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Erklärungen gemäß Regel 4.17:

— *hinsichtlich der Berechtigung des Anmelders, ein Patent zu beantragen und zu erhalten (Regel 4.17 Ziffer ii)*

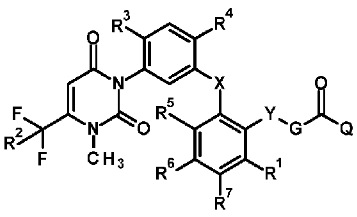
Veröffentlicht:

— *mit internationalem Recherchenbericht (Artikel 21 Absatz 3)*

— *in Schwarz-Weiss; die internationale Anmeldung enthielt in ihrer eingereichten Fassung Farbe oder Graustufen und kann von PATENTSCOPE heruntergeladen werden.*

(54) Title: SUBSTITUTED N-PHENYLURACILS AND SALTS THEREOF, AND USE THEREOF AS HERBICIDAL ACTIVE SUBSTANCES

(54) Bezeichnung: SUBSTITUIERTE N-PHENYLURACILE SOWIE DEREN SALZE UND IHRE VERWENDUNG ALS HERBIZIDE WIRKSTOFFE



(I)

(57) Abstract: The present invention relates to substituted N-phenyluracils of general formula (I) or salts thereof (formula I), wherein the radicals in general formula (I) correspond to the definitions given in the description, and to the use thereof as herbicides, in particular for controlling weeds and/or weed grasses in crops, and/or as plant growth regulators for influencing the growth of crops.

(57) Zusammenfassung: Die vorliegende Erfindung betrifft substituierte N-Phenyluracile der allgemeinen Formel (I) oder deren Salze (Formel I) wobei die Reste in der allgemeinen Formel (I) den in der Beschreibung gegebenen Definitionen entsprechen, sowie deren Verwendung als Herbizide, insbesondere zur Bekämpfung von Unkräutern und/oder Ungräsern in Nutzpflanzenkulturen und/oder als Pflanzenwachstumsregulatoren zur Beeinflussung des Wachstums von Nutzpflanzenkulturen.

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Substituted N-phenyluracils and salts thereof, and use thereof as herbicidal active substances

Description

The invention relates to the technical field of crop protection products, in particular that of herbicides for selective control of broad-leaved weeds and weed grasses in crops of useful plants.

Specifically, the present invention relates to substituted N-phenyluracils and salts thereof, to processes for preparation thereof and to the use thereof as herbicides, especially for control of broad-leaved weeds and/or weed grasses in crops of useful plants and/or as plant growth regulators for influencing the growth of crops of useful plants.

In their application, crop protection products known to date for the selective control of harmful plants in crops of useful plants or active ingredients for controlling unwanted vegetation sometimes have disadvantages, whether (a) that they have insufficient herbicidal activity, if any, against particular harmful plants, (b) that the spectrum of harmful plants which can be controlled with an active ingredient is not wide enough, (c) that their selectivity in crops of useful plants is too low and/or (d) that they have a toxicologically unfavorable profile. Furthermore, some active ingredients which can be used as plant growth regulators for a number of useful plants cause undesirably reduced harvest yields in other useful plants or are compatible with the crop plant only within a narrow application rate range, if at all. Some of the known active ingredients cannot be produced economically on an industrial scale owing to precursors and reagents which are difficult to obtain, or they have only insufficient chemical stabilities. In the case of other active ingredients, the activity is too highly dependent on environmental conditions, such as weather and soil conditions.

The herbicidal action of these known compounds, especially at low application rates, and/or the compatibility thereof with crop plants is still in need of improvement.

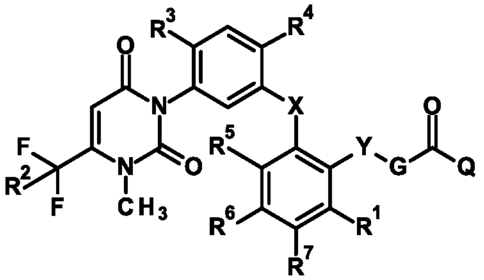
It is known from various documents that particular substituted N-aryluracils can be used as active herbicidal ingredients (cf. EP1106607, EP408382, EP473551, EP648749, US4943309,

US5084084, US5127935, US6537948, JP2001/348376, JP2001/354661, JP2002/003480, JP2002/363010, JP2002/363170, WO91/00278, WO95/29168, WO95/30661, WO96/35679, WO97/01541, WO98/25909, WO 2001/034575, WO2001/39597, WO2001/85907, WO2002/098227, WO2002/098228, WO2003/028462, WO2003/028463, WO2003/0284647, WO2016/095768 and WO2022/043205). However, the known aryluracils have a number of gaps in activity, especially with respect to monocotyledonous weeds. A number of combinations of active herbicidal ingredients based on N-aryluracils have likewise become known (cf. DE4437197, EP714602, WO96/07323, WO96/08151, JP11189506, JP2003/104808, JP2003/104809, JP2003/104810, JP2003/160415 and JP2003/160416). However, the properties of these active ingredient combinations are not entirely satisfactory.

Also known are substituted uracils having an N-bonded and further-substituted diaryl ether group or a corresponding heteroaryl aryl ether radical (cf. US6333296, US6121201, WO2001/85907, EP1122244, EP1397958, EP1422227, WO 2002/098227). There have additionally been descriptions of highly substituted N-phenyluracils having a carbonylalkyloxy group with specific substitution (cf. WO2011/137088). WO2018/019842 describes the use of specifically substituted N-phenyluracils for controlling particular dicotyledonous weeds having specific resistance to established herbicides. Substituted 3-phenyl-5-alkyl-6-(trifluoromethyl)pyrimidine-2,4(1H,3H)-diones (cf. WO2019/101551) have likewise become known.

It has now been found that, surprisingly, selected N-phenyluracils having a substituted alkyl ester side chain or salts thereof are suitable as herbicides and can be used particularly advantageously for controlling monocotyledonous and dicotyledonous weeds in crop plant cultures.

The present invention thus provides substituted N-phenyluracils of the general formula (I) or salts thereof



(I)

in which

R^1 is hydrogen, halogen, cyano, (C_1-C_8)-alkyl, (C_1-C_8)-haloalkyl, (C_1-C_8)-alkoxy or (C_1-C_8)-haloalkoxy,

R^2 is hydrogen, fluorine, chlorine, bromine, trifluoromethyl or (C_1-C_8)-alkoxy,

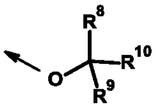
R^3 is hydrogen, halogen or (C_1-C_8)-alkoxy,

R^4 is halogen, cyano, NO_2, $C(O)NH_2$, $C(S)NH_2$, (C_1-C_8)-haloalkyl or (C_2-C_8)-alkynyl,

R^5, R^6 and R^7 are independently hydrogen, halogen, cyano, (C_1-C_8)-alkyl, (C_1-C_8)-haloalkyl, (C_1-C_8)-alkoxy or (C_1-C_8)-haloalkoxy,

G is unbranched or branched (C_1-C_8)-alkylene,

Q is a radical of the formula



,

R^8 is hydrogen, (C_1-C_8)-alkyl or cyano,

R^9 is hydrogen or (C_1-C_8)-alkyl,

R^{10} is (C_3-C_8)-cycloalkyl which is unsubstituted or in each case independently substituted by "m" radicals selected from the group consisting of halogen, (C_1-C_6)-alkyl, (C_1-C_6)-haloalkyl, (C_3-C_6)-cycloalkyl, (C_1-C_6)-alkoxy, (C_1-C_6)-haloalkoxy, cyano and nitro, or

is spiro-(C_5-C_9)-alkanyl or dispiro-(C_7-C_8)-alkanyl, which is unsubstituted or in each case independently substituted by "m" radicals selected from the group consisting of halogen, (C_1-C_6)-alkyl, (C_1-C_6)-haloalkyl, (C_1-C_6)-alkoxy, (C_1-C_6)-haloalkoxy and cyano,

m is 0, 1, 2 or 3

and

X and Y are independently O (oxygen) or S (sulfur).

The invention more preferably provides compounds of the general formula (I) in which

R^1 is hydrogen, halogen, cyano, (C_1-C_6)-alkyl, (C_1-C_6)-haloalkyl, (C_1-C_6)-alkoxy or (C_1-C_6)-haloalkoxy,

R^2 is hydrogen, fluorine, chlorine, bromine, trifluoromethyl or (C_1-C_6)-alkoxy,

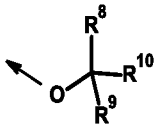
R^3 is hydrogen, halogen or (C_1-C_6)-alkoxy,

R^4 is halogen, cyano, NO_2, $C(O)NH_2$, $C(S)NH_2$, (C_1-C_6)-haloalkyl or (C_2-C_6)-alkynyl,

R^5, R^6 and R^7 are independently hydrogen, halogen, cyano, (C_1-C_6)-alkyl, (C_1-C_6)-haloalkyl, (C_1-C_6)-alkoxy or (C_1-C_6)-haloalkoxy,

G is unbranched or branched (C_1-C_6)-alkylene,

Q is a radical of the formula



,

R^8 is hydrogen, (C_1-C_6)-alkyl or cyano,

R^9 is hydrogen or (C_1-C_6)-alkyl,

R^{10} is (C_3-C_7)-cycloalkyl which is unsubstituted or in each case independently substituted by “m” radicals selected from the group consisting of halogen, (C_1-C_3)-alkyl, (C_1-C_3)-haloalkyl, (C_3-C_6)-cycloalkyl, (C_1-C_3)-alkoxy, (C_1-C_3)-haloalkoxy, cyano, nitro or

is spiro-(C_5-C_7)-alkanyl or dispiro-(C_7-C_8)-alkanyl, which is unsubstituted or in each case independently substituted by “m” radicals selected from the group consisting of halogen, (C_1-C_6)-alkyl, (C_1-C_6)-haloalkyl, (C_1-C_6)-alkoxy,

m is 0, 1, 2 or 3

and

X and Y are independently O (oxygen) or S (sulfur).

The invention very particularly preferably provides compounds of the general formula (I) in which

R^1 is hydrogen, fluorine, chlorine, bromine, iodine, cyano, methyl, ethyl, prop-1-yl, 1-methylethyl, but-1-yl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl, 1-methylbutyl, 2-methylbutyl, 3-methylbutyl, 1,1-dimethylpropyl, 1,2-dimethylpropyl, 2,2-dimethylpropyl, 1-ethylpropyl, n-hexyl, 1-methylpentyl, 2-methylpentyl, 3-methylpentyl, 4-methylpentyl, 1,1-dimethylbutyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl, 2,2-dimethylbutyl, 2,3-dimethylbutyl, 3,3-dimethylbutyl, 1-ethylbutyl, 2-ethylbutyl, 1,1,2-trimethylpropyl, 1,2,2-trimethylpropyl, 1-ethyl-1-methylpropyl, 1-ethyl-2-methylpropyl, trifluoromethyl, difluoromethyl, pentafluoroethyl, 2,2-difluoroethyl, 2,2,2-trifluoroethyl, methoxy, ethoxy, prop-1-yloxy, prop-2-yloxy, but-1-yloxy, but-2-yloxy, 2-methylprop-1-yloxy, 1,1-dimethyleth-1-yloxy, difluoromethoxy, trifluoromethoxy, pentafluoroethoxy, 2,2-difluoroethoxy, 2,2,2-trifluoroethoxy,

R^2 is hydrogen, fluorine, chlorine, bromine, trifluoromethyl, methoxy, ethoxy, prop-1-yloxy, but-1-yloxy,

R^3 is hydrogen, fluorine, chlorine, bromine, methoxy, ethoxy, prop-1-yloxy, prop-2-yloxy, but-1-yloxy, but-2-yloxy, 2-methylprop-1-yloxy, 1,1-dimethyleth-1-yloxy,

R^4 is fluorine, chlorine, bromine, cyano, NO_2, $C(O)NH_2$, $C(S)NH_2$, trifluoromethyl, difluoromethyl, pentafluoroethyl, ethynyl, propyn-1-yl, 1-butyn-1-yl, pentyn-1-yl, hexyn-1-yl,

R^5, R^6 and R^7 are independently hydrogen, fluorine, chlorine, bromine, iodine, cyano, methyl, ethyl, prop-1-yl, 1-methylethyl, but-1-yl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl, 1-methylbutyl, 2-methylbutyl, 3-methylbutyl, 1,1-dimethylpropyl, 1,2-dimethylpropyl, 2,2-dimethylpropyl, 1-ethylpropyl, n-hexyl, 1-methylpentyl, 2-methylpentyl, 3-methylpentyl, 4-methylpentyl, 1,1-dimethylbutyl, 1,2-

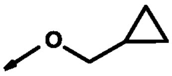
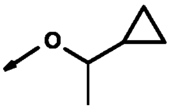
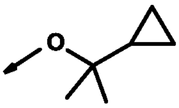
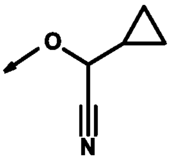
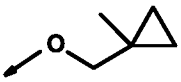
dimethylbutyl, 1,3-dimethylbutyl, 2,2-dimethylbutyl, 2,3-dimethylbutyl, 3,3-dimethylbutyl, 1-ethylbutyl, 2-ethylbutyl, 1,1,2-trimethylpropyl, 1,2,2-trimethylpropyl, 1-ethyl-1-methylpropyl, 1-ethyl-2-methylpropyl, trifluoromethyl, difluoromethyl, pentafluoroethyl, 2,2-difluoroethyl, 2,2,2-trifluoroethyl, methoxy, ethoxy, prop-1-yloxy, prop-2-yloxy, but-1-yloxy, but-2-yloxy, 2-methylprop-1-yloxy, 1,1-dimethyleth-1-yloxy, difluoromethoxy, trifluoromethoxy, pentafluoroethoxy, 2,2-difluoroethoxy, 2,2,2-trifluoroethoxy,

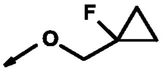
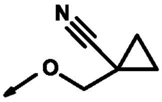
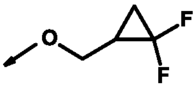
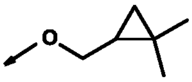
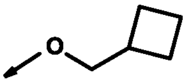
G is methylene, (methyl)methylene, (ethyl)methylene, (prop-1-yl)methylene, (prop-2-yl)methylene, (but-1-yl)methylene, (but-2-yl)methylene, (pent-1-yl)methylene, (pent-2-yl)methylene, (pent-3-yl)methylene, (dimethyl)methylene, (diethyl)methylene, ethylene, n-propylene, (1-methyl)ethyl-1-ene, (2-methyl)ethyl-1-ene, n-butylene, 1-methylpropyl-1-ene, 2-methylpropyl-1-ene, 3-methyl-propyl-1-ene, 1,1-dimethylethyl-1-ene, 2,2-dimethylethyl-1-ene, 1-ethylethyl-1-ene, 2-ethylethyl-1-ene, 1-(prop-1-yl)ethyl-1-ene, 2-(prop-1-yl)ethyl-1-ene, 1-(prop-2-yl)ethyl-1-ene, 2-(prop-2-yl)ethyl-1-ene, 1,1,2-trimethylethyl-1-ene, 1,2,2-trimethylethyl-1-ene, 1,1,2,2-tetramethylethyl-1-ene, n-pentylene, 1-methylbutyl-1-ene, 2-methylbutyl-1-ene, 3-methylbutyl-1-ene, 4-methylbutyl-1-ene, 1,1-dimethylpropyl-1-ene, 2,2-dimethylpropyl-1-ene, 3,3-dimethylpropyl-1-ene, 1,2-dimethylpropyl-1-ene, 1,3-dimethylpropyl-1-ene, 1-ethylpropyl-1-ene, n-hexylene, 1-methylpentyl-1-ene, 2-methylpentyl-1-ene, 3-methylpentyl-1-ene, 4-methylpentyl-1-ene, 1,1-dimethylbutyl-1-ene, 1,2-dimethylbutyl-1-ene, 1,3-dimethylbutyl-1-ene, 2,2-dimethylbutyl-1-ene, 2,3-dimethylbutyl-1-ene, 3,3-dimethylbutyl-1-ene, 1-ethylbutyl-1-ene, 2-ethylbutyl-1-ene, 1,1,2-trimethylpropyl-1-ene, 1,2,2-trimethylpropyl-1-ene, 1-ethyl-1-methylpropyl-1-ene, 1-ethyl-2-methylpropyl-1-ene,

X and Y are independently O (oxygen) or S (sulfur)

and

Q is one of the moieties Q-1 to Q-25 specifically mentioned below, where the arrow in the structural formulae in the table below represents a bond of the respective Q group to carbonyl group in the general formula (I),

				
Q-1	Q-2	Q-3	Q-4	Q-5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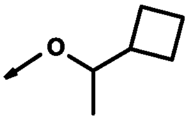	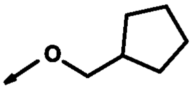	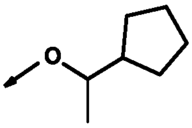	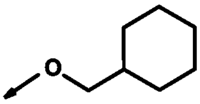	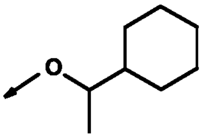
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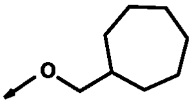
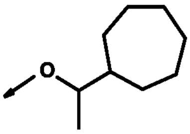
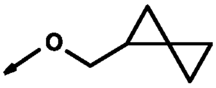
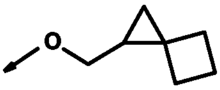
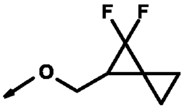
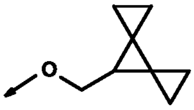
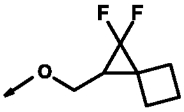
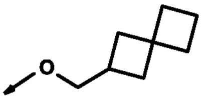
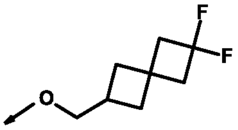
				
Q-16	Q-17	Q-18	Q-19	Q-20

				
Q-21	Q-22	Q-23	Q-24	Q-25

The invention especially preferably provides compounds of the general formula (I) in which

R^1 is hydrogen, fluorine, chlorine, bromine, iodine, cyano, methyl, ethyl, trifluoromethyl, difluoromethyl, methoxy, ethoxy, difluoromethoxy, trifluoromethoxy,

R^2 is hydrogen, fluorine or chlorine,

R^3 is hydrogen, fluorine, chlorine, bromine or methoxy,

R^4 is fluorine, chlorine, bromine, cyano, NO_2, $C(O)NH_2$, $C(S)NH_2$, trifluoromethyl, ethynyl or propyn-1-yl,

R^5, R^6 and R^7 are independently hydrogen, fluorine, chlorine, bromine, iodine, cyano, methyl, ethyl, trifluoromethyl, difluoromethyl, methoxy, ethoxy, difluoromethoxy or trifluoromethoxy,

G is methylene, (methyl)methylene, (ethyl)methylene, (dimethyl)methylene, ethylene, n-propylene, (1-methyl)ethyl-1-ene, (2-methyl)ethyl-1-ene, n-butylene, 1-methylpropyl-1-ene, 2-methylpropyl-1-ene, 3-methylpropyl-1-ene, 1,1-dimethylethyl-1-ene, 2,2-dimethylethyl-1-ene, 1-ethylethyl-1-ene, 2-ethylethyl-1-ene, 1-(prop-1-yl)ethyl-1-ene, 2-(prop-1-yl)ethyl-1-ene, 1-(prop-2-yl)ethyl-1-ene, 2-(prop-2-yl)ethyl-1-ene, n-pentylene, 1-methylbutyl-1-ene, 2-methylbutyl-1-ene, 3-methylbutyl-1-ene, 4-methylbutyl-1-ene, 1,1-dimethylpropyl-1-ene, 2,2-dimethylpropyl-1-ene, 3,3-dimethylpropyl-1-ene, 1,2-dimethylpropyl-1-ene, 1,3-dimethylpropyl-1-ene, 1-ethylpropyl-1-ene or n-hexylene,

X and Y are independently O (oxygen) or S (sulfur)

and

Q is one of the moieties Q-1 to Q-25 specifically mentioned above.

The invention very especially preferably provides compounds of the general formula (I) in which

R^1 is hydrogen, fluorine, chlorine, bromine, cyano, methyl, trifluoromethyl, methoxy or trifluoromethoxy,

R^2 is fluorine,

R^3 is fluorine,

R^4 is chlorine, bromine, cyano, NO_2, $C(O)NH_2$ or $C(S)NH_2$,

R^5, R^6 and R^7 are independently hydrogen, fluorine, chlorine, bromine, cyano, methyl, trifluoromethyl, methoxy or trifluoromethoxy,

G is methylene, (methyl)methylene, (ethyl)methylene, (dimethyl)methylene, ethylene, n-propylene, (1-methyl)ethyl-1-ene, (2-methyl)ethyl-1-ene, n-butylene, 1-methylpropyl-1-ene, 2-methylpropyl-1-ene, 3-methylpropyl-1-ene, n-pentylene or n-hexylene,

X and Y are independently O (oxygen) or S (sulfur)

and

Q is one of the moieties Q-1 to Q-25 specifically mentioned above.

The invention particularly especially preferably provides compounds of the general formula (I) in which

R^1 is hydrogen, fluorine, chlorine or bromine,

R^2 is fluorine,

R^3 is fluorine,

R^4 is chlorine, bromine, cyano or NO_2,

R^5 is hydrogen, fluorine, chlorine or bromine,

R^6 is hydrogen, fluorine, chlorine, bromine or cyano,

R^7 is hydrogen, fluorine, chlorine or bromine,

G is methylene, (methyl)methylene or (ethyl)methylene,

X and Y are independently O (oxygen) or S (sulfur)

and

Q is one of the moieties Q-1 to Q-25 specifically mentioned above.

The invention very particularly especially preferably provides compounds of the general formula (I) in which

R^1 is hydrogen,

R^2 is fluorine,

R^3 is fluorine,

R^4 is chlorine, bromine, cyano or NO_2,

R^5 is hydrogen,

R^6 is hydrogen, fluorine, chlorine, bromine or cyano,

R^7 is hydrogen,

G is methylene or (methyl)methylene,

X is O (oxygen) or S (sulfur),

Y is O (oxygen)

and

Q is one of the moieties Q-1 to Q-25 specifically mentioned above.

The invention very especially preferably provides compounds of the general formula (I) in which

R^1 is hydrogen,

R^2 is fluorine,

R^3 is fluorine,

R^4 is chlorine, bromine, cyano or NO_2,

R^5 is hydrogen,

R^6 is hydrogen, fluorine, chlorine,

R^7 is hydrogen,

G is methylene, (methyl)methylene,

X is O (oxygen) or S (sulfur),

Y is O (oxygen)

and

Q is one of the moieties Q-1 to Q-25 specifically mentioned above.

The invention extremely especially preferably provides compounds of the general formula (I) in which

R^1 is hydrogen,

R^2 is fluorine,

R^3 is fluorine,

R^4 is chlorine, bromine or cyano,

R^5 is hydrogen,

R^6 is hydrogen or fluorine,

R^7 is hydrogen,

G is methylene,

X is O (oxygen),

Y is O (oxygen)

and

Q represents one of the moieties Q-1, Q-2, Q-4, Q-5. Q-6, Q-7, Q-8, Q-9, Q-10, Q-12, Q-13, Q-14, Q-15, Q-16, Q-18 or Q-19 specifically mentioned above.

The abovementioned general or preferred radical definitions apply both to the end products of the general formula (I) and, correspondingly, to the starting materials or the intermediates required in each case for the preparation. These radical definitions can be combined with one another as desired, i.e. including combinations between the given preferred ranges.

Of particular interest, primarily for reasons of higher herbicidal activity, better selectivity and/or better preparability, are inventive compounds of the general formula (I) given or salts thereof or the inventive use thereof in which individual radicals have one of the preferred meanings already specified or specified below, or in particular those in which one or more of the preferred meanings already specified or specified below occur in combination.

If the compounds can form, through a hydrogen shift, tautomers whose structure would not formally be covered by the general formula (I), these tautomers are nevertheless encompassed by the definition of the inventive compounds of the general formula (I), unless a particular tautomer is under consideration. For example, many carbonyl compounds may be present both in the keto form and in the enol form, both forms being encompassed by the definition of the compound of the general formula (I).

Depending on the nature of the substituents and the manner in which they are attached, the compounds of the general formula (I) may be present as stereoisomers. The possible stereoisomers defined by the specific three-dimensional form thereof, such as enantiomers, diastereomers, Z and E isomers, are all encompassed by the general formula (I). If, for example, one or more alkenyl groups are present, diastereomers (Z and E isomers) may occur. If, for example, one or more asymmetric carbon atoms are present, enantiomers and diastereomers may occur. Stereoisomers can be obtained from the mixtures obtained in the preparation by customary separation methods. The chromatographic separation can be effected either on the analytical scale to find the enantiomeric excess or the diastereomeric excess, or else on the preparative scale to produce test specimens for biological testing. It is likewise possible to selectively prepare stereoisomers by using stereoselective reactions with use of optically active starting materials and/or auxiliaries. The invention thus also relates to all stereoisomers which are embraced by the general formula (I) but are not shown in their specific stereomeric form, and to mixtures thereof.

If the compounds are obtained as solids, the purification can also be carried out by recrystallisation or digestion. If individual compounds (I) cannot be obtained in a satisfactory manner by the routes described below, they can be prepared by derivatization of other compounds (I).

Suitable isolation methods, purification methods and methods for separating stereoisomers of compounds of the general formula (I) are methods generally known to the person skilled in the art from analogous cases, for example by physical processes such as crystallisation, chromatographic methods, in particular column chromatography and HPLC (high pressure liquid chromatography), distillation, optionally under reduced pressure, extraction and other methods, any mixtures that remain can generally be separated by chromatographic separation, for example on chiral solid phases. Suitable for preparative amounts or on an industrial scale are processes such as crystallisation, for example of diastereomeric salts which can be obtained from the diastereomer mixtures using optically active acids and, if appropriate, provided that acidic groups are present, using optically active bases.

With regard to the compounds of the invention, the terms used above and further down will be elucidated. These are familiar to the person skilled in the art and especially have the definitions elucidated hereinafter:

Unless defined differently, names of chemical groups are generally to be understood such that attachment to the skeleton or the remainder of the molecule is via the structural element of the relevant chemical group mentioned last, i.e. for example in the case of (C_1-C_6)-alkenyloxy via the oxygen atom and in the case of heterocyclyl-(C_1-C_8)-alkyl or (C_1-C_6)-alkoxy-(C_1-C_6)-alkoxy-(C_1-C_6)-alkyl in each case via the carbon atom of the alkyl group.

According to the invention, "alkylthio" - alone or as part of a chemical group - refers to straight-chain or branched S-alkyl, preferably having 1 to 8, or having 1 to 6 carbon atoms, such as (C_1-C_{10})-, (C_1-C_6)- or (C_1-C_4)-alkylthio, for example (but not limited to) (C_1-C_6)-alkylthio such as methylthio, ethylthio, propylthio, 1-methylethylthio, butylthio, 1-methylpropylthio, 2-methylpropylthio, 1,1-dimethylethylthio, pentylthio, 1-methylbutylthio, 2-methylbutylthio, 3-methylbutylthio, 1,1-dimethylpropylthio, 1,2-dimethylpropylthio, 2,2-dimethylpropylthio, 1-ethylpropylthio, hexylthio, 1-methylpentylthio, 2-methylpentylthio, 3-methylpentylthio, 4-methylpentylthio, 1,1-dimethylbutylthio, 1,2-dimethylbutylthio, 1,3-dimethylbutylthio, 2,2-dimethylbutylthio, 2,3-dimethylbutylthio, 3,3-dimethylbutylthio, 1-ethylbutylthio, 2-ethylbutylthio, 1,1,2-trimethylpropylthio, 1,2,2-trimethylpropylthio, 1-ethyl-1-methylpropylthio and 1-ethyl-2-methylpropylthio.

“Alkoxy” denotes an alkyl radical bonded via an oxygen atom, for example (but not limited to) (C_1-C_6)-alkoxy such as methoxy, ethoxy, propoxy, 1-methylethoxy, butoxy, 1-methylpropoxy, 2-methylpropoxy, 1,1-dimethylethoxy, pentoxy, 1-methylbutoxy, 2-methylbutoxy, 3-methylbutoxy, 1,1-dimethylpropoxy, 1,2-dimethylpropoxy, 2,2-dimethylpropoxy, 1-ethylpropoxy, hexoxy, 1-methylpentoxy, 2-methylpentoxy, 3-methylpentoxy, 4-methylpentoxy, 1,1-dimethylbutoxy, 1,2-dimethylbutoxy, 1,3-dimethylbutoxy, 2,2-dimethylbutoxy, 2,3-dimethylbutoxy, 3,3-dimethylbutoxy, 1-ethylbutoxy, 2-ethylbutoxy, 1,1,2-trimethylpropoxy, 1,2,2-trimethylpropoxy, 1-ethyl-1-methylpropoxy and 1-ethyl-2-methylpropoxy. Alkenyloxy denotes an alkenyl radical attached via an oxygen atom, and alkynyloxy denotes an alkynyl radical attached via an oxygen atom, such as (C_2-C_{10})-, (C_2-C_6)- or (C_2-C_4)-alkeneoxy and (C_3-C_{10})-, (C_3-C_6)- or (C_3-C_4)-alkyneoxy.

According to the invention, “alkylcarbonyl” (alkyl-C(=O)-), unless defined differently elsewhere, represents alkyl radicals bonded to the skeleton via -C(=O)-, such as (C_1-C_{10})-, (C_1-C_6)- or (C_1-C_4)-alkylcarbonyl. The number of the carbon atoms here relates to the alkyl radical in the alkylcarbonyl group.

“Alkoxycarbonyl (alkyl-O-C(=O)-)”, unless defined differently elsewhere: alkyl radicals bonded to the skeleton via -O-C(=O)-, such as (C_1-C_{10})-, (C_1-C_6)- or (C_1-C_4)-alkoxycarbonyl.

The number of the carbon atoms here relates to the alkyl radical in the alkoxycarbonyl group. Analogously, “alkenyloxycarbonyl” and “alkynyloxycarbonyl”, unless defined differently elsewhere, in accordance with the invention, are respectively alkenyl and alkynyl radicals bonded to the skeleton via -O-C(=O)-, such as (C_2-C_{10})-, (C_2-C_6)- or (C_2-C_4)-alkenyloxycarbonyl and (C_3-C_{10})-, (C_3-C_6)- or (C_3-C_4)-alkynyloxycarbonyl. The number of the carbon atoms here refers to the alkenyl or alkynyl radical in the alkenyloxycarbonyl or alkynyloxycarbonyl group.

According to the invention, the term “alkylcarbonyloxy” (alkyl-C(=O)-O-), unless defined differently elsewhere, represents alkyl radicals bonded to the skeleton via the oxygen of a carbonyloxy group (-C(=O)-O-), such as (C_1-C_{10})-, (C_1-C_6)- or (C_1-C_4)-alkylcarbonyloxy. The number of the carbon atoms here relates to the alkyl radical in the alkylcarbonyloxy group.

In short forms such as $C(O)R^{13}$, $C(O)OR^{13}$, $OC(O)NR^{11}R^{12}$ or $C(O)NR^{11}R^{12}$, for example, the short form O shown in brackets is an oxygen atom bonded to the adjacent carbon atom via a double bond.

In short forms such as $OC(S)OR^{13}$, $OC(S)SR^{14}$, $OC(S)NR^{11}R^{12}$, the short form S shown in brackets is a sulfur atom bonded to the adjacent carbon atom via a double bond.

The term “aryl” denotes an optionally substituted mono-, bi- or polycyclic aromatic system having preferably 6 to 14, especially 6 to 10, ring carbon atoms, for example phenyl, naphthyl, anthryl, phenanthrenyl and the like, preferably phenyl.

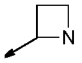
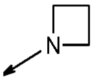
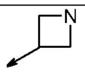
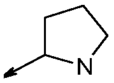
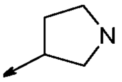
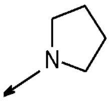
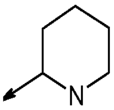
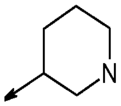
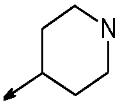
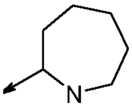
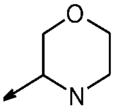
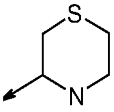
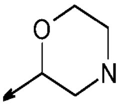
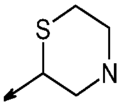
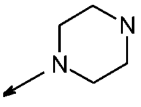
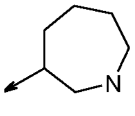
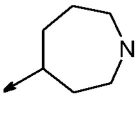
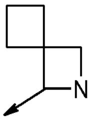
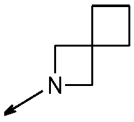
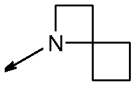
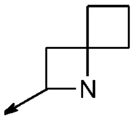
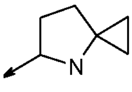
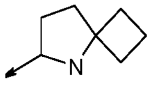
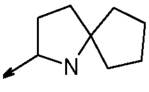
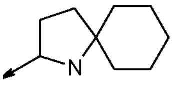
The term “optionally substituted aryl” also includes polycyclic systems, such as tetrahydronaphthyl, indenyl, indanyl, fluorenyl, biphenylyl, where the bonding site is on the aromatic system. In systematic terms, “aryl” is generally also encompassed by the term “optionally substituted phenyl”. Preferred aryl substituents here are, for example, hydrogen, halogen, alkyl, cycloalkyl, cycloalkylalkyl, cycloalkenyl, halocycloalkyl, alkenyl, alkynyl, aryl, arylalkyl, arylalkenyl, heteroaryl, heteroarylalkyl, heterocyclyl, heterocyclylalkyl, alkoxyalkyl, alkylthio, haloalkylthio, haloalkyl, alkoxy, haloalkoxy, cycloalkoxy, cycloalkylalkoxy, aryloxy, heteroraryloxy, alkoxyalkoxy, alkynylalkoxy, alkenyloxy, bisalkylaminoalkoxy, tris[alkyl]silyl, bis[alkyl]arylsilyl, bis[alkyl]alkylsilyl, tris[alkyl]silylalkynyl, arylalkynyl, heteroarylalkynyl, alkylalkynyl, cycloalkylalkynyl, haloalkylalkynyl, heterocyclyl-N-alkoxy, nitro, cyano, amino, alkylamino, bisalkylamino, alkylcarbonylamino, cycloalkylcarbonylamino, arylcarbonylamino, alkoxycarbonylamino, alkoxycarbonylalkylamino, arylalkoxycarbonylalkylamino, hydroxycarbonyl, alkoxycarbonyl, aminocarbonyl, alkylaminocarbonyl, cycloalkylaminocarbonyl, bisalkylaminocarbonyl, heteroarylalkoxy, arylalkoxy.

