s, 2 H) 10.34 - 10.65 (m, 1 H)
A35		1H NMR (400MHz, Methanol-d4) δ = 1.32 (d, J=6.72 Hz, 3 H) 1.63 - 1.82 (m, 4 H) 1.99 (s, 3 H) 2.01 (s, 6 H) 2.62 (d, J=4.65 Hz, 4 H) 3.55-3.82 (m, 4 H) 4.28 (d, J=6.72 Hz, 1 H) 7.04 (s, 2 H)
A36		1H NMR (400MHz, Methanol-d4) δ = 8.08-8.03 (m, 1H), 7.60 - 7.53 (m, 1H), 7.05 - 7.01 (m, 2H), 6.90 - 6.84 (m, 1H), 6.69 - 6.63 (m, 1H), 3.63 - 3.53 (m, 4H), 2.64-2.57 (m, 4H), 2.03 (s, 6H), 1.99 (s, 3H), 1.83-1.75 (m, 4H)
A37		1H NMR (400MHz, Methanol-d4) δ = 8.32-8.30 (m, 2H), 7.06 - 7.00 (m, 2H), 6.59 - 6.54 (m, 1H), 3.98 - 3.80 (m, 4H), 2.65 - 2.55 (m, 4H), 2.04 -2.01 (m, 6H), 2.00-1.98 (m, 3H), 1.78 - 1.71 (m, 4H)
A38		1H NMR (400MHz, Methanol-d4) δ = 1.54-1.69 (m, 4 H) 1.69 - 1.87 (m, 4 H) 1.98 - 2.00 (m, 3 H) 2.00-2.03 (m, 6 H) 2.60 (s, 4 H) 2.88 - 3.02 (m, 1 H) 3.49 (td, J=11.80, 1.96 Hz, 2 H) 3.58- 3.69 (m, 4 H) 3.90 -4.00

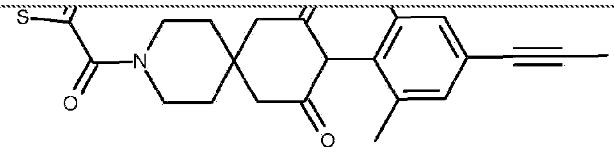
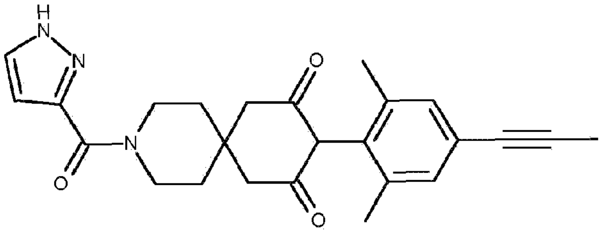
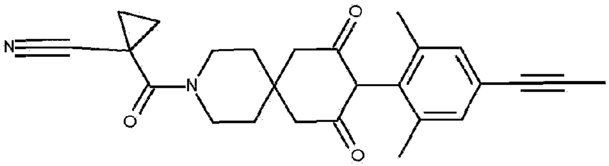
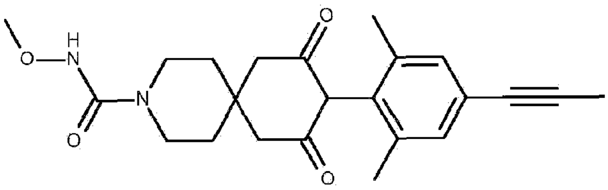
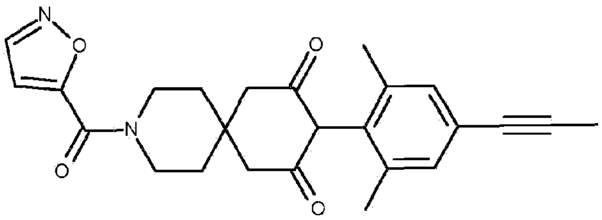
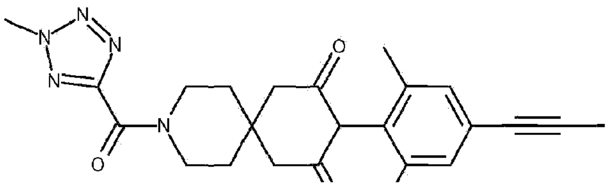
CMP	Structure	NMR or LCMS
		(m, 2 H) 7.04 (s, 2 H)
A39		1H NMR (400MHz, Methanol-d4) δ = 7.03 (s, 2H), 4.06 - 3.96 (m, 1H), 3.90 - 3.82 (m, 1H), 3.82 - 3.76 (m, 1H), 3.76 - 3.67 (m, 2H), 3.64-3.56 (m, 1H), 3.40 - 3.32 (m, 5H), 3.25 - 3.18 (m, 1H), 3.12 - 3.05 (m, 1H), 2.58 (s, 4H), 2.03 - 1.96 (m, 9H), 1.81 - 1.74 (m, 4H)
A40		1H NMR (400MHz, Methanol-d4) δ = 8.31 (s, 1H), 7.02 (s, 2H), 3.99 (s, 3H), 3.23 - 3.13 (m, 4H), 2.51 (s, 4H), 1.99 (s, 9H), 1.85 - 1.76 (m, 4H)
A41		1H NMR (400MHz, Methanol-d4) δ = 8.33-8.22 (m, 2H), 7.60 - 7.49 (m, 1H), 7.45 - 7.37 (m, 1H), 7.03 (s, 2H), 3.79-3.61 (m, 4H), 2.65 (s, 4H), 2.02 (s, 6H), 2.00 (s, 3H), 1.85 - 1.73 (m, 4H)
A42		1H NMR (400MHz, Methanol-d4) δ = 1.64-1.82 (m, 4 H) 2.00 - 2.03 (m, 3 H) 2.03 - 2.06 (m, 6 H) 2.64 (s, 4 H) 3.47-3.63 (m, 4 H) 7.06 (s, 2 H) 8.04 (s, 1 H)
A43		1H NMR (400MHz, Acetonitrile-d3) δ = 7.64 - 7.62 (m, 1H), 7.09-7.05 (m, 2H), 6.96 - 6.92 (m, 1H), 6.58 - 6.54 (m, 1H),

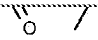
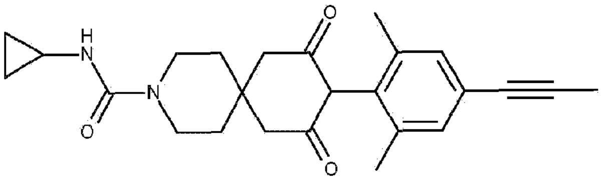
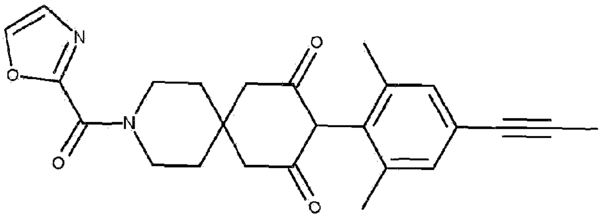
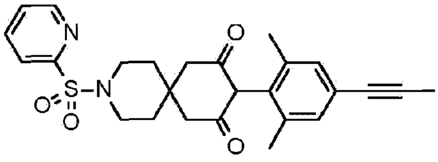
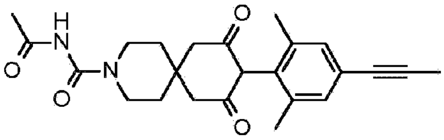
CMP	Structure	NMR or LCMS
		3.86 - 3.69 (m, 4H), 2.67 - 2.48 (m, 4H), 2.01 -2.01 (m, 6H), 1.99-1.98 (m, 3H), 1.77 - 1.70 (m, 4H)
A44		1H NMR (400MHz, Methanol-d4) δ = 7.97-7.94 (m, 1H), 7.83 - 7.80 (m, 1H), 7.06 - 7.01 (m, 2H), 4.41 - 4.31 (m, 2H), 3.88 - 3.78 (m, 2H), 2.68 -2.62 (s, 4H), 2.16-2.15 (m, 6H), 1.99 (s, 3H), 1.84 - 1.78 (m, 4H)
A45		1H NMR (400MHz, Methanol-d4) δ = 1.59 (s, 6 H) 1.77 (br d, J=6.85 Hz, 4 H) 1.98-2.01 (m, 3 H) 2.02 (s, 6 H) 2.64 (s, 4 H) 3.54 - 4.00 (m, 4 H) 7.04 (s, 2 H)
A46		1H NMR (400MHz, Methanol-d4) δ = 7.06-).92 (m, 2H), 3.86 - 3.78 (m, 2H), 3.77 - 3.69 (m, 2H), 3.09 - 3.00 (m, 2H), 2.65 - 2.61 (m, 4H), 2.04 - 1.98 (m, 9H), 1.80-1.72 (m, 4H), 1.44 - 1.39 (m, 6H)
A47		1H NMR (400MHz, Methanol-d4) δ = 8.56-3.50 (m, 1H), 7.98 - 7.85 (m, 1H), 7.49 - 7.45 (m, 1H), 7.46 - 7.37 (m, 1H), 7.08 - 6.95 (m, 2H), 4.06 - 4.00 (m, 2H), 3.71-3.60 (m, 4H), 2.65 - 2.55 (m, 4H), 2.03 - 1.96 (m, 9H), 1.72 - 1.63 (m, 4H)
A48		1H NMR (400MHz,

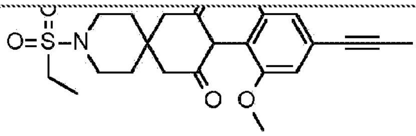
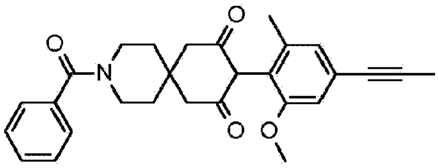
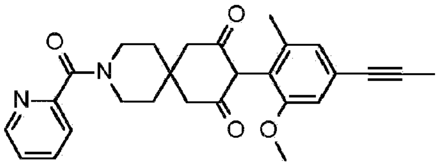
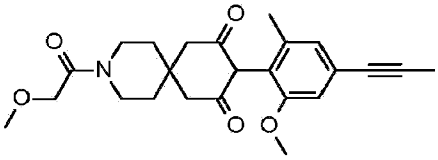
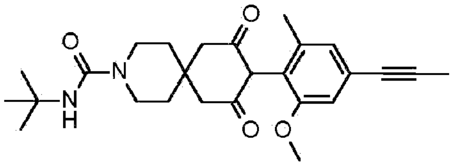
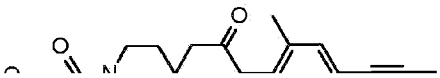
CMP	Structure	NMR or LCMS
		Methanol-d4) δ = 8.82-3.77 (m, 1H), 7.07 - 6.99 (m, 2H), 6.75 - 6.67 (m, 1H), 3.88 - 3.79 (m, 2H), 3.78 - 3.69 (m, 2H), 2.69 - 2.56 (m, 4H), 2.04-2.01 (m, 3H), 2.01 - 2.00 (m, 3H), 1.99 - 1.98 (m, 3H), 1.85 - 1.73 (m, 4H)
A49		1H NMR (400MHz, Methanol-d4) δ = 7.08-6.99 (m, 2H), 4.97 - 4.92 (m, 2H), 4.40 - 4.26 (m, 2H), 3.69 - 3.59 (m, 2H), 3.16 - 3.08 (m, 2H), 2.68 - 2.53 (m, 4H), 2.02-2.00 (m, 6H), 2.00 - 1.98 (m, 3H), 1.76 - 1.67 (m, 4H), 1.67 - 1.63 (m, 3H)
A50		1H NMR (400MHz, Methanol-d4) δ = 7.06-7.02 (m, 2H), 3.67 - 3.58 (m, 4H), 3.42 - 3.37 (m, 2H), 2.64 - 2.57 (m, 4H), 2.18 - 2.15 (m, 3H), 2.04 - 2.00 (m, 6H), 2.00-1.98 (m, 3H), 1.83 - 1.76 (m, 2H), 1.71 - 1.64 (m, 2H)
A51		1H NMR (400MHz, Methanol-d4) δ = 7.93 - 7.78 (m, 2H), 7.72 - 7.59 (m, 3H), 7.03 - 6.99 (m, 2H), 3.12 - 3.03 (m, 4H), 2.45 - 2.40 (m, 4H), 1.99 - 1.97 (m, 3H), 1.96 (s, 6H), 1.81 - 1.74 (m, 4H)
A52		1H NMR (400MHz, Methanol-d4) δ = 7.07-7.00 (m, 2H), 4.44 - 4.36 (m, 2H),

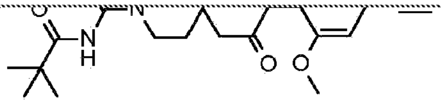
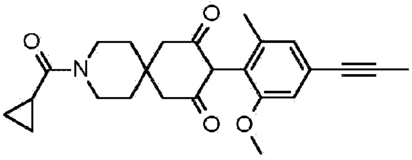
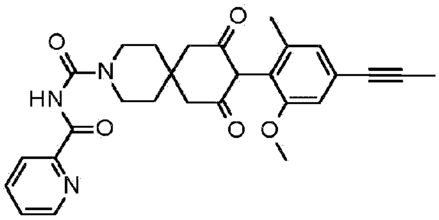
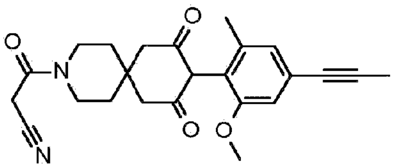
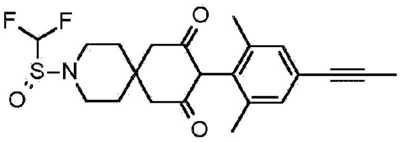
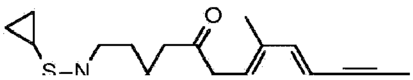
CMP	Structure	NMR or LCMS
		3.72 - 3.64 (m, 4H), 3.16 - 3.09 (m, 3H), 2.65 - 2.58 (m, 4H), 2.03 - 2.00 (m, 6H), 2.00-1.97 (m, 3H), 1.85 - 1.76 (m, 2H), 1.76 - 1.67 (m, 2H)
A53		1H NMR (400MHz, Methanol-d4) δ = 1.76-1.82 (m, 4 H) 1.98 - 2.01 (m, 9 H) 2.59 (s, 4 H) 3.31 - 3.35 (m, 5 H) 7.03 (s, 2 H)
A54		1H NMR (400MHz, Methanol-d4) δ = 1.64-1.72 (m, 2 H) 1.73 - 1.80 (m, 2 H) 1.99 (s, 3 H) 2.01 (s, 9 H) 2.61 (s, 4 H) 3.50 - 3.57 (m, 2 H) 360 - 3.69 (m, 2 H) 3.86 - 3.96 (m, 1 H) 4.05-4.09 (m, 2 H) 7.03 (s, 2 H)
A55		1H NMR (400MHz, Methanol-d4) δ = 8.51-8.41 (m, 1H), 7.06 - 6.97 (m, 2H), 3.94 - 3.78 (m, 4H), 2.69 - 2.58 (m, 4H), 2.05 - 1.96 (m, 9H), 1.84 - 1.73 (m, 4H)
A56		1H NMR (400MHz, Methanol-d4) δ = 7.07-6.99 (m, 2H), 4.83 - 4.81 (m, 2H), 3.57 - 3.43 (m, 4H), 3.05 - 2.98 (m, 1H), 2.71 - 2.65 (m, 1H), 2.63 -2.52 (m, 2H), 2.01-1.95 (m, 8H), 1.83 - 1.73 (m, 4H)
A57		1H NMR (400MHz, Methanol-d4) δ = 8.99 - 8.88 (m, 1H), 7.06 - 6.96 (s, 2H), 3.87 - 3.74 (m, 4H),

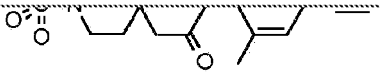
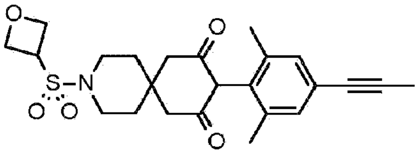
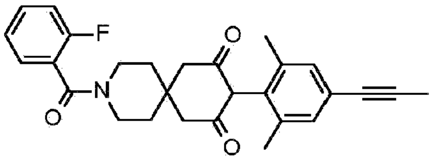
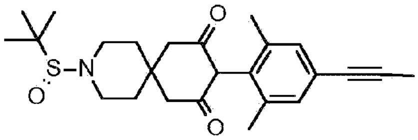
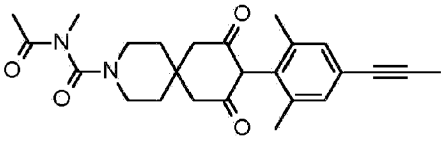
CMP	Structure	NMR or LCMS
		2.70 - 2.60 (s, 4H), 204 - 202 (s, 3H), 2.00 - 2.00 (s, 3H), 1.99 - 1.99 (s, 3H), 1.86 - 1.76 (m, 4H)
A58		1H NMR (400MHz, Methanol-d4) δ = 8.92-8.70 (m, 1H), 7.08 - 6.95 (m, 2H), 4.26 - 4.19 (m, 2H), 3.90 - 3.75 (m, 2H), 2.71 - 2.58 (m, 4H), 2.02 - 1.97 (m, 9H), 1.88-1.78 (m, 4H)
A59		1H NMR (400MHz, Methanol-d4) δ = 1.31 (d, J=6.60 Hz, 3 H) 1.63 - 1.82 (m, 4 H) 1.98-2.00 (m, 3 H) 2.00 - 2.03 (m, 6 H) 2.61 (d, J=10.39 Hz, 4 H) 3.61 (br dd, J=11.74, 6.11 Hz, 4 H) 4.58 (q, J=6.60 Hz, 1 H) 7.03 (s, 2 H)
A60		1H NMR (400MHz, Methanol-d4) δ = 7.05-7.00 (m, 2H), 4.84 - 4.81 (m, 4H), 4.22 - 4.16 (m, 1H), 3.76 - 3.69 (m, 2H), 368 - 3.63 (m, 2H), 2.62 - 2.55 (m, 4H), 2.02-2.00 (m, 6H), 2.00 - 1.97 (m, 3H), 1.72 - 1.65 (m, 4H)
A61		1H NMR (400MHz, CDC!3) δ = 7.16 (s, 2H), 3.79 - 3.47 (m, 4H), 2.57 (br s, 4H), 2.35 (s, 3H), 2.07 - 2.02 (m, 9H), 1.76 - 1.65 (m, 4H)
A62		1H NMR (400 MHz, DMSO-d6) δ ppm 1.71 (br t, J=5.44 Hz,

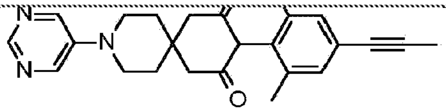
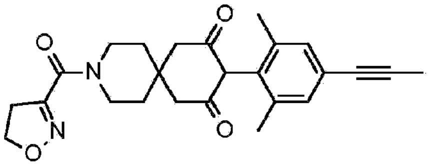
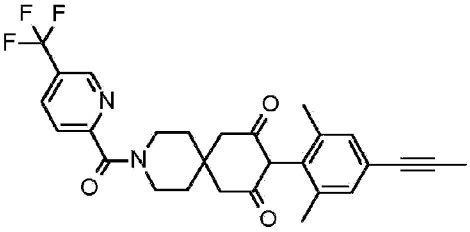
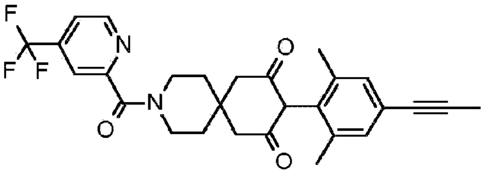
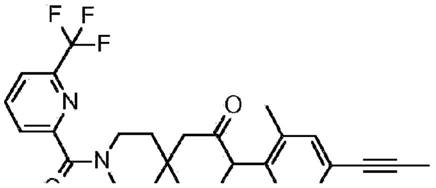
CMP	Structure	NMR or LCMS
		4 H) 1.91 - 1.98 (m, 1 H) 1.95 (d, J=7.09 Hz, 5 H) 2.02 (s, 3 H) 2.57 (br s, 4 H) 3.67 - 3.79 (m, 2 H) 3.97 (br s, 2 H) 7.01 (s, 2 H) 9.78 (s, 1 H)
A63		1H NMR (400MHz, Methanol-d4) δ ppm 1.68 - 1.83 (m, 4 H) 1.97 - 2.05 (m, 9 H) 3.73-3.98 (m, 4 H) 6.61 (d, J=2.32 Hz, 1 H) 7.03 (s, 2 H) 7.69 (d, J=2.08 Hz, 1 H)
A64		1H NMR (400MHz, Methanol-d4) δ = 8.99-8.88 (m, 1H), 7.06 - 6.96 (s, 2H), 3.87 - 3.74 (m, 4H), 2.70 - 2.60 (s, 4H), 2.04 - 2.02 (s, 3H), 2.00 - 2.00 (s, 3H), 1.99-1.99 (s, 3H), 1.86 - 1.76 (m, 4H)
A65		1H NMR (400MHz, Methanol-d4) δ = 7.03 (s, 2H), 3.63 (s, 3H), 3.45 - 3.37 (m, 4H), 2.58 (s, 4H), 2.04 - 1.96 (m, 9H), 1.73 - 1.62 (m, 4H)
A66		1H NMR (400MHz, Methanol-d4) δ = 8.53-8.46 (m, 1H), 7.09 - 6.95 (m, 2H), 6.86 - 6.74 (m, 1H), 3.86 - 3.78 (m, 2H), 372 - 3.57 (m, 2H), 2.67 - 2.59 (m, 4H), 2.03-1.98 (m, 9H), 1.86 - 1.71 (m, 4H)
A67		1H NMR (400MHz, Methanol-d4) δ = 7.10-6.95 (m, 2H), 4.43 (s, 3H), 3.90 - 3.83 (m, 2H), 3.81 - 3.73 (m, 2H), 2.65

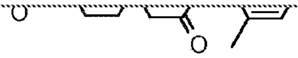
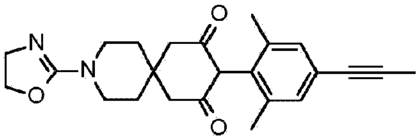
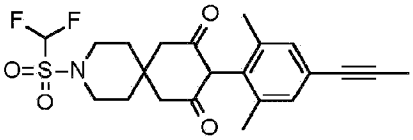
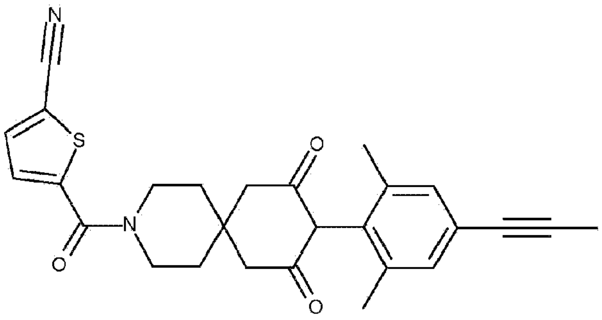
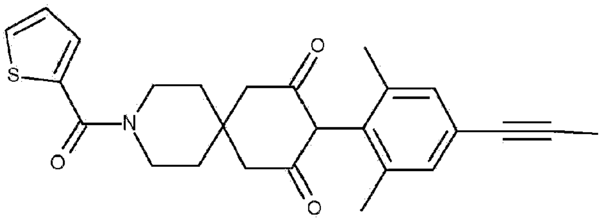
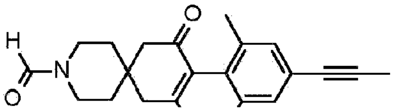
CMP	Structure	NMR or LCMS
		(d, J=1.3 Hz, 4H), 2.01-1.96 (m, 9H), 1.86 - 1.73 (m, 4H)
A68		1H NMR (400MHz, Methanol-d4) δ = 7.04-6.98 (m, 2H), 3.46 - 3.36 (m, 4H), 2.61 - 2.55 (m, 3H), 2.57-2.49 (m, 1H), 2.03 - 1.92 (m, 9H), 1.71 -1.60 (m, 4H), 0.71-0.60 (m, 2H), 0.50 - 0.34 (m, 2H)
A69		1H NMR (400MHz, Methanol-d4) δ = 8.07-8.04 (m, 1H), 7.38 - 7.34 (m, 1H), 7.06 - 7.01 (m, 2H), 4.11 - 4.05 (m, 2H), 3.85 - 3.78 (m, 2H), 2.66 - 2.61 (m, 4H), 2.04-2.00 (m, 6H), 2.00 - 1.96 (m, 3H), 1.84 - 1.77 (m, 4H)
A70		1H NMR (400MHz, Methanol-d4) δ = 8.77-8.70 (m, 1H), 8.12 - 8.04 (m, 1H), 8.00 - 7.95 (m, 1H), 7.69 - 7.62 (m, 1H), 7.04 - 6.96 (m, 2H), 3.40 - 3.34 (m, 4H), 2.53 - 2.43 (m, 4H), 1.99 - 1.98 (m, 3H), 1.98 (s, 6H), 1.80 - 1.70 (m, 4H)
A71		1H NMR (400MHz, Methanol-d4) δ = 1.68-1.78 (m, 4 H) 1.96 - 2.04 (m, 9 H) 2.15 (s, 3 H) 2.60 (s, 4 H) 3.30 (dt, J=3.27, 1.60 Hz, 2 H) 3.49 - 3.58 (m, 4 H) 7.03 (s, 2 H)
A72		1H NMR (400MHz, Methanol-d4) δ =