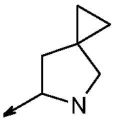
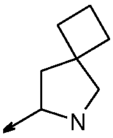
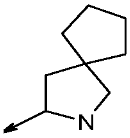
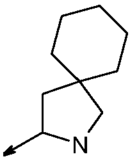
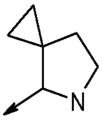
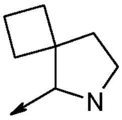
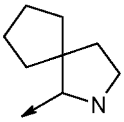
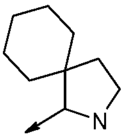
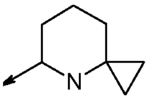
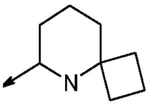
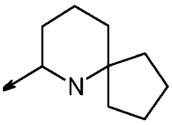
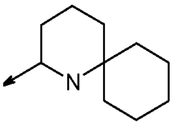
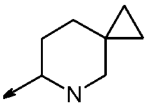
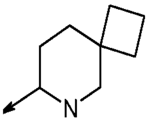
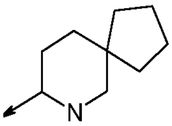
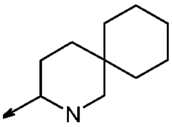
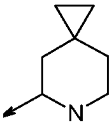
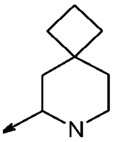
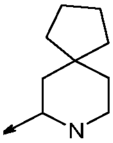
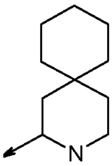
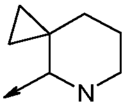
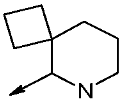
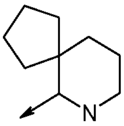
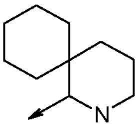
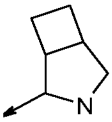
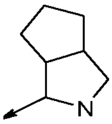
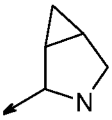
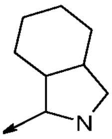
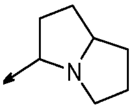
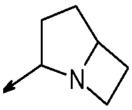
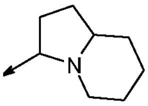
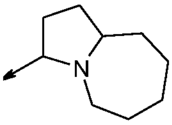
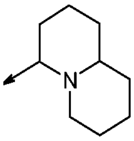
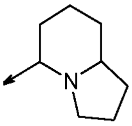
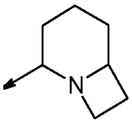
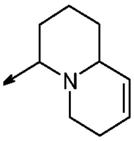
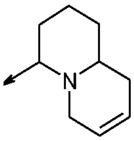
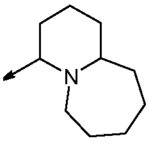
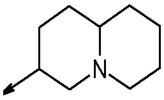
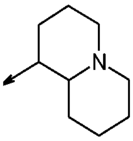
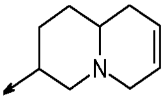
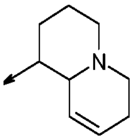
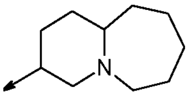
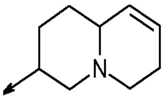
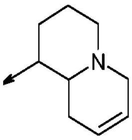
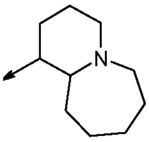
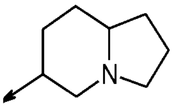
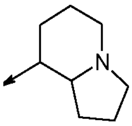
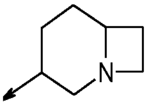
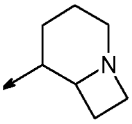
A heterocyclic radical (heterocyclyl) contains at least one heterocyclic ring (=carbocyclic ring in which at least one carbon atom has been replaced by a heteroatom, preferably by a heteroatom from the group of N, O, S, P) which is saturated, unsaturated, partly saturated or heteroaromatic and may be unsubstituted or substituted, in which case the bonding site is localized on a ring atom. If the heterocyclyl radical or the heterocyclic ring is optionally substituted, it may be fused to other carbocyclic or heterocyclic rings. In the case of optionally substituted heterocyclyl, polycyclic systems are also included, for example 8-azabicyclo[3.2.1]octanyl, 8-azabicyclo[2.2.2]octanyl or 1-azabicyclo[2.2.1]heptyl. In the case of optionally substituted heterocyclyl, spirocyclic systems are also included, for example 1-oxa-5-azaspiro[2.3]hexyl. Unless defined differently, the heterocyclic ring preferably contains 3 to 9 ring atoms, especially 3 to 6 ring atoms, and one or more, preferably 1 to 4, especially 1, 2 or 3, heteroatoms in the heterocyclic ring, preferably from the group of N, O and S, although no two oxygen atoms should be directly adjacent, for example having one heteroatom from the group of N, O and S 1- or 2- or 3-pyrrolidinyl, 3,4-dihydro-2H-pyrrol-2- or 3-yl, 2,3-dihydro-1H-pyrrol-1- or 2- or 3- or 4- or 5-yl; 2,5-dihydro-1H-pyrrol-1- or 2- or 3-yl, 1- or 2- or 3- or 4-piperidinyl; 2,3,4,5-tetrahydropyridin-2- or 3- or 4- or 5-yl or 6-yl; 1,2,3,6-tetrahydropyridin-1- or 2- or 3- or 4- or 5- or 6-yl; 1,2,3,4-tetrahydropyridin-1- or 2- or 3- or 4- or 5- or 6-yl; 1,4-dihydropyridin-1- or 2- or 3- or 4-yl; 2,3-dihydropyridin-2- or 3- or 4- or 5- or 6-yl; 2,5-dihydropyridin-2- or 3- or 4- or 5- or 6-yl, 1- or 2- or 3- or 4-azepanyl; 2,3,4,5-tetrahydro-1H-azepin-1- or 2- or 3- or 4- or 5- or 6- or 7-yl; 2,3,4,7-tetrahydro-1H-azepin-1- or 2- or 3- or 4- or 5- or 6- or 7-yl; 2,3,6,7-tetrahydro-1H-azepin-1- or 2- or 3- or 4-yl; 3,4,5,6-tetrahydro-2H-azepin-2- or 3- or 4- or 5- or 6- or 7-yl; 4,5-dihydro-1H-azepin-1- or 2- or 3- or 4-yl; 2,5-dihydro-1H-azepin-1- or -2- or 3- or 4- or 5- or 6- or 7-yl; 2,7-dihydro-1H-azepin-1- or -2- or 3- or 4-yl; 2,3-dihydro-1H-azepin-1- or -2- or 3- or 4- or 5- or 6- or 7-yl; 3,4-dihydro-2H-azepin-2- or 3- or 4- or 5- or 6- or 7-yl; 3,6-dihydro-2H-azepin-2- or 3- or 4- or 5- or 6- or 7-yl; 5,6-dihydro-2H-azepin-2- or 3- or 4- or 5- or 6- or 7-yl; 4,5-dihydro-3H-azepin-2- or 3- or 4- or 5- or 6- or 7-yl; 1H-azepin-1- or -2- or 3- or 4- or 5- or 6- or 7-yl; 2H-azepin-2- or 3- or 4- or 5- or 6- or 7-yl; 3H-azepin-2- or 3- or 4- or 5- or 6- or 7-yl; 4H-azepin-2- or 3- or 4- or 5- or 6- or 7-yl, 2- or 3-oxolanyl (= 2- or 3-tetrahydrofuranyl); 2,3-dihydrofuran-2- or 3- or 4- or 5-yl; 2,5-

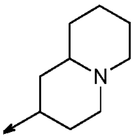
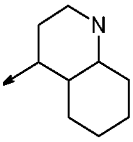
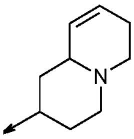
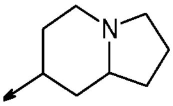
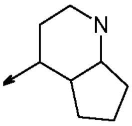
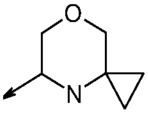
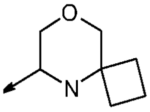
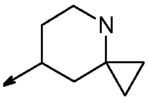
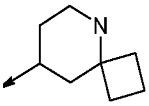
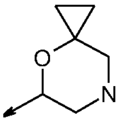
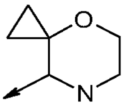
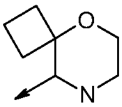
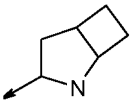
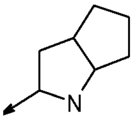
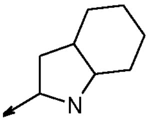
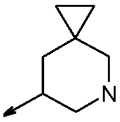
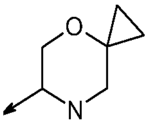
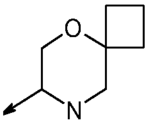
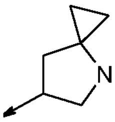
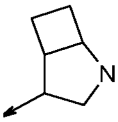
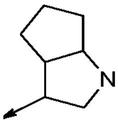
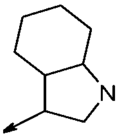
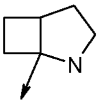
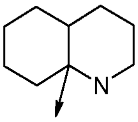
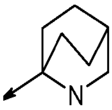
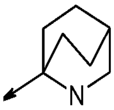
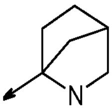
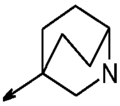
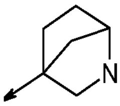
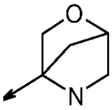
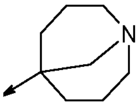
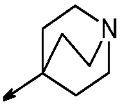
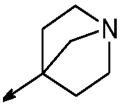
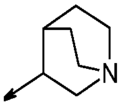
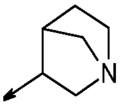
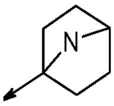
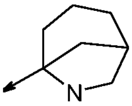
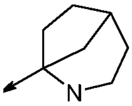
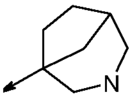
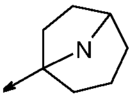
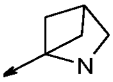
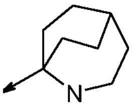
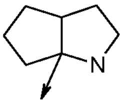
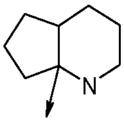
dihydrofuran-2- or 3-yl, 2- or 3- or 4-oxanyl (= 2- or 3- or 4-tetrahydropyranyl); 3,4-dihydro-2H-pyran-2- or 3- or 4- or 5- or 6-yl; 3,6-dihydro-2H-pyran-2- or 3- or 4- or 5- or 6-yl; 2H-pyran-2- or 3- or 4- or 5- or 6-yl; 4H-pyran-2- or 3- or 4-yl, 2- or 3- or 4-oxepanyl; 2,3,4,5-tetrahydrooxepin-2- or 3- or 4- or 5- or 6- or 7-yl; 2,3,4,7-tetrahydrooxepin-2- or 3- or 4- or 5- or 6- or 7-yl; 2,3,6,7-tetrahydrooxepin-2- or 3- or 4-yl; 2,3-dihydrooxepin-2- or 3- or 4- or 5- or 6- or 7-yl; 4,5-dihydrooxepin-2- or 3- or 4-yl; 2,5-dihydrooxepin-2- or 3- or 4- or 5- or 6- or 7-yl; oxepin-2- or 3- or 4- or 5- or 6- or 7-yl; 2- or 3-tetrahydrothiophenyl; 2,3-dihydrothiophen-2- or 3- or 4- or 5-yl; 2,5-dihydrothiophen-2- or 3-yl; tetrahydro-2H-thiopyran-2- or 3- or 4-yl; 3,4-dihydro-2H-thiopyran-2- or 3- or 4- or 5- or 6-yl; 3,6-dihydro-2H-thiopyran-2- or 3- or 4- or 5- or 6-yl; 2H-thiopyran-2- or 3- or 4- or 5- or 6-yl; 4H-thiopyran-2- or 3- or 4-yl. Preferred 3-membered and 4-membered heterocycles are, for example, 1- or 2-aziridinyl, oxiranyl, thiiranyl, 1- or 2- or 3-azetidinyl, 2- or 3-oxetanyl, 2- or 3-thietanyl, 1,3-dioxetan-2-yl. Further examples of "heterocyclyl" are a partly or fully hydrogenated heterocyclic radical having two heteroatoms from the group of N, O and S, for example 1- or 2- or 3- or 4-pyrazolidinyl; 4,5-dihydro-3H-pyrazol- 3- or 4- or 5-yl; 4,5-dihydro-1H-pyrazol-1- or 3- or 4- or 5-yl; 2,3-dihydro-1H-pyrazol-1- or 2- or 3- or 4- or 5-yl; 1- or 2- or 3- or 4- imidazolidinyl; 2,3-dihydro-1H-imidazol-1- or 2- or 3- or 4-yl; 2,5-dihydro-1H-imidazol-1- or 2- or 4- or 5-yl; 4,5-dihydro-1H-imidazol-1- or 2- or 4- or 5-yl; hexahydropyridazin-1- or 2- or 3- or 4-yl; 1,2,3,4-tetrahydropyridazin-1- or 2- or 3- or 4- or 5- or 6-yl; 1,2,3,6-tetrahydropyridazin-1- or 2- or 3- or 4- or 5- or 6-yl; 1,4,5,6-tetrahydropyridazin-1- or 3- or 4- or 5- or 6-yl; 3,4,5,6-tetrahydropyridazin-3- or 4- or 5-yl; 4,5-dihydropyridazin-3- or 4-yl; 3,4-dihydropyridazin-3- or 4- or 5- or 6-yl; 3,6-dihydropyridazin-3- or 4-yl; 1,6-dihydropyriazin-1- or 3- or 4- or 5- or 6-yl; hexahydropyrimidin-1- or 2- or 3- or 4-yl; 1,4,5,6-tetrahydropyrimidin-1- or 2- or 4- or 5- or 6-yl; 1,2,5,6-tetrahydropyrimidin-1- or 2- or 4- or 5- or 6-yl; 1,2,3,4-tetrahydropyrimidin-1- or 2- or 3- or 4- or 5- or 6-yl; 1,6-dihydropyrimidin-1- or 2- or 4- or 5- or 6-yl; 1,2-dihydropyrimidin-1- or 2- or 4- or 5- or 6-yl; 2,5-dihydropyrimidin-2- or 4- or 5-yl; 4,5-dihydropyrimidin- 4- or 5- or 6-yl; 1,4-dihydropyrimidin-1- or 2- or 4- or 5- or 6-yl; 1- or 2- or 3-piperazinyl; 1,2,3,6-tetrahydropyrazin-1- or 2- or 3- or 5- or 6-yl; 1,2,3,4-tetrahydropyrazin-1- or 2- or 3- or 4- or 5- or 6-yl; 1,2-dihydropyrazin-1- or 2- or 3- or 5- or 6-yl; 1,4-dihydropyrazin-1- or 2- or 3-yl; 2,3-dihydropyrazin-2- or 3- or 5- or 6-yl; 2,5-dihydropyrazin-2- or 3-yl; 1,3-dioxolan-2- or 4- or 5-yl; 1,3-dioxol-2- or 4-yl; 1,3-dioxan-2- or 4- or 5-yl; 4H-1,3-dioxin-2- or 4- or 5- or 6-yl; 1,4-dioxan-2- or 3- or 5- or 6-yl; 2,3-dihydro-1,4-dioxin-2- or 3- or 5- or 6-yl; 1,4-dioxin-2- or 3-yl; 1,2-dithiolan-3- or 4-yl; 3H-1,2-dithiol-3- or 4- or 5-yl; 1,3-dithiolan-2- or 4-yl; 1,3-dithiol-2- or 4-yl; 1,2-dithian-3- or 4-yl; 3,4-dihydro-1,2-dithiin-3- or

4- or 5- or 6-yl; 3,6-dihydro-1,2-dithiin-3- or 4-yl; 1,2-dithiin-3- or 4-yl; 1,3-dithian-2- or 4- or 5-yl; 4H-1,3-dithiin-2- or 4- or 5- or 6-yl; isoxazolidin-2- or 3- or 4- or 5-yl; 2,3-dihydroisoxazol-2- or 3- or 4- or 5-yl; 2,5-dihydroisoxazol-2- or 3- or 4- or 5-yl; 4,5-dihydroisoxazol-3- or 4- or 5-yl; 1,3-oxazolidin-2- or 3- or 4- or 5-yl; 2,3-dihydro-1,3-oxazol-2- or 3- or 4- or 5-yl; 2,5-dihydro-1,3-oxazol-2- or 4- or 5-yl; 4,5-dihydro-1,3-oxazol-2- or 4- or 5-yl; 1,2-oxazinan-2- or 3- or 4- or 5- or 6-yl; 3,4-dihydro-2H-1,2-oxazin-2- or 3- or 4- or 5- or 6-yl; 3,6-dihydro-2H-1,2-oxazin-2- or 3- or 4- or 5- or 6-yl; 5,6-dihydro-2H-1,2-oxazin-2- or 3- or 4- or 5- or 6-yl; 5,6-dihydro-4H-1,2-oxazin-3- or 4- or 5- or 6-yl; 2H-1,2-oxazin-2- or 3- or 4- or 5- or 6-yl; 6H-1,2-oxazin-3- or 4- or 5- or 6-yl; 4H-1,2-oxazin-3- or 4- or 5- or 6-yl; 1,3-oxazinan-2- or 3- or 4- or 5- or 6-yl; 3,4-dihydro-2H-1,3-oxazin-2- or 3- or 4- or 5- or 6-yl; 3,6-dihydro-2H-1,3-oxazin-2- or 3- or 4- or 5- or 6-yl; 5,6-dihydro-2H-1,3-oxazin-2- or 4- or 5- or 6-yl; 5,6-dihydro-4H-1,3-oxazin-2- or 4- or 5- or 6-yl; 2H-1,3-oxazin-2- or 4- or 5- or 6-yl; 6H-1,3-oxazin-2- or 4- or 5- or 6-yl; 4H-1,3-oxazin-2- or 4- or 5- or 6-yl; morpholin-2- or 3- or 4-yl; 3,4-dihydro-2H-1,4-oxazin-2- or 3- or 4- or 5- or 6-yl; 3,6-dihydro-2H-1,4-oxazin-2- or 3- or 5- or 6-yl; 2H-1,4-oxazin-2- or 3- or 5- or 6-yl; 4H-1,4-oxazin-2- or 3-yl; 1,2-oxazepan-2- or 3- or 4- or 5- or 6- or 7-yl; 2,3,4,5-tetrahydro-1,2-oxazepin-2- or 3- or 4- or 5- or 6- or 7-yl; 2,3,4,7-tetrahydro-1,2-oxazepin-2- or 3- or 4- or 5- or 6- or 7-yl; 2,3,6,7-tetrahydro-1,2-oxazepin-2- or 3- or 4- or 5- or 6- or 7-yl; 2,5,6,7-tetrahydro-1,2-oxazepin-2- or 3- or 4- or 5- or 6- or 7-yl; 4,5,6,7-tetrahydro-1,2-oxazepin-3- or 4- or 5- or 6- or 7-yl; 2,3-dihydro-1,2-oxazepin-2- or 3- or 4- or 5- or 6- or 7-yl; 2,5-dihydro-1,2-oxazepin-2- or 3- or 4- or 5- or 6- or 7-yl; 2,7-dihydro-1,2-oxazepin-2- or 3- or 4- or 5- or 6- or 7-yl; 4,5-dihydro-1,2-oxazepin-3- or 4- or 5- or 6- or 7-yl; 4,7-dihydro-1,2-oxazepin-3- or 4- or 5- or 6- or 7-yl; 6,7-dihydro-1,2-oxazepin-3- or 4- or 5- or 6- or 7-yl; 1,2-oxazepin-3- or 4- or 5- or 6- or 7-yl; 1,3-oxazepan-2- or 3- or 4- or 5- or 6- or 7-yl; 2,3,4,5-tetrahydro-1,3-oxazepin-2- or 3- or 4- or 5- or 6- or 7-yl; 2,3,4,7-tetrahydro-1,3-oxazepin-2- or 3- or 4- or 5- or 6- or 7-yl; 2,3,6,7-tetrahydro-1,3-oxazepin-2- or 3- or 4- or 5- or 6- or 7-yl; 2,5,6,7-tetra-hydro-1,3-oxazepin-2- or 4- or 5- or 6- or 7-yl; 4,5,6,7-tetrahydro-1,3-oxazepin-2- or 4- or 5- or 6- or 7-yl; 2,3-dihydro-1,3-oxazepin-2- or 3- or 4- or 5- or 6- or 7-yl; 2,5-dihydro-1,3-oxazepin-2- or 4- or 5- or 6- or 7-yl; 2,7-dihydro-1,3-oxazepin-2- or 4- or 5- or 6- or 7-yl; 4,5-dihydro-1,3-oxazepin-2- or 4- or 5- or 6- or 7-yl; 4,7-dihydro-1,3-oxazepin-2- or 4- or 5- or 6- or 7-yl; 6,7-dihydro-1,3-oxazepin-2- or 4- or 5- or 6- or 7-yl; 1,3-oxazepin-2- or 4- or 5- or 6- or 7-yl; 1,4-oxazepan-2- or 3- or 5- or 6- or 7-yl; 2,3,4,5-tetrahydro-1,4-oxazepin-2- or 3- or 4- or 5- or 6- or 7-yl; 2,3,4,7-tetrahydro-1,4-oxazepin-2- or 3- or 4- or 5- or 6- or 7-yl; 2,3,6,7-tetrahydro-1,4-oxazepin-2- or 3- or 5- or 6- or 7-yl; 2,5,6,7-tetrahydro-1,4-oxazepin-2- or 3- or 5- or 6- or 7-yl; 4,5,6,7-tetrahydro-1,4-

oxazepin-2- or 3- or 4- or 5- or 6- or 7-yl; 2,3-dihydro-1,4-oxazepin-2- or 3- or 5- or 6- or 7-yl; 2,5-dihydro-1,4-oxazepin-2- or 3- or 5- or 6- or 7-yl; 2,7-dihydro-1,4-oxazepin-2- or 3- or 5- or 6- or 7-yl; 4,5-dihydro-1,4-oxazepin-2- or 3- or 4- or 5- or 6- or 7-yl; 4,7-dihydro-1,4-oxazepin-2- or 3- or 4- or 5- or 6- or 7-yl; 6,7-dihydro-1,4-oxazepin-2- or 3- or 5- or 6- or 7-yl; 1,4-oxazepin-2- or 3- or 5- or 6- or 7-yl; isothiazolidin-2- or 3- or 4- or 5-yl; 2,3-dihydroisothiazol-2- or 3- or 4- or 5-yl; 2,5-dihydroisothiazol-2- or 3- or 4- or 5-yl; 4,5-dihydroisothiazol-3- or 4- or 5-yl; 1,3-thiazolidin-2- or 3- or 4- or 5-yl; 2,3-dihydro-1,3-thiazol-2- or 3- or 4- or 5-yl; 2,5-dihydro-1,3-thiazol-2- or 4- or 5-yl; 4,5-dihydro-1,3-thiazol-2- or 4- or 5-yl; 1,3-thiazinan-2- or 3- or 4- or 5- or 6-yl; 3,4-dihydro-2H-1,3-thiazin-2- or 3- or 4- or 5- or 6-yl; 3,6-dihydro-2H-1,3-thiazin-2- or 3- or 4- or 5- or 6-yl; 5,6-dihydro-2H-1,3-thiazin-2- or 4- or 5- or 6-yl; 5,6-dihydro-4H-1,3-thiazin-2- or 4- or 5- or 6-yl; 2H-1,3-thiazin-2- or 4- or 5- or 6-yl; 6H-1,3-thiazin-2- or 4- or 5- or 6-yl; 4H-1,3-thiazin-2- or 4- or 5- or 6-yl. Further examples of "heterocyclyl" are a partly or fully hydrogenated heterocyclic radical having 3 heteroatoms from the group of N, O and S, for example 1,4,2-dioxazolidin-2- or 3- or 5-yl; 1,4,2-dioxazol-3- or 5-yl; 1,4,2-dioxazinan-2- or -3- or 5- or 6-yl; 5,6-dihydro-1,4,2-dioxazin-3- or 5- or 6-yl; 1,4,2-dioxazin-3- or 5- or 6-yl; 1,4,2-dioxazepan-2- or 3- or 5- or 6- or 7-yl; 6,7-dihydro-5H-1,4,2-dioxazepin-3- or 5- or 6- or 7-yl; 2,3-dihydro-7H-1,4,2-dioxazepin-2- or 3- or 5- or 6- or 7-yl; 2,3-dihydro-5H-1,4,2-dioxazepin-2- or 3- or 5- or 6- or 7-yl; 5H-1,4,2-dioxazepin-3- or 5- or 6- or 7-yl; 7H-1,4,2-dioxazepin-3- or 5- or 6- or 7-yl. Structural examples of heterocycles which are optionally substituted further are also listed below:

 N	 N	 N	 N	 N
 N	 N	 N	 N	 N
 N	 N	 N	 N	 N
 N	 N	 N	 N	 N
 N	 N	 N	 N	 N
 N	 N	 N	 N	 N
 N	 N	 N	 N	 N
 N	 N	 N	 N	 N
 N	 N	 N	 N	 N
 N	 N	 N	 N	 N

The heterocycles listed above are preferably substituted, for example, by hydrogen, halogen, alkyl, haloalkyl, hydroxyl, alkoxy, cycloalkoxy, aryloxy, alkoxyalkyl, alkoxyalkoxy, cycloalkyl, halocycloalkyl, aryl, arylalkyl, heteroaryl, heterocyclyl, alkenyl, alkylcarbonyl, cycloalkylcarbonyl, arylcarbonyl, heteroarylcarbonyl, alkoxycarbonyl, hydroxycarbonyl, cycloalkoxycarbonyl, cycloalkylalkoxycarbonyl, alkoxycarbonylalkyl, arylalkoxycarbonyl, arylalkoxycarbonylalkyl, alkynyl, alkynylalkyl, alkylalkynyl, trisalkylsilylalkynyl, nitro, amino, cyano, haloalkoxy, haloalkylthio, alkylthio, hydrothio, hydroxyalkyl, oxo, heteroarylalkoxy, arylalkoxy, heterocyclylalkoxy, heterocyclylalkylthio, heterocyclyloxy, heterocyclylthio, heteroaryloxy, bisalkylamino, alkylamino, cycloalkylamino, hydroxycarbonylalkylamino, alkoxycarbonylalkylamino, arylalkoxycarbonylalkylamino, alkoxycarbonylalkyl(alkyl)amino, aminocarbonyl, alkylaminocarbonyl, bisalkylaminocarbonyl, cycloalkylaminocarbonyl, hydroxycarbonylalkylaminocarbonyl, alkoxycarbonylalkylaminocarbonyl, arylalkoxycarbonylalkylaminocarbonyl.

When a base structure is substituted “by one or more radicals” from a list of radicals (= group) or a generically defined group of radicals, this in each case includes simultaneous substitution by a plurality of identical and/or structurally different radicals.

In the case of a partly or fully saturated nitrogen heterocycle, this may be joined to the remainder of the molecule either via carbon or via the nitrogen.

Suitable substituents for a substituted heterocyclic radical are the substituents specified further down, and additionally also oxo and thioxo. The oxo group as a substituent on a ring carbon atom is then, for example, a carbonyl group in the heterocyclic ring. As a result, lactones and lactams are preferably also included. The oxo group may also occur on the ring heteroatoms, which may exist in different oxidation states, for example in the case of N and S, and in that case form, for example, the divalent -N(O)-, -S(O)- (also SO for short) and $S(O)_2$ (also SO_2 for short) groups in the heterocyclic ring. In the case of –N(O)- and –S(O)- groups, both enantiomers in each case are included.

According to the invention, the expression “heteroaryl” represents heteroaromatic compounds, i.e. fully unsaturated aromatic heterocyclic compounds, preferably 5- to 7-membered rings having 1 to 4, preferably 1 or 2, identical or different heteroatoms, preferably O, S or N. Heteroaryls according to the invention are, for example, 1H-pyrrol-1-yl; 1H-pyrrol-2-yl; 1H-pyrrol-3-yl; furan-2-yl; furan-3-yl; thien-2-yl; thien-3-yl, 1H-imidazol-1-yl; 1H-imidazol-2-yl; 1H-imidazol-4-yl; 1H-imidazol-5-yl; 1H-pyrazol-1-yl; 1H-pyrazol-3-yl; 1H-pyrazol-4-yl; 1H-pyrazol-5-yl, 1H-1,2,3-triazol-1-yl, 1H-1,2,3-triazol-4-yl, 1H-1,2,3-triazol-5-yl, 2H-1,2,3-triazol-2-yl, 2H-1,2,3-triazol-4-yl, 1H-1,2,4-triazol-1-yl, 1H-1,2,4-triazol-3-yl, 4H-1,2,4-triazol-4-yl, 1,2,4-oxadiazol-3-yl, 1,2,4-oxadiazol-5-yl, 1,3,4-oxadiazol-2-yl, 1,2,3-oxadiazol-4-yl, 1,2,3-oxadiazol-5-yl, 1,2,5-oxadiazol-3-yl, azepinyl, pyridin-2-yl, pyridin-3-yl, pyridin-4-yl, pyrazin-2-yl, pyrazin-3-yl, pyrimidin-2-yl, pyrimidin-4-yl, pyrimidin-5-yl, pyridazin-3-yl, pyridazin-4-yl, 1,3,5-triazin-2-yl, 1,2,4-triazin-3-yl, 1,2,4-triazin-5-yl, 1,2,4-triazin-6-yl, 1,2,3-

triazin-4-yl, 1,2,3-triazin-5-yl, 1,2,4-, 1,3,2-, 1,3,6- and 1,2,6-oxazinyl, isoxazol-3-yl, isoxazol-4-yl, isoxazol-5-yl, 1,3-oxazol-2-yl, 1,3-oxazol-4-yl, 1,3-oxazol-5-yl, isothiazol-3-yl, isothiazol-4-yl, isothiazol-5-yl, 1,3-thiazol-2-yl, 1,3-thiazol-4-yl, 1,3-thiazol-5-yl, oxepinyl, thiepinyl, 1,2,4-triazolonyl and 1,2,4-diazepinyl, 2H-1,2,3,4-tetrazol-5-yl, 1H-1,2,3,4-tetrazol-5-yl, 1,2,3,4-oxatriazol-5-yl, 1,2,3,4-thiatriazol-5-yl, 1,2,3,5-oxatriazol-4-yl, 1,2,3,5-thiatriazol-4-yl. The heteroaryl groups of the invention may also be substituted by one or more identical or different radicals. If two adjacent carbon atoms are part of a further aromatic ring, the systems are fused heteroaromatic systems, such as benzofused or polyannelated heteroaromatics. Preferred examples are quinolines (e.g. quinolin-2-yl, quinolin-3-yl, quinolin-4-yl, quinolin-5-yl, quinolin-6-yl, quinolin-7-yl, quinolin-8-yl); isoquinolines (e.g. isoquinolin-1-yl, isoquinolin-3-yl, isoquinolin-4-yl, isoquinolin-5-yl, isoquinolin-6-yl, isoquinolin-7-yl, isoquinolin-8-yl); quinoxaline; quinazoline; cinnoline; 1,5-naphthyridine; 1,6-naphthyridine; 1,7-naphthyridine; 1,8-naphthyridine; 2,6-naphthyridine; 2,7-naphthyridine; phthalazine; pyridopyrazines; pyridopyrimidines; pyridopyridazines; pteridines; pyrimidopyrimidines. Examples of heteroaryl are also 5- or 6-membered benzofused rings from the group of 1H-indol-1-yl, 1H-indol-2-yl, 1H-indol-3-yl, 1H-indol-4-yl, 1H-indol-5-yl, 1H-indol-6-yl, 1H-indol-7-yl, 1-benzofuran-2-yl, 1-benzofuran-3-yl, 1-benzofuran-4-yl, 1-benzofuran-5-yl, 1-benzofuran-6-yl, 1-benzofuran-7-yl, 1-benzothiophen-2-yl, 1-benzothiophen-3-yl, 1-benzothiophen-4-yl, 1-benzothiophen-5-yl, 1-benzothiophen-6-yl, 1-benzothiophen-7-yl, 1H-indazol-1-yl, 1H-indazol-3-yl, 1H-indazol-4-yl, 1H-indazol-5-yl, 1H-indazol-6-yl, 1H-indazol-7-yl, 2H-indazol-2-yl, 2H-indazol-3-yl, 2H-indazol-4-yl, 2H-indazol-5-yl, 2H-indazol-6-yl, 2H-indazol-7-yl, 2H-isoindol-2-yl, 2H-isoindol-1-yl, 2H-isoindol-3-yl, 2H-isoindol-4-yl, 2H-isoindol-5-yl, 2H-isoindol-6-yl; 2H-isoindol-7-yl, 1H-benzimidazol-1-yl, 1H-benzimidazol-2-yl, 1H-benzimidazol-4-yl, 1H-benzimidazol-5-yl, 1H-benzimidazol-6-yl, 1H-benzimidazol-7-yl, 1,3-benzoxazol-2-yl, 1,3-benzoxazol-4-yl, 1,3-benzoxazol-5-yl, 1,3-benzoxazol-6-yl, 1,3-benzoxazol-7-yl, 1,3-benzthiazol-2-yl, 1,3-benzthiazol-4-yl, 1,3-benzthiazol-5-yl, 1,3-benzthiazol-6-yl, 1,3-benzthiazol-7-yl, 1,2-benzisoxazol-3-yl, 1,2-benzisoxazol-4-yl, 1,2-benzisoxazol-5-yl, 1,2-benzisoxazol-6-yl, 1,2-benzisoxazol-7-yl, 1,2-benziso-thiazol-3-yl, 1,2-benzisothiazol-4-yl, 1,2-benzisothiazol-5-yl, 1,2-benzisothiazol-6-yl, 1,2-benzisothiazol-7-yl.

The term "halogen" denotes, for example, fluorine, chlorine, bromine or iodine. If the term is used for a radical, "halogen" denotes, for example, a fluorine, chlorine, bromine or iodine atom.

According to the invention, "alkyl" means a straight-chain or branched open-chain, saturated hydrocarbon radical which is optionally mono- or polysubstituted, and in the latter case is referred to as "substituted alkyl". Preferred substituents are halogen atoms, alkoxy, haloalkoxy, cyano, alkylthio, haloalkylthio, amino or nitro groups, particular preference being given to methoxy, methyl, fluoroalkyl, cyano, nitro, fluorine, chlorine, bromine or iodine. The prefix “bis” also includes the combination of different alkyl radicals, e.g. methyl(ethyl) or ethyl(methyl).

“Haloalkyl”, “-alkenyl” and “-alkynyl” mean, respectively, alkyl, alkenyl and alkynyl partly or fully substituted by identical or different halogen atoms, e.g. monohaloalkyl, for example CH_2CH_2Cl, CH_2CH_2Br, $CHClCH_3$, CH_2Cl, CH_2F; perhaloalkyl, for example CCl_3, $CClF_2$, $CFCl_2$, CF_2CClF_2, $CF_2CClFCF_3$; polyhaloalkyl, for example CH_2CHFCl, CF_2CClFH, CF_2CBrFH, CH_2CF_3; the term "perhaloalkyl" also includes the term "perfluoroalkyl".

“Haloalkoxy” is, for example, OCF_3, $OCHF_2$, OCH_2F, OCF_2CF_3, OCH_2CF_3 and OCH_2CH_2Cl; this applies correspondingly to haloalkenyl and other halogen-substituted radicals.

The expression “(C_1-C_4)-alkyl” mentioned here by way of example is a brief notation for straight-chain or branched alkyl having one to 4 carbon atoms according to the range stated for carbon atoms, i.e. encompasses the methyl, ethyl, 1-propyl, 2-propyl, 1-butyl, 2-butyl, 2-methylpropyl or tert-butyl radicals. General alkyl radicals with a larger specified range of carbon atoms, e.g. "(C_1-C_6)-alkyl", correspondingly also encompass straight-chain or branched alkyl radicals with a greater number of carbon atoms, i.e. according to the example also the alkyl radicals having 5 and 6 carbon atoms.

Unless stated specifically, preference is given to the lower carbon skeletons, for example having from 1 to 6 carbon atoms, or having from 2 to 6 carbon atoms in the case of unsaturated groups, in the case of the hydrocarbon radicals such as alkyl, alkenyl and alkynyl radicals, including in composite radicals. Alkyl radicals, including in composite radicals such as alkoxy, haloalkyl, etc., are, for example, methyl, ethyl, n-propyl or i-propyl, n-, i-, t- or 2-butyl, pentyls, hexyls such as n-hexyl, i-hexyl and 1,3-dimethylbutyl, heptyls such as n-heptyl, 1-methylhexyl and 1,4-dimethylpentyl; alkenyl and alkynyl radicals are defined as the possible unsaturated radicals corresponding to the alkyl radicals, where at least one double bond or triple bond is present. Preference is given to radicals having one double bond or triple bond.

The term "alkenyl" also includes, in particular, straight-chain or branched open-chain hydrocarbon radicals having more than one double bond, such as 1,3-butadienyl and 1,4-pentadienyl, but also allenyl or cumulenyl radicals having one or more cumulated double bonds, for example allenyl (1,2-propadienyl), 1,2-butadienyl and 1,2,3-pentatrienyl. Alkenyl means, for example, vinyl that may optionally be substituted by further alkyl radicals, for example (but not limited to) (C_2-C_6)-alkenyl such as ethenyl, 1-propenyl, 2-propenyl, 1-methylethenyl, 1-butenyl, 2-butenyl, 3-butenyl, 1-methyl-1-propenyl, 2-methyl-1-propenyl, 1-methyl-2-propenyl, 2-methyl-2-propenyl, 1-pentenyl, 2-pentenyl, 3-pentenyl, 4-pentenyl, 1-methyl-1-butenyl, 2-methyl-1-butenyl, 3-methyl-1-butenyl, 1-methyl-2-butenyl, 2-methyl-2-butenyl, 3-methyl-2-butenyl, 1-methyl-3-butenyl, 2-methyl-3-butenyl, 3-methyl-3-butenyl, 1,1-dimethyl-2-propenyl, 1,2-dimethyl-1-propenyl, 1,2-dimethyl-2-propenyl, 1-ethyl-1-propenyl, 1-ethyl-2-propenyl, 1-hexenyl, 2-hexenyl, 3-hexenyl, 4-hexenyl, 5-hexenyl, 1-methyl-1-pentenyl, 2-methyl-1-pentenyl, 3-methyl-1-pentenyl, 4-methyl-1-pentenyl, 1-methyl-2-pentenyl, 2-methyl-2-pentenyl, 3-methyl-2-pentenyl, 4-methyl-2-pentenyl, 1-methyl-3-pentenyl, 2-methyl-3-pentenyl, 3-methyl-3-pentenyl, 4-methyl-3-pentenyl, 1-methyl-4-pentenyl, 2-methyl-4-pentenyl, 3-methyl-4-pentenyl, 4-methyl-4-pentenyl, 1,1-dimethyl-2-butenyl, 1,1-dimethyl-3-butenyl, 1,2-dimethyl-1-butenyl, 1,2-dimethyl-2-butenyl, 1,2-dimethyl-3-butenyl, 1,3-dimethyl-1-butenyl, 1,3-dimethyl-2-butenyl, 1,3-dimethyl-3-butenyl, 2,2-dimethyl-3-butenyl, 2,3-dimethyl-1-butenyl, 2,3-dimethyl-2-butenyl, 2,3-dimethyl-3-butenyl, 3,3-dimethyl-1-butenyl, 3,3-dimethyl-2-butenyl, 1-ethyl-1-butenyl, 1-ethyl-2-butenyl, 1-ethyl-3-butenyl, 2-ethyl-1-butenyl, 2-ethyl-2-butenyl, 2-ethyl-3-butenyl, 1,1,2-trimethyl-2-propenyl, 1-ethyl-1-methyl-2-propenyl, 1-ethyl-2-methyl-1-propenyl and 1-ethyl-2-methyl-2-propenyl.

The term “alkynyl” also includes, in particular, straight-chain or branched open-chain hydrocarbon radicals having more than one triple bond, or else having one or more triple bonds and one or more double bonds, for example 1,3-butatrienyl or 3-penten-1-yn-1-yl. (C_2-C_6)-Alkynyl denotes, for example, ethynyl, 1-propynyl, 2-propynyl, 1-butynyl, 2-butynyl, 3-butynyl, 1-methyl-2-propynyl, 1-pentynyl, 2-pentynyl, 3-pentynyl, 4-pentynyl, 1-methyl-2-butynyl, 1-methyl-3-butynyl, 2-methyl-3-butynyl, 3-methyl-1-butynyl, 1,1-dimethyl-2-propynyl, 1-ethyl-2-propynyl, 1-hexynyl, 2-hexynyl, 3-hexynyl, 4-hexynyl, 5-hexynyl, 1-methyl-2-pentynyl, 1-methyl-3-pentynyl, 1-methyl-4-pentynyl, 2-methyl-3-pentynyl, 2-methyl-4-pentynyl, 3-methyl-1-pentynyl, 3-methyl-4-pentynyl, 4-methyl-1-pentynyl, 4-methyl-2-

pentynyl, 1,1-dimethyl-2-butynyl, 1,1-dimethyl-3-butynyl, 1,2-dimethyl-3-butynyl, 2,2-dimethyl-3-butynyl, 3,3-dimethyl-1-butynyl, 1-ethyl-2-butynyl, 1-ethyl-3-butynyl, 2-ethyl-3-butynyl and 1-ethyl-1-methyl-2-propynyl.

The term “cycloalkyl” refers to a carbocyclic saturated ring system having preferably 3-8 ring carbon atoms, for example cyclopropyl, cyclobutyl, cyclopentyl or cyclohexyl, which optionally has further substitution, preferably by hydrogen, alkyl, alkoxy, cyano, nitro, alkylthio, haloalkylthio, halogen, alkenyl, alkynyl, haloalkyl, amino, alkylamino, bisalkylamino, alkoxycarbonyl, hydroxycarbonyl, arylalkoxycarbonyl, aminocarbonyl, alkylaminocarbonyl, cycloalkylaminocarbonyl. In the case of optionally substituted cycloalkyl, cyclic systems with substituents are included, also including substituents with a double bond on the cycloalkyl radical, for example an alkylidene group such as methylidene. In the case of optionally substituted cycloalkyl, polycyclic aliphatic systems are also included, for example bicyclo[1.1.0]butan-1-yl, bicyclo[1.1.0]butan-2-yl, bicyclo[2.1.0]pentan-1-yl, bicyclo[1.1.1]pentan-1-yl, bicyclo[2.1.0]pentan-2-yl, bicyclo[2.1.0]pentan-5-yl, bicyclo[2.1.1]hexyl, bicyclo[2.2.1]hept-2-yl, bicyclo[2.2.2]octan-2-yl, bicyclo[3.2.1]octan-2-yl, bicyclo[3.2.2]nonan-2-yl, adamantan-1-yl and adamantan-2-yl, but also systems such as 1,1'-bi(cyclopropyl)-1-yl, 1,1'-bi(cyclopropyl)-2-yl, for example. The term “(C_3-C_7)-cycloalkyl” is a brief notation for cycloalkyl having three to seven carbon atoms, corresponding to the range specified for carbon atoms.

In the case of spiro-(C_5-C_9)-alkanyl, spirocyclic aliphatic systems are also included, for example spiro[2.2]pentan-1-yl, spiro[2.2]pentan-2-yl, spiro[2.3]hexan-1-yl, spiro[2.3]hexan-2-yl, spiro[2.3]hexan-4-yl, spiro[2.3]hexan-5-yl, spiro[3.3]heptan-1-yl, spiro[3.3]heptan-2-yl.

In the case of dispiro-(C_7-C_8)-alkanyl, dispirocyclic aliphatic systems are included, for example dispiro[2.0.2^4.1^3]heptan-7-yl, dispiro[2.0.2^4.1^3]heptan-1-yl, dispiro[2.0.2^4.2^3]octan-7-yl, dispiro[2.0.2^4.2^3]octan-1-yl, dispiro[2.0.3^4.1^3]octan-1-yl, dispiro[2.0.3^4.1^3]octan-8-yl, dispiro[2.0.3^4.1^3]octan-5-yl, dispiro[2.0.3^4.1^3]octan-8-yl, dispiro[2.0.3^4.1^3]octan-6-yl, dispiro[2.1.2^5.1^3]octan-4-yl, dispiro[2.1.2^5.1^3]octan-4-yl, dispiro[2.1.2^5.1^3]octan-1-yl.

“Cycloalkenyl” denotes a carbocyclic, nonaromatic, partly unsaturated ring system having preferably 4-8 carbon atoms, e.g. 1-cyclobutenyl, 2-cyclobutenyl, 1-cyclopentenyl, 2-cyclopentenyl, 3-cyclopentenyl, or 1-cyclohexenyl, 2-cyclohexenyl, 3-cyclohexenyl, 1,3-

cyclohexadienyl or 1,4-cyclohexadienyl, also including substituents with a double bond on the cycloalkenyl radical, for example an alkylidene group such as methylidene. In the case of optionally substituted cycloalkenyl, the elucidations for substituted cycloalkyl apply correspondingly.

The term “alkylidene”, also, for example, in the form (C_1-C_{10})-alkylidene, denotes the radical of a straight-chain or branched open-chain hydrocarbon radical which is attached via a double bond. Possible bonding sites for alkylidene are naturally only positions on the base structure where two hydrogen atoms can be replaced by the double bond; radicals are, for example, $=CH_2$, $=CH-CH_3$, $=C(CH_3)-CH_3$, $=C(CH_3)-C_2H_5$ or $=C(C_2H_5)-C_2H_5$. Cycloalkylidene denotes a carbocyclic radical bonded via a double bond.

The term “alkylene”, also, for example, in the form (C_1-C_8)-alkylene, denotes the radical of a straight-chain or branched open-chain hydrocarbon radical which is attached at two positions to further groups.

“Alkoxyalkyl” represents an alkoxy radical bonded via an alkyl group and “alkoxyalkoxy” denotes an alkoxyalkyl radical bonded via an oxygen atom, for example (but not limited to) methoxymethoxy, methoxyethoxy, ethoxyethoxy, methoxy-n-propyloxy.

“Arylalkyl” represents an aryl radical bonded via an alkyl group, “heteroarylalkyl” denotes a heteroaryl radical bonded via an alkyl group, and “heterocyclylalkyl” denotes a heterocyclyl radical bonded via an alkyl group.

“Cycloalkylalkyl” represents a cycloalkyl radical bonded via an alkyl group, for example (but not limited thereto) cyclopropylmethyl, cyclobutylmethyl, cyclopentylmethyl, cyclohexylmethyl, 1-cyclopropyleth-1-yl, 2-cyclopropyleth-1-yl, 1-cyclopropylprop-1-yl, 3-cyclopropylprop-1-yl.

“Arylalkenyl” represents an aryl radical bonded via an alkenyl group, “heteroarylalkenyl” denotes a heteroaryl radical bonded via an alkenyl group, and “heterocyclylalkenyl” denotes a heterocyclyl radical bonded via an alkenyl group.

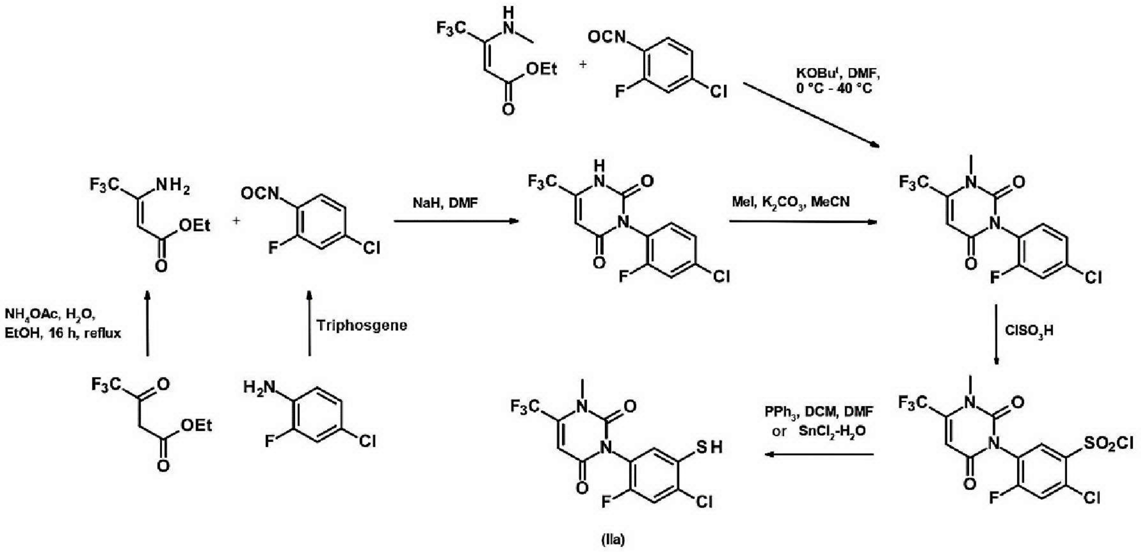
"Arylalkynyl" represents an aryl radical bonded via an alkynyl group, "heteroarylalkynyl" denotes a heteroaryl radical bonded via an alkynyl group, and "heterocyclylalkynyl" denotes a heterocyclyl radical bonded via an alkynyl group.

According to the invention, "haloalkylthio" - on its own or as constituent part of a chemical group - is straight-chain or branched S-haloalkyl, preferably having 1 to 8, or having 1 to 6 carbon atoms, such as (C_1-C_8)-, (C_1-C_6)- or (C_1-C_4)-haloalkylthio, for example (but not limited to) trifluoromethylthio, pentafluoroethylthio, difluoromethyl, 2,2-difluoroeth-1-ylthio, 2,2,2-difluoroeth-1-ylthio, 3,3,3-prop-1-ylthio.

"Halocycloalkyl" and "halocycloalkenyl" respectively denote cycloalkyl or cycloalkenyl that are partly or fully substituted by identical or different halogen atoms, such as F, Cl and Br, or by haloalkyl, such as trifluoromethyl or difluoromethyl, for example 1-fluorocycloprop-1-yl, 2-fluorocycloprop-1-yl, 2,2-difluorocycloprop-1-yl, 1-fluorocyclobut-1-yl, 1-trifluoromethylcycloprop-1-yl, 2-trifluoromethylcycloprop-1-yl, 1-chlorocycloprop-1-yl, 2-chlorocycloprop-1-yl, 2,2-dichlorocycloprop-1-yl, 3,3-difluorocyclobutyl.

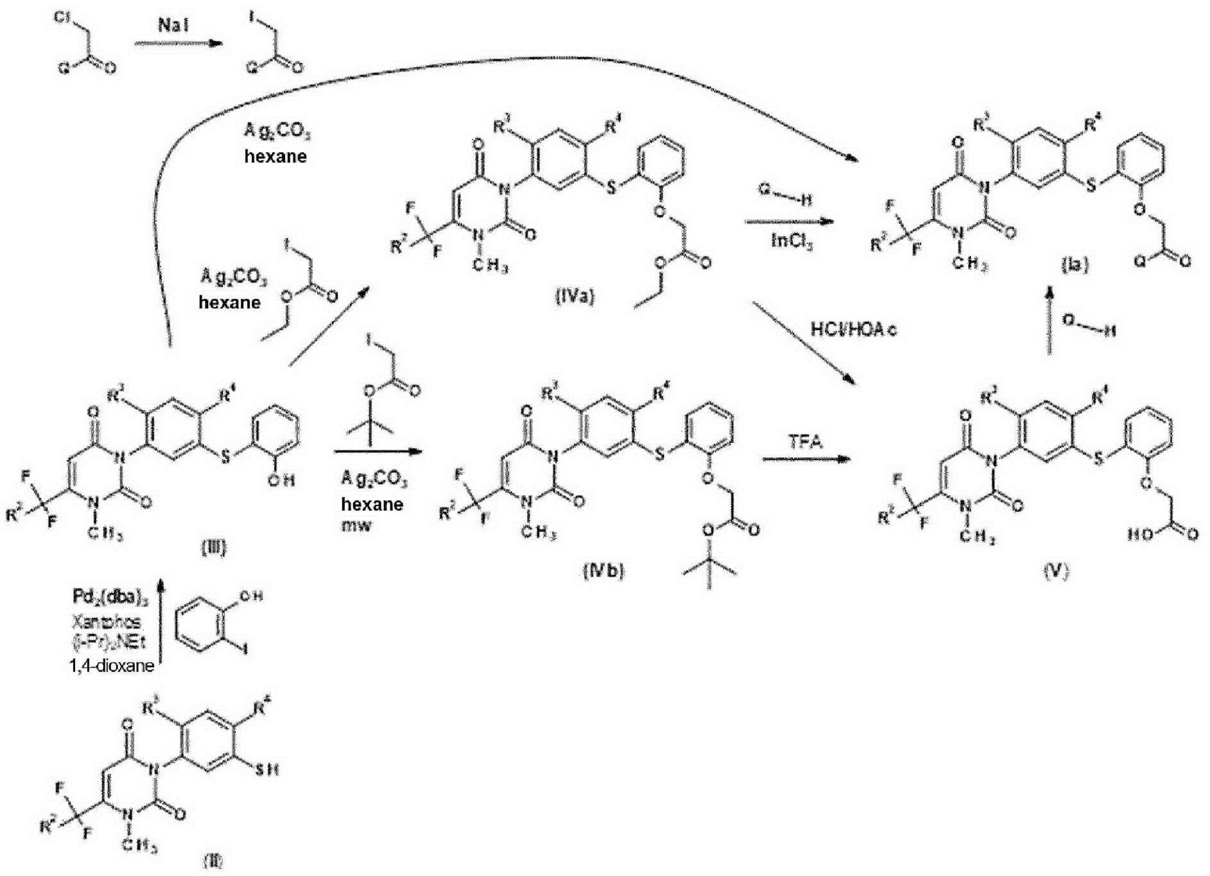
Synthesis of substituted N-phenyluracils of the general formula (I).

The substituted N-phenyluracils of the general formula (I) according to the invention can be prepared using known processes. The synthesis routes used and examined proceed from commercially available or easily preparable heteroaromatic amines and of correspondingly substituted hydroxy esters. In the schemes which follow, the moieties G, Q, R^1, R^2, R^3, R^4, R^5, R^6, R^7, X and Y of the general formula (I) have the meanings defined above, unless illustrative but non-limiting definitions are given. As a first key intermediate for the synthesis of the inventive compounds of the general formula (I) in which X is sulfur (S) and Y is oxygen (O), a mercaptophenyl-1H-pyrimidine-2,4-dione, which is optionally substituted further, is prepared. By way of example but without limitation, this is shown by the synthesis of 3-(4-chloro-2-fluoro-5-mercaptophenyl)-1-methyl-6-trifluoromethyl-1H-pyrimidine-2,4-dione (IIa) (scheme 1). To this end, a suitable substituted aniline, by way of example but without limitation, 2-fluoro-4-chloroaniline, is converted with a suitable reagent (e.g. triphosgene) in a suitable polar aprotic solvent (e.g. dichloromethane) to the corresponding isocyanate which, in the next step, is converted by reaction with a suitable aminoacrylic ester using a suitable base (e.g. sodium hydride or potassium tert-butoxide) in a suitable polar aprotic solvent (e.g. N,N-dimethylformamide) to the corresponding pyrimidine-2,4-dione optionally having further substitution, by way of example but without limitation 3-(4-chloro-2-fluorophenyl)-1-methyl-6-trifluoromethyl-1H-pyrimidine-2,4-dione (Scheme 1). By subsequent sulfochlorination with a suitable reagent (e.g. chlorosulfonic acid) followed by reduction with a suitable reducing agent (e.g. Zn in EtOH and HCl, tin(II) chloride hydrate or triphenylphosphine), it is possible to prepare the desired mercaptophenyl-1H-pyrimidine-2,4-dione, by way of example but without limitation 3-(4-chloro-2-fluoro-5-mercaptophenyl)-1-methyl-6-trifluoromethyl-1H-pyrimidine-2,4-dione (IIa) (cf. KR1345394; EP1122244; EP408382; WO 2003/029226; WO2010/038953; US2011/0224083; KR2011/110420). In Scheme 1 below, R^2 and R^3, by way of example but without limitation, are fluorine, R^4, by way of example but without limitation, is chlorine, and X, by way of example but without limitation, is sulfur.



Scheme 1.

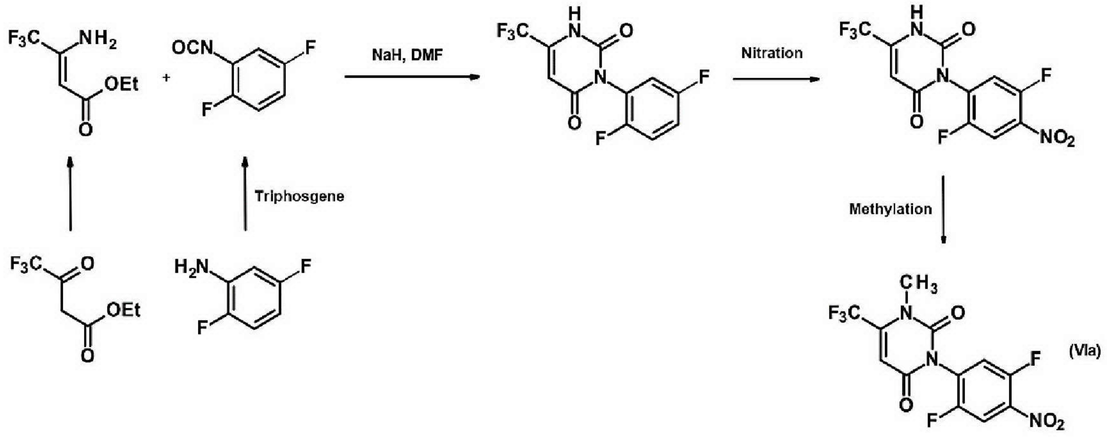
The synthesis of the key intermediate (IIa) described in scheme 1 can also be applied to the preparation of similar intermediates. The respective further-substituted N-methyl-5-mercaptophenyl-1H-pyrimidine-2,4-dione intermediates (II) can then be converted by various routes to the desired inventive compounds of the general formula (Ia) in which X is sulfur (S) and Y is oxygen (O) (Scheme 2), after the compounds (II) have been converted to intermediates (III) in a first step with the aid of a suitable optionally further-substituted iodophenol using a suitable base or using a suitable transition metal catalyst (e.g. tris(dibenzylideneacetone)dipalladium(0)) having a suitable ligand (e.g. 4,5-bis(diphenylphosphino)-9,9-dimethylxanthene) and a suitable base (e.g. diispropyl(ethyl)amine) in a suitable polar aprotic solvent (e.g. dioxane). In scheme 2 below, Q, R^2, R^3 and R^4 have the inventive meanings above. In addition, R^1, R^5, R^6, R^7, by way of example but without limitation, are hydrogen, X, by way of example but without limitation, is sulfur, Y, by way of example but without limitation, is oxygen and G, by way of example but without limitation, is CH_2. The corresponding intermediate (III) described by way of example but without limitation in Scheme 2 can be converted by reaction with a suitable optionally further-substituted iodoalkanoic ester (in Schema 3, by way of example but without limitation, an iodoacetic ester) using a suitable base (e.g. silver(I) carbonate) in a suitable polar aprotic solvent (e.g. n-hexane or cyclohexane) at elevated temperature (e.g. under microwave conditions) to a corresponding oxyalkanoic ester intermediate (IVa, IVb) or the desired target compounds of the general formula (Ia) (cf. Synthesis 2009, 2725). The corresponding iodoalkanoic esters can be prepared by routes known from the literature (cf. Eur. J. Org. Chem., 2006, 71, 8459; WO2012/037573; Organometallics, 2009, 28, 132).



Scheme 2

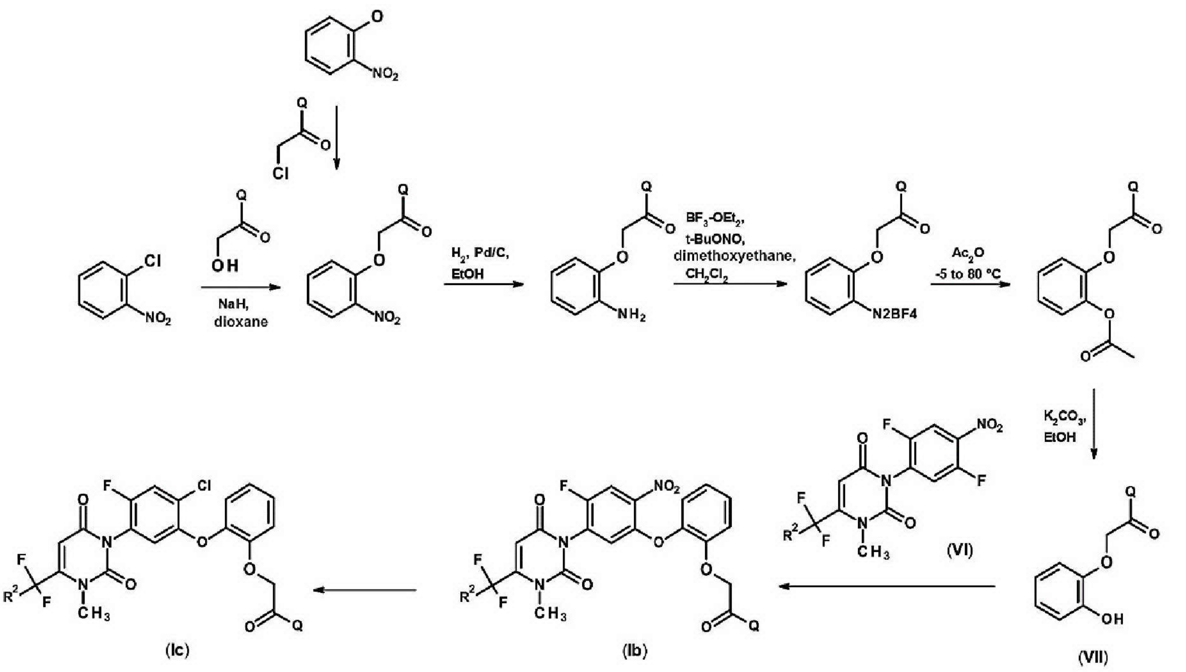
The ethyl ester (IVa) and tert-butyl ester (IVb) intermediates can then be converted under suitable reaction conditions [use of an acid such as hydrochloric acid or acetic acid in the case of (IVa) or trifluoroacetic acid (TFA) in the case of (IVb)] to the corresponding free acid (V). By reaction of the corresponding acid intermediate (V) with a suitable compound Q-H with mediation by suitable coupling agents (e.g. HOBt = 1-hydroxybenzotriazole, EDC = 1-ethyl-3-(3-dimethylaminopropyl)carbodiimide, HATU = O-(7-azabenzotriazol-1-yl)-N,N,N′,N′-tetramethyluronium hexafluorophosphate, T3P = 2,4,6-tripropyl-1,3,5,2,4,6-trioxatriphosphorinane 2,4,6-trioxide) and suitable bases (e.g. diisopropylethylamine, triethylamine) in a suitable polar aprotic solvent (e.g. dichloromethane, chloroform), it is possible to prepare the desired substituted N-phenyluracils of the general formula (Ia). Alternatively, the ethyl ester (IVa) can be converted by coupling with a suitable compound Q-H with mediation by a suitable Lewis acid (e.g. indium(III) chloride) to the corresponding desired substituted N-phenyluracil of the general formula (Ia) (cf. WO2011/1307088).

The preparation of the compounds of the general formula (I) in which X and Y, by way of example but without limitation, are oxygen (O) proceeds via the synthesis of key intermediates (VI) having a fluorine substituent at position 5, such as 3-(2,5-difluoro-4-nitro)-1-methyl-6-trifluoromethyl-1H-pyrimidine-2,4-dione (VIa). To this end, a suitable substituted aniline, by way of example but without limitation 2,5-difluoroaniline, is converted with a suitable reagent (e.g. triphosgene) in a suitable polar aprotic solvent (e.g. dichloromethane) to the corresponding isocyanate which, in the next step, is converted by reaction with a suitable aminoacrylic ester using a suitable base (e.g. sodium hydride or potassium tert-butoxide) in a suitable polar aprotic solvent (e.g. N,N-dimethylformamide) to the corresponding pyrimidine-2,4-dione optionally having further substitution, here by way of example but without limitation 3-(2,5-difluorophenyl)-6-trifluoromethyl-1H-pyrimidine-2,4-dione (scheme 3). Nitration with a suitable nitration reagent and subsequent N-methylation with a suitable methylating reagent affords the desired intermediate, here by way of example but without limitation 3-(2,5-difluoro-4-nitro)-1-methyl-6-trifluoromethyl-1H-pyrimidine-2,4-dione (VIa). In Scheme 3 below, R^2 and R^3, by way of example but without limitation, are fluorine, and R^4, by way of example but without limitation, is nitro.



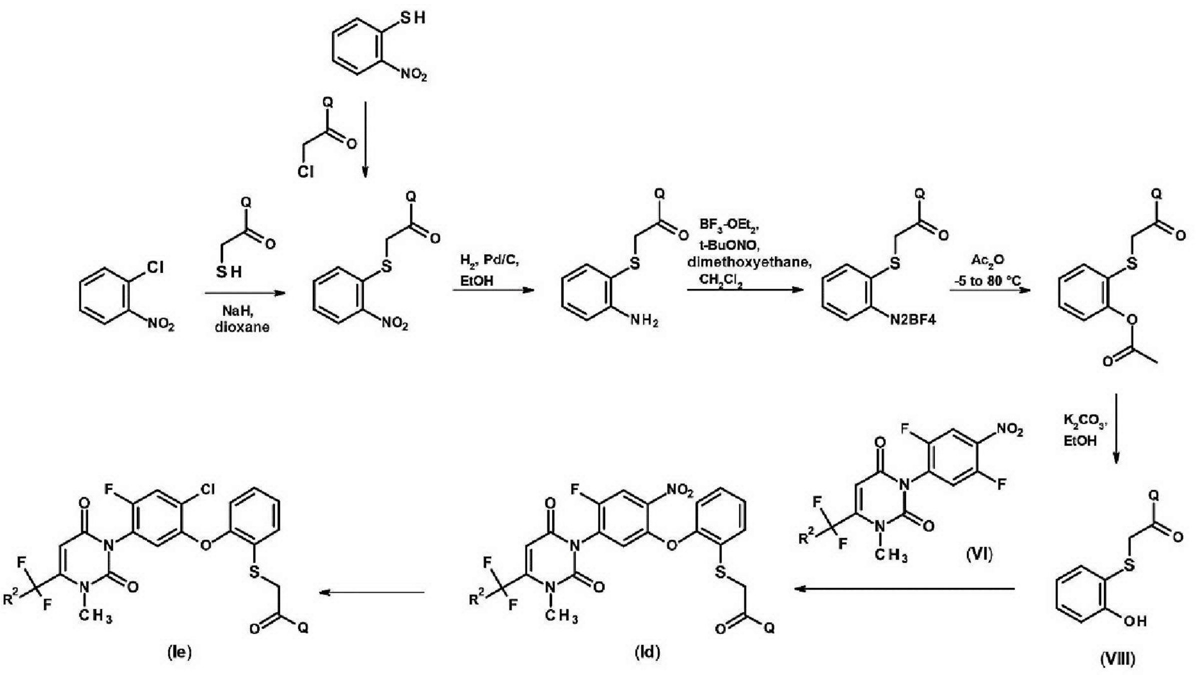
Scheme 3.

The intermediate (VI) obtained in the manner described above, e.g. compound (VIa), can then be converted with a suitable substituted 2-carbonylalkyloxy-1-hydroxybenzene (VII) using a suitable base (e.g. potassium carbonate) in a suitable polar aprotic solvent (e.g. N,N-dimethylformamide (DMF)) to a desired substituted N-phenyluracil (Ib, R^4 = nitro). The intermediate (VII) used for this purpose can be obtained by a multistage synthesis proceeding from commercially available 1-chloro-2-nitrobenzene, via (i) base-mediated coupling (e.g. with sodium hydride) with a suitable substituted hydroxyalkylcarbonyl reagent in a suitable polar aprotic solvent (e.g. tetrahydrofuran or dioxane) or alternatively by reaction of 2-nitrophenol with a suitable substituted chloromethylcarbonyl reagent, (ii) reduction of the nitro group with a suitable reducing agent (e.g. hydrogen, palladium on carbon in a suitable polar protic solvent), (iii) diazotization (with a suitable diazotizing reagent, e.g. tert-butyl nitrite (t-BuONO), boron trifluoride etherate (BF_3-OEt_2) in suitable polar aprotic solvents (e.g. dichloromethane (DCM), dimethoxyethane), (iv) reaction with acetic anhydride and (v) release of the hydroxy group by removal of the acetyl protective group (e.g. base-mediated with potassium carbonate in a polar protic solvent). The nitro group in compound (Ib) can then be converted by reduction and subsequent Sandmeyer reaction to a halogen substituent (e.g. chlorine, bromine), such that the desired substituted N-phenyluracil (Ic) can be obtained in this manner. In scheme 4 below, Q and R^2 have the above inventive meanings. In addition, R^3, by way of example but without limitation, is fluorine, R^4, by way of example but without limitation, is chlorine or nitro, R^1, R^5, R^6, R^7, by way of example but without limitation, are hydrogen, X and Y, by way of example but without limitation, are oxygen, and G, by way of example but without limitation, is CH_2.