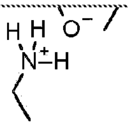
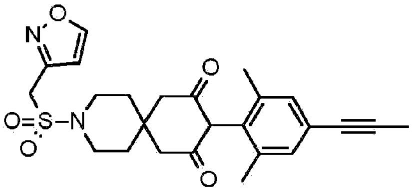
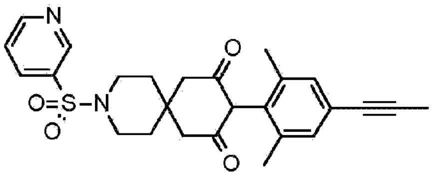
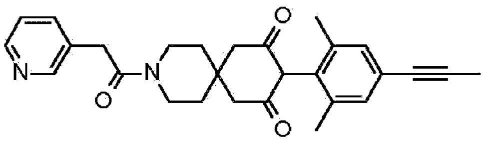
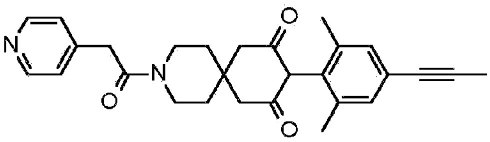
CMP	Structure	NMR or LCMS
		6.83 (s, 1H), 6.74 (s, 1H), 3.65 (s, 3H), 3.34-3.29 (m, 4H), 3.07-3.02 (q, 2H), 2.51 (m, 4H), 2.00-1.99 (m, 6H), 1.81 (t, 2H), 1.73 (t, 2H), 1.32 (t, 3H).
A73		1H NMR (400MHz, Methanol-d4) δ = 7.47-7.41 (m, 5H), 6.83 (s, 1H), 6.75 (s, 1H), 3.79-3.47 (7H), 2.59 (s, 4H), 1.99 (s, 6H), 1.83-1.64 (m, 4H)
A74		1H NMR (400MHz, Methanol-d4) δ = (8.59 (d, 1H), 7.94 (d, 1H), 7.58 (d, 1H), 7.50 (d, 1H), 6.82 (d, 1H), 6.73 (d, 1H), 3.82 (t, 2H), 3.67-3.60 (3H), 3.44 (t, 2H), 2.55 (s, 4H), 2.02-1.99 (6H), 1.86-1.68 (m, 4H),
A75		1H NMR (400MHz, Methanol-d4) δ = 6.84 (s, 1H), 6.76 (s, 1H), 4.16 (d, 2H), 3.66 (s, 3H), 3.62 (t, 2H), 3.49 (t, 2H), 3.39 (s, 3H), 2.56 (s, 4H), 2.01-1.99 (6H), 1.77-1.63 (m, 4H).
A76		1H NMR (400MHz, Methanol-d4) δ = 6.84 (s, 1H), 6.76(s, 1H), 3.66 (s, 3H), 3.43-3.38 (m, 4H), 2.53 (m, 4H), 1.99 (s, 6H), 1.69 (t, 2H), 1.62 (t, 2H), 1.32(s, 9H)
A77		1H NMR (400MHz, Methanol-d4) δ = 6.84 (s, 1H), 6.76(s,

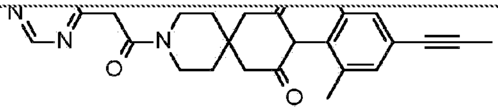
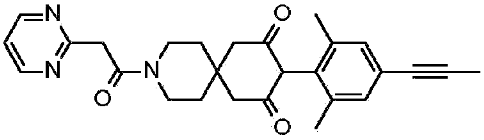
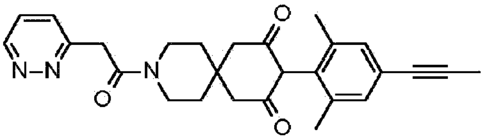
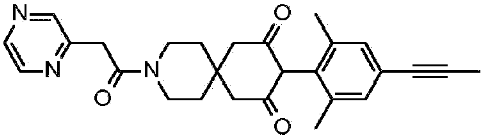
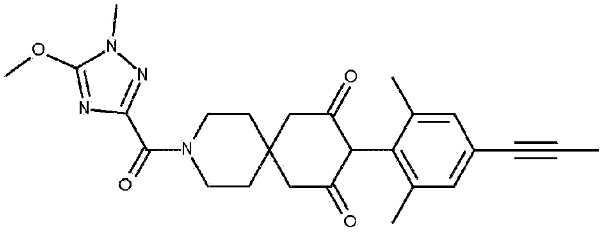
CMP	Structure	NMR or LCMS
		1H), 3.66 (s, 3H), 3.52(m, 4H), 2.57 (m, 4H), 2.00 (s, 6H), 1.77 (t, 2H), 1.71 (t, 2H), 1.22 (s, 9H)
A78		1H NMR (400MHz, Methanol-d4) δ = 6.84 (s, 1H), 6.76 (s, 1H), 3.79 (t, 2H), 3.66 (s, 3H), 3.63 (t, 2H), 2.57 (s, 4H), 2.01-1.98 (7H), 1.81-1.63 (m, 4H), 0.86-0.79 (m, 4H).
A79		1H NMR (400MHz, Methanol-d4) 6 = 8.68-8.67 (d, 1H), 8.20-8.18(d, 1H), 8.04-7.99(m, 1H), 7.64-7.61 (m, 1H), 6.84(s, 1H), 6.76(s, 1H), 3.66-3.64 (6H), 2.59 (m, 4H), 2.14 (1H), 2.01-1.99 (6H), 1.83 (t, 2H), 1.77 (t, 2H)
A80		1H NMR (400MHz, Methanol-d4) δ = 6.84 (s, 1H), 6.76 (s, 1H), 3.89-3.88 (2H), 3.66 (s, 3H), 3.64 (t, 2H), 3.48 (t, 2H), 2.56 (s, 4H), 2.01-1.99 (6H), 1.73 (m, 4H)
A81		1H NMR (400MHz, Methanol-d4) δ = 7.06-6.91 (m, 2H), 6.63 - 6.30 (m, 1H), 3.44 - 3.37 (m, 4H), 2.64 - 2.46 (m, 4H), 2.01 - 1.95 (m, 9H), 1.84 - 1.75 (m, 4H)
A82		1H NMR (400MHz, Methanol-d4) δ = 0.96-1.04 (m, 2 H)

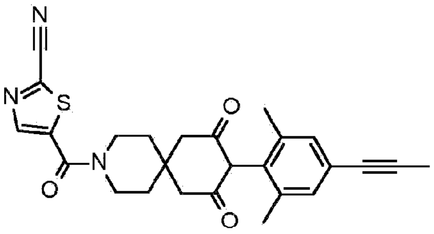
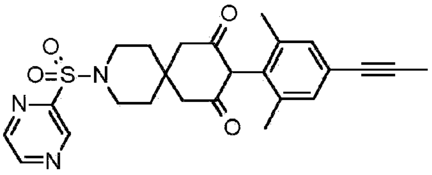
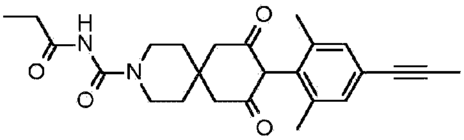
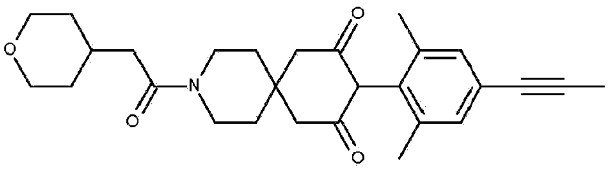
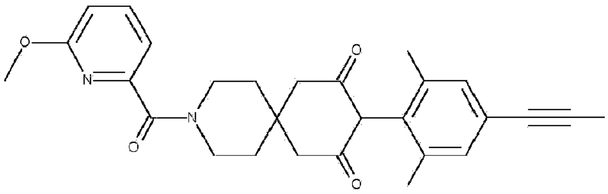
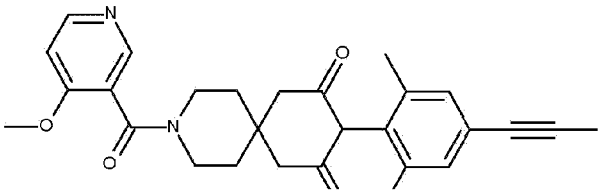
CMP	Structure	NMR or LCMS
		1.14 - 1.21 (m, 2 H) 1.80 (br t, J=5.56 Hz, 4 H) 2.04 (s, 9 H) 2.22 - 2.31 (m, 1 H) 2.55 (s, 4 H) 3.36 (br s, 4 H) 7.15 (s, 2 H).
A83		1H NMR (400MHz, Methanol-d4) δ = 7.05-7.02 (m, 2H), 4.93 - 4.89 (m, 2H), 4.86 - 4.82 (m, 2H), 4.70 - 4.62 (m, 1H), 3.36 - 3.31 (m, 4H), 2.61 - 2.55 (m, 4H), 2.01-2.00 (m, 6H), 1.99 - 1.98 (m, 3H), 1.78 - 1.72 (m, 4H)
A84		1H NMR (400MHz, Methanol-d4) δ = 7.54-7.47 (m, 1H), 7.42 - 7.36 (m, 1H), 7.34 - 7.27 (m, 1H), 7.25 - 7.16 (m, 1H), 7.05 - 6.97 (m, 2H), 3.89 - 3.78 (m, 2H), 3.44-3.36 (m, 2H), 2.68 - 2.54 (m, 4H), 2.03 - 2.01 (m, 3H), 1.99- 1.94 (m, 6H), 1.83 - 1.77 (m, 2H), 1.72 - 1.63 (m, 2H)
A85		1H NMR (400MHz, Methanol-d4) δ = 7.04-6.91 (m, 2H), 3.26 - 3.16 (m, 4H), 2.58 - 2.49 (m, 4H), 2.03 - 1.96 (m, 9H), 1.77 - 1.68 (m, 4H), 1.22 - 1.15 (m, 9H)
A86		1H NMR (400MHz, Methanol-d4) δ = 1.74 (br t, J=5.14 Hz, 4 H) 2.04 (s, 9 H) 2.12 (s, 3 H) 2.59 (br s, 4 H) 3.55 (br s, 4 H) 7.14 (s, 2 H)
A87		1H NMR (400MHz, Methanol-d4) δ =

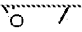
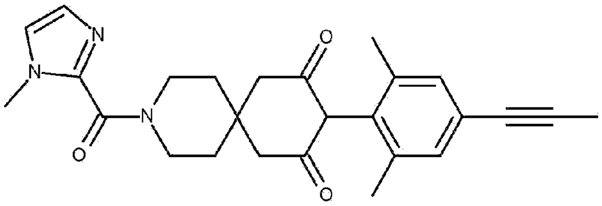
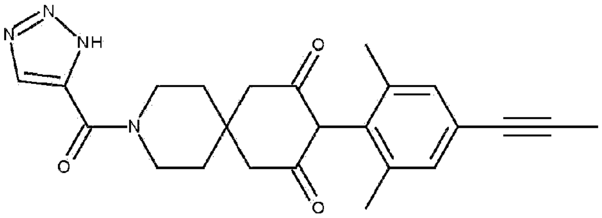
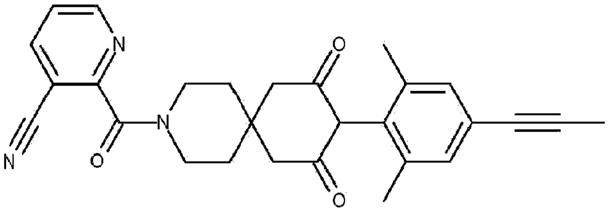
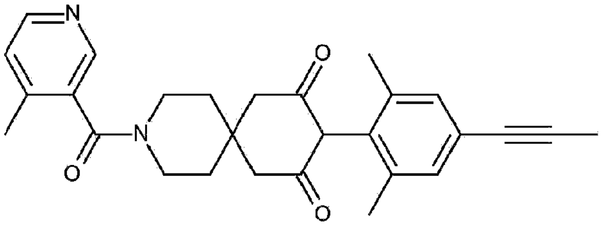
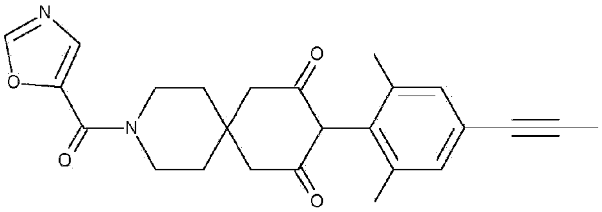
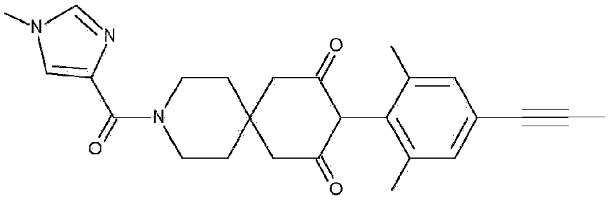
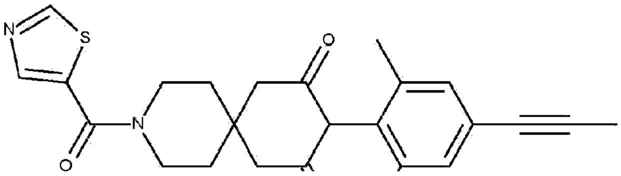
CMP	Structure	NMR or LCMS
		1.84-1.91 (m, 4 H) 1.98 - 2.00 (m, 3 H) 2.03 (s, 6 H) 2.58 (s, 4 H) 3.40 (br s, 4 H) 7.02 (s, 2 H) 8.46-8.50 (m, 2 H) 8.52 (s, 1 H).
A88		1H NMR (400MHz, Methanol-d4) δ = 7.04 (s, 2H), 4.39 (t, J = 10.5 Hz, 2H), 3.84 - 3.79 (m, 2H), 3.78 - 3.72 (m, 2H), 3.27 - 3.22 (m, 3H), 2.64 (s, 4H), 2.02 (s, 3H), 2.01 (s, 3H), 1.99 (s, 3H), 1.79 - 1.73 (m, 4H)
A89		1H NMR (400MHz, Methanol-d4) δ = 8.98-8.89 (m, 1H), 8.31 - 8.23 (m, 1H), 7.82 - 7.76 (m, 1H), 7.11 - 6.97 (m, 2H), 3.88 - 3.80 (m, 2H), 3.52 - 3.43 (m, 2H), 2.70-2.56 (m, 4H), 2.04 - 2.01 (m, 3H), 2.01 - 1.96 (m, 6H), 1.87 - 1.70 (m, 4H)
A90		1H NMR (400MHz, Methanol-d4) δ = 8.88-8.81 (m, 1H), 7.96 - 7.88 (m, 1H), 7.82 - 7.74 (m, 1H), 7.06 - 6.98 (m, 2H), 3.90 - 3.78 (m, 2H), 3.59 - 3.46 (m, 2H), 2.72-2.56 (m, 4H), 2.04 - 2.01 (m, 3H), 2.00 - 1.96 (m, 6H), 1.88 - 1.71 (m, 4H)
A91		1H NMR (400MHz, Methanol-d4) δ = 8.21-8.14 (m, 1H), 7.93 - 7.84 (m, 2H), 7.06 - 6.99 (m, 2H), 3.89 - 3.81 (m, 2H),

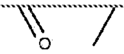
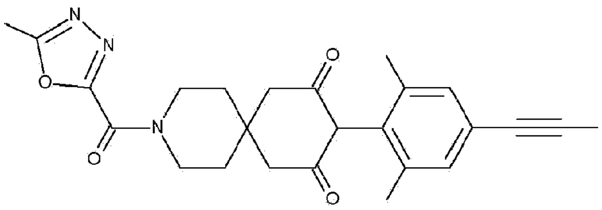
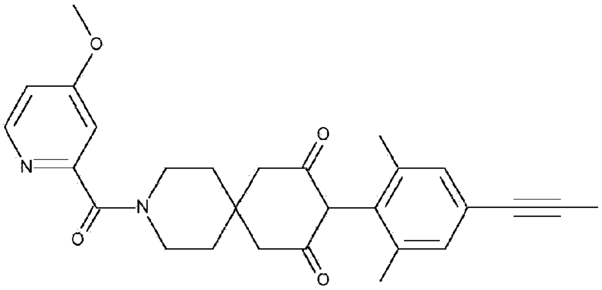
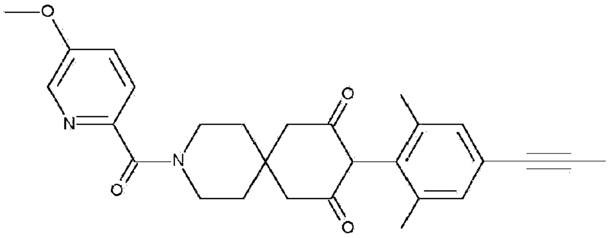
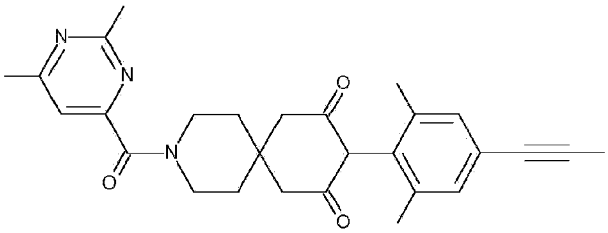
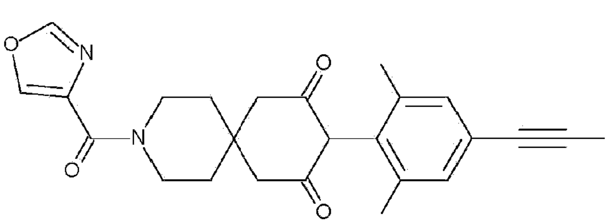
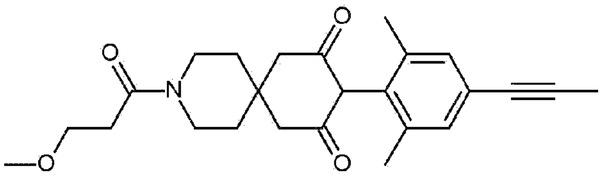
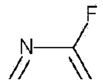
CMP	Structure	NMR or LCMS
		3.56 - 3.49 (m, 2H), 2.73 - 2.58 (m, 4H), 2.05-2.01 (m, 3H), 2.00 - 1.96 (m, 6H), 1.86 - 1.71 (m, 4H)
A92		1H NMR (400MHz, Methanol-d4) δ = 1.77-1.88 (m, 4 H) 1.97 - 1.99 (m, 3 H) 2.02 (s, 6 H) 2.52 (s, 4 H) 3.54 - 3.67 (m, 4 H) 3.92 (t, J=8.50 Hz, 2 H) 6.98 - 7.02 (m, 2 H)
A93		1H NMR (400MHz, Methanol-d4) δ = 7.08-7.03 (m, 2H), 6.62 - 6.32 (m, 1H), 3.28 - 3.22 (m, 4H), 3.09 - 3.03 (m, 2H), 2.82 - 2.76 (m, 2H), 2.06 - 1.99 (m, 10H), 2.00 - 1.89 (m, 4H)
A94		1H NMR (400MHz, Methanol-d4) δ = 7.75-7.72 (m, 1H), 7.46 - 7.42 (m, 1H), 7.06 - 7.01 (m, 2H), 3.83 - 3.71 (m, 4H), 2.67 - 2.63 (m, 4H), 2.03 - 2.00 (m, 6H), 2.00-1.98 (m, 3H), 1.83 - 1.75 (m, 4H)
A95		1H NMR (400MHz, Methanol-d4) δ = 7.65-7.62 (m, 1H), 7.42 - 7.39 (m, 1H), 7.14 - 7.10 (m, 1H), 7.05 - 7.00 (m, 2H), 3.83 - 3.75 (m, 4H), 2.68 - 2.62 (m, 6H), 2.04-2.00 (m, 6H), 2.00 - 1.98 (m, 3H), 1.81 - 1.75 (m, 4H)
A96		1H NMR (400MHz, Methanol-d4) δ = 1.24 (t, J=7.34 Hz, 3 H) 1.61-1.77 (m, 4

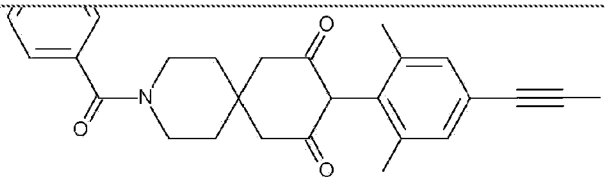
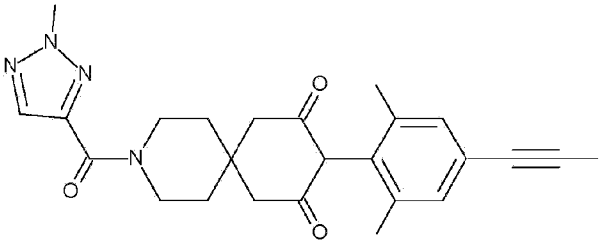
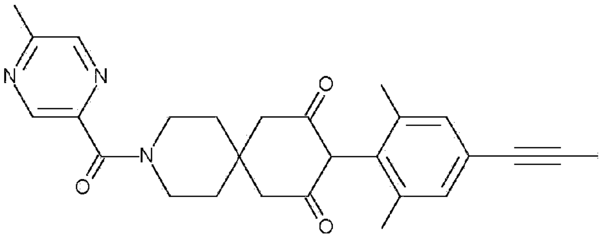
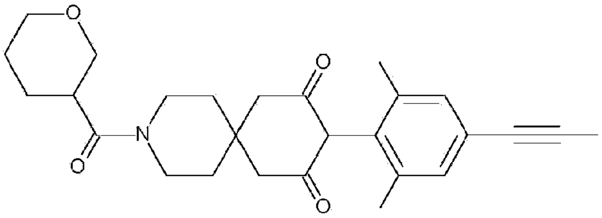
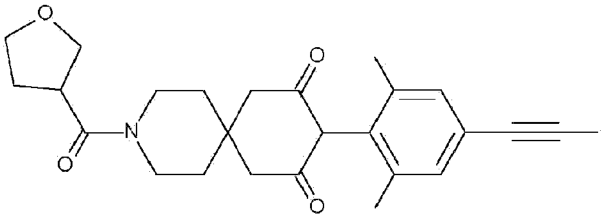
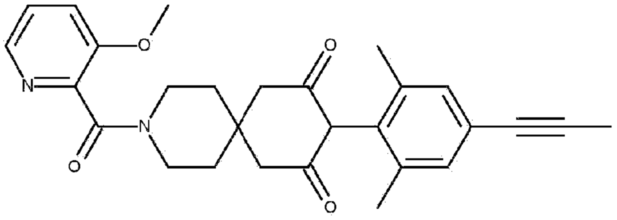
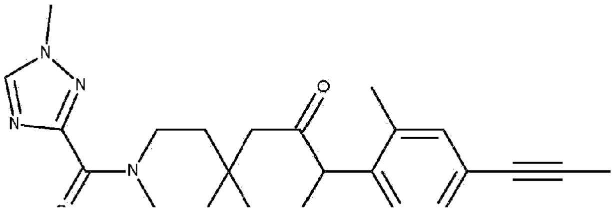
CMP	Structure	NMR or LCMS
		H) 1.98 (s, 3 H) 2.01 - 2.06 (m, 6 H) 2.39 - 2.49 (m, 4 H) 2.86 - 2.94 (m, 2 H) 3.48 (br s, 2 H) 3.53-3.59 (m, 2 H) 6.99 (s, 2 H) 8.00 (s, 1 H).
A97		1H NMR (400MHz, Methanol-d4) δ = 8.72 (d, J=1.7 Hz, 1H), 7.02 (s, 2H), 6.66 (d, J=1.6 Hz, 1H), 4.56 (s, 2H), 2.54 (s, 4H), 2.00 (s, 6H), 1.99 (s, 3H), 1.72-1.68 (m, 4H)
A98		1H NMR (400MHz, Methanol-d4) δ = 8.95 (d, J=1.6 Hz, 1H), 8.83 (dd, J=1.5, 5.0 Hz, 1H), 8.23 (ddd, J=1.6, 2.2, 8.1 Hz, 1H), 7.68 (ddd, J=0.7, 4.9, 8.0 Hz, 1H), 7.01 (s, 2H), 3.19 - 3.12 (m, 4H), 2.45 (s, 4H), 1.98 (s, 3H), 1.98 - 1.96 (m, 6H), 1.83 - 1.77 (m, 4H)
A99		1H NMR (400MHz, Methanol-d4) δ = 8.42 (d, 2H), 7.74 (d, 1H), 7.42-7.39 (d, 1H), 7.02 (s, 2H), 3.85 (s, 2H), 3.65 (4H), 2.59 (s, 4H), 2.00-1.98 (9H), 1.68-1.66 (4H)
A100		1H NMR (400MHz, Methanol-d4) δ = 7.04 (s, 2H), 3.32-3.24(s, 4H), 2.65(s, 4H), 2.00-1.98(9H), 1.84(m, 4H)
A101		1H NMR (400MHz, Methanol-d4) δ =

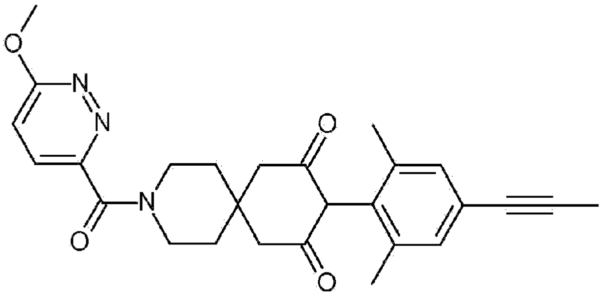
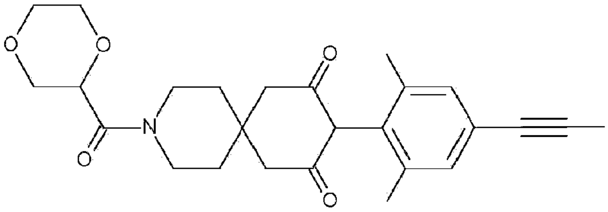
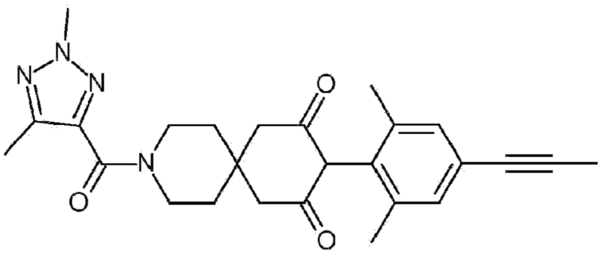
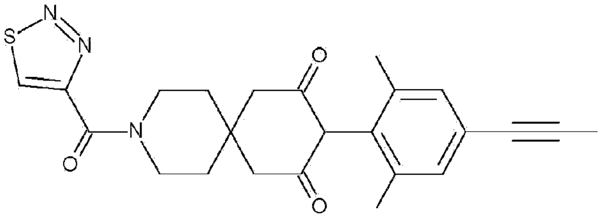
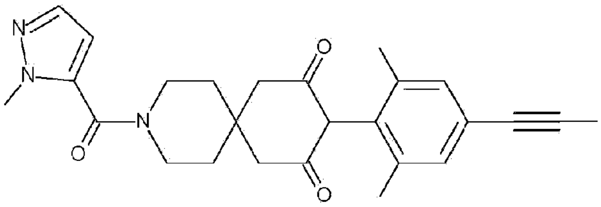
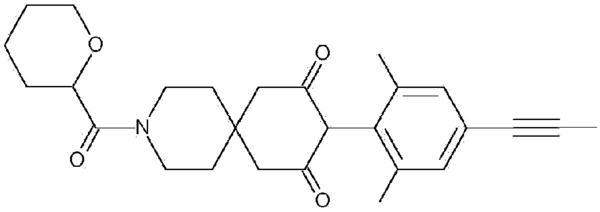
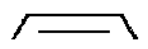
CMP	Structure	NMR or LCMS
		9.07 (s, 1H), 8.70 (d, 1H), 7.49 (s, 1H), 7.02 (s, 2H), 4.00 (s, 2H), 3.66 (4H), 2.59 (s, 4H), 2.00-1.98 (9H), 1.74-1.68 (4H)
A102		1H NMR (400MHz, Methanol-d4) δ = 8.74(d, 2H), 7.37(1H), 7.02 (s, 2H), 4.12 (s, 2H), 3.69-3.62 (m, 4H), 2.59(s, 4H), 2.00-1.98 (9H), 1.73-1.68 (4H)
A103		1H NMR (400MHz, Methanol-d4) δ = 9.10 (t, 1H), 7.71 (d, 2H), 7.04 (s, 2H), 4.00 (s, 2H), 4.19-4.17 (2H), 3.73-3.67 (m, 4H), 2.61 (s, 4H), 2.02-2.00 (9H), 1.77-1.76 (4H), 1.72-1.69 (4H)
A104		1H NMR (400MHz, Methanol-d4) δ = 8.58 (s, 1H), 8.55-8.54(m, 1H), 8.48 (d, 1H), 7.02 (s, 2H), 4.04 (s, 2H), 3.70-3.65 (m, 4H), 2.59 (s, 4H), 2.00-1.98(9H), 1.75-1.73(2H), 1.69-1.67 (2H)
A105		1H NMR (400MHz, Methanol-d4) δ = 7.06-7.00 (m, 2H), 4.14 - 4.10 (m, 3H), 3.93 - 3.85 (m, 2H), 3.84 - 3.77 (m, 2H), 3.67 - 3.63 (m, 3H), 2.69 - 2.59 (m, 4H), 2.03-2.01 (m, 3H), 2.01 - 2.00 (m, 3H), 2.00 - 1.98 (m, 3H), 1.81-1.71 (m, 4H)

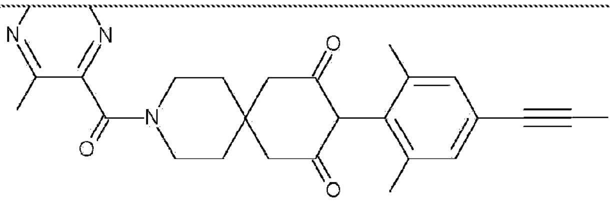
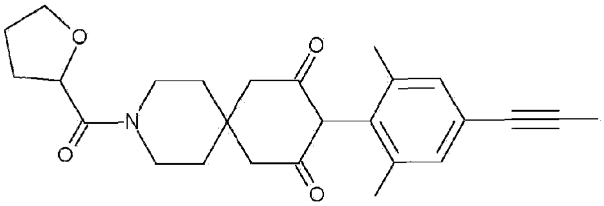
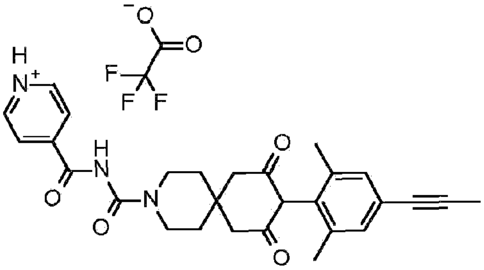
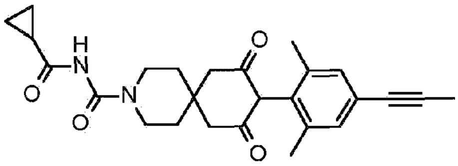
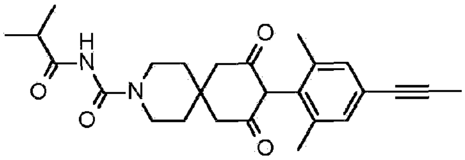
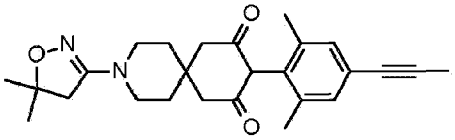
CMP	Structure	NMR or LCMS
A106		1H NMR (400MHz, Methanol-d4) δ = 8.32-8.27 (m, 1H), 7.35 - 7.28 (m, 2H), 7.06 - 7.00 (m, 2H), 3.86 - 3.69 (m, 4H), 2.68 - 2.61 (m, 4H), 2.03 - 2.00 (m, 6H), 1.99-1.98 (m, 3H), 1.84 - 1.78 (m, 4H)
A107		1H NMR (400MHz, Methanol-d4) δ = 9.12 (d, J = 1.5 Hz, 1H), 8.86 (d, J = 2.3 Hz, 1H), 8.78 (dd, J = 1.5, 2.4 Hz, 1H), 7.02 (s, 2H), 3.48 - 3.37 (m, 4H), 2.52 (s, 4H), 1.98 (s, 9H), 1.83 - 1.72 (m, 4H)
A108		1H NMR (400MHz, Methanol-d4) δ = 7.03 (s, 2H), 3.59 - 3.50 (m, 4H), 2.59 (s, 4H), 2.44 (q, J = 7.5 Hz, 2H), 2.01 (s, 6H), 2.00 - 1.98 (m, 3H), 1.76 - 1.70 (m, 4H), 1.13 (t, J = 7.5 Hz, 3H)
A109		LCMS M+H: 450
A110		LCMS M+H: 459
A111		LCMS M+H: 459

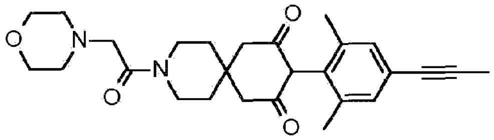
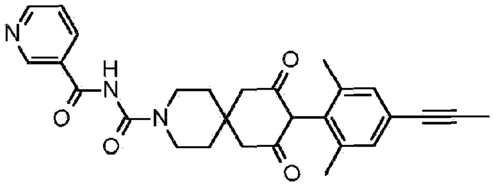
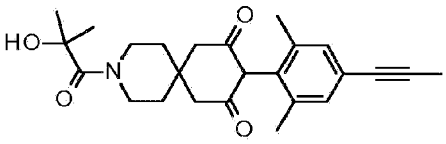
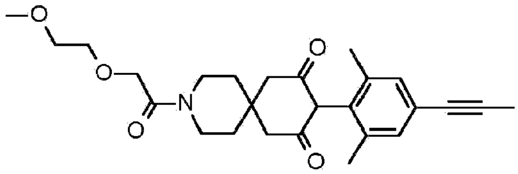
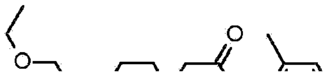
CMP	Structure	NMR or LCMS
		
A112		LCMS M+H: 432
A113		LCMS M+H: 419
A114		LCMS M+H: 454
A115		LCMS M+H: 443
A116		LCMS M+H: 419
A117		LCMS M+H: 432
A118		LCMS M+H: 435

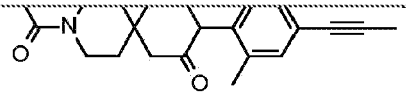
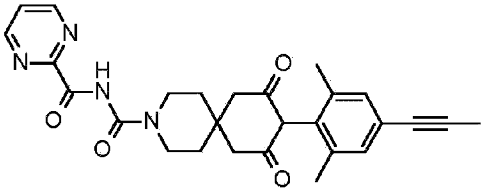
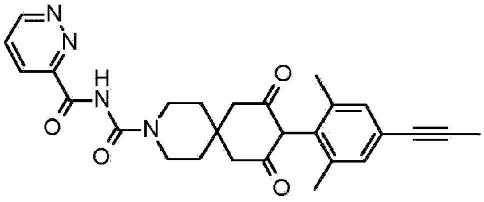
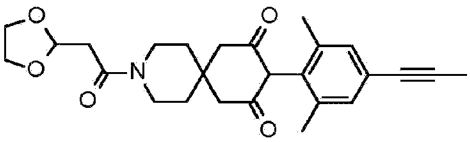
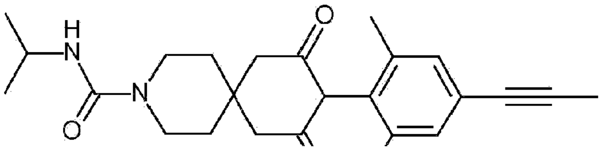
CMP	Structure	NMR or LCMS
		
A119		LCMS M+H: 434
A120		LCMS M+H: 459
A121		LCMS M+H: 459
A122		LCMS M+H: 458
A123		LCMS M+H: 419
A124		LCMS M+H: 410
A125		LCMS M+H: 447

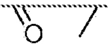
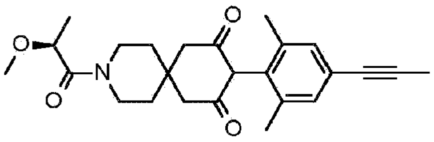
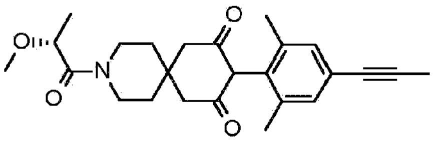
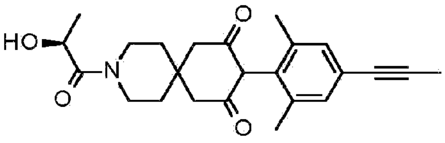
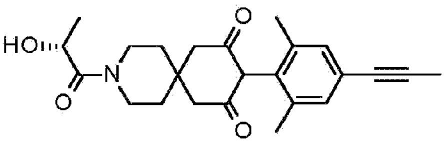
CMP	Structure	NMR or LCMS
		
A126		LCMS M+H: 433
A127		LCMS M+H: 444
A128		LCMS M+H: 436
A129		LCMS M+H: 422
A130		LCMS M+H: 459
A131		LCMS M+H: 433

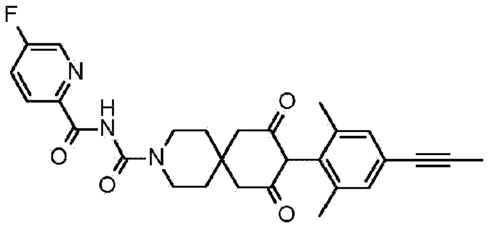
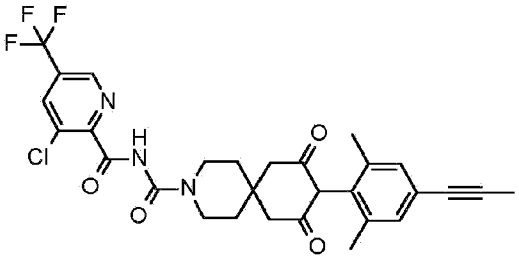
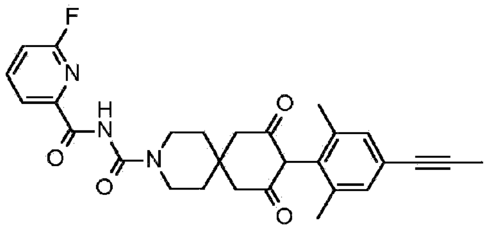
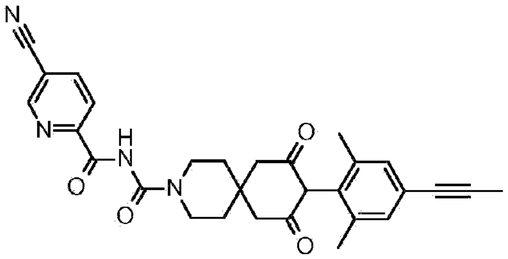
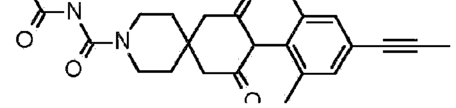
CMP	Structure	NMR or LCMS
		
A132		LCMS M+H: 460
A133		LCMS M+H: 438
A134		LCMS M+H: 447
A135		LCMS M+H: 436
A136		LCMS M+H: 432
A137		LCMS M+H: 436
A138		LCMS M+H: 444

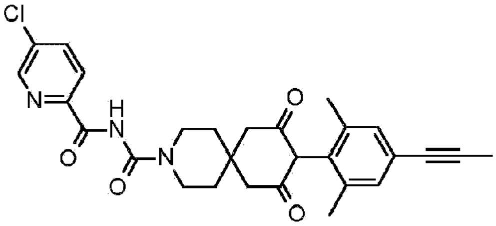
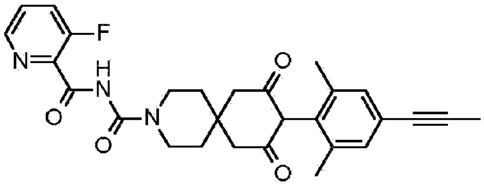
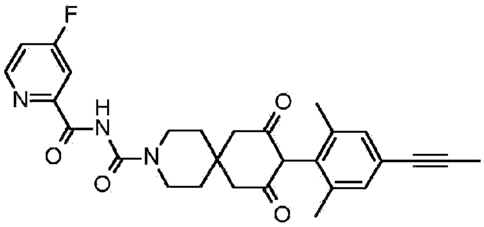
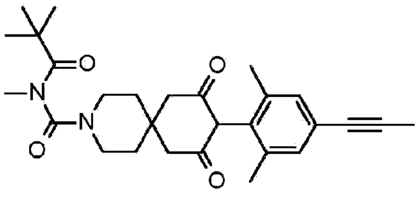
CMP	Structure	NMR or LCMS
		
A139		LCMS M+H: 422
A140		1H NMR (400MHz, Methanol-d4) δ = 8.80 (d, J = 6.0 Hz, 2H), 7.94 (d, J = 5.0 Hz, 2H), 7.04 (s, 2H), 3.63 (br s, 4H), 2.64 (s, 4H), 2.01 (s, 6H), 2.00 - 1.99 (m, 3H), 1.80 (br d, J = 5.9 Hz, 4H)
A141		1H NMR (400MHz, Methanol-d4) δ = 7.03 (s, 2H), 3.59 - 3.51 (m, 4H), 2.59 (s, 4H), 2.01 (s, 6H), 1.99 (s, 3H), 1.94 - 1.87 (m, 1H), 1.77 - 1.70 (m, 4H), 0.98- 0.92 (m, 2H), 0.91 - 0.85 (m, 2H)
A142		1H NMR (400MHz, Methanol-d4) δ = 7.03 (s, 2H), 3.59 - 3.48 (m, 4H), 2.66 (quin, J = 6.9 Hz, 1H), 2.60 (s, 4H), 2.01 (s, 6H), 1.99 (s, 3H), 1.76- 1.70 (m, 4H), 1.14 (d, J = 6.8 Hz, 6H)
A143		1H NMR (400 MHz, methanol) δ ppm 1.35 (s, 6 H) 1.69- 1.78 (m, 4 H) 1.96 - 2.03 (m, 9 H) 2.58 (s, 4 H) 2.87 (s, 2 H)

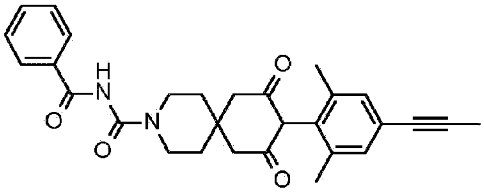
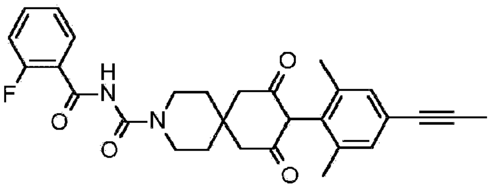
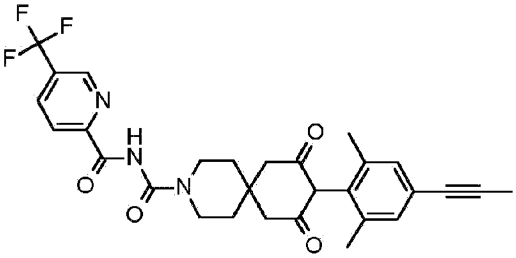
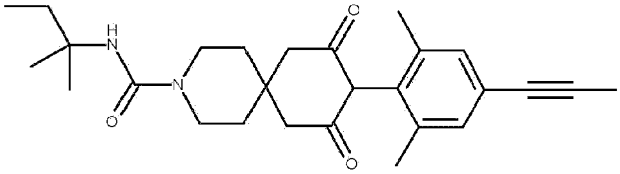
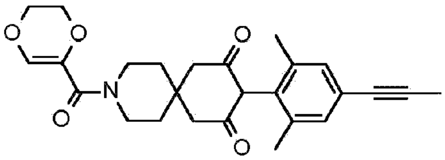
CMP	Structure	NMR or LCMS
		3.22 - 3.28 (m, 4 H) 7.03 (s, 2 H).
A144		1H NMR (400MHz, Methanol-d4) δ = 7.06-7.02 (m, 2H), 4.84 - 4.82 (m, 8H), 4.32 - 4.26 (m, 2H), 3.72- 3.66 (m, 2H), 3.48 - 3.43 (m, 2H), 2.67 - 2.57 (m, 4H), 2.03-2.00 (m, 6H), 2.00 - 1.98 (m, 3H), 1.82 - 1.75 (m, 2H), 1.75 - 1.68 (m, 2H)
A145		1H NMR (400MHz, Methanol-d4) δ = 8.69-8.66 (m, 1H), 8.19 (td, J = 1.0, 7.8 Hz, 1H), 8.02 (dt, J = 1.7, 7.7 Hz, 1H), 7.63 (ddd, J = 1.2, 4.8, 7.6 Hz, 1H), 7.03 (s, 2H), 3.69 - 3.62 (m, 4H), 2.63 (s, 4H), 2.02 - 2.01 (m, 6H), 2.00 - 1.98 (m, 3H), 1.84 - 1.78 (m, 4H)
A146		1H NMR (400MHz, Methanol-d4) δ = 1.43 (s, 6 H) 1.69 (br s, 4 H) 1.96 - 2.03 (m, 9 H) 2.60 (s, 4 H) 3.49 - 4.20 (m, 4 H) 7.04 (s, 2 H).
A147		1H NMR (400MHz, Methanol-d4) δ = 7.02 (s, 2H), 4.24 (s, 2H), 3.68 - 3.61 (m, 4H), 3.58 - 3.52 (m, 4H), 3.36 (s, 3H), 2.58 (s, 4H), 2.02 (s, 6H), 1.99 (s, 3H), 1.78 - 1.73 (m, 2H), 1.70 - 1.65 (m, 2H)
A148		1H NMR (400MHz, Methanol-d4) δ = 7.03 (s, 2H), 4.19 (s,