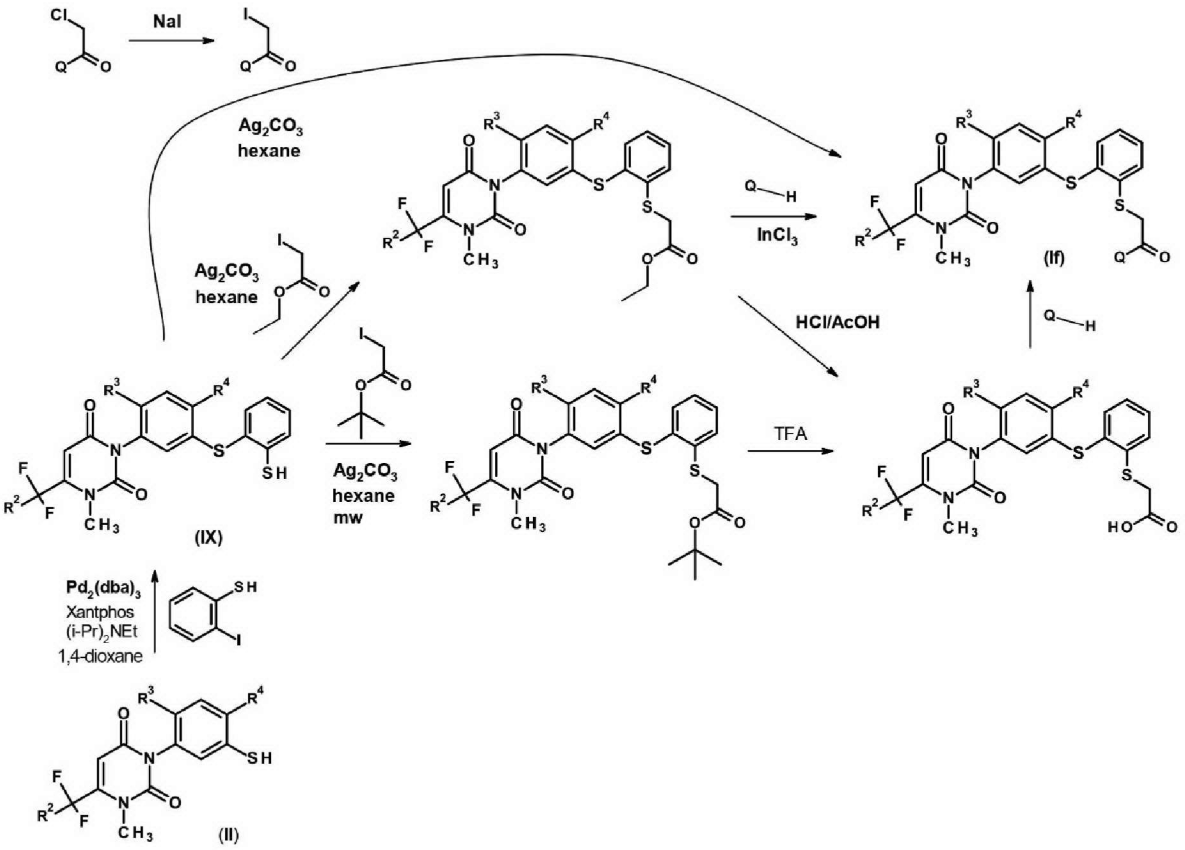
Scheme 4.

Accordingly, the intermediate (VI) obtained in the manner described above can be converted with a suitable substituted 2-carbonylalkylthio-1-hydroxybenzene (VIII) using a suitable base (e.g. potassium carbonate) in a suitable polar aprotic solvent (e.g. N,N-dimethylformamide (DMF)) to a desired substituted N-phenyluracil (Id, R^4 = nitro) where X = O (oxygen) and Y = S (sulfur). The intermediate (VIII) used for this purpose can be prepared by a multi-step synthesis analogously to the synthesis of intermediate (VII) described in Scheme 4 starting with commercially available 1-chloro-2-nitrobenzene or 2-nitrothiophenol. The nitro group in compound (Id) can then be converted by reduction and subsequent Sandmeyer reaction to a halogen substituent (e.g. chlorine, bromine), such that the desired substituted N-phenyluracil (Ie) can be obtained in this manner. In Scheme 5 below, Q and R^2 have the above inventive meanings. In addition, R^3, by way of example but without limitation, is fluorine, R^4, by way of example but without limitation, is chlorine or nitro, R^1, R^5, R^6, R^7 by way of example but without limitation, are hydrogen, X, by way of example but without limitation, is oxygen, Y, by way of example but without limitation, is sulfur and G, by way of example but without limitation, is CH_2.



Scheme 5.

The further-substituted N-methyl-5-mercaptophenyl-1H-pyrimidine-2,4-dione intermediates (II) can also be converted to the desired the inventive compounds of the general formula (If) in which X and Y are sulfur (S) (Scheme 6), after the compounds (III) have been converted to intermediates of the (IX) type, in a first step with the aid of a suitable optionally further-substituted iodothiophenol using a suitable base or using a suitable transition metal catalyst (e.g. tris(dibenzylideneacetone)dipalladium(0)) having a suitable ligand (e.g. 4,5-bis(diphenylphosphino)-9,9-dimethylxanthene) and a suitable base (e.g. diispropyl(ethyl)amine) in a suitable polar aprotic solvent (e.g. dioxane). As the case may be, intermediate protection of the thiol group using a suitable protecting group may be required. The intermediates (IX) can then be reacted with haloalkanecarboxylic acids having various substitutions using suitable bases, to afford the desired compounds of the general formula (If). In Scheme 6 below, Q, R^2, R^3, and R^4 have the inventive meanings above. In addition, R^1, R^5, R^6, R^7, by way of example but without limitation, are hydrogen, X and Y, by way of example but without limitation, are sulfur and G, by way of example but without limitation, is CH_2. In addition, the reaction pathways are described in Scheme 6 below for better clarity, by way of example but without limitation using iodoacetic esters. Also suitable for coupling with intermediate (IX) are comparable haloalkanecarboxylic acids (halogen = bromine or chlorine).

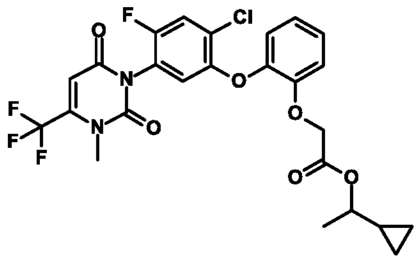


Scheme 6.

Selected detailed synthesis examples for the inventive compounds of the general formula (I) are adduced below. The example numbers mentioned correspond to the numbering scheme in Tables I.1 to I.33 below. The ^{1}H NMR spectroscopy data reported for the chemical examples described in the sections which follow (400 MHz for ^{1}H NMR, solvent: $CDCl_3$, CD_3OD or d_6-DMSO, internal standard: tetramethylsilane δ = 0.00 ppm) were obtained on a Bruker instrument, and the signals listed have the meanings given below: br = broad; s = singlet, d = doublet, t = triplet, dd = doublet of doublets, ddd = doublet of a doublet of doublets, m = multiplet, q = quartet, quint = quintet, sext = sextet, sept = septet, dq = doublet of quartets, dt = doublet of triplets. In the case of diastereomer mixtures, what is reported is either the significant signals for each of the two diastereomers or the characteristic signal of the main diastereomer. The abbreviations used for chemical groups have, for example, the following meanings: Me = CH_3, Et = CH_2CH_3, t-Hex = $C(CH_3)_2CH(CH_3)_2$, t-Bu = $C(CH_3)_3$, n-Bu = unbranched butyl, n-Pr = unbranched propyl, i-Pr = branched propyl, c-Pr = cyclopropyl, c-Hex = cyclohexyl.

Synthesis examples:

Ex. I.7-2: 1-Cyclopropylethyl (2-{2-chloro-4-fluoro-5-[3-methyl-2,6-dioxo-4-(trifluoromethyl)-3,6-dihydropyrimidin-1(2H)-yl]phenoxy}phenoxy)acetate

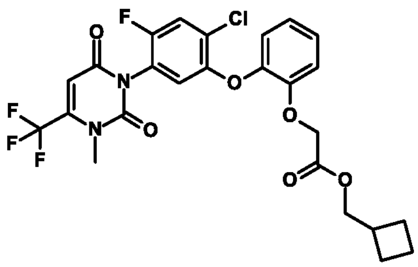


To a solution of 1-cyclopropylethanol (0.035 g, 0.408 mmol) in 5 ml of dichloromethane were added [2-({2-chloro-4-fluoro-5-[3-methyl-2,6-dioxo-4-(trifluoromethyl)-3,6-dihydropyrimidin-1(2H)-yl]phenyl}sulfanyl)phenoxy]acetic acid (0.150 g, 0.292 mmol) and then, in succession, 1-hydroxy-1H-benzotriazole hydrate (0.058 g, 0.379 mmol), 1-(3-dimethylaminopropyl)-3-ethylcarbodiimide hydrochloride (0.073 g, 0.379 mmol) and 4-dimethylaminopyridine (10 mol%), and the mixture was stirred at room temperature for 4 hours. Water and dichloromethane were added to the reaction mixture, the aqueous phase was extracted repeatedly with dichloromethane, the combined organic phases were dried over sodium sulfate, and the solvent was removed under reduced pressure.

After purification by column chromatography on silica gel with an n-heptane/ethyl acetate gradient, 0.122 g (71% of theory) of a colorless solid was obtained.

^{1}H-NMR (CDCl$_3$ δ, ppm) 7.36 (d, 1H), 7.13-7.10 (m, 1H), 7.09-7.06 (m, 1H), 7.00-6.98 (m, 1H), 6.92-6.90 (m, 1H), 6.78 (d, 1H), 6.27 (s, 1H), 4.64 (m, 2H), 4.37 (q, 1H), 3.50 (s, 3H), 1.29 (d, 3H), 1.04-0.92 (m, 1H), 0.58-0.43 (m, 2H), 0.40-0.32 (m, 1H), 0.27-0.20 (m, 1H).

Ex. I.7-10: Cyclobutylmethyl (2-{2-chloro-4-fluoro-5-[3-methyl-2,6-dioxo-4-(trifluoromethyl)-3,6-dihydropyrimidin-1(2H)-yl]phenoxy}phenoxy)acetate

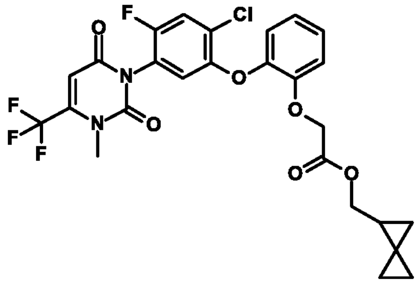


To a solution of 1-cyclobutylmethanol (0.035 g, 0.408 mmol) in 5 ml of dichloromethane were added [2-({2-chloro-4-fluoro-5-[3-methyl-2,6-dioxo-4-(trifluoromethyl)-3,6-dihydropyrimidin-1(2H)-yl]phenyl}sulfanyl)phenoxy]acetic acid (0.150 g, 0.292 mmol) and then, in succession, 1-hydroxy-1H-benzotriazole hydrate (0.058 g, 0.379 mmol), 1-(3-dimethylaminopropyl)-3-ethylcarbodiimide hydrochloride (0.073 g, 0.379 mmol) and 4-dimethylaminopyridine (10 mol%), and the mixture was stirred at room temperature for 4 hours. Water and dichloromethane were added to the reaction mixture, the aqueous phase was extracted repeatedly with dichloromethane, the combined organic phases were dried over sodium sulfate, and the solvent was removed under reduced pressure.

After purification by column chromatography on silica gel with an n-heptane/ethyl acetate gradient, 0.139 g (81% of theory) of a colorless solid was obtained.

^{1}H-NMR ($CDCl_3$ δ, ppm) 7.36 (d, 1H), 7.14-7.10 (m, 1H), 7.06-7.04 (m, 1H), 7.01-6.97 (m, 1H), 6.92-6.89 (m, 1H), 6.77 (d, 1H), 6.28 (s, 1H), 4.66 (s, 2H), 4.10 (d, 2H), 3.50 (s, 3H), 2.59 (sept, 1H), 2.06-1.97 (m, 2H), 1.91-1.80 (m, 2H), 1.75-1.71 (m, 2H).

Ex. I.7-18: Spiro[2.2]pentan-1-ylmethyl (2-{2-chloro-4-fluoro-5-[3-methyl-2,6-dioxo-4-(trifluoromethyl)-3,6-dihydropyrimidin-1(2H)-yl]phenoxy}phenoxy)acetate

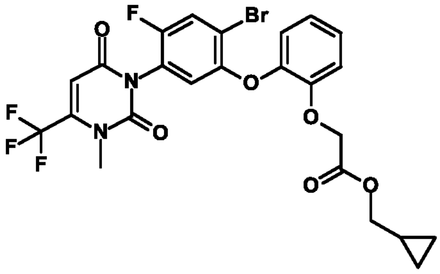


To a solution of spiro[2.2]pentan-1-ylmethanol (0.045 g, 0.463 mmol) in 5 ml of dichloromethane were added [2-({2-chloro-4-fluoro-5-[3-methyl-2,6-dioxo-4-(trifluoromethyl)-3,6-dihydropyrimidin-1(2H)-yl]phenyl}sulfanyl)phenoxy]acetic acid (0.170 g, 0.330 mmol) and then, in succession, 1-hydroxy-1H-benzotriazole hydrate (0.066 g, 0.430 mmol), 1-(3-dimethylaminopropyl)-3-ethylcarbodiimide hydrochloride (0.082 g, 0.043 mmol) and 4-dimethylaminopyridine (10 mol%), and the mixture was stirred at room temperature for 2 hours. Water and dichloromethane were added to the reaction mixture, the aqueous phase was extracted repeatedly with dichloromethane, the combined organic phases were dried over sodium sulfate, and the solvent was removed under reduced pressure.

After purification by column chromatography on silica gel with an n-heptane/ethyl acetate gradient, 0.170 g (86% of theory) of a colorless solid was obtained.

^{1}H-NMR ($CDCl_3$ δ, ppm) 7.36 (d, 1H), 7.14-7.10 (m, 1H), 7.07-7.04 (m, 1H), 7.01-6.97 (m, 1H), 6.91-6.89 (m, 1H), 6.78 (d, 1H), 6.28 (s, 1H), 4.65 (s, 2H), 4.16-4.02 (m, 2H), 3.50 (s, 3H), 1.50-1.43 (m, 1H), 1.04-1.01 (m, 1H), 0.79-0.68 (m, 5H).

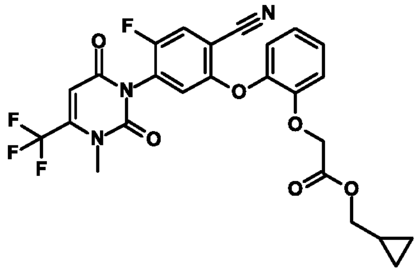
Ex. I.8-1: Cyclopropylmethyl (2-{2-bromo-4-fluoro-5-[3-methyl-2,6-dioxo-4-(trifluoromethyl)-3,6-dihydropyrimidin-1(2H)-yl]phenoxy}phenoxy)acetate



To a solution of 1-cyclopropylmethanol (98%, 81 mg, 1.09 mmol) in 10 ml of dichloromethane were added (2-{2-bromo-4-fluoro-5-[3-methyl-2,6-dioxo-4-(trifluoromethyl)-3,6-dihydropyrimidin-1(2H)-yl]phenoxy}phenoxy)acetic acid (450 mg, 0.84 mmol) and then, in succession, 1-hydroxy-1H-benzotriazole hydrate (148 mg, 1.10 mmol), 1-(3-dimethylaminopropyl)-3-ethylcarbodiimide hydrochloride (210 mg, 1.10 mmol) and catalytic amounts of 4-dimethylaminopyridine (10 mg), and the mixture was stirred at room temperature for 5 hours. The reaction mixture was left to stand overnight, and subsequent reaction monitoring by thin-film chromatography showed incomplete conversion, and so 1-hydroxy-1H-benzotriazole hydrate (148 mg, 1.10 mmol), 1-(3-dimethylaminopropyl)-3-ethylcarbodiimide hydrochloride (210 mg, 1.10 mmol) and catalytic amounts of 4-dimethylaminopyridine (10 mg) were added again. The mixture was stirred at room temperature for a further 5 hours, and virtually complete conversion was established by reaction monitoring by thin-film chromatography. Water was added to the reaction mixture, the phases were separated by means of a separator cartridge, and the solvent was removed under reduced pressure. Column chromatography purification on silica gel with an *n*-heptane/ethyl acetate gradient afforded cyclopropylmethyl (2-{2-bromo-4-fluoro-5-[3-methyl-2,6-dioxo-4-(trifluoromethyl)-3,6-dihydropyrimidin-1(2H)-yl]phenoxy}phenoxy)acetate (477 mg, 95% of theory) in the form of a colorless oil.

^{1}H-NMR ($CDCl_3$ δ, ppm): 7.52 (d, 1H), 7.14-6.92 (m, 4H), 6.74 (d, 1H), 6.27 (s, 1H), 4.67 (s, 2H), 3.96 (d, 2H), 3.50 (s, 3H), 1.11 (m, 1H), 0.56 (m, 2H), 0.26 (m, 2H).

Ex. I.9-1: Cyclopropylmethyl (2-{2-cyano-4-fluoro-5-[3-methyl-2,6-dioxo-4-(trifluoromethyl)-3,6-dihydropyrimidin-1(2H)-yl]phenoxy}phenoxy)acetate



An initial charge of cyclopropylmethyl (2-{2-bromo-4-fluoro-5-[3-methyl-2,6-dioxo-4-(trifluoromethyl)-3,6-dihydropyrimidin-1(2H)-yl]phenoxy}phenoxy)acetate (327 mg, 0.56 mmol) together with zinc cyanide (69 mg, 0.59 mmol) and tetrakis(triphenylphosphine)palladium (0) (65 mg, 0.06 mmol) in 10 ml of N,N-dimethylacetamide under argon was stirred at an oil bath temperature of 180 degrees Celsius for 1 hour. After TLC monitoring, which indicated complete conversion, the reaction mixture was added to 10 ml of water and extracted repeatedly with ethyl acetate. The combined organic phases were washed twice with saturated sodium chloride solution, then dried over sodium sulfate, filtered and then concentrated under reduced pressure.
Column chromatography purification of the crude product obtained on silica gel with an *n*-heptane/ethyl acetate gradient afforded cyclopropylmethyl (2-{2-cyano-4-fluoro-5-[3-methyl-2,6-dioxo-4-(trifluoromethyl)-3,6-dihydropyrimidin-1(2H)-yl]phenoxy}phenoxy)acetate (201 mg, 64% of theory) in the form of a colorless oil.
^{1}H-NMR ($CDCl_3$ δ, ppm): 7.49 (d, 1H), 7.20 (m, 2H), 7.04 (dt, 1H), 6.88 (dd, 1H), 6.80 (d, 1H),), 6.26 (s, 1H), 4.64 (s, 2H), 3.94 (d, 2H), 3.49 (s, 3H), 1.10 (m, 1H), 0.56 (m, 2H), 0.25 (m, 2H).

In analogy to the preparation examples cited above and recited at the appropriate point, and taking account of the general details relating to the preparation of substituted N-heterocyclyl- and N-heteroaryltetrahydropyrimidinones, the compounds cited below are obtained.

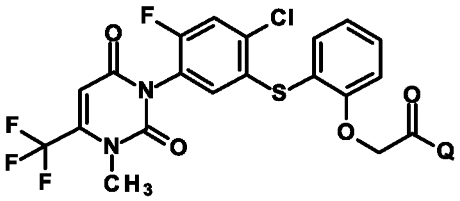
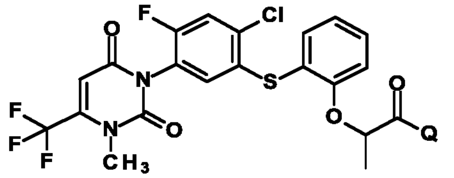

(I.1)

Table I.1: Preferred compounds of the formula (I.1) are the compounds I.1-1 to I.1-25 in which Q has the meanings from table 1 indicated in the respective row. Compounds I.1-1 to I.1-25 in table I.1 are thus defined by the meaning of the respective entry nos. 1 to 25 for Q in table 1.

Table 1:

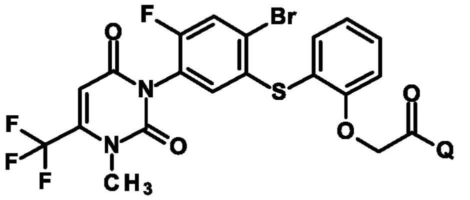
No.	Q
1	Q-1
2	Q-2
3	Q-3
4	Q-4
5	Q-5
6	Q-6
7	Q-7
8	Q-8
9	Q-9
10	Q-10
11	Q-11
12	Q-12
13	Q-13
14	Q-14
15	Q-15
16	Q-16
17	Q-17
18	Q-18
19	Q-19
20	Q-20
21	Q-21

No.	Q
22	Q-22
23	Q-23
24	Q-24
25	Q-25



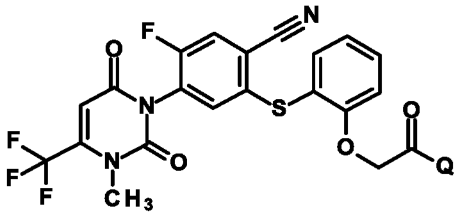
(I.2)

Table I.2: Preferred compounds of the formula (I.2) are the compounds I.2-1 to I.2-25 in which Q has the meanings from table 1 indicated in the respective row. Compounds I.2-1 to I.2-25 in table I.2 are thus defined by the meaning of the respective entry nos. 1 to 25 for Q in table 1.



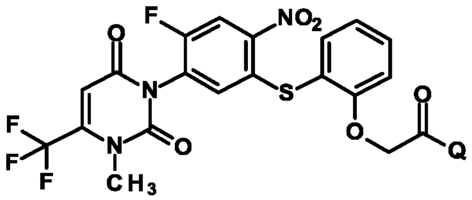
(I.3)

Table I.3: Preferred compounds of the formula (I.3) are the compounds I.3-1 to I.3-25 in which Q has the meanings from table 1 indicated in the respective row. Compounds I.3-1 to I.3-25 in table I.3 are thus defined by the meaning of the respective entry nos. 1 to 25 for Q in table 1.



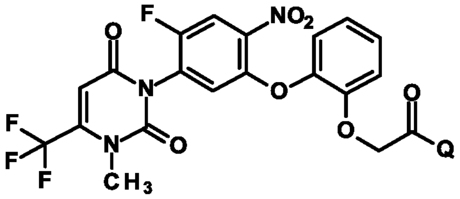
(I.4)

Table I.4: Preferred compounds of the formula (I.4) are the compounds I.4-1 to I.4-25 in which Q has the meanings from table 1 indicated in the respective row. Compounds I.4-1 to I.4-25 in table I.4 are thus defined by the meaning of the respective entry nos. 1 to 25 for Q in table 1.



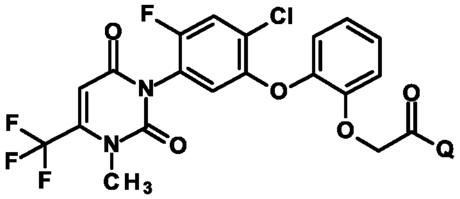
(I.5)

Table I.5: Preferred compounds of the formula (I.5) are the compounds I.5-1 to I.5-25 in which Q has the meanings from table 1 indicated in the respective row. Compounds I.5-1 to I.5-25 in table I.5 are thus defined by the meaning of the respective entry nos. 1 to 25 for Q in table 1.



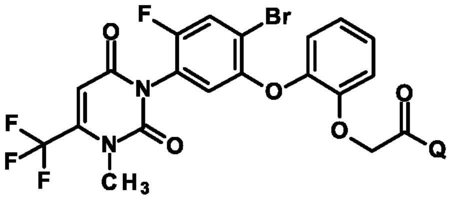
(I.6)

Table I.6: Preferred compounds of the formula (I.6) are the compounds I.6-1 to I.6-25 in which Q has the meanings from table 1 indicated in the respective row. Compounds I.6-1 to I.6-25 in table I.6 are thus defined by the meaning of the respective entry nos. 1 to 25 for Q in table 1.



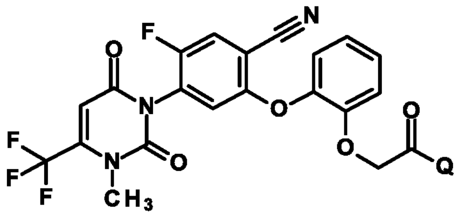
(I.7)

Table I.7: Preferred compounds of the formula (I.7) are the compounds I.7-1 to I.7-25 in which Q has the meanings from table 1 indicated in the respective row. Compounds I.7-1 to I.7-25 in table I.7 are thus defined by the meaning of the respective entry nos. 1 to 25 for Q in table 1.



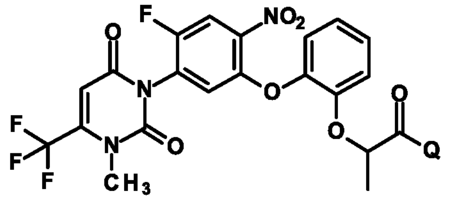
(I.8)

Table I.8: Preferred compounds of the formula (I.8) are the compounds I.8-1 to I.8-25 in which Q has the meanings from table 1 indicated in the respective row. Compounds I.8-1 to I.8-25 in table I.8 are thus defined by the meaning of the respective entry nos. 1 to 25 for Q in table 1.



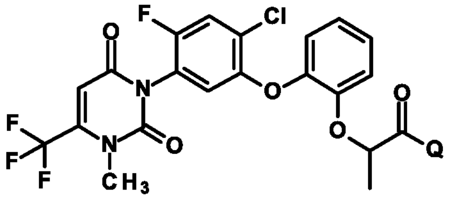
(I.9)

Table I.9: Preferred compounds of the formula (I.9) are the compounds I.9-1 to I.9-25 in which Q has the meanings from table 1 indicated in the respective row. Compounds I.9-1 to I.9-25 in table I.9 are thus defined by the meaning of the respective entry nos. 1 to 25 for Q in table 1.



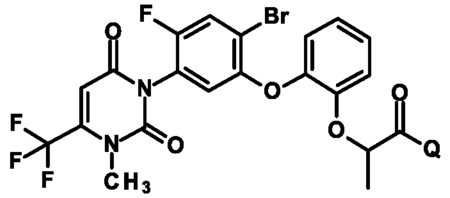
(I.10)

Table I.10: Preferred compounds of the formula (I.10) are the compounds I.10-1 to I.10-25 in which Q has the meanings from table 1 indicated in the respective row. Compounds I.10-1 to I.10-25 in table I.10 are thus defined by the meaning of the respective entry nos. 1 to 25 for Q in table 1.



(I.11)

Table I.11: Preferred compounds of the formula (I.11) are the compounds I.11-1 to I.11-25 in which Q has the meanings from table 1 indicated in the respective row. Compounds I.11-1 to I.11-25 in table I.11 are thus defined by the meaning of the respective entry nos. 1 to 25 for Q in table 1.



(I.12)

Table I.12: Preferred compounds of the formula (I.12) are the compounds I.12-1 to I.12-25 in which Q has the meanings from table 1 indicated in the respective row. Compounds I.12-1 to

I.12-25 in table I.12 are thus defined by the meaning of the respective entry nos. 1 to 25 for Q in table 1.

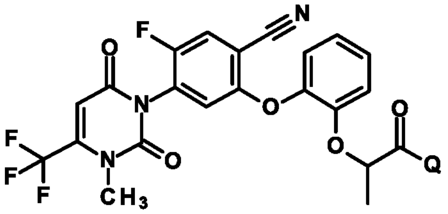

(I.13)

Table I.13: Preferred compounds of the formula (I.13) are the compounds I.13-1 to I.13-25 in which Q has the meanings from table 1 indicated in the respective row. Compounds I.13-1 to I.13-25 in table I.13 are thus defined by the meaning of the respective entry nos. 1 to 25 for Q in table 1.

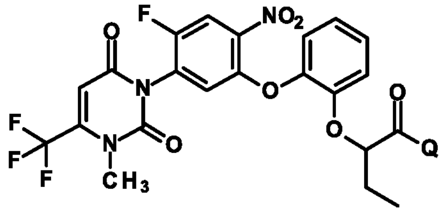

(I.14)

Table I.14: Preferred compounds of the formula (I.14) are the compounds I.14-1 to I.14-25 in which Q has the meanings from table 1 indicated in the respective row. Compounds I.14-1 to I.14-25 in table I.14 are thus defined by the meaning of the respective entry nos. 1 to 25 for Q in table 1.

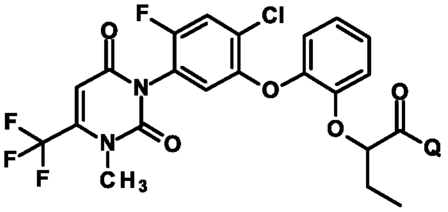
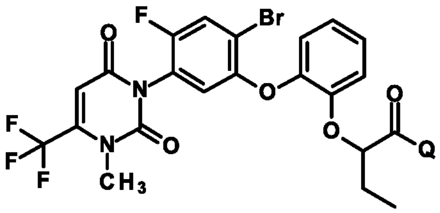
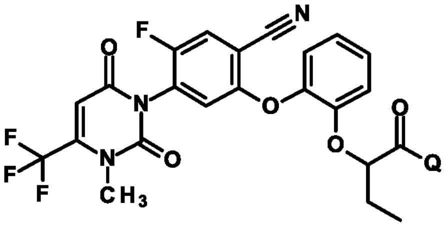

(I.15)

Table I.15: Preferred compounds of the formula (I.15) are the compounds I.15-1 to I.15-25 in which Q has the meanings from table 1 indicated in the respective row. Compounds I.15-1 to I.15-25 in table I.15 are thus defined by the meaning of the respective entry nos. 1 to 25 for Q in table 1.



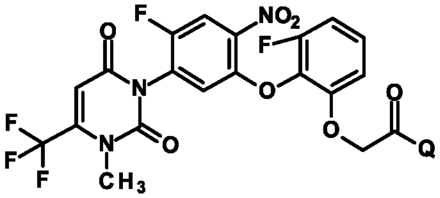
(I.16)

Table I.16: Preferred compounds of the formula (I.16) are the compounds I.16-1 to I.16-25 in which Q has the meanings from table 1 indicated in the respective row. Compounds I.16-1 to I.16-25 in table I.16 are thus defined by the meaning of the respective entry nos. 1 to 25 for Q in table 1.



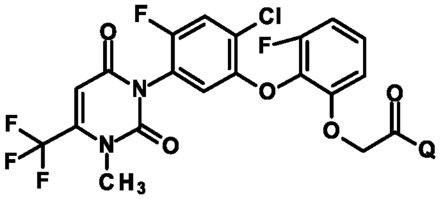
(I.17)

Table I.17: Preferred compounds of the formula (I.17) are the compounds I.17-1 to I.17-25 in which Q has the meanings from table 1 indicated in the respective row. Compounds I.17-1 to I.17-25 in table I.17 are thus defined by the meaning of the respective entry nos. 1 to 25 for Q in table 1.



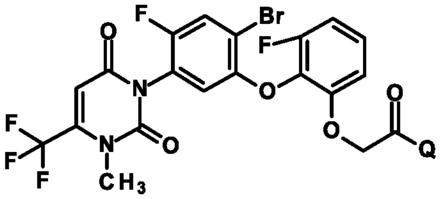
(I.18)

Table I.18: Preferred compounds of the formula (I.18) are the compounds I.18-1 to I.18-25 in which Q has the meanings from table 1 indicated in the respective row. Compounds I.18-1 to I.18-25 in table I.18 are thus defined by the meaning of the respective entry nos. 1 to 25 for Q in table 1.



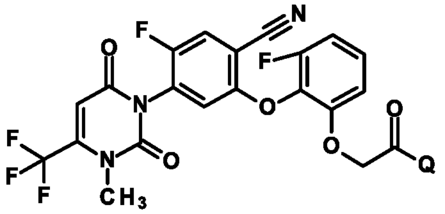
(I.19)

Table I.19: Preferred compounds of the formula (I.19) are the compounds I.19-1 to I.19-25 in which Q has the meanings from table 1 indicated in the respective row. Compounds I.19-1 to I.19-25 in table I.19 are thus defined by the meaning of the respective entry nos. 1 to 25 for Q in table 1.



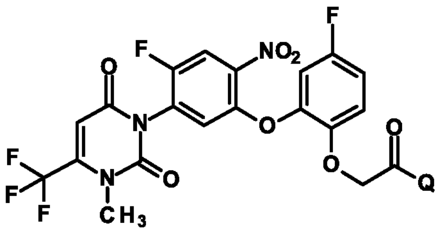
(I.20)

Table I.20: Preferred compounds of the formula (I.20) are the compounds I.20-1 to I.20-25 in which Q has the meanings from table 1 indicated in the respective row. Compounds I.20-1 to I.20-25 in table I.20 are thus defined by the meaning of the respective entry nos. 1 to 25 for Q in table 1.



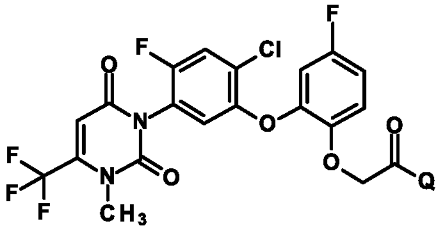
(I.21)

Table I.21: Preferred compounds of the formula (I.21) are the compounds I.21-1 to I.21-25 in which Q has the meanings from table 1 indicated in the respective row. Compounds I.21-1 to I.21-25 in table I.21 are thus defined by the meaning of the respective entry nos. 1 to 25 for Q in table 1.



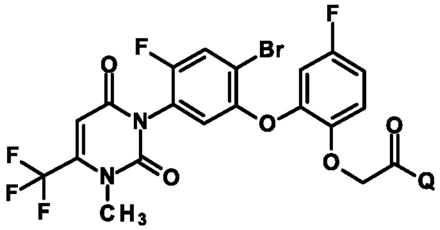
(I.22)

Table I.22: Preferred compounds of the formula (I.22) are the compounds I.22-1 to I.22-25 in which Q has the meanings from table 1 indicated in the respective row. Compounds I.22-1 to I.22-25 in table I.22 are thus defined by the meaning of the respective entry nos. 1 to 25 for Q in table 1.