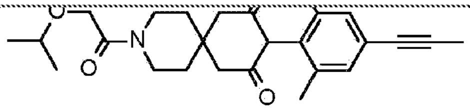
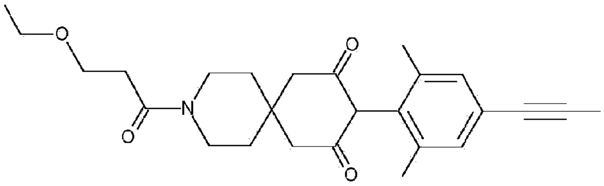
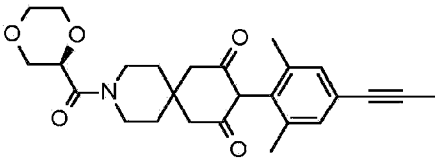
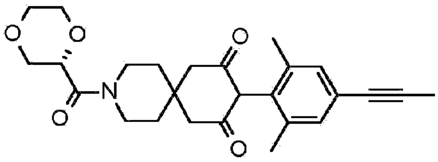
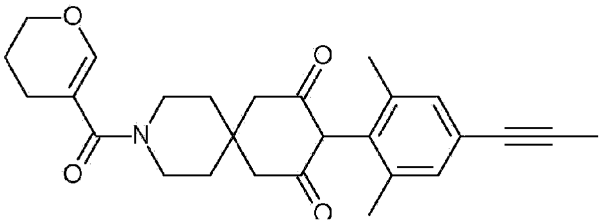
CMP	Structure	NMR or LCMS
		2H), 3.66 - 3.61 (m, 2H), 3.59 - 3.52 (m, 4H), 2.58 (s, 4H), 2.03 - 2.00 (m, 6H), 1.99 (s, 3H), 1.77 - 1.72 (m, 2H), 1.71 - 1.65 (m, 2H), 1.22 (t, J = 7.0 Hz, 3H)
A149		1H NMR (400MHz, Methanol-d4) δ = 8.97 (d, J = 4.9 Hz, 2H), 7.72 (s, 1H), 7.67 (t, J = 4.9 Hz, 1H), 7.04 (s, 2H), 3.65 (br s, 4H), 2.61 (s, 4H), 2.02 (s, 6H), 1.99 (s, 3H), 1.91 - 1.72 (m, 4H)
A150		1H NMR (400MHz, Methanol-d4) δ = 9.38 (dd, J = 1.7, 5.1 Hz, 1H), 8.37 (dd, J = 1.7, 8.5 Hz, 1H), 7.94 (dd, J = 5.1, 8.6 Hz, 1H), 7.03 (s, 2H), 3.71 - 3.64 (m, 4H), 2.62 (s, 4H), 2.02 (s, 6H), 1.99 (s, 3H), 1.85-1.78 (m, 4H)
A151		1H NMR (400MHz, Methanol-d4) δ = 7.05-7.00 (m, 2H), 5.22 - 5.17 (m, 1H), 4.00 - 3.92 (m, 2H), 3.90 - 3.83 (m, 2H), 3.68 - 3.59 (m, 4H), 2.81 -2.76 (m, 2H), 2.61-2.56 (m, 4H), 2.03 - 2.00 (m, 6H), 2.00 - 1.97 (m, 3H), 1.78 - 1.72 (m, 2H), 1.69 - 1.64 (m, 2H)
A152		1H NMR (400MHz, Methanol-d4) δ = 7.03 (s, 2H), 3.94 - 3.82 (m, 1H), 3.50 - 3.39 (m, 4H), 2.58

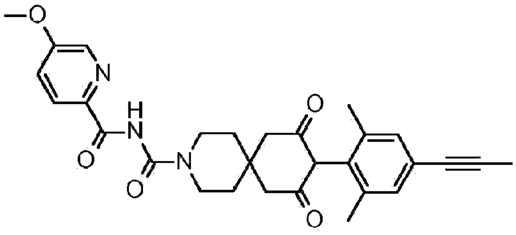
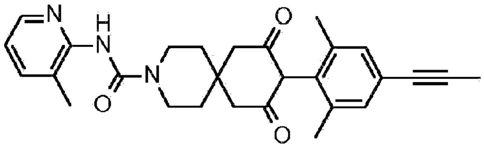
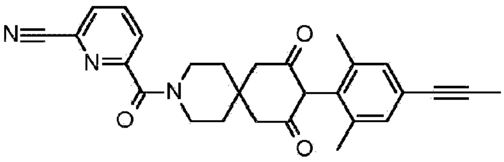
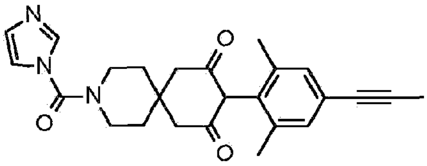
CMP	Structure	NMR or LCMS
		(s, 4H), 2.01 - 1.99 (m, 9H), 1.72-1.58 (m, 4H), 1.14 (d, 6H)
A153		1H NMR (400MHz, Methanol-d4) δ = 1.32 (d, J=6.72 Hz, 3 H) 1.65 - 1.80 (m, 4 H) 2.00 (d, J=8.93 Hz, 9 H) 2.62 (d, J=4.52 Hz, 4 H) 3.57 - 3.74 (m, 4 H) 4.27 (d, J=6.60 Hz, 1 H) 7.04 (s, 2 H).
A154		1H NMR (400MHz, Methanol-d4) δ = 1.32 (d, J=6.60 Hz, 3 H) 1.65 - 1.78 (m, 4 H) 2.00 (d, J=9.17 Hz, 9 H) 2.61 (d, J=4.52 Hz, 4 H) 3.57 - 3.74 (m, 4 H) 4.27 (q, J=6.68 Hz, 1 H) 7.04 (s, 2 H).
A155		1H NMR (400MHz, Methanol-d4) δ = 1.43 (t, J=6.54 Hz, 5 H) 1.62 - 1.91 (m, 4 H) 2.00 (d, J=8.44 Hz, 9 H) 2.62 (br d, J=18.71 Hz, 4 H) 3.44 - 3.84 (m, 4 H) 4.31 (d, J=6.85 Hz, 1 H) 5.46 - 5.54 (m, 1 H) 7.04 (s, 2 H).
A156		1H NMR (400 MHz, methanol) δ ppm 1.43 (dd, J=12.47, 6.85 Hz, 6 H) 1.55 (d, J=6.97 Hz, 3 H) 2.00 (d, J=9.66 Hz, 9 H) 2.61 (br d, J=15.41 Hz, 5 H) 3.44 - 3.82 (m, 5 H) 4.31 (q, J=6.97 Hz, 1 H) 5.16 (q, J=6.97 Hz, 1 H) 5.52 (d, J=6.85 Hz, 1 H) 7.03 (s, 2 H).

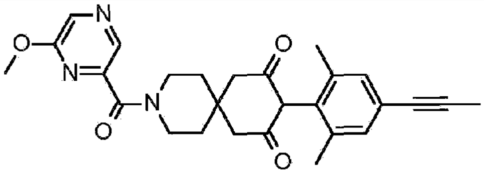
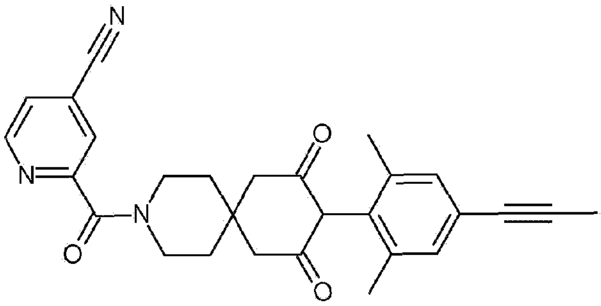
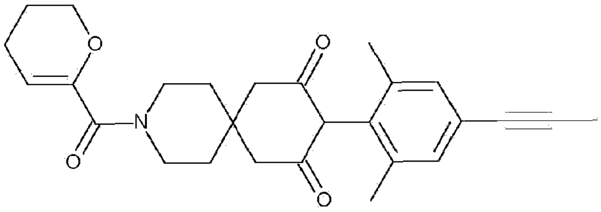
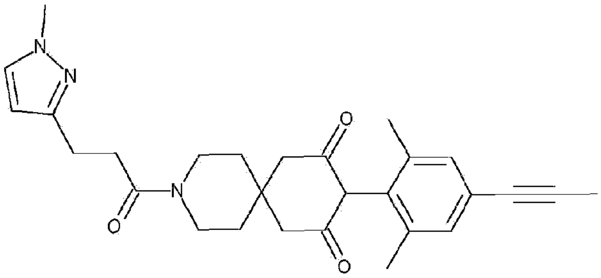
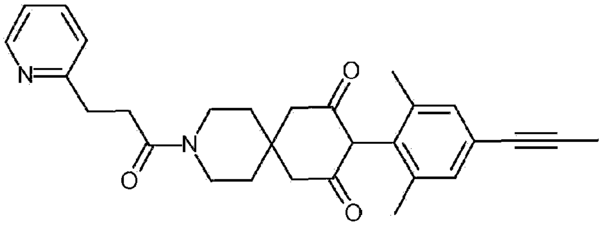
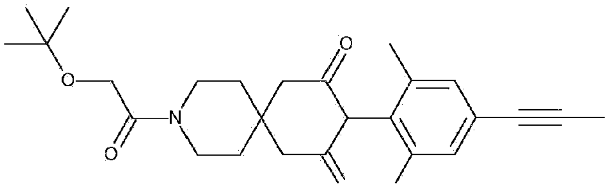
CMP	Structure	NMR or LCMS
A157		1H NMR (400MHz, Methanol-d4) δ = 8.57 (d, J = 2.8 Hz, 1H), 8.25 (dd, J = 4.5, 8.7 Hz, 1H), 7.81 (dt, J = 2.8, 8.5 Hz, 1H), 7.03 (s, 2H), 3.65 (br s, 4H), 2.63 (s, 4H), 2.02 (s, 6H), 2.00 - 1.97 (m, 3H), 1.83 - 1.77 (m, 4H)
A158		1H NMR (400MHz, Methanol-d4) δ = 8.82 (s, 1H), 8.36 (s, 1H), 7.03 (s, 2H), 3.58 (br s, 4H), 2.61 (s, 4H), 2.01 (s, 6H), 1.99 (s, 3H), 1.75 (br s, 4H)
A159		1H NMR (400MHz, Methanol-d4) δ = 8.21 - 8.07 (m, 2H), 7.35 (dd, J = 1.6, 8.1 Hz, 1H), 7.03 (s, 2H), 3.65 - 3.61 (m, 4H), 2.64 (s, 4H), 2.02 (s, 6H), 1.99 (s, 3H), 1.84- 1.76 (m, 4H)
A160		1H NMR (400MHz, Methanol-d4) δ = 9.01 (dd, J = 0.9, 2.0 Hz, 1H), 8.41 (dd, J = 2.0, 8.1 Hz, 1H), 8.31 (dd, J = 0.8, 8.1 Hz, 1H), 7.03 (s, 2H), 3.66 (s, 4H), 2.64 (s, 4H), 2.01 (d, J = 2.3 Hz, 6H), 1.99 (s, 3H), 1.85- 1.76 (m, 4H)
A161		1H NMR (400MHz, Methanol-d4) δ = 8.47 (d, J = 5.7 Hz, 1H), 7.71 (d, J = 2.4 Hz, 1H), 7.16 (dd, J = 2.6, 5.7 Hz, 1H),

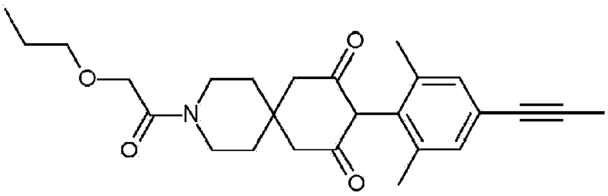
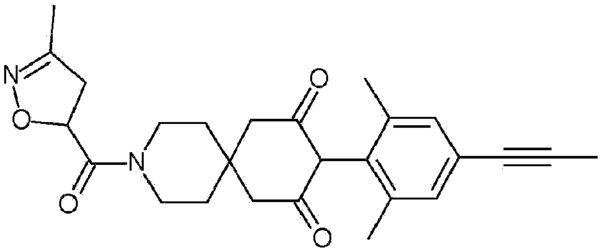
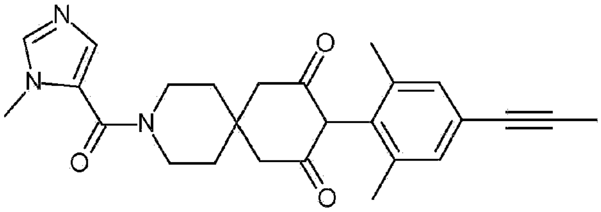
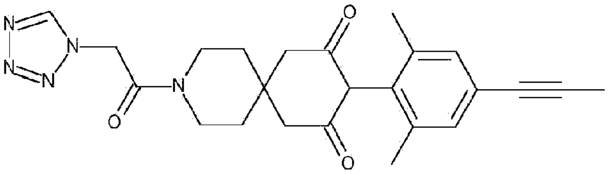
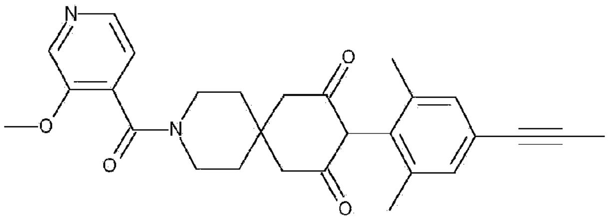
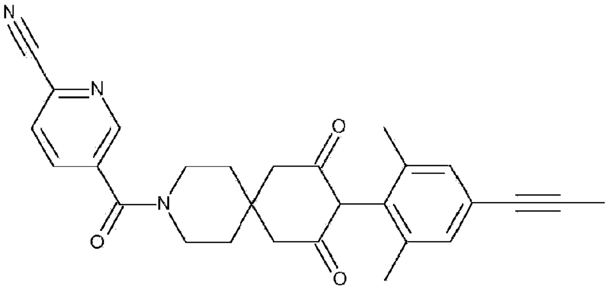
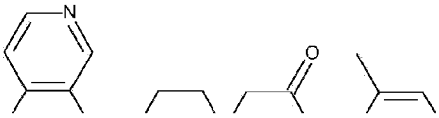
CMP	Structure	NMR or LCMS
		7.02 (s, 2H), 3.95 (s, 2H), 3.65 (br t, J = 5.0 Hz, 4H), 2.59 (s, 4H), 2.02 (s, 6H), 1.99 (s, 3H), 1.83 - 1.76 (m, 4H)
A162		1H NMR (400MHz, Methanol-d4) δ = 8.67 (dd, J = 0.6, 2.4 Hz, 1H), 8.17 (dd, J = 0.6, 8.4 Hz, 1H), 8.07 (dd, J = 2.4, 8.4 Hz, 1H), 7.03 (s, 2H), 3.68- 3.62 (m, J = 5.5 Hz, 4H), 2.64 (s, 4H), 2.02 (s, 6H), 1.99 (s, 3H), 1.84 - 1.75 (m, 4H)
A163		1H NMR (400MHz, Methanol-d4) δ = 8.49 (td, J = 1.3, 4.5 Hz, 1H), 7.81 - 7.74 (m, 1H), 7.71 - 7.65 (m, 1H), 7.03 (s, 2H), 3.67 - 3.61 (m, 4H), 2.64 (s, 4H), 2.02 (s, 6H), 1.99 (s, 3H), 1.82 - 1.77 (m, 4H)
A164		1H NMR (400MHz, Methanol-d4) δ = 8.70 (dd, J = 5.5, 7.8 Hz, 1H), 7.93 (dd, J = 2.4, 9.2 Hz, 1H), 7.46 (ddd, J = 2.6, 5.7, 8.3 Hz, 1H), 7.03 (s, 2H), 3.65 (br d, J = 5.3 Hz, 4H), 2.63 (s, 4H), 2.02 (s, 6H), 1.99 (s, 3H), 1.83 - 1.77 (m, 4H)
A165		1H NMR (400MHz, Methanol-d4) δ = 1.26 (s, 9 H) 1.75 - 1.81 (m, 4 H) 1.97 - 2.04 (m, 9 H) 2.63 (s, 4 H) 2.98 (s, 3 H) 3.59 (br s, 4 H) 7.04

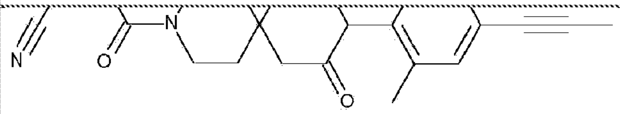
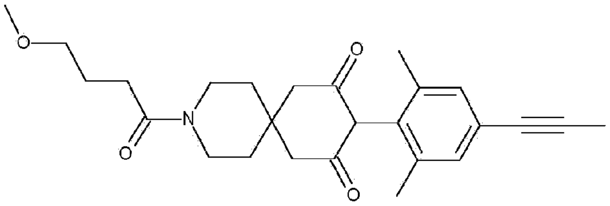
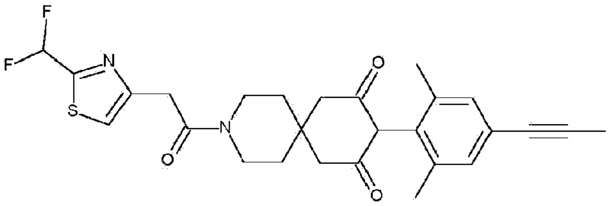
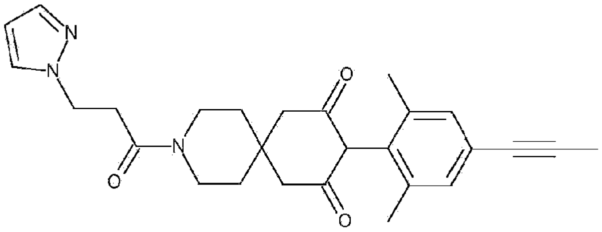
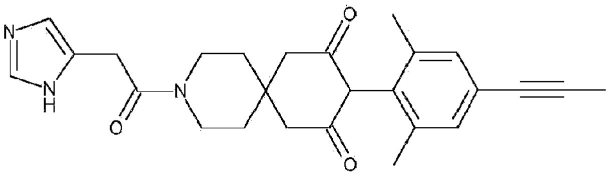
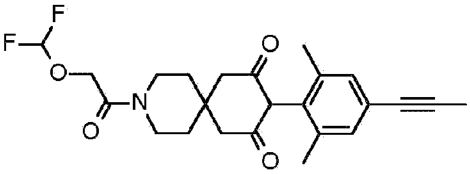
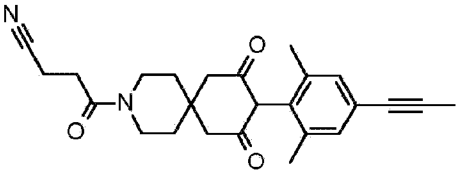
CMP	Structure	NMR or LCMS
		(s, 2 H).
A166		1H NMR (400MHz, Methanol-d4) δ = 7.91 - 7.85 (m, 2H), 7.62-7.58 (m, 1H), 7.52-7.48 (m, 2H), 7.03 (s, 2H), 3.63 (br m, 4H), 2.64 (s,4H), 2.01 - 1.99 (m, 9H), 1.84- 1.73 (m, 4H)
A167		1H NMR (400MHz, Methanol-d4) δ = 7.73 - 7.69 (m, 1H), 7.59-7.54 (m, 1H), 7.32-7.19 (m, 2H), 7.04 (s, 2H), 3.69-3.56 (m, 4H), 2.63 (s, 4H), 2.02 - 1.99 (m, 9H), 1.84-1.70 (m, 4H)
A168		1H NMR (400MHz, Methanol-d4) δ = 9.03 - 8.99 (m, 1H), 8.39 - 8.34 (m, 2H), 7.03 (s, 2H), 3.71 - 3.61 (m, 4H), 2.63 (s, 4H), 2.02 (s, 6H), 1.99 (s, 2H), 1.84 - 1.76 (m, 4H)
A169		1H NMR (400MHz, Methanol-d4) δ = 7.03 (s, 2H), 3.45-3.36 (m, 4H), 2.58 (s, 4H), 2.01 - 1.99 (m, 9H), 1.77-1.62 (m, 6H), 1.27 (s, 6H), 0.84 (t, 3H)
A170		1H NMR (400MHz, Methanol-d4) δ = 7.03 (s, 2H), 6.77 (s, 1H), 4.14 (s, 4H), 3.70 - 3.64 (m, 4H), 2.62 (s, 4H), 2.01 (s, 6H), 1.99 (s, 3H), 1.74- 1.69 (m, 4H)
A171		1H NMR (400MHz, Methanol-d4) δ =

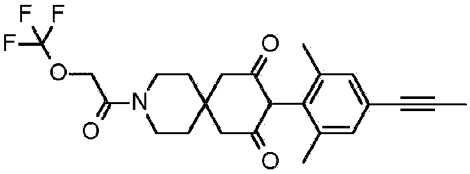
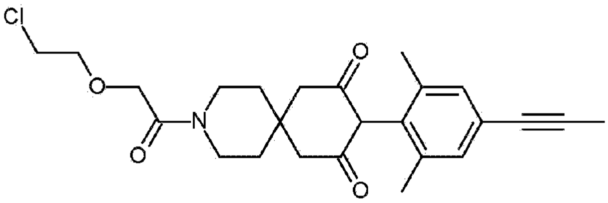
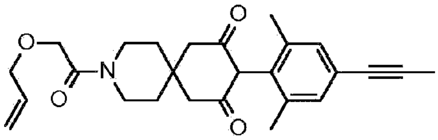
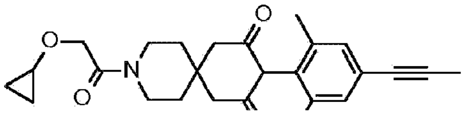
CMP	Structure	NMR or LCMS
		7.04 (s, 2H), 4.18 (s, 2H), 3.71 - 3.61 (m, 3H), 3.57 (br dd, J = 5.0, 5.7 Hz, 2H), 2.62 (s, 4H), 2.01 (s, 6H), 1.99 (s, 3H), 1.78 - 1.72 (m, 2H), 1.69 (br t, J = 5.7 Hz, 2H), 1.19 (d, J = 6.1 Hz, 6H)
A172		1H NMR (400MHz, Methanol-d4) δ = 7.04 (s, 2H), 3.70 (t, J = 6.3 Hz, 2H), 3.63 (td, J = 5.8, 12.1 Hz, 4H), 3.50 (q, J = 7.1 Hz, 2H), 2.66 (t, J = 6.3 Hz, 2H), 2.61 (s, 4H), 2.01 (s, 6H), 1.99 (s, 3H), 1.78 - 1.73 (m, 2H), 1.69 - 1.64 (m, 2H), 1.17 (t, J = 7.0 Hz, 3H)
A173		1H NMR (400MHz, Methanol-d4) δ = 7.04 (s, 2H), 4.41 (s, 1H), 3.88- 3.45 (m, 10H), 2.63 (s, 2H), 2.59 (s, 2H), 2.02 (s, 3H), 2.01 (s, 3H), 1.99 (s, 3H), 1.79- 1.60 (m, 4H)
A174		1H NMR (400MHz, Methanol-d4) δ = 7.04 (s, 2H), 4.44 - 4.39 (m, 1H), 3.87- 3.46 (m, 10H), 2.63 (s, 2H), 2.59 (s, 2H), 2.02 (s, 3H), 2.01 (s, 3H), 1.99 (s, 3H), 1.78- 1.61 (m, 4H)
A175		1H NMR (400MHz, Methanol-d4) δ = 7.03 (s, 2H), 6.78 (s, 1H), 4.06-4.01 (m, 2H), 3.71 - 3.63 (m, 4H), 2.62 (s, 4H), 2.24 (t, J = 5.7 Hz,

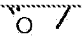
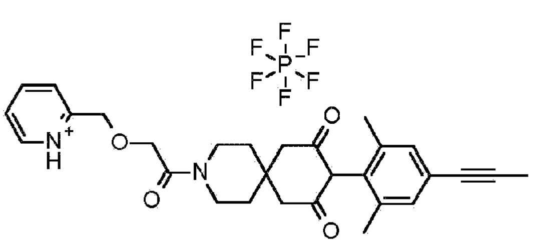
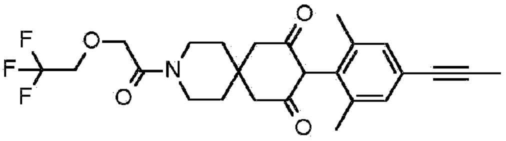
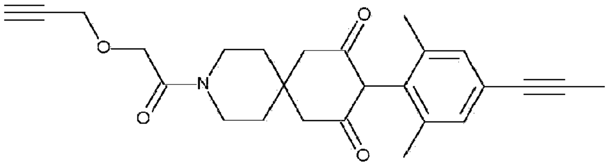
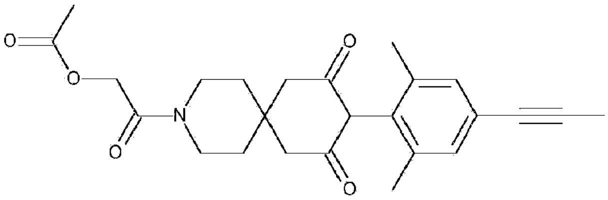
CMP	Structure	NMR or LCMS
		2H), 2.01 (s, 6H), 1.99 (s, 3H), 1.94 - 1.85 (m, 2H), 1.74-1.67 (m, 4H)
A176		1H NMR (400MHz, Methanol-d4) δ = 8.32 (d, J = 2.4 Hz, 1H), 8.15 (d, J = 9.0 Hz, 1H), 7.52 (dd, J = 2.9, 8.8 Hz, 1H), 3.95 (s, 3H), 3.67 - 3.61 (m, 4H), 2.63 (s, 4H), 2.02 (s, 6H), 1.99 (s, 3H), 1.86 - 1.76 (m, 4H)
A177		1H NMR (400MHz, Methanol-d4) δ = 8.22 - 8.17 (m, 2H), 7.40 (dd, 1H), 7.05 (s, 2H), 3.78 - 3.63 (m, 4H), 2.65 (s, 4H), 2.46 (s, 3H), 2.02 - 2.00 (m, 9H), 1.86-1.78 (m, 4H)
A178		1H NMR (400MHz, Methanol-d4) δ = 8.96 - 8.93 (m, 1H), 8.30 (dd, J = 2.0, 8.1 Hz, 1H), 7.76 (d, J = 8.2 Hz, 1H), 7.03 (d, J = 4.9 Hz, 2H), 3.86 -3.80 (m, 2H), 3.51 - 3.45 (m, 2H), 2.70 - 2.58 (m, 4H), 2.03-2.02 (m, 3H), 1.99 (s, 3H), 1.98 (s, 3H), 1.85 - 1.80 (m, 2H), 1.78- 1.72 (m, 2H)
A179		1H NMR (400MHz, Methanol-d4) δ = 8.06 (s, 1H), 7.44 (t, J = 1.3 Hz, 1H), 7.08 (s, 1H), 7.03 (s, 2H), 3.69 - 3.61 (m, 4H), 2.64 (s, 4H), 2.01 (s, 6H), 1.99 (s, 3H), 1.85- 1.79 (m, 4H)
A180		1H NMR (400MHz,

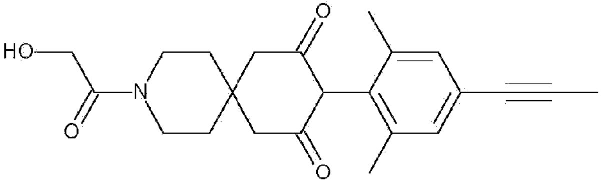
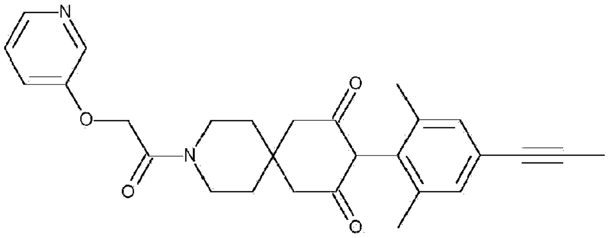
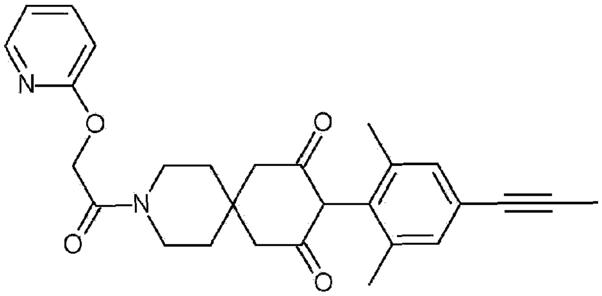
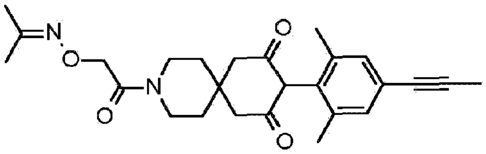
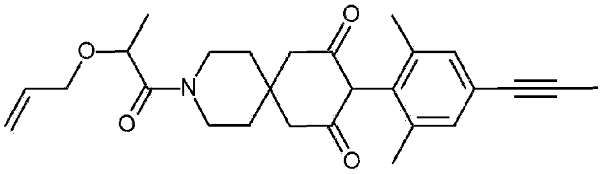
CMP	Structure	NMR or LCMS
		Methanol-d4) δ = 8.28 - 8.36 (m, 2 H) 7.01 - 7.05 (m, 2 H) 3.96 - 4.01 (m, 3 H) 3.80- 3.86 (m, 2 H) 3.57 - 3.64 (m, 2 H) 2.59 - 2.71 (m, 4 H) 2.01 - 2.04 (m, 3 H) 1.97-2.01 (m, 6 H) 1.75- 1.86 (m, 4 H)
A181		LCMS M+H: 454
A182		LCMS M+H: 434
A183		LCMS M+H: 460
A184		LCMS M+H: 457
A185		LCMS M+H: 438

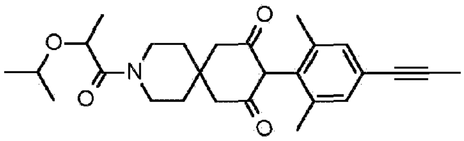
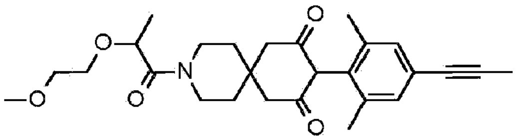
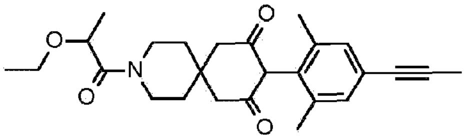
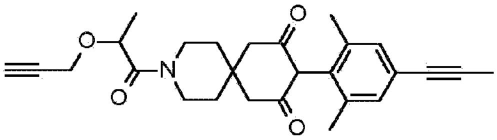
CMP	Structure	NMR or LCMS
A186		LCMS M+H: 424
A187		LCMS M+H: 435
A188		LCMS M+H: 432
A189		LCMS M+H: 434
A190		LCMS M+H: 459
A191		LCMS M+H: 454
A192		LCMS M+H: 454

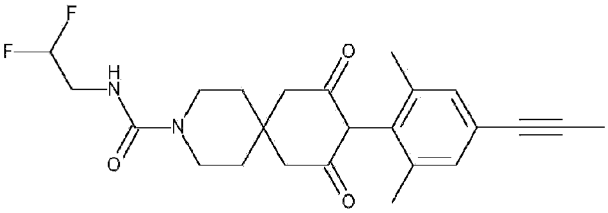
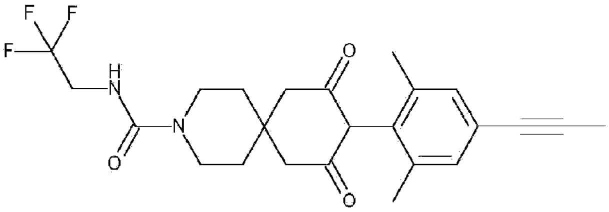
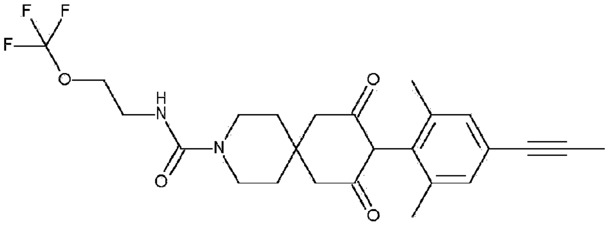
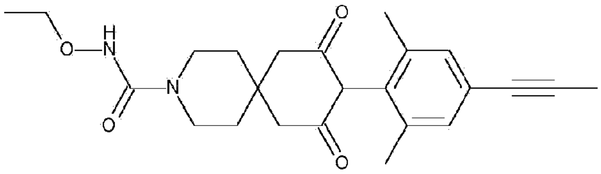
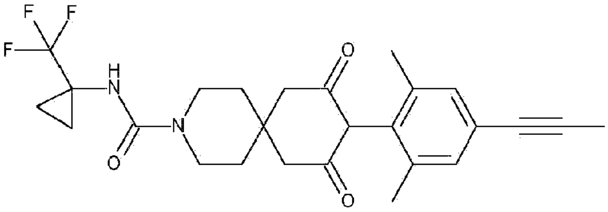
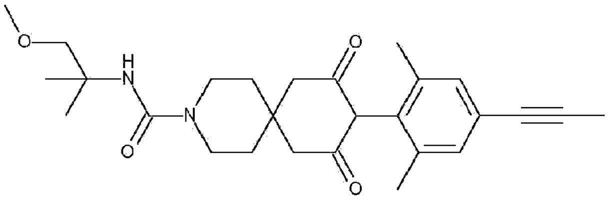
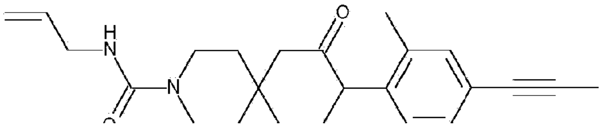
CMP	Structure	NMR or LCMS
		
A193		LCMS M+H: 424
A194		LCMS M+H: 499
A195		LCMS M+H: 446
A196		LCMS M+H: 432
A197		1H NMR (400MHz, Methanol-d4) δ = 7.03 (s, 2H), 6.50 (t, J = 74.9 Hz, 1H), 4.63 (s, 2H), 3.69-3.62 (m, 2H), 3.53 - 3.46 (m, 2H), 2.67 - 2.59 (m, 4H), 2.01 (s, 6H), 2.00- 1.98 (m, 3H), 1.81 - 1.73 (m, 2H), 1.72 - 1.65 (m, 2H)
A198		1H NMR (400MHz, Methanol-d4) δ = 7.03 (s, 2H), 3.68 - 3.63 (m, 2H), 3.58-3.53 (m, 2H), 2.83 - 2.78 (m, 2H), 2.70

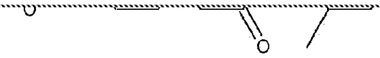
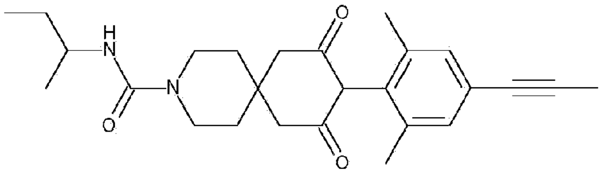
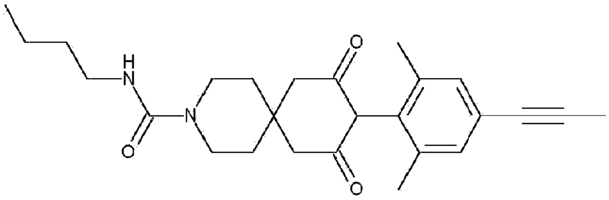
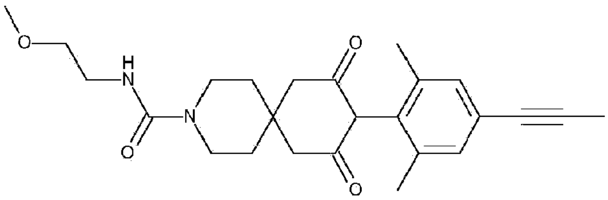
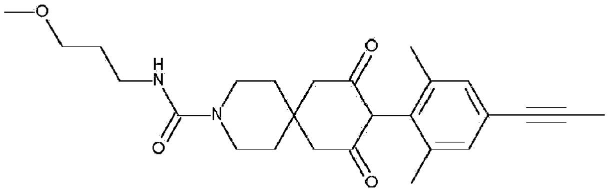
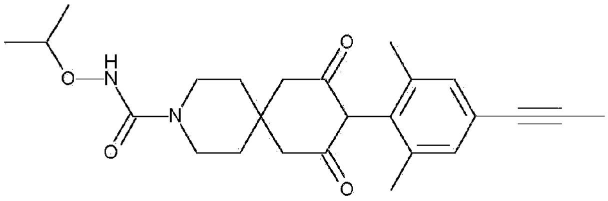
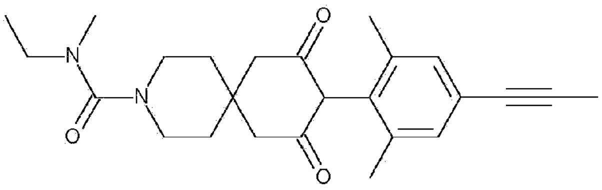
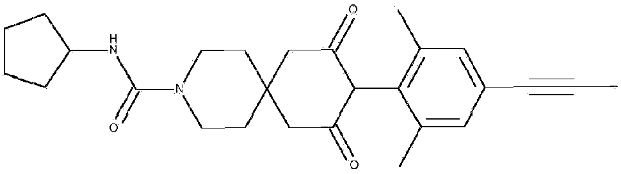
CMP	Structure	NMR or LCMS
		-2.65 (m, 2H), 2.59 (s, 4H), 2.02 (s, 6H), 1.99 (s, 3H), 1.78 - 1.73 (m, 2H), 1.70-1.66 (m, 2H)
A199		1H NMR (400MHz, Methanol-d4) δ = 7.05 - 7.01 (m, 2H), 3.69 - 3.63 (m, 2H), 3.50 - 3.43 (m, 2H), 2.64-2.58 (m, 4H), 2.03 - 2.00 (m, 6H), 2.00 - 1.98 (m, 3H), 1.79 - 1.73 (m, 2H), 1.73 - 1.68 (m, 2H)
A200		1H NMR (400MHz, Methanol-d4) δ = 7.04 (s, 2H), 4.28 (s, 2H), 3.80 - 3.75 (m, 2H), 3.73 - 3.68 (m, 2H), 3.67 - 3.61 (m, 2H), 3.59 - 3.53 (m, 2H), 2.62 (s, 4H), 2.01 (s, 6H), 1.99 (s, 3H), 1.79 - 1.74 (m, 2H), 1.72 - 1.66 (m, 2H)
A201		1H NMR (400MHz, Methanol-d4) δ = 7.03 (s, 2H), 5.94 (tdd, J = 5.5, 10.4, 17.4 Hz, 1H), 5.31 (qd, J = 1.7, 17.2 Hz, 1H), 5.20 (qd, J = 1.4, 10.5 Hz, 1H), 4.21 (s, 2H), 4.05 (td, J = 1.4, 5.6 Hz, 2H), 3.66 - 3.61 (m, 2H), 3.57 - 3.50 (m, 2H), 2.61 (s, 4H), 2.01 (s, 6H), 1.99 (s, 3H), 1.76 - 1.71 (m, 2H), 1.71 - 1.66 (m, 2H)
A202		1H NMR (400MHz, Methanol-d4) δ = 7.03 (s, 2H), 4.25 (s, 2H), 3.68 - 3.58 (m,

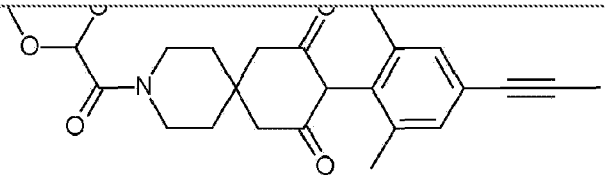
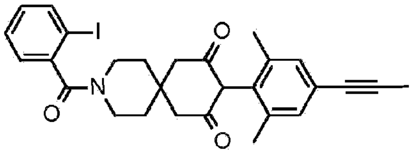
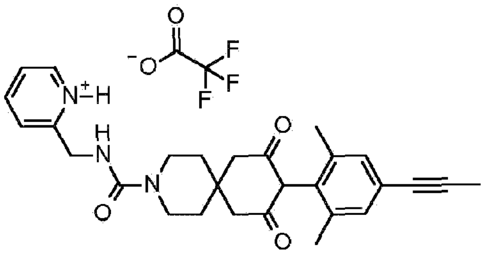
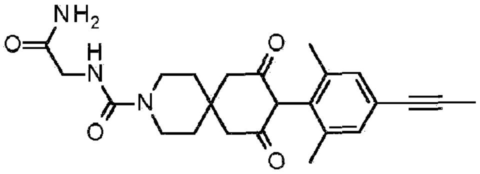
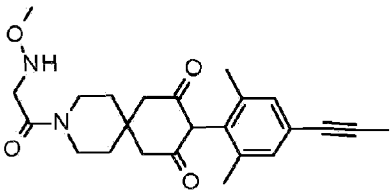
CMP	Structure	NMR or LCMS
		2H), 3.55 - 3.50 (m, 2H), 3.47 (tt, J = 3.0, 6.0 Hz, 1H), 2.61 (s, 4H), 2.01 (s, 6H), 1.99 (s, 3H), 1.77 - 1.72 (m, 2H), 1.71 - 1.65 (m, 2H), 0.64 - 0.58 (m, 2H), 0.52 - 0.46 (m, 2H)
A203		1H NMR (400 MHz, methanol) δ = 8.85 (dd, J = 1.5, 6.4 Hz, 1H), 8.59 (dt, J = 1.5, 7.9 Hz, 1H), 8.03 - 7.99 (m, 2H), 7.04 (s, 2H), 5.08 (s, 2H), 4.64 (s, 2H), 3.73 - 3.67 (m, 2H), 3.49 - 3.44 (m, 2H), 2.63 (s, 4H), 2.01 (s, 6H), 2.01 - 1.98 (m, 3H), 1.80 - 1.75 (m, 2H), 1.75 - 1.70 (m, 2H)
A204		H NMR (400 MHz, methanol) δ = 7.04 (s, 2H), 4.42 (s, 2H), 4.04 (q, J = 8.9 Hz, 2H), 3.68 - 3.60 (m, 2H), 3.48 (br t, J = 5.6 Hz, 2H), 2.61 (s, 4H), 2.01 (s, 6H), 1.99 (s, 3H), 1.77 - 1.72 (m, 2H), 1.72 - 1.67 (m, 2H)
A205		LCMS M+H: 420
A206		LCMS M+H: 424
A207		LCMS M+H: 382

CMP	Structure	NMR or LCMS
		
A208		LCMS M+H: 459
A209		1H NMR (400MHz, Methanol-d4) δ = 8.12 (br d, J = 3.8 Hz, 1H), 7.82 - 7.74 (m, 1H), 7.04 (s, 2H), 7.02 - 6.90 (m, 2H), 5.13 (s, 2H), 3.68 - 3.57 (m, 4H), 2.64 (s, 4H), 2.03 - 2.01 (m, 6H), 1.99 (s, 3H), 1.85 - 1.79 (m, 2H), 1.73 - 1.67 (m, 2H)
A210		1H NMR (400MHz, Methanol-d4) δ = 1.65 - 1.78 (m, 4 H) 1.85 (s, 3 H) 1.91 (s, 3 H) 1.97 - 2.04 (m, 10 H) 2.60 (s, 4 H) 3.54-3.69 (m, 4 H) 4.70 (s, 2 H) 7.03 (s, 2 H)
A211		1H NMR (400MHz, Methanol-d4) δ = 1.35 (d, J=6.72 Hz, 3 H) 1.71 (dt, J=18.13, 5.73 Hz, 4 H) 2.00 (d, J=8.07 Hz, 9 H) 2.61 (d, J=4.89 Hz, 4 H) 3.55-3.76 (m, 4 H) 3.86 - 3.96 (m, 1 H) 3.98 - 4.08 (m, 1 H) 4.41 (d, J=6.72 Hz, 1 H) 5.17 (dq, J=10.39, 1.39 Hz, 1

CMP	Structure	NMR or LCMS
		H) 5.29 (dq, J=17.25, 1.67 Hz, 1 H) 5.93 (dd, J=17.24, 10.39 Hz, 1 H) 7.04 (s, 2 H).
A212		1H NMR (400MHz, Methanol-d4) δ = 1.16 (d, J=6.11 Hz, 7 H) 1.32 (d, J=6.72 Hz, 3 H) 1.64 - 1.79 (m, 4 H) 2.00 (d, J=8.80 Hz, 10 H) 2.62 (d, J=4.77 Hz, 4 H) 3.55 - 3.84 (m, 6 H) 4.45 (q, J=6.72 Hz, 1 H) 7.04 (s, 2 H)
A213		1H NMR (400MHz, Methanol-d4) δ = 1.34 (d, J=6.72 Hz, 3 H) 1.64 - 1.81 (m, 4 H) 1.95 - 2.05 (m, 9 H) 2.62 (d, J=8.31 Hz, 4 H) 3.35 (s, 3 H) 3.50- 3.76 (m, 9 H) 4.41 (d, J=6.72 Hz, 1 H) 7.04 (s, 2 H)
A214		1H NMR (400MHz, Methanol-d4) δ = 1.20 (t, J=7.03 Hz, 3 H) 1.33 (d, J=6.72 Hz, 3 H) 1.64 - 1.79 (m, 4 H) 2.00 (d, J=8.44 Hz, 9 H) 2.62 (d, J=5.01 Hz, 4 H) 3.39 - 3.55 (m, 2 H) 3.57 - 3.75 (m, 4 H) 4.35 (d, J=6.72 Hz, 1 H) 7.04 (s, 2 H).
A215		1H NMR (400MHz, Methanol-d4) δ = 1.35 (d, J=6.72 Hz, 3 H) 1.64 - 1.81 (m, 4 H) 2.00 (d, J=8.44 Hz, 9 H) 2.62 (d, J=9.17 Hz, 4 H) 3.54 - 3.80 (m, 4 H) 4.07 -

CMP	Structure	NMR or LCMS
		4.28 (m, 2 H) 4.63 (d, J=6.72 Hz, 1 H) 7.04 (s, 2 H).
A216		LCMS M+H: 431
A217		LCMS M+H: 449
A218		LCMS M+H: 479
A219		LCMS M+H: 411
A220		LCMS M+H: 475
A221		LCMS M+H: 453
A222		LCMS M+H: 407

CMP	Structure	NMR or LCMS
		
A223		LCMS M+H: 423
A224		LCMS M+H: 423
A225		LCMS M+H: 425
A226		LCMS M+H: 439
A227		LCMS M+H: 425
A228		LCMS M+H: 409
A229		LCMS M+H: 435
A230		LCMS M+H: 426

CMP	Structure	NMR or LCMS
		
A231		1H NMR (400MHz, Methanol-d4) δ = 7.91 (dd, J = 0.8, 8.0 Hz, 1H), 7.48 (dt, J = 1.0, 7.5 Hz, 1H), 7.28 (dd, J = 1.5, 7.6 Hz, 1H), 7.17 (dt, J = 1.7, 7.7 Hz, 1H), 7.03 (s, 1H), 7.01 (s, 1H), 3.83 (t, J = 5.7 Hz, 2H), 2.64 - 2.64 (m, 1H), 2.68-2.50 (m, 3H), 2.03 (s, 3H), 2.00 - 1.98 (m, 3H), 1.97 - 1.93 (m, 3H), 1.90 - 1.74 (m, 3H), 1.70- 1.61 (m, 1H)
A232		1H NMR (400MHz, Methanol-d4) δ = 8.69 (d, 1H), 8.45 (td, 1H), 7.91 (d, 1H), 7.85 (t, 1H), 7.04 (s, 2H), 4.63 (s, 2H), 3.52-3.50 (m, 4H), 2.61 (s, 4H), 2.01 - 1.99 (m, 9H), 1.76-1.67 (m, 4H)
A233		1H NMR (400MHz, Methanol-d4) δ = 7.03 (s, 2H), 3.78 (s, 2H), 3.54-3.42 (m, 4H), 2.60 (s, 4H), 2.01 - 1.99 (m, 9H), 1.76- 1.64 (m, 4H)
A234		1H NMR (400MHz, Methanol-d4) δ = 7.04 (s, 2H), 4.15 (s, 2H), 3.76 (s, 3H), 3.70 - 3.63 (m, 2H), 3.54 - 3.49 (m, 2H), 2.62 (s, 4H), 2.01 (s, 6H), 1.99 (s, 3H),