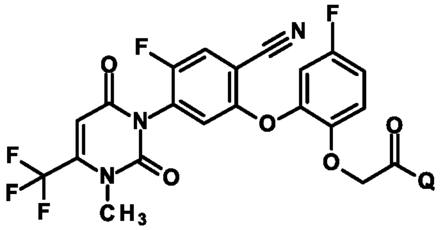
(I.23)

Table I.23: Preferred compounds of the formula (I.23) are the compounds I.23-1 to I.23-25 in which Q has the meanings from table 1 indicated in the respective row. Compounds I.23-1 to I.23-25 in table I.23 are thus defined by the meaning of the respective entry nos. 1 to 25 for Q in table 1.



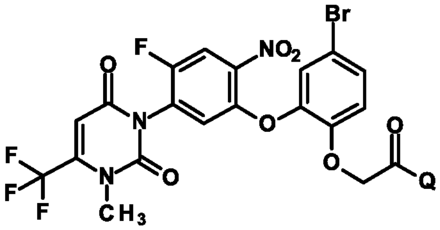
(I.24)

Table I.24: Preferred compounds of the formula (I.24) are the compounds I.24-1 to I.24-25 in which Q has the meanings from table 1 indicated in the respective row. Compounds I.24-1 to I.24-25 in table I.24 are thus defined by the meaning of the respective entry nos. 1 to 25 for Q in table 1.



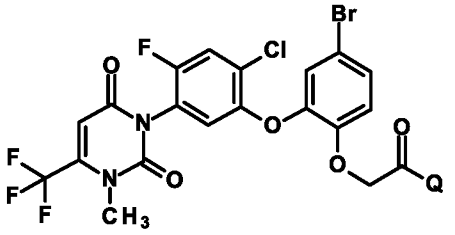
(I.25)

Table I.25: Preferred compounds of the formula (I.25) are the compounds I.25-1 to I.25-25 in which Q has the meanings from table 1 indicated in the respective row. Compounds I.25-1 to I.25-25 in table I.25 are thus defined by the meaning of the respective entry nos. 1 to 25 for Q in table 1.



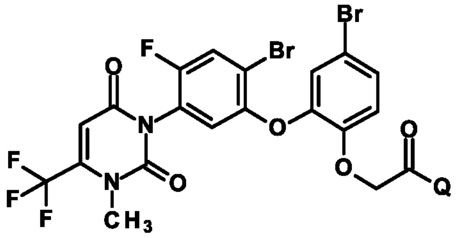
(I.26)

Table I.26: Preferred compounds of the formula (I.26) are the compounds I.26-1 to I.26-25 in which Q has the meanings from table 1 indicated in the respective row. Compounds I.26-1 to I.22-25 in table I.26 are thus defined by the meaning of the respective entry nos. 1 to 25 for Q in table 1.



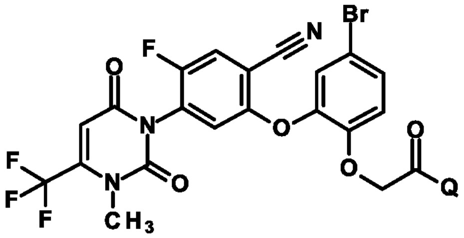
(I.27)

Table I.27: Preferred compounds of the formula (I.27) are the compounds I.27-1 to I.27-25 in which Q has the meanings from table 1 indicated in the respective row. Compounds I.27-1 to I.27-25 in table I.27 are thus defined by the meaning of the respective entry nos. 1 to 25 for Q in table 1.



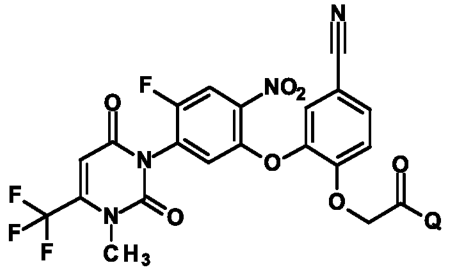
(I.28)

Table I.28: Preferred compounds of the formula (I.28) are the compounds I.28-1 to I.28-25 in which Q has the meanings from table 1 indicated in the respective row. Compounds I.28-1 to I.28-25 in table I.28 are thus defined by the meaning of the respective entry nos. 1 to 25 for Q in table 1.



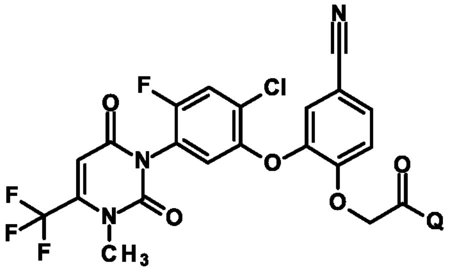
(I.29)

Table I.29: Preferred compounds of the formula (I.29) are the compounds I.29-1 to I.29-25 in which Q has the meanings from table 1 indicated in the respective row. Compounds I.29-1 to I.29-25 in table I.29 are thus defined by the meaning of the respective entry nos. 1 to 25 for Q in table 1.



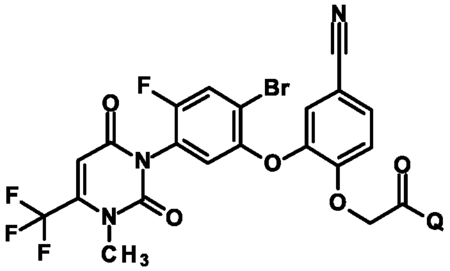
(I.30)

Table I.30: Preferred compounds of the formula (I.30) are the compounds I.30-1 to I.30-25 in which Q has the meanings from table 1 indicated in the respective row. Compounds I.30-1 to I.30-25 in table I.30 are thus defined by the meaning of the respective entry nos. 1 to 25 for Q in table 1.



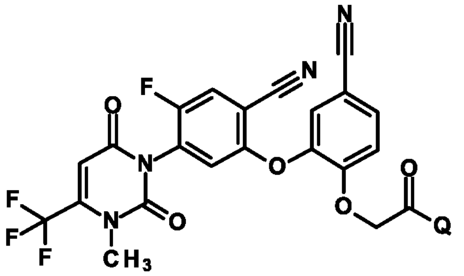
(I.31)

Table I.31: Preferred compounds of the formula (I.31) are the compounds I.31-1 to I.31-25 in which Q has the meanings from table 1 indicated in the respective row. Compounds I.31-1 to I.31-25 in table I.31 are thus defined by the meaning of the respective entry nos. 1 to 25 for Q in table 1.



(I.32)

Table I.32: Preferred compounds of the formula (I.32) are the compounds I.32-1 to I.32-25 in which Q has the meanings from table 1 indicated in the respective row. Compounds I.32-1 to I.32-25 in table I.32 are thus defined by the meaning of the respective entry nos. 1 to 25 for Q in table 1.



(I.33)

Table I.33: Preferred compounds of the formula (I.33) are the compounds I.33-1 to I.33-25 in which Q has the meanings from table 1 indicated in the respective row. Compounds I.33-1 to I.33-25 in table I.33 are thus defined by the meaning of the respective entry nos. 1 to 25 for Q in table 1.

NMR data of selected examples: The ^{1}H NMR data of selected examples of compounds of the general formula (I) are stated in two different ways, namely (a) conventional NMR interpretation or (b) in the form of 1H NMR peak lists according to the method described below.

a) Conventional NMR interpretation

Ex. I.7-12: ^{1}H-NMR ($CDCl_3$ δ, ppm) 7.36 (d, 1H), 7.14-7.10 (m, 1H), 7.07-7.04 (m, 1H), 7.01-6.97 (m, 1H), 6.92-6.90 (m, 1H), 6.77 (d, 1H), 6.28 (s, 1H), 4.66 (s, 2H), 4.02 (d, 2H), 3.50 (s, 3H), 2.17 (sept, 1H), 1.73-1.65 (m, 2H), 1.61-1.50 (m, 4H), 1.23-1.16 (m, 2H).

b) NMR peak list method

The ^{1}H-NMR data of selected examples are noted in the form of ^{1}H-NMR peak lists. For each signal peak, first the δ value in ppm and then the signal intensity in round brackets are listed. The δ value/signal intensity number pairs for different signal peaks are listed with separation from one another by semicolons.

The peak list for one example therefore has the form:

δ_1 (intensity$_1$); δ_2 (intensity$_2$);........; δ_i (intensity$_i$);......; δ_n (intensity$_n$)

The intensity of sharp signals correlates with the height of the signals in a printed example of an NMR spectrum in cm and shows the true ratios of the signal intensities. In the case of broad signals, several peaks or the middle of the signal and the relative intensity thereof may be shown in comparison to the most intense signal in the spectrum.

For calibration of the chemical shift of ^{1}H NMR spectra, we use tetramethylsilane and/or the chemical shift of the solvent, particularly in the case of spectra which are measured in DMSO. Therefore, the tetramethylsilane peak may but need not occur in NMR peak lists.

The lists of the 1H NMR peaks are similar to the conventional ^{1}H NMR printouts and thus usually contain all peaks listed in a conventional NMR interpretation.

In addition, like conventional ^{1}H NMR printouts, they may show solvent signals, signals of stereoisomers of the target compounds which are likewise provided by the invention, and/or peaks of impurities.

In the reporting of compound signals within the delta range of solvents and/or water, our lists of ^{1}H NMR peaks show the standard solvent peaks, for example peaks of DMSO in DMSO-D_6 and the peak of water, which usually have a high intensity on average.

The peaks of stereoisomers of the target compounds and/or peaks of impurities usually have a lower intensity on average than the peaks of the target compounds (for example with a purity of > 90%).

Such stereoisomers and/or impurities may be typical of the particular preparation process. Their peaks can thus help in identifying reproduction of our preparation process with reference to "by-product fingerprints".

An expert calculating the peaks of the target compounds by known methods (MestreC, ACD simulation, but also with empirically evaluated expected values) can, if required, isolate the peaks of the target compounds, optionally using additional intensity filters. This isolation would be similar to the peak picking in question in conventional ^{1}H NMR interpretation.

Further details of ^{1}H NMR peak lists can be found in Research Disclosure Database Number 564025.

I.7-1: ^{1}H-NMR (600.3 MHz, CDCl$_3$): δ= 9.2312 (4.0); 9.2276 (8.7); 9.2239 (5.2); 9.1769 (0.8); 9.1738 (18.8); 9.1701 (17.4); 9.1663 (0.7); 9.1648 (0.4); 7.3609 (4.9); 7.3462 (5.0); 7.2672 (3.7); 7.1318 (1.1); 7.1293 (1.3); 7.1159 (2.8); 7.1058 (1.6); 7.1033 (1.8); 7.0586 (2.2); 7.0561 (2.4); 7.0452 (3.6); 7.0429 (3.5); 7.0027 (1.8); 7.0005 (2.5); 6.9878 (3.1); 6.9770 (1.0); 6.9749 (1.4); 6.9353 (3.0); 6.9333 (3.5); 6.9216 (2.7); 6.9197 (3.1); 6.7759 (5.1); 6.7682 (0.4); 6.7649 (5.2); 6.2763 (9.6); 4.6713 (0.7); 4.6676 (17.4); 4.0744 (2.0); 4.0714 (50.0); 4.0677 (3.2); 4.0661 (1.1); 4.0652 (0.7); 3.9772 (0.3); 3.9734 (9.2); 3.9651 (0.4); 3.9611 (9.4); 3.4994 (15.8); 1.5923 (0.4); 1.1383 (0.3); 1.1332 (0.6); 1.1252 (1.2); 1.1206 (0.9); 1.1125 (1.7); 1.1075 (0.7); 1.1048 (1.0); 1.0996 (1.2); 1.0916 (0.6); 1.0871 (0.4); 0.5718 (1.2); 0.5626 (4.2); 0.5543 (1.5); 0.5492 (4.1); 0.5409 (1.3); 0.2741 (1.4); 0.2652 (5.0); 0.2567 (5.1); 0.2485 (1.2); -0.0001 (0.4)
I.8-1: ^{1}H-NMR (400.6 MHz, CDCl$_3$): δ= 7.5333 (4.7); 7.5118 (4.7); 7.2600 (64.4); 7.1445 (1.1); 7.1401 (1.3); 7.1261 (1.8); 7.1242 (1.8); 7.1216 (2.1); 7.1198 (1.8); 7.1059 (1.7); 7.1014 (2.1); 7.0752 (1.8); 7.0708 (2.0); 7.0552 (3.7); 7.0508 (2.9); 7.0135 (2.1); 7.0098 (2.5); 6.9951 (2.1); 6.9934 (1.8); 6.9914 (2.2); 6.9898 (1.7); 6.9751 (1.0); 6.9714 (1.1); 6.9450 (2.8); 6.9414 (2.5); 6.9246 (2.3); 6.9211 (2.1); 6.7436 (4.3); 6.7274 (4.4); 6.2732 (7.4); 4.6705 (16.0); 4.6387 (0.5); 3.9749 (7.8); 3.9566 (7.8); 3.4970 (10.7); 3.4941 (10.6); 2.5517 (0.8); 1.5375 (14.4); 1.2556 (0.8); 1.1319 (0.9); 1.1238 (0.7); 1.1200 (0.6); 1.1120 (1.5); 1.1038 (0.6); 1.1000 (0.8); 1.0919 (0.9); 0.5802 (1.0); 0.5677 (2.9); 0.5646 (3.4); 0.5620 (1.9); 0.5535 (1.4); 0.5475 (3.2); 0.5446 (2.8); 0.5334 (1.1); 0.2792 (1.2); 0.2675 (3.9); 0.2648 (3.0); 0.2555 (3.1); 0.2526 (3.8); 0.2410 (0.9); 0.0079 (3.0); 0.0062 (1.3); -0.0002 (93.8); -0.0051 (1.4); -0.0060 (1.3); -0.0085 (2.8)
I.9-1: ^{1}H-NMR (400.6 MHz, CDCl$_3$): δ= 7.5014 (5.5); 7.4804 (5.5); 7.2605 (32.3); 7.2259 (2.5); 7.2220 (3.8); 7.2183 (2.4); 7.2142 (1.4); 7.2060 (2.5); 7.2027 (4.7); 7.1987 (4.6); 7.1940 (2.3); 7.1790 (2.8); 7.1748 (1.9); 7.0554 (2.4); 7.0518 (2.6); 7.0361 (3.8); 7.0325 (3.5); 7.0167 (1.7); 7.0131 (1.7); 6.8958 (3.2); 6.8924 (2.8); 6.8754 (3.0); 6.8724 (2.4); 6.8014 (5.4); 6.7868 (5.5); 6.2624 (10.0); 4.6375 (16.0); 3.9507 (7.7); 3.9324 (8.1); 3.4897 (13.6); 3.4868 (14.1); 2.0451 (1.3); 1.5480 (2.0); 1.2595 (0.9); 1.1347 (0.5); 1.1228 (1.1); 1.1148 (1.0); 1.1110 (0.7); 1.1030 (1.9); 1.0949 (0.7); 1.0909 (1.0); 1.0830 (1.2); 1.0712 (0.6); 0.5874 (1.2); 0.5748 (3.7); 0.5718 (4.4); 0.5692 (2.4); 0.5596 (1.6); 0.5547 (4.1); 0.5517 (3.6); 0.5406 (1.3); 0.2724 (1.7); 0.2609 (4.9); 0.2490 (3.9); 0.2460 (4.6); 0.2344 (1.1); 0.0080 (1.4); -0.0002 (50.7); -0.0085 (1.5)
I.24-1: ^{1}H-NMR (400.6 MHz, CDCl$_3$): δ= 7.5535 (4.3); 7.5320 (4.3); 7.2613 (10.8); 6.9698 (1.7); 6.9569 (1.8); 6.9473 (2.3); 6.9344 (2.2); 6.8330 (4.6); 6.8265 (1.8); 6.8168 (4.3); 6.8148 (2.1); 6.8115 (1.1); 6.8071 (1.8); 6.8040 (1.5); 6.7922 (1.0); 6.7847 (1.4); 6.7745 (2.5); 6.7672 (1.8); 6.7526 (2.5); 6.7452 (1.8); 6.2979 (6.7); 5.2992 (10.4); 4.6492 (16.0); 3.9836 (7.3); 3.9652 (7.5); 3.5162 (8.8); 3.5132 (9.2); 1.1375 (0.7); 1.1361 (0.7); 1.1294 (0.6); 1.1176 (1.3); 1.1055 (0.6); 1.0990 (0.7); 1.0976 (0.8); 0.5884 (0.8); 0.5875 (0.8); 0.5758 (2.4); 0.5727 (3.1); 0.5702 (1.6); 0.5684 (1.1); 0.5614 (1.0); 0.5606 (1.1); 0.5557 (2.9); 0.5526 (2.4); 0.5506 (1.5); 0.5407 (1.0); 0.2867 (1.1); 0.2751 (3.3); 0.2722 (2.5); 0.2655 (1.4); 0.2632 (2.5); 0.2601 (3.2); 0.2485 (0.7); -0.0002 (16.3)
I.7-5: ^{1}H-NMR (400.6 MHz, CDCl$_3$): δ= 7.3702 (3.0); 7.3481 (3.0); 7.2602 (32.2); 7.1410 (0.7); 7.1365 (0.9); 7.1227 (1.1); 7.1207 (1.1); 7.1182 (1.3); 7.1163 (1.2); 7.1025 (1.2); 7.0979 (1.4); 7.0635 (1.1); 7.0591 (1.3); 7.0435 (2.5); 7.0391 (2.0); 7.0082 (1.4); 7.0046 (1.6); 6.9899 (1.2); 6.9882 (1.0); 6.9863 (1.4); 6.9847 (1.1); 6.9699 (0.7); 6.9663 (0.7); 6.9419 (1.8); 6.9384 (1.6); 6.9216 (1.5); 6.9180 (1.4); 6.7800 (2.8); 6.7635 (2.9); 6.2780 (4.9); 4.6889 (10.1); 3.9384 (9.8); 3.5004

(6.7); 3.4975 (6.9); 1.5412 (16.0); 1.0668 (13.6); 0.8820 (0.7); 0.4705 (0.7); 0.4554 (2.9); 0.4449 (1.2); 0.3656 (1.3); 0.3549 (3.0); 0.3507 (2.6); 0.3397 (0.8); 0.0080 (1.2); -0.0002 (48.4); -0.0085 (1.5)
I.7-6: ^{1}H-NMR (400.6 MHz, CDCl$_3$): δ= 7.3738 (4.5); 7.3516 (4.5); 7.2602 (18.8); 7.1466 (1.1); 7.1421 (1.3); 7.1283 (1.6); 7.1263 (1.6); 7.1238 (1.9); 7.1219 (1.8); 7.1081 (1.7); 7.1036 (2.0); 7.0780 (1.7); 7.0735 (2.0); 7.0579 (3.8); 7.0535 (3.0); 7.0218 (2.1); 7.0181 (2.4); 7.0035 (1.9); 7.0017 (1.6); 6.9998 (2.0); 6.9982 (1.6); 6.9835 (1.0); 6.9798 (1.0); 6.9451 (2.7); 6.9415 (2.5); 6.9247 (2.3); 6.9212 (2.0); 6.7570 (4.3); 6.7406 (4.4); 6.2718 (7.4); 4.7418 (16.0); 4.4178 (3.4); 4.3643 (3.0); 4.3622 (3.0); 4.3603 (3.0); 3.4950 (10.2); 3.4921 (10.4); 2.0449 (0.7); 1.5486 (10.6); 1.2770 (0.5); 1.2728 (0.6); 1.2647 (1.0); 1.2593 (1.1); 1.2551 (0.8); 1.1360 (0.7); 1.1185 (2.2); 1.1005 (0.9); 1.0901 (0.7); 1.0726 (2.2); 1.0546 (0.9); 0.8989 (0.5); 0.8820 (1.9); 0.8643 (0.7); 0.7500 (0.9); 0.7381 (1.2); 0.7333 (3.1); 0.7298 (2.6); 0.7174 (1.3); 0.7127 (3.7); 0.7063 (1.3); 0.6937 (0.8); 0.0079 (0.8); -0.0002 (27.6); -0.0085 (0.8)
I.7-2: ^{1}H-NMR (400.6 MHz, CDCl$_3$): δ= 7.3691 (2.0); 7.3469 (2.1); 7.2602 (34.6); 7.1335 (0.6); 7.1196 (0.7); 7.1177 (0.7); 7.1152 (0.8); 7.1133 (0.8); 7.0994 (0.7); 7.0949 (0.9); 7.0642 (0.8); 7.0598 (0.9); 7.0442 (1.6); 7.0398 (1.3); 7.0045 (1.0); 7.0008 (1.1); 6.9861 (0.9); 6.9845 (0.7); 6.9825 (0.9); 6.9809 (0.8); 6.9201 (1.2); 6.9165 (1.1); 6.8997 (1.0); 6.8962 (0.9); 6.7818 (1.9); 6.7653 (1.9); 6.2740 (3.1); 4.6411 (2.2); 4.6379 (2.6); 4.6360 (2.6); 4.6325 (2.2); 3.4999 (3.2); 3.4969 (4.6); 3.4938 (3.3); 1.5395 (16.0); 1.2988 (3.8); 1.2964 (3.8); 1.2829 (3.8); 1.2805 (3.8); 0.4711 (0.5); 0.3514 (0.6); 0.3393 (0.6); 0.2195 (0.5); 0.0080 (1.4); -0.0002 (52.3); -0.0085 (1.5)
I.7-8: ^{1}H-NMR (400.6 MHz, CDCl$_3$): δ= 7.3766 (3.0); 7.3544 (3.0); 7.2602 (36.7); 7.1521 (0.8); 7.1477 (0.9); 7.1331 (1.2); 7.1286 (1.4); 7.1135 (1.2); 7.1091 (1.4); 7.0862 (0.8); 7.0817 (1.6); 7.0771 (0.9); 7.0662 (1.8); 7.0616 (3.1); 7.0571 (1.4); 7.0286 (2.0); 7.0250 (2.2); 7.0103 (1.8); 7.0085 (1.4); 7.0067 (1.8); 7.0050 (1.4); 6.9903 (0.9); 6.9867 (0.9); 6.9370 (1.3); 6.9333 (2.4); 6.9297 (1.2); 6.9167 (1.1); 6.9130 (2.0); 6.9094 (1.0); 6.7440 (2.1); 6.7393 (2.0); 6.7276 (2.1); 6.7228 (2.0); 6.2768 (4.3); 4.6823 (12.2); 4.2537 (0.5); 4.2508 (0.6); 4.2478 (0.5); 4.2371 (0.7); 4.1546 (0.8); 4.1308 (1.1); 4.1130 (0.5); 3.4976 (8.5); 2.0452 (2.5); 1.9823 (0.6); 1.9634 (0.7); 1.9540 (0.8); 1.9503 (0.7); 1.9352 (0.8); 1.9315 (0.7); 1.9221 (0.7); 1.9032 (0.7); 1.5427 (16.0); 1.5344 (0.7); 1.5260 (0.6); 1.5171 (0.9); 1.5054 (0.8); 1.4972 (0.9); 1.4855 (0.9); 1.2773 (1.1); 1.2646 (1.4); 1.2595 (2.2); 1.2553 (0.8); 1.2417 (0.9); 1.2331 (0.5); 1.2234 (0.5); 1.2138 (0.7); 1.2043 (0.5); 1.1903 (0.5); 1.1809 (0.7); 0.8990 (0.8); 0.8820 (2.8); 0.8644 (1.0); 0.0079 (1.5); -0.0002 (54.2); -0.0060 (0.6); -0.0085 (1.6)
I.7-7: ^{1}H-NMR (400.6 MHz, CDCl$_3$): δ= 7.3833 (4.3); 7.3611 (4.3); 7.2605 (21.3); 7.1637 (1.0); 7.1590 (1.2); 7.1456 (1.4); 7.1435 (1.5); 7.1408 (1.8); 7.1388 (1.7); 7.1254 (1.6); 7.1206 (1.9); 7.0815 (1.4); 7.0769 (1.7); 7.0615 (3.7); 7.0568 (3.0); 7.0374 (2.1); 7.0338 (2.4); 7.0193 (1.8); 7.0158 (1.9); 7.0139 (1.4); 6.9993 (0.8); 6.9957 (0.9); 6.9711 (2.6); 6.9676 (2.4); 6.9508 (2.2); 6.9473 (2.0); 6.7563 (4.1); 6.7399 (4.2); 6.2763 (7.2); 4.7393 (16.0); 4.1568 (0.9); 4.1273 (6.5); 4.1189 (6.8); 4.0894 (0.9); 3.4991 (9.6); 3.4962 (9.9); 2.1713 (4.0); 1.5483 (5.4); 1.3374 (1.9); 1.3241 (4.0); 1.3192 (4.6); 1.3159 (2.3); 1.3067 (2.5); 1.2672 (1.1); 1.0595 (2.6); 1.0511 (2.2); 1.0470 (4.8); 1.0432 (3.1); 1.0412 (3.1); 1.0289 (2.1); 0.8989 (0.5); 0.8820 (1.9); 0.8643 (0.7); 0.0080 (0.8); -0.0002 (30.3); -0.0085 (0.9)
I.7-9: ^{1}H-NMR (400.6 MHz, CDCl$_3$): δ= 7.3691 (1.8); 7.3469 (1.8); 7.2603 (8.2); 7.1332 (0.5); 7.1193 (0.6); 7.1174 (0.6); 7.1149 (0.7); 7.1130 (0.7); 7.0991 (0.7); 7.0946 (0.8); 7.0658 (0.7); 7.0614 (0.8); 7.0457 (1.4); 7.0414 (1.2); 7.0073 (0.8); 7.0037 (1.0); 6.9890 (0.8); 6.9874 (0.6); 6.9854 (0.8); 6.9838 (0.7); 6.9271 (1.0); 6.9236 (0.9); 6.9068 (0.8); 6.9033 (0.8); 6.7869 (1.6); 6.7704 (1.7);

6.2781 (2.9); 5.2991 (1.8); 4.6670 (6.0); 3.9880 (0.5); 3.4999 (4.0); 3.4969 (4.2); 1.5491 (2.6); 1.0410 (16.0); 0.5404 (0.7); 0.5287 (0.8); 0.5188 (0.6); 0.5071 (0.7); 0.1877 (0.5); 0.1754 (1.0); -0.0002 (12.3)
I.7-13: ^{1}H-NMR (400.6 MHz, CDCl$_3$): δ= 7.3678 (7.1); 7.3456 (7.2); 7.2603 (31.2); 7.1359 (1.6); 7.1315 (1.9); 7.1175 (2.5); 7.1156 (2.5); 7.1131 (2.9); 7.1113 (2.6); 7.0973 (2.6); 7.0929 (2.9); 7.0627 (2.7); 7.0584 (3.0); 7.0427 (5.5); 7.0384 (4.4); 7.0005 (3.4); 6.9969 (3.8); 6.9821 (3.1); 6.9804 (2.6); 6.9785 (3.3); 6.9769 (2.6); 6.9621 (1.6); 6.9585 (1.6); 6.9000 (3.5); 6.8967 (3.3); 6.8797 (3.0); 6.8764 (2.8); 6.7843 (4.0); 6.7828 (4.1); 6.7679 (4.1); 6.7663 (4.1); 6.2759 (11.6); 5.2990 (6.0); 4.8610 (0.6); 4.8453 (2.0); 4.8296 (2.1); 4.8259 (2.2); 4.8102 (2.0); 4.7946 (0.6); 4.6692 (0.6); 4.6284 (7.8); 4.6248 (14.1); 4.5815 (0.6); 3.4996 (15.7); 3.4968 (16.0); 1.9978 (0.8); 1.9785 (1.6); 1.9564 (1.6); 1.9369 (1.0); 1.6885 (1.1); 1.6772 (1.6); 1.6656 (1.6); 1.6577 (1.8); 1.6469 (2.0); 1.6380 (1.3); 1.6275 (1.2); 1.6199 (1.0); 1.6025 (0.9); 1.5927 (1.3); 1.5834 (1.9); 1.5712 (2.0); 1.5636 (2.3); 1.5591 (2.2); 1.5498 (1.9); 1.5464 (1.9); 1.5434 (2.0); 1.5297 (2.3); 1.5190 (1.6); 1.5131 (2.2); 1.5000 (1.8); 1.4948 (1.3); 1.4903 (1.1); 1.4855 (1.5); 1.4666 (0.7); 1.2553 (1.1); 1.2330 (0.8); 1.2247 (0.8); 1.2085 (14.2); 1.2062 (14.1); 1.1929 (14.3); 1.1906 (13.7); 1.1806 (1.4); 1.1753 (1.0); 1.1707 (1.0); 1.1588 (0.9); 1.1546 (0.9); 1.1398 (0.9); 1.1210 (0.7); 0.0079 (1.3); -0.0002 (46.1); -0.0085 (1.3)
I.7-15: ^{1}H-NMR (400.6 MHz, CDCl$_3$): δ= 7.3693 (7.1); 7.3471 (7.2); 7.2602 (76.1); 7.1344 (1.6); 7.1300 (1.8); 7.1159 (2.4); 7.1142 (2.5); 7.1116 (2.8); 7.1098 (2.6); 7.0958 (2.4); 7.0914 (2.8); 7.0596 (2.6); 7.0552 (2.9); 7.0396 (5.4); 7.0352 (4.3); 6.9991 (3.4); 6.9955 (3.8); 6.9807 (3.2); 6.9791 (2.7); 6.9772 (3.3); 6.9756 (2.6); 6.9608 (1.6); 6.9572 (1.6); 6.9062 (4.1); 6.9027 (3.9); 6.8859 (3.5); 6.8823 (3.2); 6.7823 (5.9); 6.7658 (5.9); 6.2791 (7.2); 6.2771 (7.0); 4.8110 (0.6); 4.7952 (2.6); 4.7794 (4.0); 4.7636 (2.6); 4.7477 (0.7); 4.6779 (0.6); 4.6371 (8.0); 4.6338 (14.7); 4.6315 (8.9); 4.5905 (0.6); 3.4988 (15.4); 1.7304 (1.3); 1.6844 (2.9); 1.6522 (2.4); 1.6243 (2.2); 1.5929 (1.2); 1.5434 (16.0); 1.4402 (0.7); 1.4320 (0.9); 1.4269 (1.0); 1.4187 (1.0); 1.4112 (1.0); 1.3973 (0.6); 1.3891 (0.6); 1.2552 (4.0); 1.2117 (1.2); 1.1807 (1.8); 1.1656 (13.8); 1.1631 (13.8); 1.1496 (14.9); 1.1471 (14.5); 1.1301 (1.9); 1.1044 (1.3); 1.0738 (0.9); 0.9951 (0.5); 0.9868 (0.8); 0.9641 (1.3); 0.9558 (1.7); 0.9430 (0.7); 0.9337 (1.3); 0.9249 (2.0); 0.8946 (1.6); 0.8820 (2.7); 0.8640 (1.1); 0.0079 (3.2); -0.0002 (113.0); -0.0085 (3.2)
I.7-14: ^{1}H-NMR (400.6 MHz, CDCl$_3$): δ= 7.3696 (4.8); 7.3474 (4.8); 7.2602 (67.2); 7.1390 (1.2); 7.1345 (1.4); 7.1206 (1.7); 7.1187 (1.7); 7.1162 (2.0); 7.1143 (2.0); 7.1004 (1.9); 7.0959 (2.2); 7.0660 (1.9); 7.0616 (2.2); 7.0459 (4.1); 7.0416 (3.2); 7.0068 (2.3); 7.0032 (2.6); 6.9885 (2.1); 6.9868 (1.7); 6.9849 (2.2); 6.9832 (1.7); 6.9685 (1.1); 6.9648 (1.2); 6.9212 (2.8); 6.9176 (2.7); 6.9009 (2.4); 6.8973 (2.2); 6.7735 (4.6); 6.7571 (4.7); 6.2810 (7.9); 4.6575 (16.0); 3.9451 (5.0); 3.9298 (4.9); 3.5013 (10.6); 3.4983 (11.0); 1.7151 (1.3); 1.6769 (3.2); 1.6516 (1.2); 1.6346 (2.6); 1.6117 (0.7); 1.6037 (0.7); 1.5951 (0.6); 1.5410 (15.4); 1.2557 (0.9); 1.2289 (1.2); 1.2048 (1.2); 1.1976 (1.6); 1.1716 (1.6); 1.1455 (0.8); 1.1135 (0.6); 0.9464 (0.8); 0.9174 (1.5); 0.8870 (1.2); 0.0079 (2.7); -0.0002 (101.6); -0.0085 (2.8)
I.7-10: ^{1}H-NMR (400.6 MHz, CDCl$_3$): δ= 7.3711 (4.7); 7.3489 (4.7); 7.2602 (28.5); 7.1385 (1.1); 7.1340 (1.3); 7.1201 (1.7); 7.1182 (1.6); 7.1156 (2.0); 7.1137 (1.8); 7.0999 (1.7); 7.0954 (2.0); 7.0658 (1.8); 7.0614 (2.0); 7.0457 (3.9); 7.0413 (3.1); 7.0071 (2.2); 7.0034 (2.4); 6.9887 (2.0); 6.9870 (1.7); 6.9851 (2.1); 6.9836 (1.6); 6.9687 (1.0); 6.9651 (1.0); 6.9180 (2.8); 6.9144 (2.6); 6.8976 (2.4); 6.8941 (2.1); 6.7757 (4.5); 6.7593 (4.5); 6.2824 (7.7); 4.6595 (16.0); 4.1142 (7.5); 4.0972 (7.8); 3.5024 (10.5); 3.4995 (10.7); 2.6050 (1.0); 2.5869 (1.3); 2.5681 (1.1); 2.0449 (0.6); 2.0368 (0.6); 2.0323 (1.1); 2.0229 (1.2); 2.0164 (1.1); 2.0111 (1.2); 2.0081 (1.1); 2.0049 (1.1); 2.0019 (1.2); 1.9972 (1.2); 1.9894 (1.1); 1.9848 (0.8); 1.9777 (0.7); 1.9724 (0.6); 1.9123 (0.8); 1.9052 (0.8); 1.8849 (2.0); 1.8706 (0.7); 1.8624 (1.2); 1.8500 (1.0); 1.8435