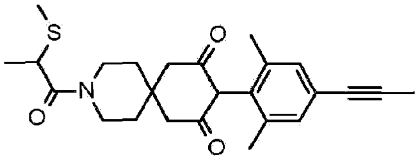
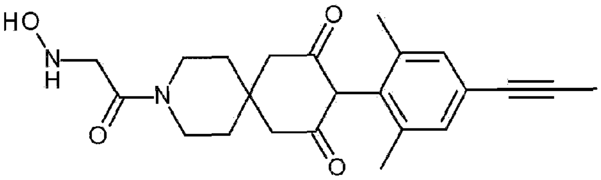
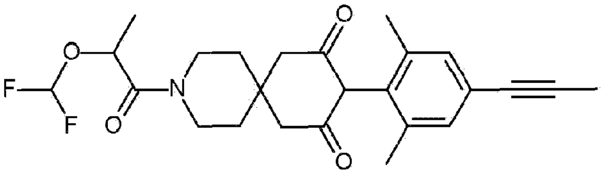
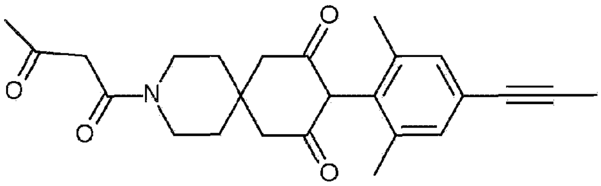
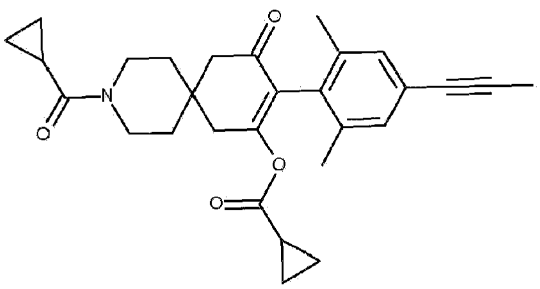
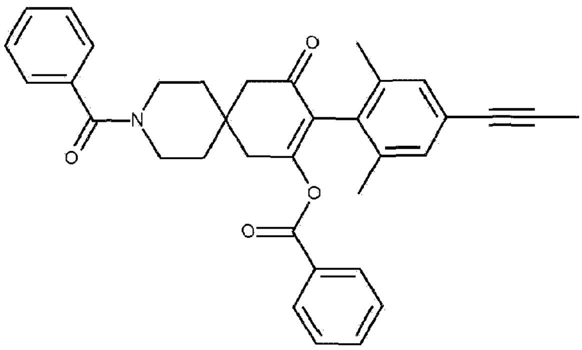
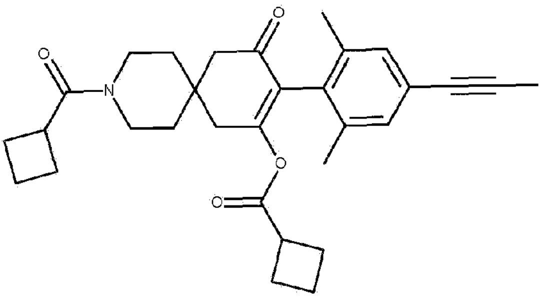
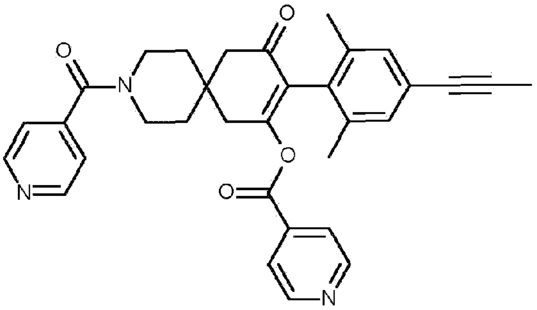
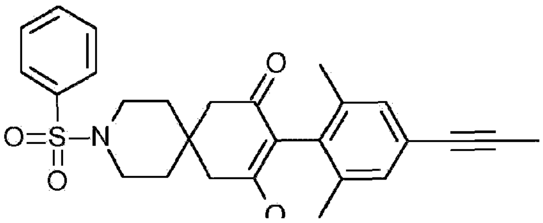
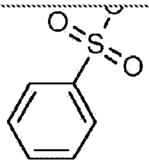
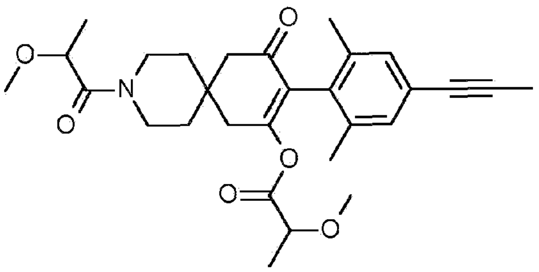
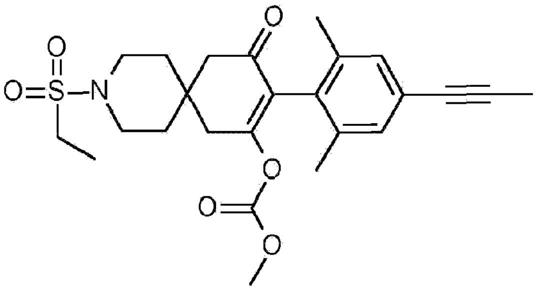
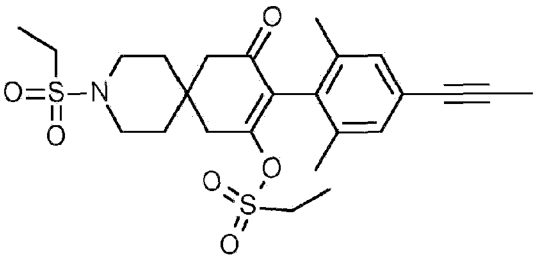
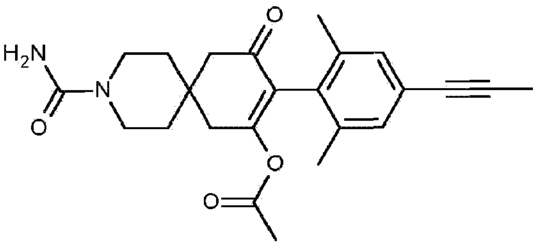
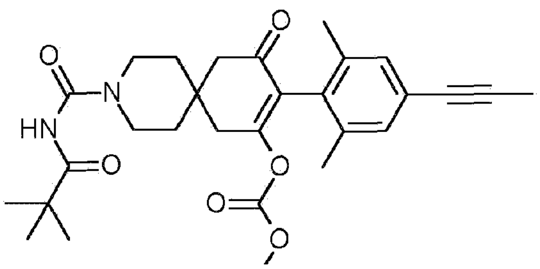
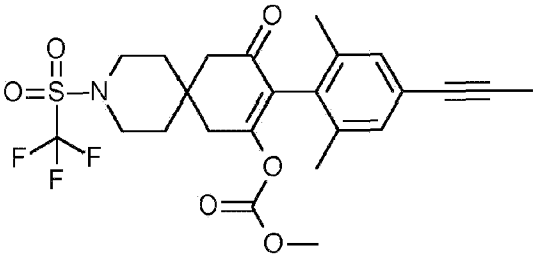
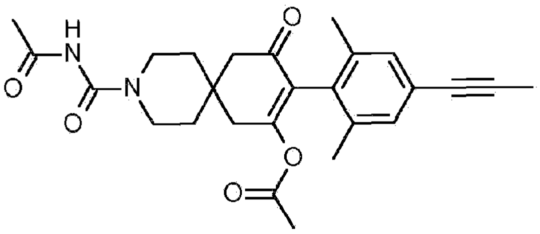
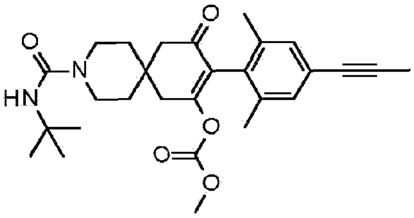
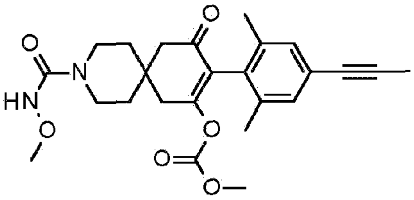
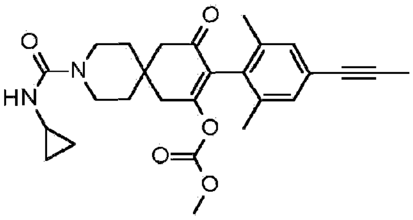
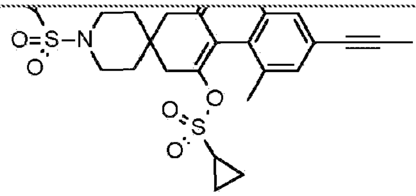
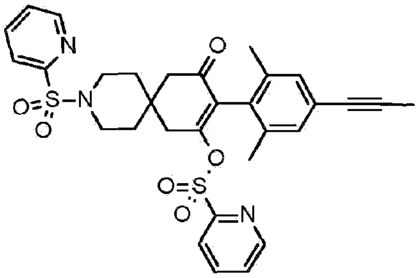
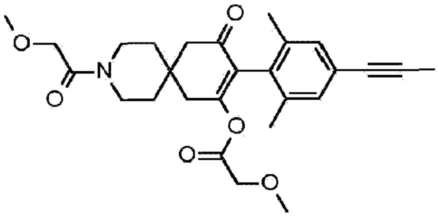
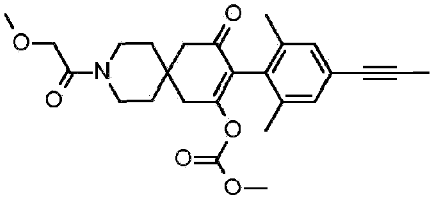
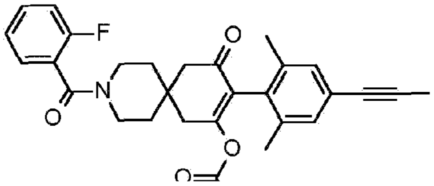
CMP	Structure	NMR or LCMS
		1.80 - 1.74 (m, 2H), 1.72 - 1.67 (m, 2H)
A235		1H NMR (400MHz, Methanol-d4) δ = 7.05 - 7.01 (m,2H), 3.88 - 3.81 (m, 1H), 3.80 - 3.69 (m, 2H), 3.61 - 3.48 (m, 2H), 2.64 - 2.56 (m, 4H), 2.05 (s, 3H), 2.03 - 2.00 (m, 6H), 1.99 (s, 3H), 1.83 - 1.61 (d, 3H), 1.43 - 1.39 (m, 4H)
A236		1H NMR (400MHz, Methanol-d4) δ = 1.65 - 1.79 (m, 4 H) 1.95 - 2.02 (m, 10 H) 2.55 (s, 2 H) 2.82 (s, 2 H) 3.42 - 3.65 (m, 3 H) 3.71 (s, 2 H) 3.73 (s, 3 H) 3.75 - 3.86 (m, 1 H) 7.01 (s, 2 H)
A237		1H NMR (400MHz, Methanol-d4) δ = 1.44 (d, J=6.60 Hz, 3 H) 1.64 - 1.81 (m, 4 H) 2.00 (d, J=8.56 Hz, 9 H) 2.62 (d, J=5.75 Hz, 4 H) 3.55 - 3.79 (m, 4 H) 5.14 (d, J=6.72 Hz, 1 H) 6.25 - 6.65 (m, 1 H) 7.04 (s, 2 H)
A238		1H NMR (400MHz, Methanol-d4) δ = 7.03 (s, 2H), 3.69-3.63 (m, 2H), 3.51 - 3.45 (m, 2H), 2.61 (s, 4H), 2.23 (s, 3H), 2.03- 1.98 (m, 9H), 1.79 - 1.66 (m, 4H)

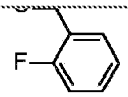
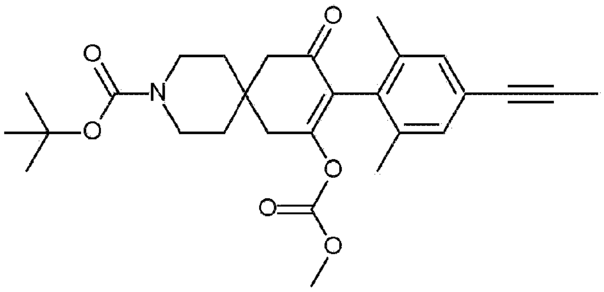
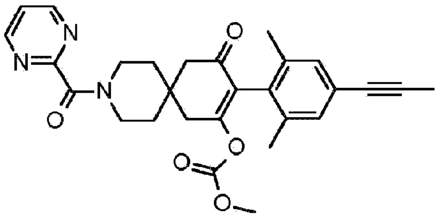
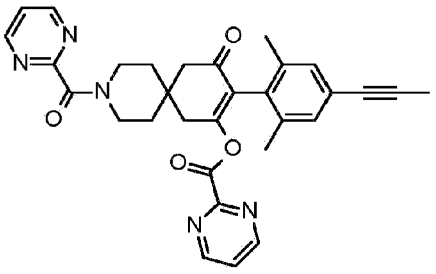
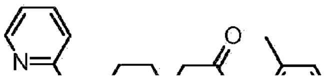
Table 2

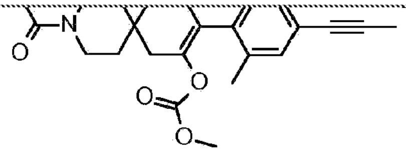
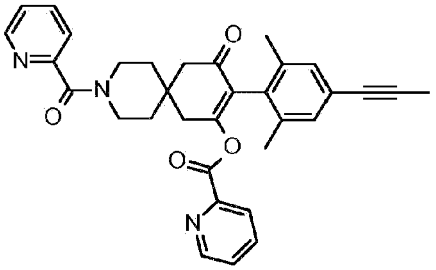
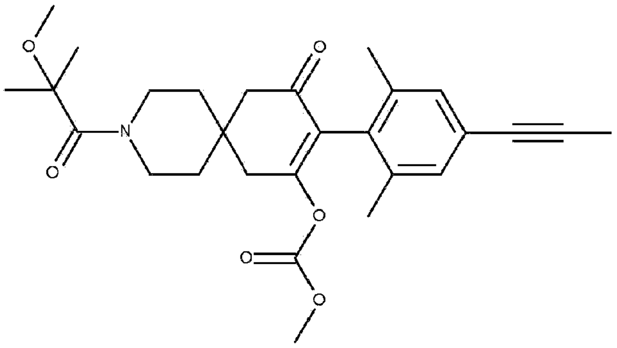
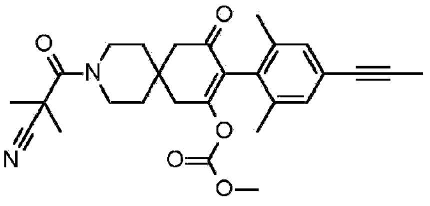
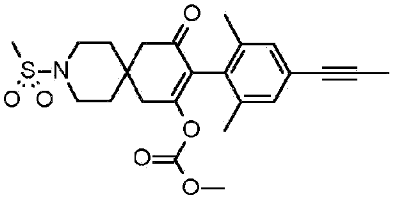
CMP	Structure	NMR
P1		1H NMR (400MHz, CDCl3) δ = 7.12 - 6.95 (m, 2H), 3.81 - 3.52 (m, 4H), 2.79 - 2.57 (m, 4H), 2.07 - 1.98 (m, 9H), 1.90 - 1.66 (m, 5H), 1.44 - 1.37 (m, 1H), 1.01 - 0.93 (m, 2H), 0.81 - 0.67 (m, 6H)
P2		1H NMR (400MHz, CDCl3) δ = 7.75 - 7.68 (m, 2H), 7.60 - 7.49 (m, 1H), 7.43 - 7.36 (m, 7H), 7.07 - 6.98 (m, 2H), 3.98 - 3.73 (m, 2H), 3.63 - 3.44 (m, 2H), 3.00 - 2.88 (m, 2H), 2.73 - 2.59 (m, 2H), 2.14 - 2.04 (m, 6H), 2.02 - 1.95 (m, 3H), 1.92 - 1.70 (m, 4H)
P3		1H NMR (400MHz, Methanol-d4) δ = 7.04 - 6.96 (m, 2H), 3.85 - 3.73 (m, 1H), 3.57 - 3.38 (m, 4H), 3.09-2.94 (m, 1H), 2.86 - 2.80 (m, 2H), 2.65 - 2.56 (m, 2H), 2.35 - 2.12 (m, 4H), 2.04 - 1.99 (m, 10H), 1.99 - 1.92 (m, 2H), 1.91 - 1.56 (m, 10H)
P4		1H NMR (400MHz, $CDCl_3$) δ = 8.77 - 8.60 (m, 4H), 7.53 - 7.45 (m, 2H), 7.32 - 7.29 (m, 2H), 7.08 - 6.98 (m, 2H), 3.99 - 3.72 (m, 2H), 3.51 - 3.29 (m, 2H), 2.95 - 2.90 (m, 2H), 2.76 - 2.66 (m, 2H), 2.11 - 2.01 (m,6H), 2.00- 1.97 (m, 3H), 1.94 - 1.68 (m, 4H)
P5		1H NMR (400MHz, Methanol-d4) δ = 7.87 - 7.79 (m, 2H), 7.73 - 7.60 (m, 4H), 7.41 - 7.26 (m, 4H), 6.92 - 6.84 (m, 2H), 3.23 - 3.14 (m, 2H), 3.07 - 2.98 (m, 2H), 2.90 -

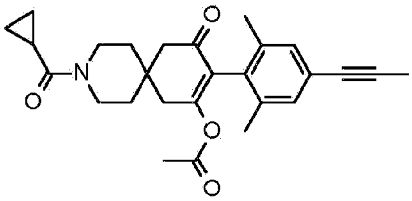
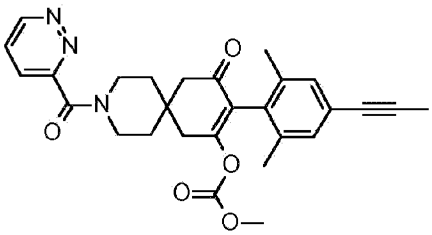
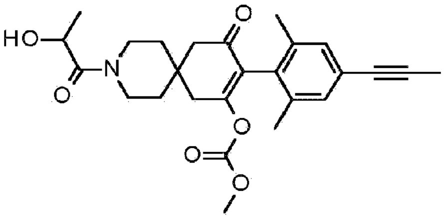
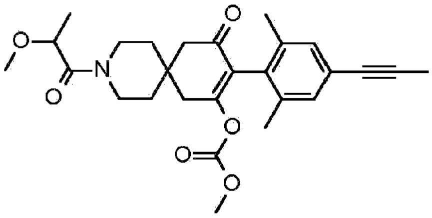
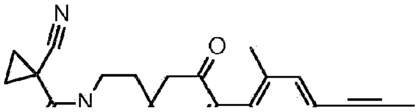
CMP	Structure	NMR
		2.80 (m, 2H), 2.55 - 2.44 (m, 2H), 2.04 - 2.01 (m, 3H), 1.91 - 1.87 (m, 6H), 1.85 - 1.72 (m, 4H)
P6		1H NMR (400MHz, Methanol-d4) δ = 1.32 (d, J=6.72 Hz, 3 H) 1.63 - 1.82 (m, 4 H) 1.99 (s, 3 H) 2.01 (s, 6 H) 2.62 (d, J=4.65 Hz, 4 H) 3.55 - 3.82 (m, 4 H) 4.28 (d, J=6.72 Hz, 1 H) 7.04 (s, 2 H)
P7		1H NMR (400MHz, CDCl3) δ = 7.12 - 7.00 (m, 2H), 3.72 - 3.59 (m, 3H), 3.42 - 3.29 (m, 4H), 3.02 - 2.92 (m, 2H), 2.79 - 2.74 (m, 2H), 2.66 - 2.52 (m, 2H), 2.02 (m, 9H), 1.91 - 1.74 (m, 4H), 1.41 - 1.30 (m, 3H).
P8		1H NMR (400MHz, $CDCl_3$) δ = 7.12 - 7.07 (m, 2H), 3.47 - 3.28 (m, 4H), 3.02 - 2.93 (m, 4H), 2.71 - 2.63 (m, 2H), 2.62 - 2.54 (m, 2H), 2.10 - 1.98 (m, 9H), 1.90 - 1.74 (m, 4H), 1.44 - 1.33 (m, 3H), 1.00 - 0.88 (m, 3H)
P9		1H NMR (400MHz, $COCl_3$) δ = 1.62 - 1.84 (m, 5 H) 1.87 (s, 3 H) 1.99 - 2.02 (m, 6 H) 2.02 - 2.04 (m, 3 H) 2.60 (s, 2 H) 2.72 (s, 2 H) 3.34- 3.56 (m, 4 H) 4.58 (s, 2 H) 7.07 (s, 2 H)
P10		1H NMR (400MHz, $CDCl_3$) δ = 7.09 - 7.03 (m, 2H), 3.73 - 3.63 (m, 3H), 3.60 - 3.39 (m, 4H), 2.82 - 2.73 (m, 2H), 2.65 - 2.59 (m, 2H), 2.06 - 2.00 (m, 9H), 1.92 - 1.71 (m, 4H), 1.27 - 1.22 (m,

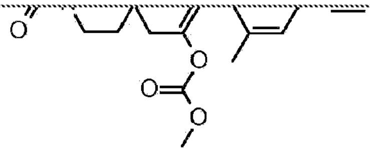
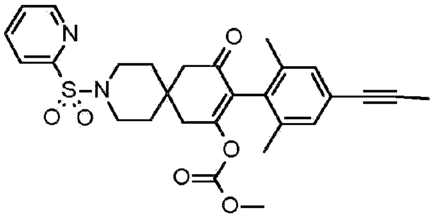
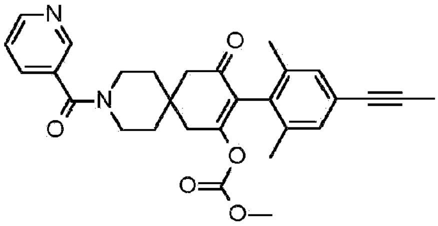
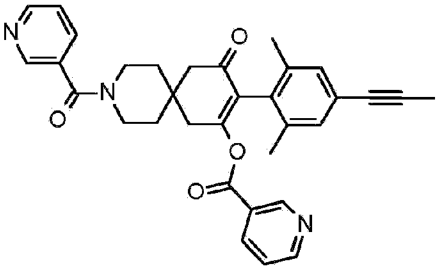
CMP	Structure	NMR
		9H)
P11		1H NMR (400MHz, $CDCl_3$) δ = 7.08 (s, 2H), 3.70 (s, 3H), 3.66 - 3.35 (m, 4H), 2.80 (s, 2H), 2.67 - 2.59 (m, 2H), 2.04 - 1.99 (m, 9H), 1.97 - 1.75 (m, 4H)
P12		1H NMR (400MHz, $CDCl_3$) δ = 1.68 - 1.86 (m, 5 H) 1.86 - 1.89 (m, 3 H) 1.98 - 2.07 (m, 9 H) 2.34 (s, 3 H) 2.62 (s, 2 H) 2.74 (s, 2 H) 3.44 - 3.63 (m, 4 H) 7.07 (s, 2 H) 8.13 (s, 1 H)
P13		1H NMR (400MHz, CDCl3) δ = 7.10 - 7.01 (m, 2H), 4.37 - 4.28 (m, 1H), 3.70 - 3.63 (m, 3H), 3.47 - 3.38 (m, 2H), 3.36 - 3.26 (m, 2H), 2.77 - 2.72 (m, 2H), 2.63 - 2.53 (m, 2H), 2.05 - 1.98 (m, 9H), 1.84 - 1.62 (m, 4H), 1.39 - 1.31 (m, 9H)
P14		1H NMR (400MHz, CDCl3) δ = 7.07 (s, 2H), 7.07 - 7.05 (m, 1H), 3.72 (s, 3H), 3.69 (s, 3H), 3.56 - 3.34 (m, 4H), 2.77 (s, 2H), 2.61 (s, 2H), 2.06 - 1.98 (m, 9H), 1.84 - 1.63 (m, 4H).
P15		1H NMR (400MHz, CDCl3) δ = 7.09 - 7.03 (m, 2H), 3.70 - 3.60 (m, 3H), 3.47 - 3.30 (m, 4H), 2.81 - 2.72 (m, 2H), 2.68 - 2.62 (m, 1H), 2.60 - 2.54 (m, 2H), 2.06 - 1.98 (m, 9H), 1.79 - 1.63 (m, 4H), 0.78 - 0.70 (m, 2H), 0.49 - 0.41 (m, 2H)
P16		1H NMR (400MHz, CDCl3) δ = 0.73 - 0.81

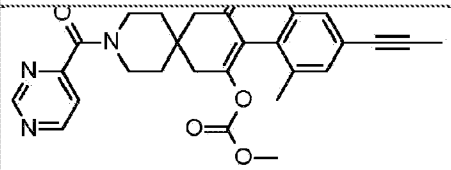
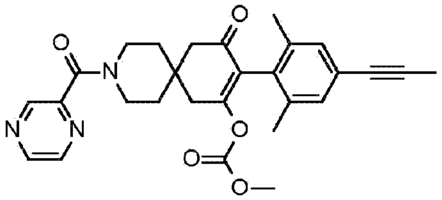
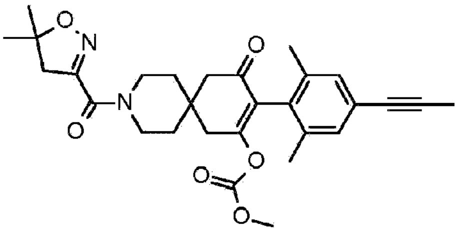
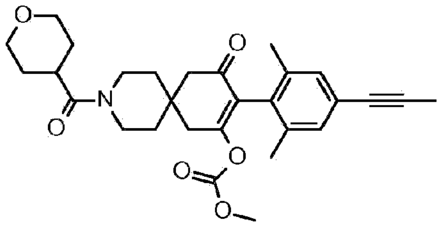
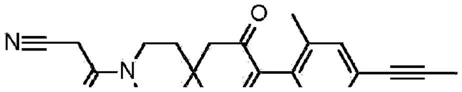
CMP	Structure	NMR
		(m, 2 H) 0.94 - 1.06 (m, 4 H) 1.14 - 1.22 (m, 2 H) 1.79 (s, 5 H) 2.03 (s, 3 H) 2.07 (s, 6 H) 2.23. - 2.32 (m, 1 H) 2.62 (s, 2 H) 2.92 (s, 2 H) 3.30 - 3.47 (m, 4 H) 7.10 (s, 2 H)
P17		1H NMR (400MHz, CDCl3) δ = 1.73 - 1.83 (m, 2 H) 1.89 (s, 8 H) 2.04 (d, J=3.79 Hz, 4 H) 2.55 (s, 2 H) 3.01 (s, 2 H) 3.48 (t, J=5.62 Hz, 4 H) 6.80 (s, 2 H) 7.31 (dt, J=7.92, 0.93 Hz, 1 H) 7.47 - 7.56 (m, 2 H) 7.72 (td, J=7.79, 1.77 Hz, 1 H) 7.90 - 7.99 (m, 2 H) 8.51 - 8.55 (m, 1 H) 8.73 - 8.79 (m, 1 H).
P18		1H NMR (400MHz, Methanol-d4) δ = 7.04 - 7.00 (m, 2H), 4.18 - 4.12 (m, 2H), 3.86 - 3.83 (m, 2H), 3.82 - 3.74 (m, 1H), 3.59 - 3.43 (m, 3H), 3.41 - 3.38 (m, 3H), 3.10 - 3.05 (m, 3H), 2.91 - 2.85 (m, 2H), 2.69 - 2.62 (m, 2H), 2.06 - 1.97 (m, 9H), 1.90 - 1.59 (m, 4H)
P19		1H NMR (400MHz, Methanol-d4) δ = 7.03 - 7.00 (m, 2H), 4.18 - 4.14 (m, 2H), 3.86 - 3.77 (m, 1H), 3.69 - 3.66 (m, 3H), 3.60 - 3.44 (m, 3H), 3.42 - 3.38 (m, 3H), 2.93 - 2.88 (m, 2H), 2.66 - 2.63 (m, 2H), 2.05 - 1.97 (m, 9H), 1.90 - 1.59 (m, 4H)
P20		1H NMR (400MHz, CDCl3) δ = 7.56 - 7.48 (m, 2H), 7.43 - 7.36 (m, 2H), 7.25 - 7.19 (m, 2H), 7.15 - 7.09 (m, 2H), 7.06 - 7.03 (m, 1H), 7.03 -

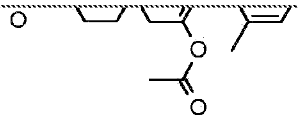
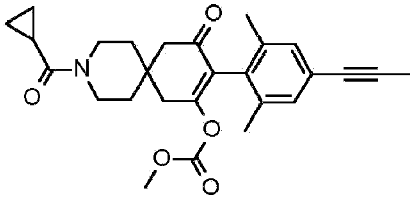
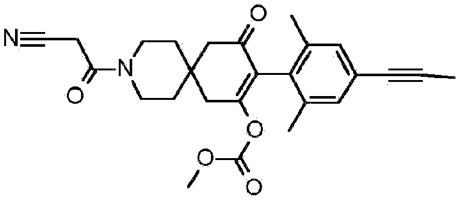
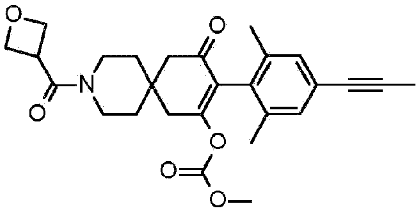
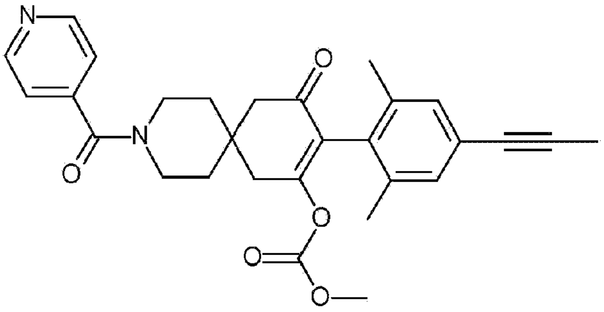
CMP	Structure	NMR
		7.00 (m, 1H), 4.04 - 3.91 (m, 1H), 3.86 - 3.72 (m, 1H), 3.48 - 3.38 (m, 2H), 2.95 - 2.88 (m, 2H), 2.71 - 2.67 (m, 2H), 2.13 - 2.07 (m, 3H), 2.04 - 2.02 (m, 3H), 2.00 - 1.96 (m, 3H), 1.93 - 1.70 (m, 4H)
P21		1H NMR (400MHz, CDCl3) δ = 7.11 - 7.05 (m, 2H), 3.70 - 3.63 (m, 3H), 3.59 - 3.48 (m, 2H), 3.47 - 3.35 (m, 3H), 2.81 - 2.73 (m, 2H), 2.63 - 2.38 (m, 2H), 2.04 - 1.99 (m, 9H), 1.77 - 1.61 (m, 5H), 1.50 - 1.41 (m, 9H)
P22		1H NMR (400MHz, Methanol-d4) δ = 8.89 (d, J=5.0 Hz, 2H), 7.56 (t, J=5.0 Hz, 1H), 7.02 (s, 1H), 7.00 (s, 1H), 4.03 (ddd, J=4.4, 6.1, 13.4 Hz, 1H), 3.76 - 3.69 (m, 1H), 3.69 - 3.67 (m, 3H), 3.41 - 3.33 (m, 2H), 2.96 (d, J=1.5 Hz, 2H), 2.68 (d, J=3.7 Hz, 2H), 2.02 (s, 3H), 1.99 (s, 3H), 1.97 (s, 3H), 1.95 - 1.89 (m, 1H), 1.88 - 1.66 (m, 3H)
P23		1H NMR (400MHz, Methanol-d4) δ = 8.92 - 8.83 (m, 2H), 7.60 - 7.50 (m, 1H), 7.05 - 6.97 (m, 2H), 4.08 - 3.96 (m, 1H), 3.75 - 3.65 (m, 4H), 3.42 - 3.34 (m, 2H), 2.99 - 2.84 (m, 2H), 2.70 - 2.63 (m, 2H), 2.04 - 2.01 (m, 3H), 2.01 - 1.99 (m, 3H), 1.98 - 1.95 (m, 3H), 1.95 - 1.90 (m, 1H), 1.86 - 1.64 (m, 3H)
P24		1H NMR (400MHz, Methanol-d4) δ = 8.64 - 8.57 (m, 1H), 8.02 - 7.94

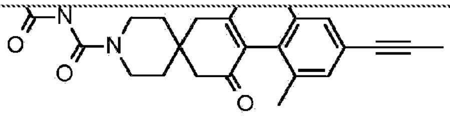
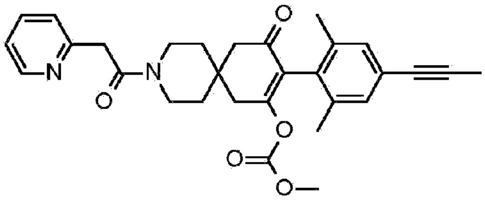
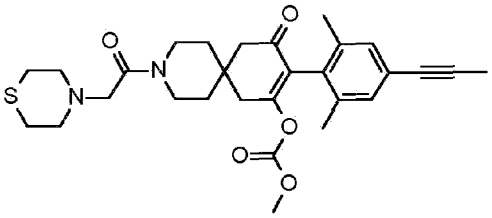
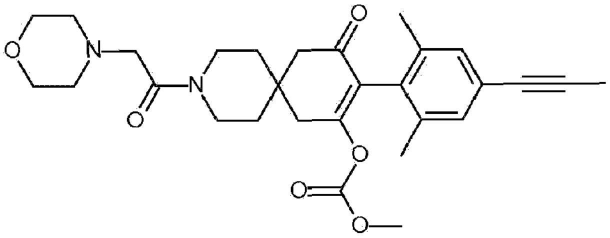
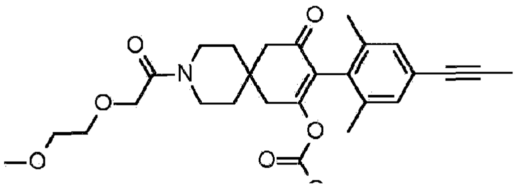
CMP	Structure	NMR
		(m, 1H), 7.64 - 7.56 (m, 1H), 7.54 - 7.48 (m, 1H), 7.05 - 6.90 (m, 2H), 4.06 - 3.97 (m, 1H), 3.71 - 3.64 (m, 3H), 3.52 - 3.43 (m, 3H), 2.98 - 2.90 (m, 2H), 2.71 - 2.59 (m, 2H), 2.04 - 1.94 (m, 9H), 1.87 - 1.61 (m, 4H)
P25		1H NMR (400MHz, CDCl3) δ = 8.74 - 8.68 (m, 1H), 8.62 - 8.54 (m, 1H), 7.84 - 7.71 (m, 2H), 7.73 - 7.59 (m, 2H), 7.52 - 7.42 (m, 1H), 7.39 - 7.27 (m, 1H), 7.04 - 6.92 (m, 2H), 4.07 - 3.96 (m, 1H), 3.80 - 3.56 (m, 3H), 3.02 - 2.89 (m, 2H), 2.74 - 2.66 (m, 2H), 2.16 - 1.98 (m, 9H), 1.97 - 1.70 (m,4H)
P26		1H NMR (400MHz, CDCl3) δ = 7.08 (s, 2H), 4.18 - 4.04 (m, 1H), 4.01 - 3.89 (m, 1H), 3.84 - 3.72 (m, 1H), 3.68 (s, 3H), 3.65 - 3.53 (m, 1H), 3.24 (s, 3H), 2.80 (s, 2H), 2.62 (br d, J=2.6 Hz, 2H), 2.03 (s, 9H), 1.84 - 1.64 (m, 4H), 1.45 (s, 6H)
P27		1H NMR (400MHz, CDCl3) δ = 7.08 (s, 2H), 3.93 - 3.70 (m, 4H), 3.70 - 3.67 (m, 3H), 2.82 (s, 2H), 2.64 (s, 2H), 2.03 (s, 9H), 1.95 - 1.71 (m, 4H), 1.62 (s, 6H)
P28		1H NMR (400MHz, Methanol-d4) δ = 7.04 - 6.99 (m, 2H), 3.70 - 3.64 (m, 3H), 3.39 - 3.32 (m, 2H), 3.29 - 3.22 (m, 2H), 2.91 - 2.88 (m, 2H), 2.87 - 2.83 (m, 3H), 2.67 - 2.62 (m, 2H), 2.02 - 2.00

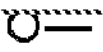
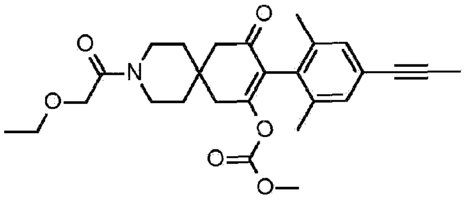
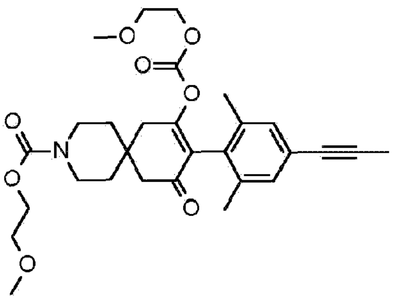
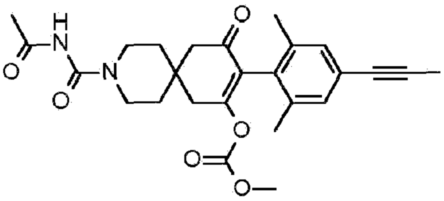
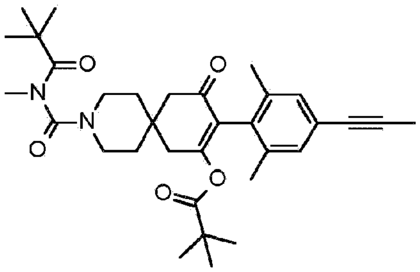
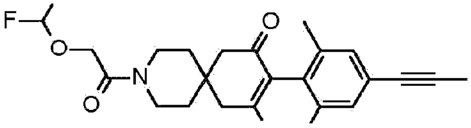
CMP	Structure	NMR
		(m, 6H), 2.00 (s, 3H), 1.95 - 1.86 (m, 2H), 1.83 - 1.74 (m, 2H)
P29		1H NMR (400MHz, Methanol-d4) δ = 7.02 (s, 2H), 3.96-3.68 (m, 3H), 3.56-3.45 (m, 1H), 2.88 (s, 2H), 2.65 (s, 2H), 2.01 (s, 6H), 2.00 (s, 3H), 1.98-1.96 (m, 1H), 1.94-1.89 (m, 1H), 1.88 (s, 3H), 1.83-1.54 (m, 3H), 0.89-0.78 (m, 4H)
P30		1H NMR (400MHz, Methanol-d4) δ = 9.28 - 9.22 (m, 1H), 7.92 - 7.86 (m, 1H), 7.85 - 7.79 (m, 1H), 7.05 - 6.96 (m, 2H), 4.07 - 3.97 (m, 1H), 3.79 - 3.69 (m, 1H), 3.69 - 3.64 (m, 3H), 3.57 - 3.48 (m, 2H), 2.97 - 2.90 (m, 2H), 2.70 - 2.64 (m, 2H), 2.02 (s, 3H), 1.99 (s, 3H), 1.97 (s, 3H), 1.95 - 1.68 (m, 4H)
P31		1H NMR (400MHz, CDCl3) δ = 7.08 (s, 2H), 4.47 (m, 1H), 3.84 - 3.82 (m, 1H), 3.72 - 3.69 (m, 1H), 3.69 (s, 3H), 3.45 (m, 2H), 2.82 - 2.79 (m, 2H), 2.68 - 2.58 (m, 2H), 2.03 (m, 9H), 1.86 - 1.70 (m, 4H), 1.33 (d, 3H)
P32		1H NMR (400MHz, CDCl3) δ = 7.08 (s, 2H), 4.16 (q, 1H), 3.84 - 3.52 (m, 4H), 3.69 (s, 3H), 3.35 (s, 3H), 2.80 (s, 2H), 2.63 (s, 2H), 2.03 (s, 9H), 1.91 - 1.63 (m, 4H), 1.40 (d, 3H)
P33		1H NMR (400MHz, CDCl3) δ = 7.08 (s, 2H), 3.96 - 3.54 (m, 4H), 3.69 (s, 3H), 2.82 (s, 2H),

CMP	Structure	NMR
		2.64 (s, 2H), 2.03 (s, 9H), 1.90 - 1.57 (m, 4H), 1.55 - 1.51 (m, 4H)
P34		1H NMR (400MHz, Methanol-d4) δ = 8.76 - 8.71 (m, 1 H), 8.11 - 8.05 (m, 1H), 8.00 - 7.95 (m, 1H), 7.68 - 7.62 (m, 1H), 7.02 - 6.92 (m, 2H), 3.68 - 3.60 (m, 3H), 3.49 - 3.41 (m,2H), 3.39 - 3.33 (m, 2H), 2.80 - 2.74 (m, 2H), 2.58 - 2.51 (m, 2H), 2.00 - 1.98 (m, 3H), 1.98 - 1.95 (m, 6H), 1.90 - 1.80 (m, 2H), 1.77 - 1.68 (m, 2H)
P35		1H NMR (400MHz, Methanol-d4) δ = 8.67 - 8.60 (m, 2H), 7.95 - 7.89 (m, 1H), 7.57 - 7.51 (m, 1H), 7.03 - 6.99 (m, 2H), 3.70 - 3.67 (m, 3H), 3.56 - 3.46 (m, 2H), 2.99 - 2.89 (m, 2H), 2.81 - 2.72 (m, 2H), 2.71 - 2.63 (m, 2H), 2.02 (br s, 3H), 2.00 - 1.96 (m, 6H), 1.88 - 1.76 (m, 2H), 1.76 - 1.63 (m, 2H)
P36		1H NMR (400MHz, Methanol-d4) δ = 8.86 - 8.79 (m, 2H), 8.79 - 8.71 (m, 2H), 8.27 - 8.21 (m, 1H), 8.18 - 8.10 (m, 1H), 7.84 - 7.74 (m, 1H), 7.57 - 7.49 (m, 1H), 7.01 - 6.92 (m, 2H), 4.10 - 3.98 (m, 1H), 3.80 - 3.68 (m, 1H), 3.60 - 3.48 (m, 2H), 3.12 - 3.05 (m, 2H), 2.80 - 2.71 (m,2H), 2.13 - 2.02 (m, 6H), 2.01 - 1.96 (m, 1H), 1.96 - 1.93 (m, 3H), 1.92 - 1.73 (m, 3H)
P37		1H NMR (400MHz, Methanol-d4) δ = 9.22

CMP	Structure	NMR
		(d, J=1.3 Hz, 1H), 8.94 (d, J=5.1 Hz, 1H), 7.66 (dd, J=1.5, 5.1 Hz, 1H), 7.01 (d, J=5.5 Hz, 2H), 4.05 - 3.96 (m, 1H), 3.74 - 3.64 (m, 4H), 3.56 - 3.46 (m, 2H), 2.95 (d, J=1.3 Hz, 2H), 2.68 (d, J=2.2 Hz, 2H), 2.02 (s, 3H), 1.99 (s, 3H), 1.98 (s, 3H), 1.95 - 1.69 (m, 4H)
P38		1H NMR (400MHz, Methanol-d4) δ = 8.84 (d, J=1.5 Hz, 1H), 8.69 (d, J=2.7 Hz, 1H), 8.65 (dd, J=1.6, 2.6 Hz, 1H), 7.02 (s, 1H), 7.00 (s, 1H), 4.07 - 3.98 (m, 1H), 3.77 - 3.69 (m, 1H), 3.65 - 3.52 (m, 2H), 2.96 (s, 2H), 2.69 (d, J=2.2 Hz, 2H), 2.02 (s, 3H), 2.00 (s, 3H), 1.98 (s, 3H), 1.95 - 1.68 (m, 4H)
P39		1H NMR (400MHz, CDCl3) δ = 1.45 (s, 6 H) 1.68- 1.90 (m, 4 H) 1.99 - 2.05 (m, 9 H) 2.63 (d, J=1.83 Hz, 2 H) 2.80 (s, 2 H) 3.06 (d, J=3.55 Hz, 2 H) 3.68 (s, 7 H) 7.07 (s, 2 H)
P40		1H NMR (400MHz, CDCl3) δ = 1.56 - 1.77 (m, 6 H) 1.92 (br d, J=12.59 Hz, 3 H) 2.03 (s, 9 H) 2.62 (d, J=7.58 Hz, 2 H) 2.79 (s, 3 H) 3.45 (td, J=11.77, 2.02 Hz, 2 H) 3.51 - 3.65 (m, 3 H) 3.68 (s, 3 H) 3.71 - 3.80 (m, 1 H) 4.02 (br dd, J=11.55, 1.90 Hz, 2 H) 7.08 (s, 2 H).
P41		LCMS M+H: 433

CMP	Structure	NMR
		
P42		1H NMR (400MHz, CDCl3) δ = 7.13-7.05(m, 2H), 2.84-2.76(m, 2H), 2.68-2.59(m, 2H), 2.06-2.02(m, 9H), 1.93-1.64(m, 5H), 1.05-0.93(m, 2H), 0.83-0.71(m, 2H)
P43		1H NMR (400MHz, CDCl3) δ = 7.08(s, 2H), 3.75-3.58(m, 5H), 3.52-3.49(m, 4H), 2.80(s, 3H), 2.63(s, 2H), 2.03-2.02(m, 9H), 1.95-1.69(m, 4H)
P44		1H NMR (400MHz, CDCl3) δ = 7.04 - 6.99 (m, 2H), 4.86 - 4.79 (m, 4H), 4.24 - 4.14 (m, 1H), 3.88 - 3.69 (m, 2H), 3.69 - 3.65 (m, 3H), 3.62 - 3.36 (m, 2H), 2.93 - 2.88 (m, 2H), 2.67 - 2.61 (m, 2H), 2.02 - 2.00 (m, 6H), 2.00 - 1.99 (m, 3H), 1.85 - 1.75 (m, 2H), 1.68 - 1.59 (m, 2H)
P45		1H NMR (400MHz, Methanol-d4) δ = 8.68 - 8.63 (m, 2H), 7.49 - 7.43 (m, 2H), 6.97 (br d, J = 5.9 Hz, 2H), 4.04 - 3.94 (m, 1H), 3.84 - 3.69 (m, 1H), 3.69 - 3.66 (m, 3H), 3.50 - 3.37 (m, 2H), 2.97 - 2.91 (m, 2H), 2.71 - 2.63 (m, 2H), 2.04 - 1.95 (m, 9H), 1.95 - 1.87 (m, 1H), 1.85 - 1.74 (m, 2H), 1.73 - 1.61 (m, 1H)
P46		1H NMR (400MHz, CDCl3) δ = 9.87(bs, 1H), 8.64-8.60(m, 1H), 8.24(d, 1H), 7.92(dt, 1H),

CMP	Structure	NMR
		7.56-7.50(m, 1H), 7.08(s, 2H), 3.76-3.57(m, 7H), 2.84(s, 2H), 2.66(s, 2H), 2.03(s, 9H), 1.93-1.76(m, 4H)
P47		1H NMR (400MHz, Methanol-d4) δ = 8.50 - 8.44 (m, 1H), 7.82 - 7.75 (m, 1H), 7.40 - 7.34 (m, 1H), 7.33 - 7.27 (m, 1H), 7.03 - 6.98 (m, 2H), 3.99 - 3.94 (m, 1H), 3.89 - 3.80 (m, 1H), 3.76 - 3.69 (m, 1H), 3.69 - 3.64 (m, 3H), 3.65 - 3.56 (m, 1H), 3.56 - 3.46 (m, 1H), 2.91 - 2.84 (m, 2H), 2.66 - 2.57 (m, 2H), 2.08 - 1.96 (m, 9H), 1.83 - 1.74 (m, 2H), 1.67- 1.55 (m, 2H)
P48		1H NMR (400MHz, Methanol-d4) δ = 7.02 (s, 2H), 3.83 - 3.68 (m, 2H), 3.68 (s, 3H), 3.60 - 3.40 (m, 4H), 2.92 (s, 2H), 2.86 (br s, 4H), 2.74 - 2.73 (m, 4H), 2.65 (s, 2H), 2.03 - 1.98 (m, 9H), 1.86 - 1.60 (m, 4H)
P49		1H NMR (400MHz, Methanol-d4) δ = 7.04 - 7.00 (m, 2H), 4.32 - 4.27 (m, 2H), 4.12 - 3.79 (m, 5H), 3.70 - 3.66 (m, 3H), 3.44 (br s, 5H), 3.39 - 3.32 (m, 2H), 2.96 - 2.91 (m, 2H), 2.69 - 2.64 (m, 2H), 2.02 - 2.00 (m, 6H), 2.00 - 1.99 (m, 3H), 1.96 - 1.88 (m, 1H), 1.88 - 1.79 (m, 1H), 1.79 - 1.63 (m, 2H)
P50		1H NMR (400MHz, Methanol-d4) δ = 7.02 (s, 2H), 4.24 (d, J = 1.7 Hz, 2H), 3.87 - 3.72 (m, 1H), 3.68 - 3.64 (m, 5H), 3.61 - 3.55 (m, 3H), 3.55

CMP	Structure	NMR
		- 3.45 (m, 2H), 3.36 (s, 3H), 2.91 (s, 2H), 2.64 (s, 2H), 2.01 (s, 6H), 2.00 (s, 3H), 1.88 - 1.57 (m, 4H)
P51		1H NMR (400MHz, Methanol-d4) δ = 7.02 (s, 2H), 4.19 (s, 2H), 3.83 - 3.77 (m, 1H), 3.67 (s, 3H), 3.63 - 3.46 (m, 5H), 2.90 (s, 2H), 2.64 (s, 2H), 2.01 (s, 6H), 2.00 (s, 3H), 1.88 - 1.76 (m, 2H), 1.74 - 1.59 (m, 2H)
P52		1H NMR (400MHz, Methanol-d4) δ = 7.02 (s, 2H), 4.22 - 4.15 (m, 4H), 3.70 - 3.58 (m, 4H), 3.54 - 3.41 (m, 4H), 3.37 (s, 3H), 3.26 (s, 3H), 2.89 (s, 2H), 2.63 (s, 2H), 2.01 (s, 6H), 1.99 (s, 3H), 1.79 (ddd, J = 3.7, 6.2, 13.4 Hz, 2H), 1.69 - 1.60 (m, 2H)
P53		1H NMR (400MHz, Methanol-d4) δ = 7.01 (s, 2H), 3.68 (s, 3H), 3.69 - 3.61 (m, 2H), 3.55 - 3.41 (m, 2H), 2.91 (s, 2H), 2.64 (s, 2H), 2.15 (s, 3H), 2.00 (m, 9H), 1.89 - 1.63 (m, 4H)
P54		1H NMR (400MHz, CDCl3) δ = 0.90 (s, 9 H) 1.28 (s, 9 H) 1.71 - 1.91 (m, 4 H) 2.02 (s, 9 H) 2.61 - 2.79 (m, 4 H) 2.99 (s, 3 H) 3.58 (br s, 4 H) 7.06 (s, 2 H)
P55		1H NMR (400MHz, Methanol-d4) δ = 7.01 (s, 2H), 6.50 (t, J = 75.6 Hz, 1H), 4.63 (s, 2H), 3.87 - 3.79 (m, 1H), 3.68

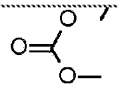
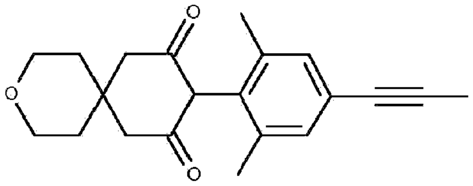
CMP	Structure	NMR
		(s, 3H), 3.51 (dt, J = 4.0, 8.9 Hz, 3H), 2.92 (s, 2H), 2.65 (s, 2H), 1.92 - 1.77 (m, 2H), 1.77 - 1.60 (m, 2H)

Table 3. Prior art comparator.