(0.7); 1.8397 (0.8); 1.8272 (0.8); 1.7508 (0.6); 1.7476 (0.7); 1.7298 (1.8); 1.7254 (1.2); 1.7105 (1.6); 1.7052 (1.7); 1.6826 (1.2); 1.5457 (14.2); 1.2595 (0.6); 0.8820 (1.0); 0.0080 (1.1); -0.0002 (41.5); -0.0085 (1.2)
I.7-16: ^{1}H-NMR (400.6 MHz, $CDCl_3$): δ= 7.3695 (4.9); 7.3473 (4.9); 7.2602 (44.5); 7.1378 (1.1); 7.1334 (1.3); 7.1177 (1.9); 7.1150 (2.1); 7.0992 (1.7); 7.0948 (2.0); 7.0657 (1.9); 7.0613 (2.1); 7.0457 (4.0); 7.0413 (3.2); 7.0059 (2.2); 7.0023 (2.4); 6.9875 (2.1); 6.9840 (2.3); 6.9675 (1.1); 6.9639 (1.0); 6.9161 (3.0); 6.9126 (2.7); 6.8958 (2.6); 6.8923 (2.2); 6.7779 (4.5); 6.7614 (4.5); 6.2806 (8.4); 4.6615 (16.0); 4.6457 (0.5); 3.9320 (6.1); 3.9151 (6.3); 3.5011 (12.2); 3.4984 (12.3); 1.8116 (0.5); 1.8038 (0.7); 1.7956 (0.7); 1.7870 (1.0); 1.7785 (0.8); 1.7705 (0.7); 1.7625 (0.7); 1.6891 (0.6); 1.6805 (0.9); 1.6709 (1.4); 1.6544 (2.1); 1.6361 (3.7); 1.6165 (1.6); 1.6116 (1.6); 1.6041 (1.3); 1.5945 (1.4); 1.5852 (1.2); 1.5758 (1.3); 1.5690 (1.3); 1.5444 (6.8); 1.5047 (1.1); 1.4967 (1.2); 1.4820 (1.7); 1.4753 (1.4); 1.4566 (1.3); 1.4507 (1.3); 1.4278 (1.3); 1.4080 (1.8); 1.3844 (1.4); 1.3782 (1.1); 1.3607 (0.6); 1.3547 (0.6); 1.2649 (1.0); 1.1826 (1.0); 1.1772 (1.2); 1.1672 (0.6); 1.1526 (2.3); 1.1437 (1.4); 1.1263 (2.3); 1.1019 (0.9); 0.8985 (0.6); 0.8820 (1.7); 0.8643 (0.7); 0.0080 (2.0); -0.0002 (64.7); -0.0085 (2.2)
I.7-19: ^{1}H-NMR (400.6 MHz, $CDCl_3$): δ= 7.3702 (4.8); 7.3480 (4.9); 7.2602 (42.4); 7.1424 (1.1); 7.1379 (1.3); 7.1240 (1.6); 7.1222 (1.7); 7.1195 (2.0); 7.1178 (1.9); 7.1038 (1.7); 7.0993 (2.1); 7.0700 (1.9); 7.0656 (2.1); 7.0499 (3.9); 7.0455 (3.1); 7.0097 (2.2); 7.0060 (2.5); 6.9913 (2.0); 6.9877 (2.1); 6.9862 (1.8); 6.9713 (1.0); 6.9677 (1.1); 6.9407 (2.8); 6.9371 (2.6); 6.9204 (2.4); 6.9168 (2.2); 6.7913 (4.5); 6.7749 (4.6); 6.2751 (8.0); 4.6849 (16.0); 4.0881 (1.0); 4.0823 (1.0); 4.0705 (1.0); 4.0647 (1.0); 4.0596 (1.4); 4.0538 (1.4); 4.0420 (1.3); 4.0362 (1.3); 3.8918 (1.2); 3.8868 (1.2); 3.8716 (1.2); 3.8663 (1.3); 3.8635 (1.1); 3.8583 (1.0); 3.8430 (0.9); 3.8379 (0.9); 3.4987 (10.7); 3.4958 (11.1); 2.1040 (2.0); 2.0932 (1.2); 2.0844 (2.2); 2.0795 (2.2); 2.0755 (2.1); 2.0647 (1.5); 2.0610 (1.8); 2.0527 (1.6); 2.0449 (1.3); 2.0349 (1.3); 2.0250 (1.2); 1.9996 (0.9); 1.9903 (1.1); 1.9834 (1.3); 1.9776 (0.8); 1.9739 (1.2); 1.9698 (1.3); 1.9630 (1.8); 1.9508 (1.1); 1.5425 (15.8); 1.2554 (0.8); 1.0168 (0.9); 1.0033 (1.0); 0.9988 (0.9); 0.9852 (0.9); 0.9781 (0.5); 0.6757 (1.9); 0.6627 (2.0); 0.6539 (1.8); 0.6410 (1.8); 0.3105 (1.1); 0.3072 (1.1); 0.2974 (2.1); 0.2941 (2.1); 0.2844 (1.0); 0.2809 (1.0); 0.0079 (1.7); -0.0002 (65.8); -0.0085 (1.9)
I.7-18: ^{1}H-NMR (400.6 MHz, $CDCl_3$): δ= 7.3707 (4.7); 7.3486 (4.7); 7.2604 (26.4); 7.1382 (1.1); 7.1337 (1.4); 7.1198 (1.7); 7.1179 (1.7); 7.1154 (2.0); 7.1134 (1.9); 7.0996 (1.8); 7.0951 (2.2); 7.0683 (1.7); 7.0638 (1.9); 7.0482 (3.6); 7.0438 (2.8); 7.0098 (2.3); 7.0061 (2.5); 6.9914 (2.0); 6.9897 (1.7); 6.9878 (2.1); 6.9861 (1.7); 6.9714 (1.1); 6.9678 (1.1); 6.9125 (2.7); 6.9089 (2.6); 6.8922 (2.3); 6.8886 (2.1); 6.7816 (4.2); 6.7651 (4.2); 6.2767 (7.8); 4.6530 (16.0); 4.1588 (0.8); 4.1550 (0.8); 4.1405 (0.8); 4.1367 (0.8); 4.1308 (1.7); 4.1270 (1.5); 4.1126 (1.7); 4.1087 (1.5); 4.0672 (1.3); 4.0624 (1.4); 4.0491 (1.4); 4.0443 (1.4); 4.0393 (0.8); 4.0344 (0.8); 4.0211 (0.7); 4.0163 (0.8); 3.4991 (10.4); 3.4962 (10.7); 2.0451 (1.2); 1.5497 (3.8); 1.4698 (1.0); 1.4594 (1.0); 1.4514 (1.1); 1.4408 (1.0); 1.4324 (0.5); 1.2849 (0.6); 1.2772 (0.8); 1.2642 (1.5); 1.2595 (1.7); 1.2416 (0.5); 1.0441 (1.8); 1.0331 (1.8); 1.0249 (1.6); 1.0137 (1.7); 0.8989 (0.9); 0.8820 (3.1); 0.8643 (1.1); 0.7930 (0.8); 0.7851 (0.6); 0.7796 (0.6); 0.7729 (1.0); 0.7677 (1.1); 0.7538 (2.2); 0.7496 (1.8); 0.7426 (3.1); 0.7385 (6.8); 0.7274 (1.2); 0.7187 (0.7); 0.6985 (2.4); 0.6919 (1.7); 0.6872 (2.3); 0.6814 (2.5); 0.6760 (1.4); 0.6706 (1.0); 0.0080 (1.1); -0.0002 (40.5); -0.0085 (1.1)
I.7-4: ^{1}H-NMR (400.6 MHz, $CDCl_3$): δ= 7.3909 (3.7); 7.3866 (3.8); 7.3688 (3.8); 7.3645 (3.8); 7.2604 (31.9); 7.1661 (1.0); 7.1638 (1.0); 7.1612 (1.2); 7.1587 (1.2); 7.1482 (1.5); 7.1461 (2.4); 7.1435 (2.7); 7.1410 (2.9); 7.1386 (1.6); 7.1280 (1.7); 7.1260 (1.7); 7.1231 (2.1); 7.1209 (1.9); 7.0910 (1.1); 7.0865 (1.9); 7.0823 (1.4); 7.0709 (3.5); 7.0668 (4.9); 7.0623 (2.7); 7.0525 (4.1); 7.0490 (4.5);

7.0348 (3.1); 7.0312 (3.2); 7.0289 (1.9); 7.0147 (1.3); 7.0111 (1.3); 6.9592 (2.1); 6.9548 (3.1); 6.9506 (2.2); 6.9390 (1.9); 6.9345 (2.6); 6.9303 (1.8); 6.7334 (3.5); 6.7169 (3.8); 6.7141 (3.7); 6.6977 (3.4); 6.2915 (5.9); 6.2740 (6.1); 5.2992 (1.0); 5.0911 (3.6); 5.0776 (3.8); 5.0709 (3.7); 5.0575 (3.7); 4.7496 (15.0); 4.7425 (8.0); 4.7393 (7.7); 3.5024 (16.0); 3.5000 (11.9); 1.5492 (4.4); 1.4306 (0.6); 1.4223 (0.8); 1.4105 (1.6); 1.4006 (1.8); 1.3902 (1.8); 1.3803 (1.9); 1.3684 (1.0); 1.3601 (0.8); 1.2552 (0.5); 0.7927 (0.7); 0.7842 (2.1); 0.7809 (1.4); 0.7778 (1.6); 0.7717 (0.5); 0.7655 (1.5); 0.7636 (1.8); 0.7607 (1.1); 0.7574 (1.8); 0.7506 (2.6); 0.7458 (1.6); 0.7406 (1.2); 0.7371 (0.9); 0.7306 (2.8); 0.7276 (1.5); 0.7260 (1.6); 0.7236 (1.8); 0.7207 (1.7); 0.7169 (0.6); 0.7113 (0.7); 0.7034 (0.5); 0.7004 (0.7); 0.6023 (0.6); 0.5938 (1.0); 0.5869 (3.1); 0.5818 (2.7); 0.5749 (5.6); 0.5705 (2.9); 0.5629 (3.4); 0.5509 (0.7); 0.0080 (1.3); -0.0002 (45.6); -0.0085 (1.2)
I.7-21: ^{1}H-NMR (400.6 MHz, $CDCl_3$): δ= 7.3780 (4.8); 7.3558 (4.8); 7.2603 (40.6); 7.1478 (1.1); 7.1433 (1.3); 7.1293 (1.9); 7.1249 (2.2); 7.1093 (1.8); 7.1049 (2.1); 7.0815 (1.2); 7.0774 (2.0); 7.0734 (1.3); 7.0614 (2.7); 7.0575 (3.9); 7.0535 (2.0); 7.0252 (2.6); 7.0216 (2.7); 7.0069 (2.3); 7.0035 (2.4); 6.9870 (1.1); 6.9834 (1.1); 6.9084 (2.8); 6.8883 (2.4); 6.7488 (2.9); 6.7437 (2.9); 6.7324 (2.9); 6.7273 (2.9); 6.2790 (5.1); 6.2738 (5.0); 4.6632 (16.0); 4.2495 (3.3); 4.2455 (2.4); 4.2308 (3.3); 4.2270 (2.2); 3.4994 (13.4); 3.4966 (13.2); 2.1874 (1.2); 2.1682 (1.2); 1.5558 (1.1); 1.2553 (1.0); 1.1863 (1.0); 1.1704 (1.3); 1.1590 (1.4); 1.0649 (2.0); 1.0537 (3.4); 1.0391 (4.4); 1.0279 (1.9); 1.0128 (0.6); 0.0079 (1.8); -0.0002 (52.6); -0.0085 (1.4)
I.7-25: ^{1}H-NMR (400.6 MHz, $CDCl_3$): δ= 7.3775 (1.5); 7.3553 (1.5); 7.2603 (42.3); 7.1232 (0.6); 7.1211 (0.6); 7.1185 (0.6); 7.1164 (0.6); 7.1030 (0.6); 7.0982 (0.6); 7.0586 (0.6); 7.0432 (1.3); 7.0386 (1.0); 7.0193 (0.8); 7.0157 (0.9); 7.0013 (0.6); 6.9975 (0.8); 6.9262 (0.9); 6.9228 (0.8); 6.9059 (0.8); 6.9025 (0.7); 6.7501 (1.4); 6.7337 (1.4); 6.2811 (2.5); 4.6528 (5.2); 4.0989 (2.3); 4.0826 (2.4); 3.5030 (3.5); 3.5002 (3.6); 2.5658 (0.8); 2.5415 (0.6); 2.4649 (0.8); 2.1741 (0.6); 2.1536 (0.6); 2.1476 (0.7); 2.1418 (0.8); 2.1211 (0.7); 1.9001 (0.8); 1.8805 (0.7); 1.8745 (0.7); 1.8679 (0.6); 1.8482 (0.6); 1.5410 (16.0); 0.0079 (1.6); -0.0002 (54.9); -0.0085 (1.5)
I.7-23: ^{1}H-NMR (400.6 MHz, $CDCl_3$): δ= 7.3763 (4.4); 7.3541 (4.4); 7.2604 (57.0); 7.1539 (1.1); 7.1494 (1.3); 7.1355 (1.7); 7.1337 (1.7); 7.1311 (2.0); 7.1293 (1.8); 7.1154 (1.7); 7.1109 (2.0); 7.0847 (1.1); 7.0807 (1.6); 7.0770 (1.2); 7.0646 (2.3); 7.0610 (3.1); 7.0570 (1.8); 7.0260 (2.3); 7.0224 (2.5); 7.0077 (2.1); 7.0041 (2.2); 6.9877 (1.0); 6.9841 (1.0); 6.9319 (2.4); 6.9116 (2.1); 6.7584 (2.5); 6.7544 (2.5); 6.7420 (2.6); 6.7380 (2.5); 6.2740 (5.7); 4.6930 (16.0); 4.1236 (1.5); 4.1197 (1.6); 4.1040 (2.2); 4.0886 (0.8); 3.4971 (10.8); 2.2571 (0.7); 2.2418 (0.9); 2.1180 (2.7); 2.1120 (2.0); 2.1037 (3.5); 2.0870 (1.5); 2.0803 (1.7); 2.0668 (1.2); 2.0415 (0.9); 2.0312 (0.8); 2.0252 (0.9); 2.0055 (0.7); 1.9979 (0.5); 1.6556 (0.8); 1.6356 (1.6); 1.6217 (0.9); 1.6158 (0.8); 1.6019 (1.6); 1.5824 (0.9); 1.5443 (15.8); 0.0079 (2.4); -0.0002 (74.2); -0.0085 (2.1)
I.7-24: ^{1}H-NMR (400.6 MHz, $CDCl_3$): δ= 7.3702 (4.7); 7.3480 (4.7); 7.2602 (23.7); 7.1397 (1.0); 7.1352 (1.2); 7.1197 (1.7); 7.1169 (1.9); 7.1154 (1.8); 7.1012 (1.6); 7.0967 (1.8); 7.0662 (1.7); 7.0618 (1.9); 7.0462 (3.8); 7.0418 (3.0); 7.0093 (2.0); 7.0057 (2.2); 6.9902 (1.9); 6.9876 (2.0); 6.9709 (0.9); 6.9674 (0.9); 6.9107 (2.8); 6.9072 (2.6); 6.8904 (2.4); 6.8869 (2.1); 6.7746 (4.5); 6.7581 (4.5); 6.2797 (8.0); 4.6444 (16.0); 4.0685 (7.4); 4.0512 (7.7); 3.5005 (11.0); 3.4978 (11.3); 2.4247 (1.1); 2.4059 (1.7); 2.3864 (1.3); 2.3684 (0.6); 2.0575 (2.2); 2.0514 (1.3); 2.0373 (2.3); 2.0316 (2.3); 2.0263 (2.8); 2.0123 (1.3); 2.0059 (2.4); 1.9916 (1.8); 1.9736 (3.9); 1.9569 (2.2); 1.8889 (1.2); 1.8730 (3.2); 1.8668 (1.4); 1.8545 (2.6); 1.8117 (1.1); 1.8079 (1.1); 1.7965 (1.7); 1.7907 (3.1); 1.7837 (0.5); 1.7794 (0.9); 1.7735 (3.8); 1.7598 (1.2); 1.7562 (1.0); 1.7525 (1.5); 1.6935 (2.4); 1.6873 (1.2); 1.6743 (2.4); 1.6685 (2.2); 1.6622 (2.1); 1.6488 (1.1); 1.6432 (2.0); 1.5472 (12.2); 0.0079 (0.9); -0.0002 (30.1); -0.0085 (0.9)

I.7-22: ^{1}H-NMR (400.6 MHz, $CDCl_3$):
δ= 7.3713 (5.0); 7.3491 (5.0); 7.2604 (44.1); 7.1365 (1.2); 7.1320 (1.4); 7.1181 (1.9); 7.1162 (1.8); 7.1137 (2.1); 7.1118 (1.9); 7.0979 (1.8); 7.0935 (2.1); 7.0689 (2.0); 7.0644 (2.2); 7.0488 (4.2); 7.0444 (3.2); 7.0101 (2.4); 7.0064 (2.5); 6.9917 (2.2); 6.9901 (1.9); 6.9882 (2.2); 6.9866 (1.8); 6.9717 (1.1); 6.9681 (1.0); 6.8825 (2.8); 6.8789 (2.6); 6.8621 (2.5); 6.8585 (2.2); 6.7816 (4.6); 6.7652 (4.6); 6.2767 (8.2); 5.2997 (0.7); 4.6357 (15.8); 4.6256 (0.8); 4.1868 (8.3); 4.1689 (8.4); 3.4997 (11.9); 3.4968 (11.7); 1.7416 (1.1); 1.7238 (2.3); 1.7062 (1.1); 1.5461 (16.0); 1.2558 (0.6); 0.8558 (0.9); 0.8519 (0.9); 0.8462 (1.1); 0.8429 (1.7); 0.8394 (1.2); 0.8338 (2.5); 0.8299 (2.2); 0.8241 (2.2); 0.8206 (3.5); 0.8171 (2.2); 0.8119 (2.3); 0.8088 (2.2); 0.7979 (1.8); 0.7948 (1.8); 0.7865 (2.8); 0.7771 (1.9); 0.7730 (1.9); 0.7642 (1.3); 0.7550 (1.0); 0.7510 (0.9); 0.6662 (1.7); 0.6559 (1.9); 0.6437 (3.1); 0.6338 (2.8); 0.6233 (1.9); 0.5419 (1.8); 0.5324 (2.8); 0.5224 (2.8); 0.5107 (2.0); 0.4998 (1.1); 0.0080 (2.0); -0.0002 (59.7); -0.0085 (1.6)

The present invention further provides for the use of one or more inventive compounds of the general formula (I) and/or salts thereof, as defined above, preferably in one of the embodiments identified as preferred or particularly preferred, in particular one or more compounds of the formulae (I.1) to (I.33) and/or salts thereof, in each case as defined above, as herbicide and/or plant growth regulator, preferably in crops of useful plants and/or ornamentals.

The present invention further provides a method of controlling harmful plants and/or for regulating the growth of plants, characterised in that an effective amount of

- of one or more inventive compounds of the general formula (I) and/or salts thereof, as defined above, preferably in one of the embodiments identified as preferred or particularly preferred, in particular one or more compounds of the formulae (I.1) to (I.33) and/or salts thereof, in each case as defined above, or

- a composition of the invention, as defined below,

is applied to the (harmful) plants, seeds of (harmful) plants, the soil in which or on which the (harmful) plants grow or the area under cultivation.

The present invention also provides a method for controlling unwanted plants, preferably in crops of useful plants, characterised in that an effective amount of

- of one or more compounds of the general formula (I) and/or salts thereof, as defined above, preferably in one of the embodiments identified as preferred or particularly preferred, in particular one or more compounds of the formulae (I.1) to (I.33) and/or salts thereof, in each case as defined above, or

- a composition of the invention, as defined below,

is applied to unwanted plants (for example harmful plants such as mono- or dicotyledonous weeds or unwanted crop plants), the seed of the unwanted plants (i.e. plant seeds, for example grains, seeds or vegetative propagation organs such as tubers or shoot parts with buds), the soil in which or on which the unwanted plants grow (for example the soil of crop-growing land or non-crop-growing land) or the area under cultivation (i.e. the area on which the unwanted plants will grow).

The present invention also further provides methods for controlling for regulating the growth of plants, preferably of useful plants, characterized in that an effective amount of

- one or more compounds of the general formula (I) and/or salts thereof, as defined above, preferably in one of the embodiments identified as preferred or particularly preferred, in particular one or more compounds of the formulae (I.1) to (I.33) and/or salts thereof, in each case as defined above, or

- a composition of the invention, as defined below,

is applied to the plant, the seed of the plant (i.e. plant seed, for example grains, seeds or vegetative propagation organs such as tubers or shoot parts with buds), the soil in which or on which the plants grow (for example the soil of crop land or non-crop land) or the area under cultivation (i.e. the area on which the plants will grow).

In this context, the inventive compounds of the general formula (I) or the compositions of the invention can be deployed, for example, by pre-sowing (if appropriate also by incorporation into the soil), pre-emergence and/or post-emergence methods. Specific examples of some representatives of the monocotyledonous and dicotyledonous weed flora which can be controlled by the inventive compounds are as follows, though there is no intention to restrict the enumeration to particular species.

In a method of the invention for controlling harmful plants or for regulating the growth of plants, preference is given to using one or more compounds of the general formula (I) and/or salts thereof for control of harmful plants or for regulation of growth in crops of useful plants or ornamental plants, where the useful plants or ornamental plants in a preferred configuration are transgenic plants.

The inventive compounds of the general formula (I) and/or salts thereof are suitable for controlling the following genera of monocotyledonous and dicotyledonous harmful plants:
Monocotyledonous harmful plants of the genera: Aegilops, Agropyron, Agrostis, Alopecurus, Apera, Avena, Brachiaria, Bromus, Cenchrus, Commelina, Cynodon, Cyperus, Dactyloctenium, Digitaria, Echinochloa, Eleocharis, Eleusine, Eragrostis, Eriochloa, Festuca, Fimbristylis, Heteranthera, Imperata, Ischaemum, Leptochloa, Lolium, Monochoria, Panicum, Paspalum, Phalaris, Phleum, Poa, Rottboellia, Sagittaria, Scirpus, Setaria, Sorghum.
Dicotyledonous harmful plants of the genera: Abutilon, Amaranthus, Ambrosia, Anoda, Anthemis, Aphanes, Artemisia, Atriplex, Bellis, Bidens, Capsella, Carduus, Cassia, Centaurea, Chenopodium, Cirsium, Convolvulus, Datura, Desmodium, Emex, Erysimum, Euphorbia, Galeopsis, Galinsoga, Galium, Hibiscus, Ipomoea, Kochia, Lamium, Lepidium, Lindernia, Matricaria, Mentha, Mercurialis, Mullugo, Myosotis, Papaver, Pharbitis, Plantago, Polygonum, Portulaca, Ranunculus, Raphanus, Rorippa, Rotala, Rumex, Salsola, Senecio, Sesbania, Sida, Sinapis, Solanum, Sonchus, Sphenoclea, Stellaria, Taraxacum, Thlaspi, Trifolium, Urtica, Veronica, Viola, Xanthium.

When the inventive compounds of the general formula (I) are applied to the soil surface before germination of the harmful plants (weed grasses and/or broad-leaved weeds) (pre-emergence method), either the seedlings of the weed grasses or broad-leaved weeds are prevented completely from emerging or they grow until they have reached the cotyledon stage, but then stop growing and eventually, after three to four weeks have elapsed, die completely.

When the inventive compounds of the general formula (I) are applied post-emergence to the green parts of the plants, growth stops after the treatment, and the harmful plants remain at the growth stage at the time of application, or they die completely after a certain time, so that in this manner competition by the weeds, which is harmful to the crop plants, is eliminated very early and in a sustained manner.

Although the inventive compounds of the general formula (I) display outstanding herbicidal activity against monocotyledonous and dicotyledonous weeds, crop plants of economically important crops, for example dicotyledonous crops of the genera Arachis, Beta, Brassica, Cucumis, Cucurbita, Helianthus, Daucus, Glycine, Gossypium, Ipomoea, Lactuca, Linum, Lycopersicon, Miscanthus, Nicotiana, Phaseolus, Pisum, Solanum, Vicia, or monocotyledonous crops of the genera Allium, Ananas, Asparagus, Avena, Hordeum, Oryza, Panicum, Saccharum, Secale, Sorghum, Triticale, Triticum, Zea, are damaged only to an insignificant extent, or not at all, depending on the structure of the respective compound according to the invention and its application rate. For these reasons, the present compounds are very suitable for selective control of unwanted plant growth in plant crops such as agriculturally useful plants or ornamental plants.

In addition, the inventive compounds of the general formula (I) (depending on their particular structure and the application rate deployed) have outstanding growth-regulating properties in crop plants. They intervene in the plants' own metabolism with regulatory effect, and can thus be used for the controlled influencing of plant constituents and to facilitate harvesting, for example by triggering desiccation and stunted growth. Furthermore, they are also suitable for the general control and inhibition of unwanted vegetative growth without killing the plants in the process. Inhibition of vegetative growth plays a major role for many mono- and dicotyledonous crops since, for example, this can reduce or completely prevent lodging.

By virtue of their herbicidal and plant growth regulatory properties, the inventive compounds of the general formula (I) can also be used to control harmful plants in crops of genetically modified plants or plants modified by conventional mutagenesis. In general, the transgenic plants are characterized by particular advantageous properties, for example by resistances to certain pesticides, in particular certain herbicides, resistances to plant diseases or pathogens of plant diseases, such as certain insects or microorganisms such as fungi, bacteria or viruses. Other specific characteristics relate, for example, to the harvested material with regard to quantity, quality, storability, composition and specific constituents. For instance, there are known transgenic plants with an elevated starch content or altered starch quality, or those with a different fatty acid composition in the harvested material.

It is preferred with a view to transgenic crops to use the inventive compounds of the general formula (I) and/or salts thereof in economically important transgenic crops of useful plants and ornamentals, for example of cereals such as wheat, barley, rye, oats, millet, rice and maize or else crops of sugar beet, cotton, soybean, oilseed rape, potato, tomato, peas and other vegetables.

It is preferable to employ the inventive compounds of the general formula (I) also as herbicides in crops of useful plants which are resistant, or have been made resistant by recombinant means, to the phytotoxic effects of the herbicides.
By virtue of their herbicidal and plant growth regulatory properties, the inventive compounds of the general formula (I) can also be used to control harmful plants in crops of genetically modified plants which are known or are yet to be developed. In general, the transgenic plants are characterized by particular advantageous properties, for example by resistances to certain pesticides, in particular certain herbicides, resistances to plant diseases or pathogens of plant diseases, such as certain insects or microorganisms such as fungi, bacteria or viruses. Other specific characteristics relate, for example, to the harvested material with regard to quantity, quality, storability, composition and specific constituents. For instance, there are known transgenic plants with an elevated starch content or altered starch quality, or those with a different fatty acid composition in the harvested material. Further special properties may be tolerance or resistance to abiotic stressors, for example heat, cold, drought, salinity and ultraviolet radiation.

Preference is given to the use of the inventive compounds of the general formula (I) or salts thereof in economically important transgenic crops of useful plants and ornamentals, for example of cereals such as wheat, barley, rye, oats, triticale, millet, rice, cassava and corn, or else crops of sugar beet, cotton, soybean, oilseed rape, potatoes, tomatoes, peas and other vegetables.

It is preferable to employ the compounds of the general formula (I) as herbicides in crops of useful plants which are resistant, or have been made resistant by recombinant means, to the phytotoxic effects of the herbicides.

Conventional ways of producing novel plants which have modified properties in comparison to existing plants consist, for example, in traditional cultivation methods and the generation of mutants. Alternatively, novel plants with altered properties can be generated with the aid of recombinant methods.

A large number of molecular-biological techniques by means of which novel transgenic plants with modified properties can be generated are known to the person skilled in the art. For such genetic manipulations, nucleic acid molecules which allow mutagenesis or sequence alteration by recombination of DNA sequences can be introduced into plasmids. With the aid of standard methods, it is possible, for example, to undertake base exchanges, remove part sequences or add natural or synthetic sequences. To connect the DNA fragments to each other, adapters or linkers may be added to the fragments.

For example, the generation of plant cells with a reduced activity of a gene product can be achieved by expressing at least one corresponding antisense RNA, a sense RNA for achieving a cosuppression effect, or by expressing at least one suitably constructed ribozyme which specifically cleaves transcripts of the abovementioned gene product.

To this end, it is firstly possible to use DNA molecules which encompass the entire coding sequence of a gene product inclusive of any flanking sequences which may be present, and also DNA molecules which only encompass portions of the coding sequence, in which case it is necessary for these portions to be long enough to have an antisense effect in the cells. It is also possible to use DNA sequences which have a high degree of homology to the coding sequences of a gene product, but are not completely identical to them.

When expressing nucleic acid molecules in plants, the protein synthesized may be localized in any desired compartment of the plant cell. However, to achieve localisation in a particular compartment, it is possible, for example, to join the coding region to DNA sequences which ensure localisation in a particular compartment. Sequences of this kind are known to the person skilled in the art (see, for example, Braun et al., EMBO J. 11 (1992), 3219-3227). The nucleic acid molecules can also be expressed in the organelles of the plant cells.
The transgenic plant cells can be regenerated by known techniques to give rise to entire plants. In principle, the transgenic plants may be plants of any desired plant species, i.e. not only monocotyledonous but also dicotyledonous plants.

Obtainable in this way are transgenic plants having properties altered by overexpression, suppression or inhibition of homologous (= natural) genes or gene sequences or expression of heterologous (= foreign) genes or gene sequences.

It is preferable to employ the inventive compounds of the general formula (I) in transgenic crops which are resistant to growth regulators, for example dicamba, or to herbicides which inhibit essential plant enzymes, for example acetolactate synthases (ALS), EPSP synthases, glutamine synthases (GS) or hydroxyphenylpyruvate dioxygenases (HPPD), or to herbicides from the group of the sulfonylureas, glyphosates, glufosinates or benzoylisoxazoles and analogous active ingredients.

When the inventive compounds of the general formula (I) are employed in transgenic crops, not only do the effects toward harmful plants observed in other crops occur, but frequently also effects which are specific to application in the particular transgenic crop, for example an altered or specifically widened spectrum of weeds which can be controlled, altered application rates which can be used for the application, preferably good combinability with the herbicides to which the transgenic crop is resistant, and influencing of growth and yield of the transgenic crop plants.

The invention therefore also relates to the use of the inventive compounds of the general formula (I) and/or salts thereof as herbicides for controlling harmful plants in crops of useful plants or ornamentals, optionally in transgenic crop plants.

Preference is given to the use in cereals, here preferably corn, wheat, barley, rye, oats, millet or rice, by the pre- or post-emergence method.

Preference is also given to the use in soybeans by the pre- or post-emergence method.

The use according to the invention for the control of harmful plants or for growth regulation of plants also includes the case in which a compound of the general formula (I) or its salt is not formed from a precursor substance (“prodrug”) until after application on the plant, in the plant or in the soil.

The invention also provides for the use of one or more compounds of the general formula (I) or salts thereof or of a composition of the invention (as defined below) (in a method) for controlling harmful plants or for regulating the growth of plants which comprises applying an effective amount of one or more compounds of the general formula (I) or salts thereof onto the plants (harmful plants, if appropriate together with the useful plants), plant seeds, the soil in which or on which the plants grow or the area under cultivation.

The invention also provides a herbicidal and/or plant growth-regulating composition, characterised in that the composition comprises

(a) one or more compounds of the general formula (I) and/or salts thereof, as defined above, preferably in one of the embodiments identified as preferred or particularly preferred, in particular one or more compounds of the formulae (I.1) to (I.33) and/or salts thereof, in each case as defined above,

and

(b) one or more further substances selected from groups (i) and/or (ii):
  (i) one or more further agrochemically active substances, preferably selected from the group consisting of insecticides, acaricides, nematicides, further herbicides (i.e. those not conforming to the general formula (I) defined above), fungicides, safeners, fertilisers and/or further growth regulators,

  (ii) one or more formulation auxiliaries customary in crop protection.

The further agrochemically active substances of component (i) of a composition of the invention are preferably selected from the group of substances mentioned in "The Pesticide Manual", 16th edition, The British Crop Protection Council and the Royal Soc. of Chemistry, 2012.

A herbicidal or plant growth-regulating composition of the invention comprises preferably one, two, three or more formulation auxiliaries (ii) customary in crop protection selected from the group consisting of surfactants, emulsifiers, dispersants, film formers, thickeners, inorganic salts, dusting agents, carriers that are solid at 25°C and 1013 mbar, preferably adsorptive granulated inert materials, wetting agents, antioxidants, stabilisers, buffer substances, antifoam agents, water, organic solvents, preferably organic solvents miscible with water in any ratio at 25°C and 1013 mbar.

The inventive compounds of the general formula (I) can be used in the form of wettable powders, emulsifiable concentrates, sprayable solutions, dusting products or granules in the customary formulations. The invention therefore also provides herbicidal and plant growth-regulating compositions which comprise compounds of the general formula (I) and/or salts thereof.

The inventive compounds of the general formula (I) and/or salts thereof can be formulated in various ways according to which biological and/or physicochemical parameters are specified. Possible formulations include, for example: wettable powders (WP), water-soluble powders (SP), water-soluble concentrates, emulsifiable concentrates (EC), emulsions (EW), such as oil-in-water and water-in-oil emulsions, sprayable solutions, suspension concentrates (SC), dispersions based on oil or water, oil-miscible solutions, capsule suspensions (CS), dusting products (DP), dressings, granules for scattering and soil application, granules (GR) in the form of microgranules, spray granules, absorption and adsorption granules, water-dispersible granules (WG), water-soluble granules (SG), ULV formulations, microcapsules and waxes. These individual formulation types and the formulation auxiliaries, such as inert materials, surfactants, solvents and further additives, are known to the person skilled in the art and are described, for example, in: Watkins, "Handbook of Insecticide Dust Diluents and Carriers", 2nd ed., Darland Books, Caldwell N.J., H.v. Olphen, "Introduction to Clay Colloid Chemistry"; 2nd ed., J. Wiley & Sons, N.Y.; C. Marsden, "Solvents Guide"; 2nd ed., Interscience, N.Y. 1963; McCutcheon's "Detergents and Emulsifiers Annual", MC Publ. Corp., Ridgewood N.J.; Sisley and Wood, "Encyclopedia of Surface Active Agents", Chem. Publ. Co. Inc., N.Y. 1964; Schönfeldt, "Grenzflächenaktive Äthylenoxidaddukte" [Interface-active Ethylene Oxide Adducts], Wiss. Verlagsgesellschaft, Stuttgart 1976; Winnacker-Küchler, "Chemische Technologie", Volume 7, C. Hanser Verlag Munich, 4th ed. 1986.

Wettable powders are preparations which can be dispersed uniformly in water and, in addition to the active ingredient, apart from a diluent or inert substance, also comprise surfactants of the ionic and/or nonionic type (wetting agents, dispersants), for example polyoxyethylated alkylphenols, polyoxyethylated fatty alcohols, polyoxyethylated fatty amines, fatty alcohol polyglycol ether sulfates, alkanesulfonates, alkylbenzenesulfonates, sodium lignosulfonate, sodium 2,2'-dinaphthylmethane-6,6'-disulfonate, sodium dibutylnaphthalenesulfonate or else sodium oleoylmethyltaurate. To produce the wettable powders, the active herbicidal ingredients are finely ground, for example in customary apparatuses such as hammer mills, blower mills and air-jet mills, and simultaneously or subsequently mixed with the formulation auxiliaries.

Emulsifiable concentrates are produced by dissolving the active ingredient in an organic solvent, for example butanol, cyclohexanone, dimethylformamide, xylene, or else relatively high-boiling aromatics or hydrocarbons or mixtures of the organic solvents, with addition of one or more ionic and/or nonionic surfactants (emulsifiers). Examples of emulsifiers which may be used are: calcium alkylarylsulfonate salts, for example calcium dodecylbenzenesulfonate, or nonionic emulsifiers such as fatty acid polyglycol esters, alkylaryl polyglycol ethers, fatty alcohol polyglycol ethers, propylene oxide-ethylene oxide condensation products, alkyl polyethers, sorbitan esters, for example sorbitan fatty acid esters, or polyoxyethylene sorbitan esters, for example polyoxyethylene sorbitan fatty acid esters.

Dusting products are obtained by grinding the active ingredient with finely distributed solids, for example talc, natural clays, such as kaolin, bentonite and pyrophyllite, or diatomaceous earth.

Suspension concentrates may be water- or oil-based. They can be produced, for example, by wet grinding by means of standard commercial bead mills and optionally the addition of surfactants, as have already been listed e.g. above for the other types of formulation. Emulsions, e.g. oil-in-water emulsions (EW), can be prepared, for example, by means of stirrers, colloid mills and/or static mixers using aqueous organic solvents and optionally surfactants, as have already been listed e.g. above for the other formulation types.

Granules can be produced either by spraying the active ingredient onto granular inert material capable of adsorption or by applying active ingredient concentrates to the surface of carrier substances, such as sand, kaolinites or granular inert material, by means of adhesives, for example polyvinyl alcohol, sodium polyacrylate or else mineral oils. Suitable active ingredients can also be granulated in the manner customary for the production of fertiliser granules - if desired as a mixture with fertilisers.

Water-dispersible granules are produced generally by the customary processes such as spray-drying, fluidised-bed granulation, pan granulation, mixing with high-speed mixers and extrusion without solid inert material.

For the production of pan granules, fluidised bed granules, extruder granules and spray granules, see, for example, processes in "Spray-Drying Handbook" 3rd ed. 1979, G. Goodwin Ltd., London; J.E. Browning, "Agglomeration", Chemical and Engineering 1967, pages 147 ff.; "Perry's Chemical Engineer's Handbook", 5th Ed., McGraw-Hill, New York 1973, pp. 8-57.

For further details regarding the formulation of crop protection agents, see, for example, G.C. Klingman, “Weed Control as a Science”, John Wiley and Sons, Inc., New York, 1961, pages 81-96 and J.D. Freyer, S.A. Evans, “Weed Control Handbook”, 5th ed., Blackwell Scientific Publications, Oxford, 1968, pages 101-103.

The agrochemical preparations, preferably herbicidal or plant growth-regulating compositions, of the present invention preferably comprise a total amount of 0.1 to 99% by weight, preferably 0.5 to 95% by weight, more preferably 1 to 90% by weight, especially preferably 2 to 80% by weight, of active ingredients of the general formula (I) and salts thereof.

In wettable powders, the active ingredient concentration is, for example, about 10% to 90% by weight, the remainder to 100% by weight consisting of customary formulation constituents. In emulsifiable concentrates, the active ingredient concentration may be about 1% to 90% and preferably 5% to 80% by weight. Formulations in the form of dusts comprise 1% to 30% by weight of active ingredient, preferably usually 5% to 20% by weight of active ingredient; sprayable solutions contain about 0.05% to 80% by weight, preferably 2% to 50% by weight of active ingredient. In the case of water-dispersible granules, the active ingredient content depends partly on whether the active ingredient is in liquid or solid form and on which granulation auxiliaries, fillers, and so forth are used. In the water-dispersible granules, the content of active ingredient is, for example, between 1% and 95% by weight, preferably between 10% and 80% by weight.

In addition, the active ingredient formulations mentioned optionally comprise the respectively customary stickers, wetters, dispersants, emulsifiers, penetrants, preservatives, antifreeze agents and solvents, fillers, carriers and dyes, defoamers, evaporation inhibitors and agents which influence the pH and the viscosity. Examples of formulation auxiliaries are described inter alia in “Chemistry and Technology of Agrochemical Formulations”, ed. D.A. Knowles, Kluwer Academic Publishers (1998).

The inventive compounds of the general formula (I) or salts thereof can be used as such or in the form of their preparations (formulations) in a combination with other pesticidally active substances, for example insecticides, acaricides, nematicides, herbicides, fungicides, safeners, fertilisers and/or growth regulators, for example in the form of a finished formulation or of tankmixes. The combination formulations can be produced on the basis of the abovementioned formulations, taking account of the physical properties and stabilities of the active ingredients to be combined.

Combination partners usable for the inventive compounds of the general formula (I) in mixed formulations or in a tankmix are, for example, known active ingredients based on inhibition of, for example, acetolactate synthase, acetyl-CoA carboxylase, cellulose synthase, enolpyruvylshikimate-3-phosphate synthase, glutamine synthetase, p-hydroxyphenylpyruvate dioxygenase, phytoene desaturase, photosystem I, photosystem II, protoporphyrinogen oxidase, as described, for example, in Weed Research 26 (1986) 441-445 or “The Pesticide Manual”, 16th edition, The British Crop Protection Council and the Royal Soc. of Chemistry, 2012, and the literature cited therein.

Of particular interest is the selective control of harmful plants in crops of useful plants and ornamentals. Although the inventive compounds of the general formula (I) have already demonstrated very good to adequate selectivity in a large number of crops, in principle, in some crops and in particular also in the case of mixtures with other, less selective herbicides, phytotoxicities on the crop plants may occur. In this connection, combinations of inventive compounds of the general formula (I) that are of particular interest are those comprising the compounds (I) or combinations thereof with other herbicides or pesticides and safeners. The safeners, which are used in an antidotically effective amount, reduce the phytotoxic side effects of the herbicides/pesticides employed, for example in economically important crops, such as cereals (wheat, barley, rye, maize, rice, millet), sugarbeet, sugarcane, oilseed rape, cotton and soybeans, preferably cereals.

The weight ratios of herbicide (mixture) to safener depend generally on the herbicide application rate and the efficacy of the safener in question and may vary within wide limits, for example in the range from 200:1 to 1:200, preferably 100:1 to 1:100, in particular 20:1 to 1:20. Analogously to the compounds of the general formula (I) or mixtures thereof, the safeners can be formulated with further herbicides/pesticides and be provided and employed as a finished formulation or tank mix with the herbicides.

For application, the herbicide formulations or herbicide-safener formulations in the commercial form are diluted if appropriate in a customary manner, for example with water in the case of wettable powders, emulsifiable concentrates, dispersions and water-dispersible granules. Preparations in dust form, granules for soil application or granules for scattering and sprayable solutions are not normally diluted further with other inert substances prior to application.

The application rate of the inventive compounds of the general formula (I) and/or salts thereof is affected to a certain extent by external conditions such as temperature, humidity, etc. The application rate may vary within wide limits. For application as a herbicide for controlling harmful plants, the total amount of inventive compounds of the general formula (I) and salts thereof is preferably in the range from 0.001 to 10.0 kg/ha, with preference in the range from 0.005 to 5 kg/ha, more preferably in the range from 0.01 to 1.5 kg/ha, particularly preferably in the range from 0.05 to 1 kg/ha. This applies both to pre-emergence or to post-emergence application.

When the inventive compounds of the general formula (I) and/or salts thereof are used as plant growth regulator, for example as culm stabiliser for crop plants like those mentioned above, preferably cereal plants, such as wheat, barley, rye, triticale, millet, rice or maize, the total application rate is preferably in the range of from 0.001 to 2 kg/ha, preferably in the range of from 0.005 to 1 kg/ha, in particular in the range of from 10 to 500 g/ha, very particularly preferably in the range from 20 to 250 g/ha. This applies both to pre-emergence or to post-emergence application.

The application as culm stabiliser may take place at various stages of the growth of the plants. Preferred is, for example, the application after the tillering phase, at the beginning of the longitudinal growth.

As an alternative, application as plant growth regulator is also possible by treating the seed, which includes various techniques for dressing and coating seed. The application rate depends on the particular techniques and can be determined in preliminary tests.

Combination partners usable for the compounds of the general formula (I) in mixed formulations or in a tank mix are, for example, known active ingredients that are based on inhibition of, for example, acetolactate synthase, acetyl-CoA carboxylase, cellulose synthase, enolpyruvylshikimate-3-phosphate synthase, glutamine synthetase, p-hydroxyphenylpyruvate dioxygenase, phytoene desaturase, photosystem I, photosystem II or protoporphyrinogen oxidase or act as plant growth regulators, as known, for example, from Weed Research 26 (1986) 441-445 or “The Pesticide Manual”, 14th edition, The British Crop Protection Council and the Royal Soc. of Chemistry, 2006, and literature cited therein.

Examples of known herbicides or plant growth regulators which can be combined with compounds of the general formula (I) include the active ingredients which follow (the compounds are designated either by the “common name” according to the International Organization for Standardization (ISO) or by the chemical name or by the code number) and always encompass all use forms, such as acids, salts, esters and isomers, such as stereoisomers and optical isomers. These include, by way of example, one use form and in some cases also a plurality of use forms:
acetochlor, acifluorfen, acifluorfen-methyl, acifluorfen-sodium, aclonifen, alachlor, allidochlor, alloxydim, alloxydim-sodium, ametryn, amicarbazon, amidochlor, amidosulfuron, 4-amino-3-chloro-6-(4-chloro-2-fluoro-3-methylphenyl)-5-fluoropyridine-2-carboxylic acid, aminocyclopyrachlor, aminocyclopyrachloro-potassium, aminocyclopyrachloro-methyl, aminopyralid, aminopyralid-dimethylammonium, aminopyralid-tripromine, amitrol, ammonium sulfamate, anilofos, asulam, asulam-potassium, asulam-sodium, atrazin, azafenidin, azimsulfuron, beflubutamid, (S)-(-)-beflubutamid, beflubutamid-M, benazolin, benazolin-ethyl, benazolin-dimethylammonium, benazolin-potassium, benfluralin, benfuresate, bensulfuron, bensulfuron-methyl, bensulid, bentazon, bentazon-sodium, benzobicyclon, benzofenap, bicyclopyrone, bifenox, bilanafos, bilanafos-sodium, bipyrazone, bispyribac, bispyribac-sodium, bixlozon, bromacil, bromacil-lithium, bromacil-sodium, bromobutid, bromofenoxim, bromoxynil, bromoxynilbutyrat, bromoxynil-potassium, bromoxynil heptanoate and bromoxynil octanoate, busoxinon, butachlor, butafenacil, butamifos, butenachlor, butralin, butroxydim, butylat, cafenstrol, cambendichlor, carbetamide, carfentrazone, carfentrazone-ethyl, chloramben, chloramben-ammonium, chloramben-diolamine, chloramben-methyl, chloramben-methylammonium, chloramben-sodium, chlorbromuron, chlorfenac, chlorfenac-ammonium, chlorfenac-sodium, chlorfenprop, chlorfenprop-methyl, chlorflurenol, chlorflurenol-methyl, chloridazon, chlorimuron, chlorimuron-ethyl, chlorophthalim,

chlorotoluron, chlorsulfuron, chlorthal, chlorthal-dimethyl, chlorthal-monomethyl, cinidon, cinidon-ethyl, cinmethylin, exo-(+)-cinmethylin, i.e. (1R,2S,4S)-4-isopropyl-1-methyl-2-[(2-methylbenzyl)oxy]-7-oxabicyclo[2.2.1]heptane, exo-(-)-cinmethylin, i.e. (1R,2S,4S)-4-isopropyl-1-methyl-2-[(2-methylbenzyl)oxy]-7-oxabicyclo[2.2.1]heptane, cinosulfuron, clacyfos, clethodim, clodinafop, clodinafop-ethyl, clodinafop-propargyl, clomazon, clomeprop, clopyralid, clopyralid-methyl, clopyralid-olamine, clopyralid-potassium, clopyralid-tripomine, cloransulam, cloransulam-methyl, cumyluron, cyanamide, cyanazine, cycloat, cyclopyranil, cyclopyrimorat, cyclosulfamuron, cycloxydim, cyhalofop, cyhalofop-butyl, cyprazine, 2,4-D (and the ammonium, butotyl, butyl, choline, diethylammonium, dimethylammonium, diolamine, doboxyl, dodecylammonium, etexyl, ethyl, 2-ethylhexyl, heptylammonium, isobutyl, isooctyl, isopropyl, isopropylammonium, lithium, meptyl, methyl, potassium, tetradecylammonium, triethylammonium, triisopropanolammonium, tripromine and trolamine salts thereof), 2,4-DB, 2,4-DB-butyl, 2,4-DB-dimethylammonium, 2,4-DB-isooctyl, 2,4-DB-potassium and 2,4-DB-sodium, daimuron (dymron), dalapon, dalapon-calcium, dalapon-magnesium, dalapon-sodium, dazomet, dazomet-sodium, n-decanol, 7-deoxy-D-sedoheptulose, desmedipham, detosyl pyrazolate (DTP), dicamba and salts thereof (e.g. dicamba biproamine, dicamba N,N-bis(3-aminopropyl)methylamine, dicamba-butotyl, dicamba-choline, dicamba-diglycolamine, dicamba-dimethylammonium, dicamba-diethanolaminemmonium, dicamba-diethylammonium, dicamba-isopropylammonium, dicamba-methyl, dicamba-monoethanolamine, dicamba-olamine, dicamba-potassium, dicamba-sodium, dicamba-triethanolamine), dichlobenil, 2-(2,4-dichlorobenzyl)-4,4-dimethyl-1,2-oxazolidin-3-one, 2-(2,5-dichlorobenzyl)-4,4-dimethyl-1,2-oxazolidin-3-one, dichlorprop, dichlorprop-butotyl, dichlorprop-dimethylammonium, dichlorprop-etexyl, dichlorprop-ethylammonium, dichlorprop-isoctyl, dichlorprop-methyl, dichlorprop-potassium, dichlorprop-sodium, dichlorprop-P, dichlorprop-P-dimethylammonium, dichlorprop-P-etexyl, dichlorprop-P-potassium, dichlorprop-sodium, diclofop, diclofop-methyl, diclofop-P, diclofop-P-methyl, diclosulam, difenzoquat, difenzoquat-metilsulfate, diflufenican, diflufenzopyr, diflufenzopyr-sodium, dimefuron, dimepiperate, dimesulfazet, dimethachlor, dimethametryn, dimethenamid, dimethenamid-P, dimetrasulfuron, dinitramine, dinoterb, dinoterb-acetate, diphenamid, diquat, diquat-dibromide, diquat-dichloride, dithiopyr, diuron, DNOC, DNOC-ammonium, DNOC-potassium, DNOC-sodium, endothal, endothal-diammonium, endothal-dipotassium, endothal-disodium, epyrifenacil (S-3100), EPTC, esprocarb, ethalfluralin, ethametsulfuron, ethametsulfuron-methyl, ethiozin, ethofumesate, ethoxyfen, ethoxyfen-ethyl, ethoxysulfuron, etobenzanid, F-5231, i.e. N-[2-chloro-4-fluoro-5-[4-(3-fluoropropyl)-4,5-dihydro-5-oxo-1Htetrazol-1-yl]-phenyl]ethanesulfonamide, F-7967, i.e. 3-[7-chloro-5-fluoro-2-(trifluoromethyl)-1H-benzimidazol-4-yl]-1-methyl-6-(trifluoromethyl)pyrimidine-2,4(1H,3H)-dione, fenoxaprop, fenoxaprop-P, fenoxaprop-ethyl, fenoxaprop-P-ethyl, fenoxasulfone, fenpyrazone, fenquinotrione, fentrazamid, flamprop, flamprop-isoproyl, flamprop-methyl, flamprop-M-isopropyl, flamprop-M-methyl, flazasulfuron, florasulam, florpyrauxifen, florpyrauxifen-benzyl, fluazifop, fluazifop-butyl, fluazifop-methyl, fluazifop-P, fluazifop-P-butyl, flucarbazone, flucarbazone-sodium, flucetosulfuron, fluchloralin, flufenacet, flufenpyr, flufenpyr-ethyl, flumetsulam, flumiclorac, flumiclorac-pentyl, flumioxazin, fluometuron, flurenol, flurenol-butyl, -dimethylammonium and -methyl, fluoroglycofen, fluoroglycofen-ethyl, flupropanat, flupropanat-sodium, flupyrsulfuron, flupyrsulfuron-methyl, flupyrsulfuron-methyl-sodium, fluridon, flurochloridon, fluroxypyr, fluroxypyr-butometyl, fluroxypyr-meptyl, flurtamon, fluthiacet, fluthiacet-methyl, fomesafen, fomesafen-sodium, foramsulfuron, foramsulfuron-sodium, fosamine, fosamine-ammonium, glufosinate, glufosinate-ammonium, glufosinate-sodium, L-glufosinate-ammonium, L-glufosinate-sodium, glufosinate-P-sodium, glufosinate-P-ammonium, glyphosate, glyphosate-ammonium, glyphosate-isopropylammonium, glyphosate-diammonium, glyphosate-dimethylammonium, glyphosate-potassium, glyphosate-sodium, glyphosate-sesquisodium and glyphosate-trimesium, H-9201, i.e. O-(2,4-dimethyl-6-nitrophenyl)-O-ethyl isopropylphosphoramidothioate, halauxifen, halauxifen-methyl, halosafen, halosulfuron, halosulfuron-methyl, haloxyfop, haloxyfop-P, haloxyfop-ethoxyethyl, haloxyfop-P-ethoxyethyl, haloxyfop-methyl, haloxyfop-P-methyl, haloxifop-sodium, hexazinon, HNPC-A8169, i.e. prop-2-yn-1-yl (2S)-2-{3-[(5-tert-butylpyridin-2-yl)oxy]phenoxy}propanoate, HW-02, i.e. 1-(dimethoxyphosphoryl)ethyl (2,4-dichlorophenoxy)acetate, hydantocidin, icafolin, icafolin-methyl, imazamethabenz, imazamethabenz-methyl, imazamox, imazamox-ammonium, imazapic, imazapic-ammonium, imazapyr, imazapyr-isopropylammonium, imazaquin, imazaquin-ammonium, imazaquin-methyl, imazethapyr, imazethapyr-ammonium, imazosulfuron, indanofan, indaziflam, indolauxipyr, iodosulfuron, iodosulfuron-methyl, iodosulfuron-methyl-sodium, ioxynil, ioxynil-lithium, -octanoate, -potassium and -sodium, ipfencarbazone, iptriazopyrid, i.e. 3-[(isopropylsulfonyl)methyl]-N-(5-methyl-1,3,4-oxadiazol-2-yl)-5-(trifluoromethyl)[1,2,4]triazolo-[4,3-a]pyridine-8-carboxamide, isoproturon, isouron, isoxaben, isoxaflutole, karbutilate, KUH-043, i.e. 3-({[5-(difluoromethyl)-1-methyl-3-(trifluoromethyl)-1H-pyrazol-4-yl]methyl}sulfonyl)-5,5-dimethyl-4,5-dihydro-1,2-oxazole, ketospiradox, ketospiradox-potassium, lactofen, lenacil, linuron, MCPA, MCPA-butotyl, -butyl, -dimethylammonium, -diolamine, -2-ethylhexyl, -ethyl, -isobutyl, -isoctyl, -isopropyl, -

isopropylammonium, -methyl, -olamine, -potassium, -sodium and -trolamine, MCPB, MCPB-methyl, -ethyl and -sodium, mecoprop, mecoprop-butotyl, mecoprop-dimethylammonium, mecoprop-diolamine, mecoprop-etexyl, mecoprop-ethadyl, mecoprop-isoctyl, mecoprop-methyl, mecoprop-potassium, mecoprop-sodium, and mecoprop-trolamine, mecoprop-P, mecoprop-P-butotyl, -dimethylammonium, -2-ethylhexyl and -potassium, mefenacet, mefluidid, mefluidid-diolamine, mefluidid-potassium, mesosulfuron, mesosulfuron-methyl, mesosulfuron-sodium, mesotrion, methabenzthiazuron, metam, metamifop, metamitron, metazachlor, metazosulfuron, methabenzthiazuron, methiopyrsulfuron, methiozolin, methyl isothiocyanat, metobromuron, metolachlor, S-metolachlor, metosulam, metoxuron, metproxybicyclon, metribuzin, metsulfuron, metsulfuron-methyl, molinat, monolinuron, monosulfuron, monosulfuron-methyl, MT-5950, i.e. N-[3-chloro-4-(1-methylethyl)phenyl]-2-methylpentanamide, NGGC-011, napropamide, NC-310, i.e. 4-(2,4-dichlorobenzoyl)-1-methyl-5-benzyloxypyrazole, neburon, nicosulfuron, nonanoic acid (pelargonic acid), norflurazon, oleic acid (fatty acids), orbencarb, orthosulfamuron, oryzalin, oxadiargyl, oxadiazon, oxasulfuron, oxaziclomefone, oxyfluorfen, paraquat, paraquat-dichloride, paraquat-dimethylsulfate, pebulate, pendimethalin, penoxsulam, pentachlorophenol, pentoxazone, pethoxamid, petroleum oil, phenmedipham, phenmedipham-ethyl, picloram, picloram-dimethylammonium, picloram-etexyl, picloram-isoctyl, picloram-methyl, picloram-olamine, picloram-potassium, picloram-triethylammonium, picloram-tripromine, picloram-trolamine, picolinafen, pinoxaden, piperophos, pretilachlor, primisulfuron, primisulfuron-methyl, prodiamines, profoxydim, prometon, prometryn, propachlor, propanil, propaquizafop, propazines, propham, propisochlor, propoxycarbazones, propoxycarbazone-sodium, propyrisulfuron, propyzamid, prosulfocarb, prosulfuron, pyraclonil, pyraflufen, pyraflufen-ethyl, pyraquinat, pyrasulfotol, pyrazolynat (pyrazolat), pyrazosulfuron, pyrazosulfuron-ethyl, pyrazoxyfen, pyribambenz, pyribambenz-isopropyl, pyribambenz-propyl, pyribenzoxim, pyributicarb, pyridafol, pyridat, pyriftalid, pyriminobac, pyriminobac-methyl, pyrimisulfan, pyrithiobac, pyrithiobac-sodium, pyroxasulfon, pyroxsulam, quinclorac, quinclorac-dimethylammonium, quinclorac-methyl, quinmerac, quinoclamin, quizalofop, quizalofop-ethyl, quizalofop-P, quizalofop-P-ethyl, quizalofop-P-tefuryl, QYM201, i.e. 1-{2-chloro-3-[(3-cyclopropyl-5-hydroxy-1-methyl-1H-pyrazol-4-yl)carbonyl]-6-(trifluoromethyl)phenyl}piperidin-2-one, rimsulfuron, saflufenacil, sethoxydim, siduron, simazine, simetryn, SL-261, sulcotrione, sulfentrazone, sulfometuron, sulfometuron-methyl, sulfosulfuron, SYP-249, i.e. 1-ethoxy-3-methyl-1-oxobut-3-en-2-yl 5-[2-chloro-4-(trifluoromethyl)phenoxy]-2-nitrobenzoate, SYP-300, i.e. 1-[7-fluoro-3-oxo-4-(prop-2-yn-1-

yl)-3,4-dihydro-2H-1,4-benzoxazin-6-yl]-3-propyl-2-thioxoimidazolidine-4,5-dione, 2,3,6-TBA, TCA (trichloroacetic acid) and its salts, e.g. TCA-ammonium, TCA-calcium, TCA-ethyl, TCA-magnesium, TCA-sodium, tebuthiuron, tefuryltriones, tembotrione, tepraloxydim, terbacil, terbucarb, terbumeton, terbuthylazines, terbutryn, tetflupyrolimet, thaxtomin, thenylchlor, thiazopyr, thiencarbazones, thiencarbazone-methyl, thifensulfuron, thifensulfuron-methyl, thiobencarb, tiafenacil, tolpyralat, topramezon, tralkoxydim, triafamon, tri-allate, triasulfuron, triaziflam, tribenuron, tribenuron-methyl, triclopyr, triclopyr-butotyl, triclopyr-choline, triclopyr-ethyl, triclopyr-triethylammonium, trietazine, trifloxysulfuron, trifloxysulfuron-sodium, trifludimoxazin, trifluralin, triflusulfuron, triflusulfuron-methyl, tritosulfuron, urea sulfate, vernolate, XDE-848, ZJ-0862, i.e. 3,4-dichloro-N-{2-[(4,6-dimethoxypyrimidin-2-yl)oxy]benzyl}aniline, methyl 3-(2-chloro-4-fluoro-5-(3-methyl-2,6-dioxo-4-trifluoromethyl-3,6-dihydropyrimidin-1(2H)-yl)phenyl)-5-methyl-4,5-dihydroisoxazole-5-carboxylate, ethyl 3-(2-chloro-4-fluoro-5-(3-methyl-2,6-dioxo-4-trifluoromethyl-3,6-dihydropyrimidin-1(2H)-yl)phenyl)-5-methyl-4,5-dihydroisoxazol-5-carboxylate, 3-(2-chloro-4-fluoro-5-(3-methyl-2,6-dioxo-4-trifluoromethyl-3,6-dihydropyrimidin-1(2H)-yl)phenyl)-5-methyl-4,5-dihydroisoxazole-5-carboxylic acid, ethyl [(3-{2-chloro-4-fluoro-5-[3-methyl-2,6-dioxo-4-(trifluoromethyl)-3,6-dihydropyrimidin-1(2H)-yl]phenoxy}pyridin-2-yl)oxy]acetate, 3-chloro-2-[3-(difluoromethyl)isoxazolyl-5-yl]phenyl 5-chloropyrimidin-2-yl ether, 2-(3,4-dimethoxyphenyl)-4-[(2-hydroxy-6-oxocyclohex-1-en-1-yl)carbonyl]-6-methylpyridazin-3(*2H*)-one, 2-({2-[(2-methoxyethoxy)methyl]-6-methylpyridin-3-yl}carbonyl)cyclohexane-1,3-dione, (5-hydroxy-1-methyl-1H-pyrazol-4-yl)(3,3,4-trimethyl-1,1-dioxido-2,3-dihydro-1-benzothiophen-5-yl)methanone, 1-methyl-4-[(3,3,4-trimethyl-1,1-dioxido-2,3-dihydro-1-benzothiophen-5-yl)carbonyl]-1H-pyrazol-5-yl propane-1-sulfonate, 4-{2-chloro-3-[(3,5-dimethyl-1H-pyrazol-1-yl)methyl]-4-(methylsulfonyl)benzoyl}-1-methyl-1H-pyrazol-5-yl 1,3-dimethyl-1H-pyrazole-4-carboxylate; cyanomethyl 4-amino-3-chloro-5-fluoro-6-(7-fluoro-1H-indol-6-yl)pyridine-2-carboxylate, prop-2-yn-1-yl 4-amino-3-chloro-5-fluoro-6-(7-fluoro-1H-indol-6-yl)pyridine-2-carboxylate, methyl 4-amino-3-chloro-5-fluoro-6-(7-fluoro-1H-indol-6-yl)pyridine-2-carboxylate, benzyl 4-amino-3-chloro-5-fluoro-6-(7-fluoro-1H-indol-6-yl)pyridine-2-carboxylate, ethyl 4-amino-3-chloro-5-fluoro-6-(7-fluoro-1H-indol-6-yl)pyridine-2-carboxylate, methyl 4-amino-3-chloro-5-fluoro-6-(7-fluoro-1-isobutyryl-1H-indol-6-yl)pyridine-2-carboxylate, methyl 6-(1-acetyl-7-fluoro-1H-indol-6-yl)-4-amino-3-chloro-5-fluoropyridine-2-carboxylate, methyl 4-amino-3-chloro-6-[1-(2,2-dimethylpropanoyl)-7-fluoro-1H-indol-6-yl]-5-fluoropyridine-2-carboxylate, methyl 4-amino-3-chloro-5-fluoro-6-[7-fluoro-1-(methoxyacetyl)-1H-indol-6-yl]pyridine-2-carboxylate, potassium 4-amino-3-

chloro-5-fluoro-6-(7-fluoro-1H-indol-6-yl)pyridine-2-carboxylate, sodium-4-amino-3-chloro-5-fluoro-6-(7-fluoro-1H-indol-6-yl)pyridine-2-carboxylate, butyl 4-amino-3-chloro-5-fluoro-6-(7-fluoro-1H-indol-6-yl)pyridine-2-carboxylate, 4-hydroxy-1-methyl-3-[4-(trifluoromethyl)pyridin-2-yl]imidazolidin-2-one, 3-(5-tert-butyl-1,2-oxazol-3-yl)-4-hydroxy-1-methylimidazolidin-2-one, 3-[5-chloro-4-(trifluoromethyl)pyridin-2-yl]-4-hydroxy-1-methylimidazolidin-2-one, 4-hydroxy-1-methoxy-5-methyl-3-[4-(trifluoromethyl)pyridin-2-yl]imidazolidin-2-one, 6-[(2-hydroxy-6-oxocyclohex-1-en-1-yl)carbonyl]-1,5-dimethyl-3-(2-methylphenyl)quinazoline-2,4(1H,3H)-dione, 3-(2,6-dimethylphenyl)-6-[(2-hydroxy-6-oxocyclohex-1-en-1-yl)carbonyl]-1-methylquinazoline-2,4(1H,3H)-dione, 2-[2-chloro-4-(methylsulfonyl)-3-(morpholin-4-ylmethyl)benzoyl]-3-hydroxycyclohex-2-en-1-one, 1-(2-carboxyethyl)-4-(pyrimidin-2-yl)pyridazin-1-ium salt (with appropriate anions, for example chloride, acetate or trifluoroacetate), 1-(2-carboxyethyl)-4-(pyridazin-3-yl)pyridazin-1-ium salt (with appropriate anions, for example chloride, acetate or trifluoroacetate), 4-(pyrimidin-2-yl)-1-(2-sulfoethyl)pyridazin-1-ium salt (with appropriate anions, for example chloride, acetate or trifluoroacetate), 4-(pyridazin-3-yl)-1-(2-sulfoethyl)pyridazin-1-ium salt (with appropriate anions, for example chloride, acetate or trifluoroacetate), 1-(2-carboxyethyl)-4-(1,3-thiazol-2-yl)pyridazin-1-ium salt (with appropriate anions, for example chloride, acetate or trifluoroacetate), 1-(2-carboxyethyl)-4-(1,3,4-thiadiazol-2-yl)pyridazin-1-ium salt (with appropriate anions, for example chloride, acetate or trifluoroacetate), methyl (2R)-2-{[(E)-({2-chloro-4-fluoro-5-[3-methyl-2,6-dioxo-4-(trifluoromethyl)-3,6-dihydropyrimidin-1(2H)-yl]phenyl}methylidene)amino]oxy}propanoate, methyl (2S)-2-{[(E)-({2-chloro-4-fluoro-5-[3-methyl-2,6-dioxo-4-(trifluoromethyl)-3,6-dihydropyrimidin-1(2H)-yl]phenyl}methylidene)amino]oxy}propanoate, methyl (2R/S)-2-{[(E)-({2-chloro-4-fluoro-5-[3-methyl-2,6-dioxo-4-(trifluoromethyl)-3,6-dihydropyrimidin-1(2H)-yl]phenyl}methylidene)amino]oxy}propanoate, (E)-2-(trifluoromethyl)benzaldehyde O-{2,6-bis[(4,6-dimethoxypyrimidin-2-yl)oxy]benzoyl}oxime, 2-fluoro-N-(5-methyl-1,3,4-oxadiazol-2-yl)-3-[(R)-propylsulfinyl]-4-(trifluoromethyl)benzamide, (2R)-2-[(4-amino-3,5-dichloro-6-fluoro-2-pyridyl)oxy]propanecarboxylic acid, 2-ethoxy-2-oxoethyl 1-{2-chloro-4-fluoro-5-[3-methyl-2,6-dioxo-4-(trifluoromethyl)-3,6-dihydropyrimidin-1(2H)-yl]phenoxy}cyclopropanecarboxylate, 2-methoxy-2-oxoethyl 1-{2-chloro-4-fluoro-5-[3-methyl-2,6-dioxo-4-(trifluoromethyl)-3,6-dihydropyrimidin-1(2H)-yl]phenoxy}cyclopropanecarboxylate, {[(1-{2-chloro-4-fluoro-5-[3-methyl-2,6-dioxo-4-(trifluoromethyl)-3,6-dihydropyrimidin-1(2H)-yl]phenoxy}cyclopropyl)carbonyl]oxy}acetic acid, 2-(2-bromo-4-chlorobenzyl)-4,4-dimethyl-1,2-oxazolidin-3-one, methyl 3-{2-chloro-4-

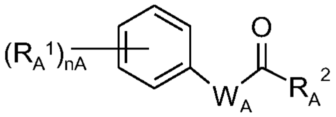
fluoro-5-[3-methyl-2,6-dioxo-4-(trifluoromethyl)-3,6-dihydropyrimidin-1(2H)-yl]phenyl}-3a,4,5,6-tetrahydro-6aH-cyclopenta[d][1,2]oxazole-6a-carboxylate, ethyl 3-{2-chloro-4-fluoro-5-[3-methyl-2,6-dioxo-4-(trifluoromethyl)-3,6-dihydropyrimidin-1(2H)-yl]phenyl}-3a,4,5,6-tetrahydro-6aH-cyclopenta[d][1,2]oxazole-6a-carboxylate.