Compound	Structure
C1 (Compound A-38 from WO2014/096289)	

Biological Examples

[0136] Seeds of a variety of test species are sown in standard soil in pots (*Lolium perenne* (LOLPE), *Setaria faberi* (SETFA), *Alopecurus myosuroides* (ALOMY), *Echinochloa crus-galli* (ECHCG), *Avena fatua* (AVEFA)). After cultivation for one day (pre-emergence) or after 8 days cultivation (post-emergence) under controlled conditions in a glasshouse (at 24/16°C, day/night; 14 hours light; 65 % humidity), the plants are sprayed with an aqueous spray solution derived from the formulation of the technical active ingredient in acetone / water (50:50) solution containing 0.5% Tween 20 (polyoxyethelyene sorbitan monolaurate, CAS RN 9005-64-5). Compounds are applied at 250 g/h. The test plants are then grown in a glasshouse under controlled conditions in a glasshouse (at 24/16°C, day/night; 14 hours light; 65 % humidity) and watered twice daily. After 13 days for pre and post-emergence, the test is evaluated for the percentage damage caused to the plant. The biological activities are shown in the following table on a five point scale (5 = 80-100%; 4 = 60-79%; 3=40-59%; 2=20-39%; *1*=0-19%).

TABLE B1

Compound	LOLPE		SETFA		ALOMY		ECHCG		AVEFA	
	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST
A7	5	5	5	5	5	5	5	5	5	5
A8	5	5	5	5	5	5	5	5	5	5
A9	5	5	5	5	5	5	5	5	5	5
A12	5	5	5	5	4	5	5	5	4	5
A13	5	5	5	5	5	5	5	5	5	5
A15	5	5	5	5	5	5	5	NT	5	5
A16	5	5	5	5	5	5	5	5	5	5

Compound	LOLPE		SETFA		ALOMY		ECHCG		AVEFA	
	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST
A17	5	5	5	5	5	5	5	NT	5	5
A18	5	5	5	5	5	5	5	5	5	5
A19	5	5	5	5	5	5	5	5	5	5
A20	5	5	5	5	5	5	5	NT	5	5
A21	5	5	3	5	5	5	2	NT	5	5
A22	5	5	5	5	5	5	5	5	5	5
A37	5	5	5	5	5	5	5	5	4	5
A38	5	5	5	5	5	5	5	5	3	4
A39	5	5	5	5	4	5	5	5	4	5
A40	5	5	5	5	5	5	5	NT	5	5
A41	5	5	5	5	4	4	5	5	4	5
A70	5	5	5	5	5	5	5	5	5	5
A71	5	5	5	5	5	5	5	5	5	5
A72	5	5	5	5	5	5	5	5	5	5
A73	5	5	5	5	5	5	5	5	5	5
A74	5	5	5	5	5	5	5	5	5	5
A75	5	5	5	5	5	5	5	5	5	5
A76	5	5	5	5	5	5	5	5	5	5
A77	5	5	5	5	5	5	5	5	5	5
A78	5	5	5	5	5	5	5	5	5	5
A79	5	5	4	5	4	5	4	NT	5	5
A80	5	5	5	5	5	5	5	5	5	5
A81	5	5	5	5	5	5	5	5	5	5
A82	5	5	5	5	5	5	5	5	5	5
A83	5	5	5	5	5	5	5	5	4	5
A84	5	5	5	5	5	5	5	5	4	5
A85	5	5	5	4	5	5	5	5	3	5
A86	5	5	5	5	5	5	5	5	5	5
A87	5	5	5	5	4	5	5	NT	3	5
A88	5	5	5	5	5	5	5	5	5	5
A89	5	5	5	5	5	5	5	5	5	5
A90	5	5	5	5	5	5	5	5	5	5
A91	5	5	5	5	5	5	5	5	5	5

Compound	LOLPE		SETFA		ALOMY		ECHCG		AVEFA	
	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST
A96	5	5	5	5	5	5	5	NT	5	5
A97	5	5	5	5	4	5	5	NT	5	5
A98	5	5	3	5	4	5	4	NT	5	5
A99	4	4	4	5	3	4	5	5	3	5
A100	5	5	5	5	3	4	5	5	3	5
A101	5	5	5	5	4	5	5	5	4	5
A102	5	5	5	5	2	5	5	5	5	5
A103	4	5	5	5	4	5	5	5	4	5
A104	5	5	5	5	4	5	5	5	5	5
A105	5	5	5	5	5	NT	5	3	5	5
A106	3	3	4	5	NT	NT	4	3	2	5
A107	5	5	4	5	NT	NT	3	5	4	5
A108	5	5	5	5	NT	NT	5	5	5	5
A109	5	5	5	5	NT	NT	5	5	5	5
A110	5	5	5	5	NT	NT	5	5	5	5
A112	5	5	5	5	NT	NT	5	5	5	5
A114	5	5	5	5	NT	NT	5	5	4	5
A115	5	5	5	5	NT	NT	5	5	3	5
A116	5	5	5	5	NT	NT	5	5	5	5
A117	4	5	5	5	NT	NT	5	5	2	5
A118	5	5	5	5	NT	NT	5	5	5	5
A119	5	5	5	5	NT	NT	5	5	5	5
A120	5	5	5	5	NT	NT	5	5	4	5
A121	5	5	5	5	NT	NT	5	5	4	5
A122	5	5	5	5	NT	NT	5	5	5	5
A123	5	5	5	5	NT	NT	5	5	5	5
A124	5	5	5	5	NT	NT	5	5	5	5
A125	5	5	5	5	NT	NT	5	5	5	5
A126	5	5	5	5	NT	NT	5	5	5	5
A127	5	5	5	5	NT	NT	5	5	5	5
A128	5	5	5	4	NT	NT	5	5	3	5
A129	5	5	5	5	NT	NT	5	5	5	5
A132	5	5	5	5	NT	NT	5	5	5	5
A133	5	5	5	5	NT	NT	5	5	5	5

Compound	LOLPE		SETFA		ALOMY		ECHCG		AVEFA	
	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST
A134	5	5	5	5	NT	NT	5	5	5	5
A135	5	5	5	5	NT	NT	5	5	5	5
A136	5	5	5	5	NT	NT	5	5	5	5
A138	5	5	5	5	NT	NT	5	5	5	5
A139	5	5	5	5	NT	NT	5	5	5	5
A141	5	5	5	5	NT	NT	5	5	4	5
A142	5	5	5	5	NT	NT	5	5	4	5
A143	5	5	5	5	NT	NT	5	5	4	5
A145	4	5	5	5	3	5	5	5	2	5
A146	5	5	5	5	5	5	5	5	4	5
A147	5	5	5	5	4	5	5	5	3	5
A148	5	5	5	5	5	5	5	5	5	5
A151	5	5	5	5	5	5	5	5	5	5
A152	5	5	5	5	5	5	5	5	5	5
A153	5	5	5	5	5	5	5	5	5	5
A154	5	5	5	5	5	5	5	5	5	5
A155	5	5	5	5	5	5	5	5	5	5
A156	5	5	5	5	5	5	5	5	5	5
A157	5	5	5	5	3	5	5	5	2	5
A158	3	5	5	5	2	3	5	5	2	5
A159	5	5	5	5	5	5	5	5	5	5
A160	3	5	5	5	2	4	4	4	4	5
A162	5	5	5	5	5	5	5	5	5	5
A163	4	5	5	5	0	5	5	5	5	5
A164	5	5	5	5	4	5	5	5	5	5
A165	4	5	5	5	4	5	5	5	4	5
A166	5	5	5	5	5	5	4	5	4	5
A167	5	5	5	5	4	5	5	5	4	5
A168	4	4	5	4	4	4	5	5	4	4
A169	5	5	5	5	5	5	5	5	5	5
A170	4	5	4	5	4	5	3	5	2	5
A171	5	5	5	5	5	5	5	5	5	5
A172	5	5	5	5	5	5	5	5	5	5

Compound	LOLPE		SETFA		ALOMY		ECHCG		AVEFA	
	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST
A173	5	5	5	5	5	5	5	5	5	5
A174	5	5	5	5	5	5	5	5	5	5
A175	5	5	5	5	5	5	5	5	4	5
A176	5	5	5	5	3	5	5	5	2	2
A177	5	5	5	5	2	4	5	5	4	5
A178	5	5	5	5	4	5	4	5	5	5
A180	5	5	5	5	5	5	5	5	5	5
A182	5	5	5	5	5	5	5	5	3	4
A183	5	5	5	5	4	5	5	5	4	5
A184	5	5	5	5	1	4	4	5	2	5
A185	5	5	5	5	5	5	5	5	4	5
A186	5	5	5	5	5	5	5	5	5	5
A187	5	5	5	5	4	5	5	5	5	5
A191	5	5	5	5	2	5	5	5	4	5
A192	5	5	5	5	3	5	5	5	3	5
A193	5	5	5	5	5	5	5	5	5	5
A194	5	5	5	5	4	4	5	5	5	5
A195	5	5	5	5	4	5	2	5	5	5
A196	5	5	5	5	3	5	5	5	4	5
A197	5	5	5	5	5	5	5	5	5	5
A198	5	5	5	5	5	5	5	5	4	5
A199	5	5	5	5	5	5	5	5	5	5
A200	5	5	5	5	5	5	5	5	4	5
A201	5	5	5	5	5	5	5	5	4	5
A202	5	5	5	5	5	5	5	5	5	5
P1	5	5	5	5	5	5	5	5	5	5
P2	5	5	5	5	5	5	5	5	5	5
P3	5	5	5	5	5	5	5	5	5	5
P4	5	5	5	5	5	5	5	5	4	5
P6	5	5	5	5	5	5	5	5	5	5
P7	5	5	5	5	5	5	5	5	5	5
P9	5	5	5	5	5	5	5	5	4	5
P10	5	5	5	5	5	5	5	5	5	5
P11	5	4	5	5	5	5	5	5	3	5

Compound	LOLPE		SETFA		ALOMY		ECHCG		AVEFA	
	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST
P12	5	5	5	5	4	5	5	5	4	5
P13	5	5	5	5	5	5	5	5	5	5
P14	5	5	5	5	5	5	5	5	5	5
P15	5	5	5	5	5	5	5	5	5	5
P17	4	5	4	5	5	5	5	5	3	5
P18	5	5	5	5	5	5	5	5	5	5
P19	5	5	5	5	5	5	5	5	5	5
P20	5	5	5	5	5	5	5	5	3	5
P21	5	5	5	5	5	5	5	5	4	5
P22	5	5	5	5	5	5	5	NT	5	5
P23	5	5	5	5	5	5	5	NT	4	5
P24	5	5	5	5	5	5	5	5	5	5
P25	5	5	5	5	5	5	5	5	5	5
P26	5	5	5	5	5	5	5	NT	5	5
P27	5	5	5	5	5	5	5	5	5	5
P28	5	5	5	5	5	5	5	5	5	5
P29	5	5	5	5	5	5	5	5	5	5
P30	5	5	5	5	5	5	5	5	5	5
P31	5	5	5	5	5	5	5	NT	5	5
P32	5	5	5	5	5	5	5	NT	5	5
P33	5	5	5	5	5	5	5	NT	5	5
P34	5	5	5	5	5	5	5	NT	5	5
P35	5	5	5	5	5	NT	5	5	5	5
P36	5	5	5	5	NT	NT	5	5	4	5
P37	5	5	5	5	5	NT	5	5	5	5
P38	5	5	5	5	5	NT	5	5	5	5
P39	5	5	5	5	5	NT	5	5	5	5
P40	5	5	5	5	5	NT	5	5	5	5
P41	5	5	5	5	5	NT	5	5	5	5
P42	5	5	5	5	5	NT	5	5	5	5
P43	5	5	5	5	5	NT	5	4	5	5
P44	5	5	5	5	5	NT	5	5	5	5
P45	5	5	5	5	NT	NT	5	5	5	5

Compound	LOLPE		SETFA		ALOMY		ECHCG		AVEFA	
	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST
P46	5	5	5	5	NT	NT	5	5	2	5
P47	5	5	5	5	NT	NT	5	5	5	5
P50	4	5	5	5	3	4	5	5	2	5
P51	5	5	5	5	5	5	5	5	5	5
P52	5	5	5	5	5	5	5	5	5	5
P53	4	5	5	5	4	5	5	5	5	5
P54	5	5	5	5	4	5	5	5	4	4
NT = not tested.										

[0137] Using procedures outlines above, wheat and barley crop plants and a weed species (SETFA) are treated post-emergence with compound A11 of the present invention or comparator compound C1 (Compound A-38 from WO2014/096289) at the application rates indicated. The compounds were also applied to wheat in conjunction with the safener compound cloquintocet-mexyl (CQC) at 50 g/ha.

TABLE B2.

Compound	Rate	Wheat	Barley	SETFA
C1	30	40	80	100
	60	70	90	100
	60+CQC	60	NT	NT
A11	30	10	10	100
	60	30	40	100
	60+CQC	0	NT	NT
NT = not tested.				

[0138] These results demonstrate that the compounds of the present invention, exemplified using compound A11 exhibit significantly improved crop safety vis-à-vis structurally similar prior art compounds e.g C1 whilst retaining good overall weed control.

REFERENCES CITED IN THE DESCRIPTION

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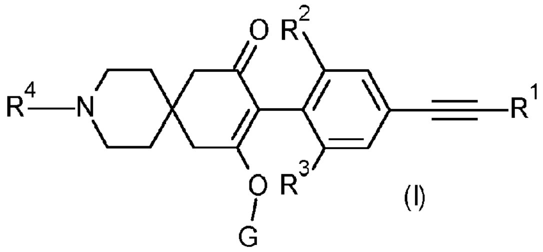
Patentkrav

1. Forbindelse med formel (I)



(I)

hvor

R^1 er methyl;

R^2 er methyl eller methoxy;

R^3 er methyl eller methoxy;

R^4 er valgt fra gruppen, der består af $-S(O)_nC_1-C_6$alkyl, $-S(O)_nC_1-C_6$halogenalkyl, $-S(O)_n-(CH_2)_n-C_3-C_6$cycloalkyl, $-S(O)_nC(R^{11})R^{12}R^{13}$, $-C(O)H$, $-C(O)-(CH_2)_n-C_3-C_6$cycloalkyl, $-C(O)C_2-C_4$alkenyl, $-C(O)(CR^9R^{10})CN$, $-C(O)(CR^9R^{10})(CR^9R^{10})CN$, $-C(O)CH_2C(O)-C_1-C_6$alkyl, $-C(O)CH_2OC(O)-C_1-C_6$alkyl, $-C(O)OC_1-C_6$alkyl, $-C(O)OC_1-C_6$halogenalkyl, $-C(O)(CR^9R^{10})_nS(O)_nC_1-C_6$alkyl, $-C(O)C_1-C_3$alkoxyC_1-C_6alkyl, $-C(O)C_1-C_3$alkoxyC_2-C_6alkenyl, $-C(O)C_1-C_3$alkoxyC_2-C_6alkynyl, $-C(O)C_1-C_3$alkoxyC_1-C_6halogenalkyl, $-C(O)C_1-C_3$alkoxyC_3-C_6cycloalkyl, $-C(O)OC_1-C_3$alkoxyC_1-C_6alkyl, $-C(O)C_1-C_3$alkoxyC_1-C_3alkoxyC_1-C_6alkyl, $-C(O)(CH_2)_nNR^5R^6$, $-C(O)-(CH_2)_n-NR^7C(O)R^8$, $-C(O)-(CH_2)_n-O-N=CR^5R^5$, $-CN$, $-(CH_2)_n$-phenyl, $-C(O)-(CH_2)_n$-phenyl, $-S(O)_n-(CH_2)_n$-phenyl, -heterocyclyl, $-C(O)-(CH_2)_n$-heterocyclyl, $-C(O)(CH_2)_nO-(CH_2)_n$-heterocyclyl, $-S(O)_n-(CH_2)_n$-heterocyclyl, hvor hver heterocyclyl er en 5- eller 6-leddet heterocyclyl, der kan være aromatisk, mættet eller delvist mættet og kan indeholde fra 1 til 4 heteroatomer, der hver for sig er valgt fra gruppen, der består af oxygen, nitrogen og svovl, og hvor heterocyclyl- eller phenylgrupperne eventuelt er substitueret med en, to eller tre substituenter, der er valgt uafhængigt fra gruppen, der består af C_1-C_3alkyl, C_1-C_3halogenalkyl, C_1-C_3alkoxy, C_2-C_3alkenyl, C_2-C_3alkynyl, halogen, cyano og nitro;

R^5 er valgt fra gruppen, der består af hydrogen og C_1-C_6 alkyl;

R^6 er valgt fra gruppen, der består af hydrogen, C_1-C_6alkyl, C_2-C_6alkenyl, C_2-C_6alkynyl, C_1-C_6halogenalkyl, hydroxyl-, C_1-C_6alkoxy, C_3-C_6cycloalkyl, $-C_1-C_4$alkoxy-C_1-C_6alkyl, $-C_1-C_3$alkoxy-C_1-C_6halogenalkyl, $-(CR^9R^{10})C_1-C_6$halogenalkyl, $-(CR^9R^{10})C(O)NR^5R^5$, phenyl, -pyridyl, hvor phenyl og pyridyl eventuelt er substitueret med en, to eller tre substituenter, der er valgt uafhængigt fra gruppen, der består af C_1-C_3 alkyl, C_1-C_3 halogenalkyl, C_1-C_3 alkoxy, C_2-C_3 alkenyl, C_2-C_3 alkynyl, halogen, cyano og nitro; eller

R^5 og R^6 sammen danner $-CH_2CH_2OCH_2CH_2-$; og

R^7 er valgt fra gruppen, der består af hydrogen og C_1-C_6 alkyl;

R^8 er valgt fra gruppen, der består af hydrogen, C_1-C_6 alkyl, C_1-C_6 alkoxy, C_3-C_6 cycloalkyl, phenyl, -pyridyl, hvor phenyl og pyridyl eventuelt er substitueret med en, to eller tre substituenter, der er valgt uafhængigt fra gruppen, der består af C_1-C_3 alkyl, C_1-C_3 halogenalkyl, C_1-C_3 alkoxy, C_2-C_3 alkenyl, C_2-C_3 alkynyl, halogen, cyano og nitro;

R^9 er hydrogen eller methyl;

R^{10} er hydrogen eller methyl; eller

R^9 og R^{10} sammen danner $-CH_2CH_2-$; og

R^{11} er hydrogen eller methyl;

R^{12} er valgt fra gruppen, der består af hydrogen, C_1-C_6 alkyl, hydroxyl og C_1-C_6 alkoxy-;

R^{13} er valgt fra gruppen, der består af hydrogen, C_1-C_6 alkyl, hydroxyl og C_1-C_6alkoxy; eller

R^{12} og R^{13} sammen danner $-CH_2-X-CH_2-$; og

X er valgt fra gruppen, der består af O, S og $N-R^{14}$;

R^{14} er valgt fra gruppen, der består af hydrogen, C_1-C_3 alkyl og C_1-C_3 alkoxy-;

n er 0, 1 eller 2;

G er valgt fra gruppen, der består af hydrogen, $-(CH_2)_n-R^a$, $-C(O)-R^a$, $-C(O)-(CR^cR^d)_n-O-R^b$, $-C(O)-(CR^cR^d)_n-S-R^b$, $-C(O)NR^aR^a$, $-S(O)_2-R^a$ og C_1-C_8alkoxy-C_1-C_3alkyl-;

R^a er valgt uafhængigt fra gruppen, der består af hydrogen, C_1-C_8alkyl, C_1-C_3halogenalkyl, C_2-C_8alkenyl, C_2-C_8alkynyl, C_3-C_6cycloalkyl, heterocyclyl og phenyl, hvor heterocyclyl- og phenylgrupperne eventuelt er substitueret med en, to eller tre substituenter, der er valgt uafhængigt fra gruppen, der består af C_1-C_3alkyl, C_1-C_3halogenalkyl, C_1-C_3alkoxy, C_2-C_3alkenyl, C_2-C_3alkynyl, halogen, cyano og nitro;

R^b er valgt fra gruppen, der består af C_1-C_8alkyl, C_1-C_3halogenalkyl, C_2-C_8alkenyl, C_2-C_8alkynyl, C_3-C_6 cycloalkyl, heterocyclyl og phenyl, hvor heterocyclyl- og phenylgrupperne eventuelt er substitueret med en, to eller tre substituenter, der er valgt uafhængigt fra gruppen, der består af C_1-C_3alkyl, C_1-C_3halogenalkyl, C_1-C_3alkoxy, C_2-C_3alkenyl, C_2-C_3alkynyl, halogen, cyano og nitro;

R^c er hydrogen eller C_1-C_3 alkyl; og

R^d er hydrogen eller C_1-C_3 alkyl;

eller et agrikulturelt acceptabelt salt deraf.

2. Forbindelse ifølge krav 1, hvor R^2 er methyl.

3. Forbindelse ifølge et hvilket som helst af ovennævnte krav, hvor R^3 er methyl.

4. Forbindelse ifølge et hvilket som helst af ovennævnte krav 1 til 2, hvor R^3 er methoxy.

5. Forbindelse ifølge et hvilket som helst af ovennævnte krav, hvor R^4 er -C(O)OC_1-C_6alkyl.

6. Forbindelse ifølge et hvilket som helst af kravene 1 til 4, hvor R^4 er -C(O)NR^5R^6.

7. Forbindelse ifølge et hvilket som helst af kravene 1 til 4, hvor R^4 er R^4 er -C(O)NR^7C(O)R^8.

8. Forbindelse ifølge et hvilket som helst af ovennævnte krav, hvor G er hydrogen.

9. Forbindelse ifølge et hvilket som helst af kravene 1 til 7, hvor G er -C(O)C_1-C_6alkyl.

10. Forbindelse ifølge et hvilket som helst af kravene 1 til 7, hvor G er -C(O)-O-C_1-C_6alkyl.

11. Herbicid sammensætning, som omfatter en forbindelse med formel (I) ifølge et hvilket som helst af ovennævnte krav og et agrikulturelt acceptabelt formuleringsadjuvans.

12. Herbicid sammensætning ifølge krav 11, som yderligere omfatter mindst ét yderligere pesticid.

13. Herbicid sammensætning ifølge krav 12, hvor det yderligere pesticid er et herbicid eller en herbicidsafener.

14. Fremgangsmåde til bekæmpelse af ukrudt på en lokalitet, som omfatter påføring på lokaliteten af en ukrudtsbekæmpende mængde af en sammensætning ifølge et hvilket som helst af kravene 11 til 13.

15. Anvendelse af en forbindelse med formel (I) ifølge krav 1 som et herbicid.