Examples of plant growth regulators as possible mixing partners are:
abscisic acid and related analogs [e.g. (2Z,4E)-5-[6-ethynyl-1-hydroxy-2,6-dimethyl-4-oxocyclohex-2-en-1-yl]-3-methylpenta-2,4-dienoic acid, methyl (2Z,4E)-5-[6-ethynyl-1-hydroxy-2,6-dimethyl-4-oxocyclohex-2-en-1-yl]-3-methylpenta-2,4-dienoate, (2Z,4E)-3-ethyl-5-(1-hydroxy-2,6,6-trimethyl-4-oxocyclohex-2-en-1-yl)penta-2,4-dienoic acid, (2E,4E)-5-(1-hydroxy-2,6,6-trimethyl-4-oxocyclohex-2-en-1-yl)-3-(trifluoromethyl)penta-2,4-dienoic acid, methyl (2E,4E)-5-(1-hydroxy-2,6,6-trimethyl-4-oxocyclohex-2-en-1-yl)-3-(trifluoromethyl)penta-2,4-dienoate, (2Z,4E)-5-(2-hydroxy-1,3-dimethyl-5-oxobicyclo[4.1.0]hept-3-en-2-yl)-3-methylpenta-2,4-dienoic acid], acibenzolar, acibenzolar-S-methyl, S-adenosylhomocysteine, allantoin, 2-aminoethoxyvinylglycine (AVG), aminooxyacetic acid and related esters [e.g. (isopropylidene)aminooxyacetic acid 2-(methoxy)-2-oxoethyl ester, (isopropylidene)aminooxyacetic acid 2-(hexyloxy)-2-oxoethyl ester, (cyclohexylidene)aminooxyacetic acid-2-(isopropyloxy)-2-oxoethyl ester], 1-aminocycloprop-1-ylcarboxylic acid, N-methyl-1-aminocyclopropyl-1-carboxylic acid, 1-aminocyclopropyl-1-carboxamide, substituted 1-aminocyclopropyl-1-carboxylic acid derivatives as described in DE3335514, EP30287, DE2906507 or US5123951, 1-aminocyclopropyl-1-hydroxamic acid, 5-aminolevulinic acid, ancymidol, 6-benzylaminopurine, bikinin, brassinolide, brassinolide-ethyl, L-canaline, catechol and catechols (e.g. (2S,3R)-2-(3,4-dihydroxyphenyl)-3,4-dihydro-2H-chromene-3,5,7-triol), chitooligosaccharides (CO; COs differ from LCOs in that they lack the fatty acid side chain characteristic of LCOs. COs, in some cases referred to as N-acetylchitooligosaccharides, are also constructed from GlcNAc units but have side chains that distinguish them from chitin molecules [$(C_8H_{13}NO_5)_n$, CAS No. 1398-61-4] and chitosan molecules [$(C_5H_{11}NO_4)_n$, CAS No. 9012-76-4]), chitin-like compounds, chlormequat chloride, cloprop, cyclanilide, 3-(cycloprop-1-enyl)propionic acid, 1-[2-(4-cyano-3,5-dicyclopropylphenyl)acetamido]cyclohexanecarboxylic acid, 1-[2-(4-cyano-3-cyclopropylphenyl)acetamido]cyclohexanecarboxylic acid, 1-cyclopropenylmethanol, daminozid, dazomet, dazomet-sodium, n-decanol, dikegulac, dikegulac-sodium, endothal, endothal-dipotassum, -disodium, and mono(N,N-dimethylalkylammonium), ethephon, 1-ethylcyclopropene, flumetralin, flurenol, flurenol-butyl, flurenol-methyl, flurprimidol,

forchlorfenuron, gibberellic acid, inabenfid, indole-3-acetic acid (IAA), 4-indol-3-ylbutyric acid, isoprothiolan, probenazole, jasmonic acid, jasmonic esters or other derivatives (e.g. jasmonic acid methyl ester, jasmonic acid ethyl ester), lipochitooligosaccharides (LCOs, in some cases also referred to as symbiotic nodulation signals (Nod or Nod factors) or as Myc factors, consist of an oligosaccharide backbone composed of β-l,4-bonded *N*-acetyl-D-glucosamine residues ("GlcNAc") with an N-bonded fatty acid side chain fused onto the non-reducing end. As can be inferred from the literature, LCOs differ in the number of GlcNAc units in the backbone structure, in the length and in the degree of saturation of the fatty acid chain, and in the substitution of the reducing and non-reducing sugar units), linoleic acid or derivatives thereof, linolenic acid or derivatives thereof, maleic hydrazide, mepiquat chloride, mepiquat pentaborate, 1-methylcyclopropene, 3-methylcyclopropene, methoxyvinylglycine (MVG), 3'-methylabscisic acid, 1-(4-methylphenyl)-N-(2-oxo-1-propyl-1,2,3,4-tetrahydroquinolin-6-yl)methanesulfonamide and related substituted (tetrahydroquinolin-6-yl)methanesulfonamides, (3E,3aR,8bS)-3-({[(2R)-4-methyl-5-oxo-2,5-dihydrofuran-2-yl]oxy}methylene)-3,3a,4,8b-tetrahydro-2H-indeno[1,2-b]furan-2-one and related lactones as described in EP2248421, 2-(1-naphthyl)acetamide, 1-naphthylacetic acid, 2-naphthyloxyacetic acid, nitrophenoxide mixture, 4-oxo-4[(2-phenylethyl)amino]butyric acid, paclobutrazole, 4-phenylbutyric acid and salts thereof (e.g. sodium 4-phenylbutanoate, potassium 4-phenylbutanoate), phenylalanines, N-phenylphthalamic acid, prohexadiones, prohexadione-calcium, 1-n-propylcyclopropene, putrescine, prohydrojasmone, rhizobitoxin, salicylic acid and methyl salicylate, sarcosine, sodium cycloprop-1-en-1-ylacetate, sodium cycloprop-2-en-1-ylacetate, sodium 3-(cycloprop-2-en-1-yl)propanoate, sodium 3-(cycloprop-1-en-1-yl)propanoate, sidefungin, spermidine, spermines, strigolactones, tecnazenes, thidiazuron, triacontanol, trinexapac, trinexapac-ethyl, tryptophan, tsitodef, uniconazole, uniconazole-P, 2-fluoro-N-(3-methoxyphenyl)-*9H*-purine-6-amine, 2-chloro-N-(3-methoxyphenyl)-*9H*-purine-6-amine.

Useful combination partners for the inventive compounds of the general formula (I) also include, for example, the following safeners:

S1) Compounds of the formula (S1)

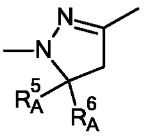


(S1)

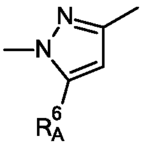
where the symbols and indices are defined as follows:

n_A is a natural number from 0 to 5, preferably from 0 to 3;

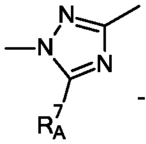
R_A^1 is halogen, (C_1-C_4)-alkyl, (C_1-C_4)-alkoxy, nitro or (C_1-C_4)-haloalkyl;



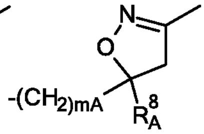
(W_A1)



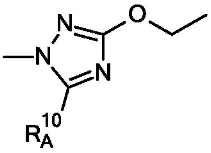
(W_A2)



(W_A3)



(W_A4)



(W_A5)

W_A is an unsubstituted or substituted divalent heterocyclic radical from the group of the partly unsaturated or aromatic five-membered heterocycles having 1 to 3 ring heteroatoms from the N and O group, where at least one nitrogen atom and at most one oxygen atom is present in the ring, preferably a radical from the group of (W_A^1) to (W_A^5),

m_A is 0 or 1;

R_A^2 is OR_A^3, SR_A^3 or $NR_A^3R_A^4$ or a saturated or unsaturated 3- to 7-membered heterocycle having at least one nitrogen atom and up to 3 heteroatoms, preferably from the group consisting of O and S, which is joined to the carbonyl group in (S1) via the nitrogen atom and is unsubstituted or substituted by radicals from the group consisting of (C_1-C_4)-alkyl, (C_1-C_4)-alkoxy or optionally substituted phenyl, preferably a radical of the formula OR_A^3, NHR_A^4 or $N(CH_3)_2$, especially of the formula OR_A^3;

R_A^3 is hydrogen or an unsubstituted or substituted aliphatic hydrocarbon radical, preferably having a total of 1 to 18 carbon atoms;

R_A^4 is hydrogen, (C_1-C_6)-alkyl, (C_1-C_6)-alkoxy or substituted or unsubstituted phenyl;

R_A^5 is H, (C_1-C_8)-alkyl, (C_1-C_8)-haloalkyl, (C_1-C_4)-alkoxy-(C_1-C_8)-alkyl, cyano or $COOR_A^9$, where R_A^9 is hydrogen, (C_1-C_8)-alkyl, (C_1-C_8)-haloalkyl, (C_1-C_4)-alkoxy-(C_1-C_4)-alkyl, (C_1-C_6)-hydroxyalkyl, (C_3-C_{12})-cycloalkyl or tri-(C_1-C_4)-alkylsilyl;

R_A^6, R_A^7, R_A^8 are identical or different and are hydrogen, (C_1-C_8)-alkyl, (C_1-C_8)-haloalkyl, (C_3-C_{12})-cycloalkyl or substituted or unsubstituted phenyl;

R_A^{10} is H, (C_3-C_{12})-cycloalkyl, substituted or unsubstituted phenyl or substituted or unsubstituted heteroaryl;

preferably:

a) compounds of the dichlorophenylpyrazoline-3-carboxylic acid type ($S1^a$), preferably compounds such as 1-(2,4-dichlorophenyl)-5-(ethoxycarbonyl)-5-methyl-2-pyrazoline-3-carboxylic acid, ethyl 1-(2,4-dichlorophenyl)-5-(ethoxycarbonyl)-5-methyl-2-pyrazoline-3-carboxylate (S1-1) (“mefenpyr-diethyl”), and related compounds as described in WO-A-91/07874;

b) derivatives of dichlorophenylpyrazolecarboxylic acid ($S1^b$), preferably compounds such as ethyl 1-(2,4-dichlorophenyl)-5-methylpyrazole-3-carboxylate (S1-2), ethyl 1-(2,4-dichlorophenyl)-5-isopropylpyrazole-3-carboxylate (S1-3), ethyl 1-(2,4-dichlorophenyl)-5-(1,1-dimethylethyl)pyrazole-3-carboxylate (S1-4) and related compounds as described in EP-A-333 131 and EP-A-269 806;

c) derivatives of 1,5-diphenylpyrazole-3-carboxylic acid ($S1^c$), preferably compounds such as ethyl 1-(2,4-dichlorophenyl)-5-phenylpyrazole-3-carboxylate (S1-5), methyl 1-(2-chlorophenyl)-5-phenylpyrazole-3-carboxylate (S1-6) and related compounds as described in EP-A-268 554, for example;

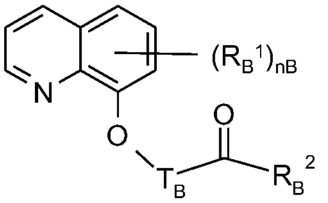
d) compounds of the triazolecarboxylic acid type ($S1^d$), preferably compounds such as fenchlorazole(-ethyl ester), i.e. ethyl 1-(2,4-dichlorophenyl)-5-trichloromethyl-(1H)-1,2,4-triazole-3-carboxylate (S1-7), and related compounds as described in EP-A-174 562 and EP-A-346 620;

e) compounds of the 5-benzyl- or 5-phenyl-2-isoxazoline-3-carboxylic acid or of the 5,5-diphenyl-2-isoxazoline-3-carboxylic acid type ($S1^e$), preferably compounds such as ethyl 5-(2,4-dichlorobenzyl)-2-isoxazoline-3-carboxylate (S1-8) or ethyl 5-phenyl-2-isoxazoline-3-carboxylate (S1-9) and related compounds as described in WO-A-91/08202, or 5,5-diphenyl-2-

isoxazoline-3-carboxylic acid (S1-10) or ethyl 5,5-diphenyl-2-isoxazoline-3-carboxylate (S1-11) ("isoxadifen-ethyl") or n-propyl 5,5-diphenyl-2-isoxazoline-3-carboxylate (S1-12) or ethyl 5-(4-fluorophenyl)-5-phenyl-2-isoxazoline-3-carboxylate (S1-13), as described in patent application WO-A-95/07897;

f) compounds of the triazolyloxyacetic acid derivative type ($S1^f$), preferably compounds such as methyl {[1,5-bis(4-chloro-2-fluorophenyl)-1H-1,2,4-triazol-3-yl]oxy}acetate (S1-14) or {[1,5-bis(4-chloro-2-fluorophenyl)-1H-1,2,4-triazol-3-yl]oxy}acetic acid (S1-15) or methyl {[5-(4-chloro-2-fluorophenyl)-1-(2,4-difluorophenyl)-1H-1,2,4-triazol-3-yl]oxy}acetate (S1-16) or {[5-(4-chloro-2-fluorophenyl)-1-(2,4-difluorophenyl)-1H-1,2,4-triazol-3-yl]oxy}acetic acid (S1-17) or methyl {[1-(4-chloro-2-fluorophenyl)-5-(2,4-difluorophenyl)-1H-1,2,4-triazol-3-yl]oxy}acetate (S1-18) or {[1-(4-chloro-2-fluorophenyl)-5-(2,4-difluorophenyl)-1H-1,2,4-triazol-3-yl]oxy}acetic acid (S1-19), as described in patent application WO2021105101.

S2) Quinoline derivatives of the formula (S2),



(S2)

where the symbols and indices are defined as follows:

R_B^1 is halogen, (C_1-C_4)-alkyl, (C_1-C_4)-alkoxy, nitro or (C_1-C_4)-haloalkyl;

n_B is a natural number from 0 to 5, preferably from 0 to 3;

R_B^2 is OR_B^3, SR_B^3 or $NR_B^3R_B^4$ or a saturated

or unsaturated 3- to 7-membered heterocycle having at least one nitrogen atom and up to 3 heteroatoms, preferably from the group of O and S, which is joined via the nitrogen atom to the carbonyl group in (S2) and is unsubstituted or substituted by radicals from the group of (C_1-C_4)-alkyl, (C_1-C_4)-alkoxy or optionally substituted phenyl, preferably a radical of the formula OR_B^3, NHR_B^4 or $N(CH_3)_2$, especially of the formula OR_B^3;

R_B^3 is hydrogen or an unsubstituted or substituted aliphatic hydrocarbon radical, preferably having a total of 1 to 18 carbon atoms;

R_B^4 is hydrogen, (C_1-C_6)-alkyl, (C_1-C_6)-alkoxy or substituted or unsubstituted phenyl;

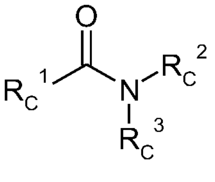
T_B is a (C_1 or C_2)-alkanediyl chain which is unsubstituted or substituted by one or two (C_1-C_4)-alkyl radicals or by [(C_1-C_3)-alkoxy]carbonyl;

preferably:

a) compounds of the 8-quinolinoxyacetic acid type ($S2^a$), preferably 1-methylhexyl (5-chloro-8-quinolinoxy)acetate ("cloquintocet-mexyl") (S2-1), 1,3-dimethylbut-1-yl (5-chloro-8-quinolinoxy)acetate (S2-2), 4-allyloxybutyl (5-chloro-8-quinolinoxy)acetate (S2-3), 1-allyloxyprop-2-yl (5-chloro-8-quinolinoxy)acetate (S2-4), ethyl (5-chloro-8-quinolinoxy)acetate (S2-5), methyl (5-chloro-8-quinolinoxy)acetate (S2-6), allyl (5-chloro-8-quinolinoxy)acetate (S2-7), 2-(2-propylideneiminoxy)-1-ethyl (5-chloro-8-quinolinoxy)acetate (S2-8), 2-oxoprop-1-yl (5-chloro-8-quinolinoxy)acetate (S2-9) and related compounds, as described in EP-A-86 750, EP-A-94 349 and EP-A-191 736 or EP-A-0 492 366, and also (5-chloro-8-quinolinoxy)acetic acid (S2-10), hydrates and salts thereof, for example the lithium, sodium, potassium, calcium, magnesium, aluminum, iron, ammonium, quaternary ammonium, sulphonium or phosphonium salts thereof, as described in WO-A-2002/34048;

b) compounds of the (5-chloro-8-quinolinoxy)malonic acid type ($S2^b$), preferably compounds such as diethyl (5-chloro-8-quinolinoxy)malonate, diallyl (5-chloro-8-quinolinoxy)malonate, methyl ethyl (5-chloro-8-quinolinoxy)malonate and related compounds, as described in EP-A-0 582 198.

S3) Compounds of the formula (S3)



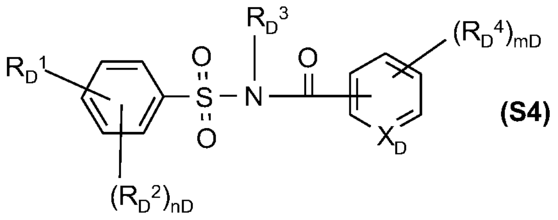
(S3)

where the symbols and indices are defined as follows:

R_C^1 is (C_1-C_4)-alkyl, (C_1-C_4)-haloalkyl, (C_2-C_4)-alkenyl, (C_2-C_4)-haloalkenyl, (C_3-C_7)-cycloalkyl, preferably dichloromethyl;

R_C^2, R_C^3 are identical or different and are hydrogen, (C_1-C_4)-alkyl, (C_2-C_4)-alkenyl, (C_2-C_4)-alkynyl, (C_1-C_4)-haloalkyl, (C_2-C_4)-haloalkenyl, (C_1-C_4)-alkylcarbamoyl-(C_1-C_4)-alkyl, (C_2-C_4)-alkenylcarbamoyl-(C_1-C_4)-alkyl, (C_1-C_4)-alkoxy-(C_1-C_4)-alkyl, dioxolanyl-(C_1-C_4)-alkyl, thiazolyl, furyl, furylalkyl, thienyl, piperidyl, substituted or unsubstituted phenyl, or R_C^2 and R_C^3 together form a substituted or unsubstituted heterocyclic ring, preferably an oxazolidine, thiazolidine, piperidine, morpholine, hexahydropyrimidine or benzoxazine ring; preferably: active ingredients of the dichloroacetamide type, which are frequently used as pre-emergence safeners (soil-acting safeners), for example "dichlormid" (N,N-diallyl-2,2-dichloroacetamide) (S3-1), "R-29148" (3-dichloroacetyl-2,2,5-trimethyl-1,3-oxazolidine) from Stauffer (S3-2), "R-28725" (3-dichloroacetyl-2,2-dimethyl-1,3-oxazolidine) from Stauffer (S3-3), "benoxacor" (4-dichloroacetyl-3,4-dihydro-3-methyl-2H-1,4-benzoxazine) (S3-4), "PPG-1292" (N-allyl-N-[(1,3-dioxolan-2-yl)methyl]dichloroacetamide) from PPG Industries (S3-5), "DKA-24" (N-allyl-N-[(allylaminocarbonyl)methyl]dichloroacetamide) from Sagro-Chem (S3-6), "AD-67" or "MON 4660" (3-dichloroacetyl-1-oxa-3-azaspiro[4,5]decane) from Nitrokemia or Monsanto (S3-7), "TI-35" (1-dichloroacetylazepane) from TRI-Chemical RT (S3-8), "diclonon" (dicyclonone) or "BAS145138" or "LAB145138" (S3-9) ((RS)-1-dichloroacetyl-3,3,8a-trimethylperhydropyrrolo[1,2-a]pyrimidin-6-one) from BASF, "furilazole" or "MON 13900" ((RS)-3-dichloroacetyl-5-(2-furyl)-2,2-dimethyloxazolidine) (S3-10); and the (R) isomer thereof (S3-11).

S4) N-acylsulfonamides of the formula (S4) and salts thereof,



(S4)

in which the symbols and indices are defined as follows:

X_D is CH or N;

R_D^1 is CO-$NR_D^5R_D^6$ or NHCO-R_D^7;

R_D^2 is halogen, (C_1-C_4)-haloalkyl, (C_1-C_4)-haloalkoxy, nitro, (C_1-C_4)-alkyl, (C_1-C_4)-alkoxy, (C_1-C_4)-alkylsulfonyl, (C_1-C_4)-alkoxycarbonyl or (C_1-C_4)-alkylcarbonyl;

R_D^3 is hydrogen, (C_1-C_4)-alkyl, (C_2-C_4)-alkenyl or (C_2-C_4)-alkynyl;

R_D^4 is halogen, nitro, (C_1-C_4)-alkyl, (C_1-C_4)-haloalkyl, (C_1-C_4)-haloalkoxy, (C_3-C_6)-cycloalkyl, phenyl, (C_1-C_4)-alkoxy, cyano, (C_1-C_4)-alkylthio, (C_1-C_4)-alkylsulfinyl, (C_1-C_4)-alkylsulfonyl, (C_1-C_4)-alkoxycarbonyl or (C_1-C_4)-alkylcarbonyl;

R_D^5 is hydrogen, (C_1-C_6)-alkyl, (C_3-C_6)-cycloalkyl, (C_2-C_6)-alkenyl, (C_2-C_6)-alkynyl, (C_5-C_6)-cycloalkenyl, phenyl or 3- to 6-membered heterocyclyl containing v_D heteroatoms from the group consisting of nitrogen, oxygen and sulfur, where the seven latter radicals are substituted by v_D substituents from the group consisting of halogen, (C_1-C_6)-alkoxy, (C_1-C_6)-haloalkoxy, (C_1-C_2)-alkylsulfinyl, (C_1-C_2)-alkylsulfonyl, (C_3-C_6)-cycloalkyl, (C_1-C_4)-alkoxycarbonyl, (C_1-C_4)-alkylcarbonyl and phenyl and, in the case of cyclic radicals, also (C_1-C_4)-alkyl and (C_1-C_4)-haloalkyl;

R_D^6 is hydrogen, (C_1-C_6)-alkyl, (C_2-C_6)-alkenyl or (C_2-C_6)-alkynyl, where the three latter radicals are substituted by v_D radicals from the group consisting of halogen, hydroxyl, (C_1-C_4)-alkyl, (C_1-C_4)-alkoxy and (C_1-C_4)-alkylthio, or

R_D^5 and R_D^6 together with the nitrogen atom that bears them form a pyrrolidinyl or piperidinyl radical;

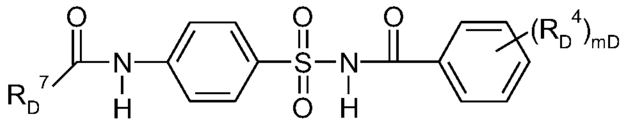
R_D^7 is hydrogen, (C_1-C_4)-alkylamino, di-(C_1-C_4)-alkylamino, (C_1-C_6)-alkyl, (C_3-C_6)-cycloalkyl, where the 2 latter radicals are substituted by v_D substituents from the group consisting of halogen, (C_1-C_4)-alkoxy, (C_1-C_6)-haloalkoxy and (C_1-C_4)-alkylthio and, in the case of cyclic radicals, also (C_1-C_4)-alkyl and (C_1-C_4)-haloalkyl;

n_D is 0, 1 or 2;

m_D is 1 or 2;

v_D is 0, 1, 2 or 3;

among these, preference is given to compounds of the N-acylsulfonamide type, for example of the formula ($S4^a$) below, which are known, for example, from WO-A-97/45016



(S4^a)

in which

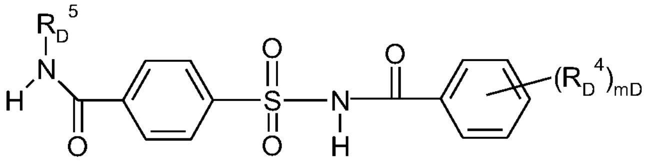
R_D^7 is $(C_1\text{-}C_6)$-alkyl, $(C_3\text{-}C_6)$-cycloalkyl, where the 2 latter radicals are substituted by v_D substituents from the group consisting of halogen, $(C_1\text{-}C_4)$-alkoxy, $(C_1\text{-}C_6)$-haloalkoxy and $(C_1\text{-}C_4)$-alkylthio and, in the case of cyclic radicals, also $(C_1\text{-}C_4)$-alkyl and $(C_1\text{-}C_4)$-haloalkyl;

R_D^4 is halogen, $(C_1\text{-}C_4)$-alkyl, $(C_1\text{-}C_4)$-alkoxy, CF_3;

m_D is 1 or 2;

v_D is 0, 1, 2 or 3;

and also to acylsulfamoylbenzamides, for example of the formula (S4^b) below, which are known, for example, from WO-A-99/16744,



(S4^b)

e.g. those in which

R_D^5 = cyclopropyl and (R_D^4) = 2-OMe (“cyprosulfamide”, S4-1),

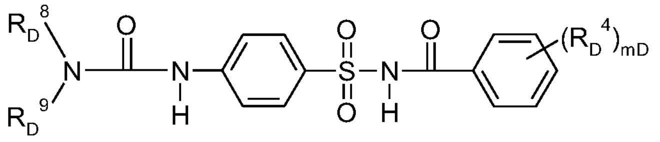
R_D^5 = cyclopropyl and (R_D^4) = 5-Cl-2-OMe (S4-2),

R_D^5 = ethyl and (R_D^4) = 2-OMe (S4-3),

R_D^5 = isopropyl and (R_D^4) = 5-Cl-2-OMe (S4-4) and

R_D^5 = isopropyl and (R_D^4) = 2-OMe (S4-5),

and to compounds of the N-acylsulfamoylphenylurea type, of the formula (S4^c), which are known, for example, from EP-A-365484,



(S4^c)

in which

R_D^8 and R_D^9 are independently hydrogen, (C_1-C_8)-alkyl, (C_3-C_8)-cycloalkyl, (C_3-C_6)-alkenyl, (C_3-C_6)-alkynyl,

R_D^4 is halogen, (C_1-C_4)-alkyl, (C_1-C_4)-alkoxy, CF_3,

m_D is 1 or 2;

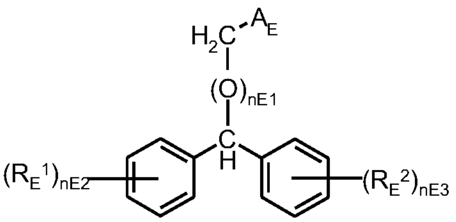
for example

1-[4-(N-2-methoxybenzoylsulfamoyl)phenyl]-3-methylurea,
1-[4-(N-2-methoxybenzoylsulfamoyl)phenyl]-3,3-dimethylurea,
1-[4-(N-4,5-dimethylbenzoylsulfamoyl)phenyl]-3-methylurea.

S5) Active ingredients from the class of the hydroxyaromatics and aromatic-aliphatic carboxylic acid derivatives (S5), for example ethyl 3,4,5-triacetoxybenzoate, 3,5-dimethoxy-4-hydroxybenzoic acid, 3,5-dihydroxybenzoic acid, 4-hydroxysalicylic acid, 4-fluorosalicylic acid, 2-hydroxycinnamic acid, 2,4-dichlorocinnamic acid, as described in WO-A-2004/084631, WO-A-2005/015994, WO-A-2005/016001.

S6) Active ingredients from the class of the 1,2-dihydroquinoxalin-2-ones (S6), for example 1-methyl-3-(2-thienyl)-1,2-dihydroquinoxalin-2-one, 1-methyl-3-(2-thienyl)-1,2-dihydroquinoxaline-2-thione, 1-(2-aminoethyl)-3-(2-thienyl)-1,2-dihydroquinoxalin-2-one hydrochloride, 1-(2-methylsulfonylaminoethyl)-3-(2-thienyl)-1,2-dihydroquinoxalin-2-one, as described in WO-A-2005/112630.

S7) Compounds of the formula (S7), as described in WO-A-1998/38856,



(S7)

in which the symbols and indices are defined as follows:

R_E^1, R_E^2 are independently halogen, (C_1-C_4)-alkyl, (C_1-C_4)-alkoxy, (C_1-C_4)-haloalkyl, (C_1-C_4)-alkylamino, di-(C_1-C_4)-alkylamino, nitro;

A_E is $COOR_E^3$ or $COSR_E^4$

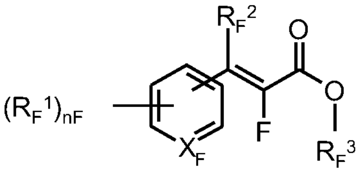
R_E^3, R_E^4 are independently hydrogen, (C_1-C_4)-alkyl, (C_2-C_6)-alkenyl, (C_2-C_4)-alkynyl, cyanoalkyl, (C_1-C_4)-haloalkyl, phenyl, nitrophenyl, benzyl, halobenzyl, pyridinylalkyl and alkylammonium,

n_E^1 is 0 or 1

n_E^2, n_E^3 are independently 0, 1 or 2,

preferably diphenylmethoxyacetic acid, ethyl diphenylmethoxyacetate, methyl diphenylmethoxyacetate (CAS reg. no. 41858-19-9) (S7-1).

S8) Compounds of the formula (S8), as described in WO-A-98/27049,



(S8)

in which

X_F is CH or N,

n_F in the case that X_F = N is an integer from 0 to 4 and in the case that X_F=CH is an integer from 0 to 5,

R_F^1 is halogen, (C_1-C_4)-alkyl, (C_1-C_4)-haloalkyl, (C_1-C_4)-alkoxy, (C_1-C_4)-haloalkoxy, nitro, (C_1-C_4)-alkylthio, (C_1-C_4)-alkylsulfonyl, (C_1-C_4)-alkoxycarbonyl, optionally substituted phenyl, optionally substituted phenoxy,

R_F^2 is hydrogen or (C_1-C_4)-alkyl,

R_F^3 is hydrogen, (C_1-C_8)-alkyl, (C_2-C_4)-alkenyl, (C_2-C_4)-alkynyl or aryl, where each of the abovementioned carbon-containing radicals is unsubstituted or substituted by one or more, preferably up to three identical or different radicals from the group consisting of halogen and alkoxy; or salts thereof,

preferably compounds in which

X_F is CH,

n_F is an integer from 0 to 2,

R_F^1 is halogen, (C_1-C_4)-alkyl, (C_1-C_4)-haloalkyl, (C_1-C_4)-alkoxy, (C_1-C_4)-haloalkoxy,

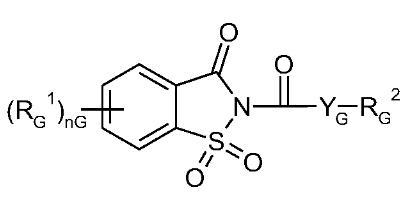
R_F^2 is hydrogen or (C_1-C_4)-alkyl,

R_F^3 is hydrogen, (C_1-C_8)-alkyl, (C_2-C_4)-alkenyl, (C_2-C_4)-alkynyl or aryl, where each of the abovementioned carbon-containing radicals is unsubstituted or substituted by one or more, preferably up to three identical or different radicals from the group consisting of halogen and alkoxy, or salts thereof.

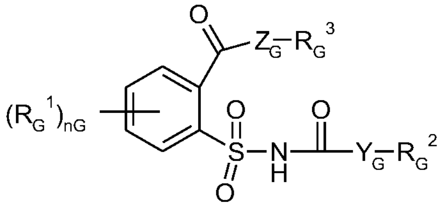
S9) Active ingredients from the class of the 3-(5-tetrazolylcarbonyl)-2-quinolones (S9), for example 1,2-dihydro-4-hydroxy-1-ethyl-3-(5-tetrazolylcarbonyl)-2-quinolone (CAS reg. no. 219479-18-2), 1,2-dihydro-4-hydroxy-1-methyl-3-(5-tetrazolylcarbonyl)-2-quinolone (CAS reg. no. 95855-00-8), as described in WO-A-1999/000020.

S10) Compounds of the formulae ($S10^a$) or ($S10^b$)

as described in WO-A-2007/023719 and WO-A-2007/023764



(S10a)



(S10b)

in which

R_G^1 is halogen, (C_1-C_4)-alkyl, methoxy, nitro, cyano, CF_3, OCF_3,

Y_G, Z_G independently of one another represent O or S,

n_G is an integer from 0 to 4,

R_G^2 is (C_1-C_{16})-alkyl, (C_2-C_6)-alkenyl, (C_3-C_6)-cycloalkyl, aryl; benzyl, halobenzyl,

R_G^3 is hydrogen or (C_1-C_6)-alkyl.

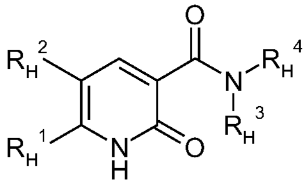
S11) Active ingredients of the oxyimino compound type (S11), which are known as seed-dressing compositions, for example "oxabetrinil" ((Z)-1,3-dioxolan-2-yl-methoxyimino(phenyl)acetonitrile) (S11-1), which is known as a seed-dressing safener for millet/sorghum against damage by metolachlor, "fluxofenim" (1-(4-chlorophenyl)-2,2,2-trifluoro-1-ethanone O-(1,3-dioxolan-2-ylmethyl)oxime) (S11-2), which is known as a seed-dressing safener for millet against damage by metolachlor, and "cyometrinil" or "CGA-43089" ((Z)-cyanomethoxyimino(phenyl)acetonitrile) (S11-3), which is known as a seed-dressing safener for millet/sorghum against damage by metolachlor.

S12) Active ingredients from the class of the isothiochromanones (S12), for example methyl [(3-oxo-1H-2-benzothiopyran-4(3H)-ylidene)methoxy]acetate (CAS reg. no. 205121-04-6) (S12-1) and related compounds from WO-A-1998/13361.

S13) One or more compounds from group (S13): “naphthalic anhydride” (1,8-naphthalenedicarboxylic anhydride) (S13-1), which is known as a seed-dressing safener for maize against damage by thiocarbamate herbicides, “fenclorim” (4,6-dichloro-2-phenylpyrimidine) (S13-2), which is known as a safener for pretilachlor in sown rice, “flurazole” (benzyl 2-chloro-4-trifluoromethyl-1,3-thiazole-5-carboxylate) (S13-3), which is known as a seed-dressing safener for millet against damage by alachlor and metolachlor, “CL 304415” (CAS reg. no. 31541-57-8) (4-carboxy-3,4-dihydro-2H-1-benzopyran-4-acetic acid) (S13-4) from American Cyanamid, which is known as a safener for maize against damage by imidazolinones, “MG 191” (CAS reg. no. 96420-72-3) (2-dichloromethyl-2-methyl-1,3-dioxolane) (S13-5) from Nitrokemia, which is known as a safener for maize, “MG-838” (CAS reg. no. 133993-74-5) (2-propenyl 1-oxa-4-azaspiro[4.5]decane-4-carbodithioate) (S13-6) from Nitrokemia, “disulfoton” (O,O-diethyl S-2-ethylthioethyl phosphorodithioate) (S13-7), “dietholate” (O,O-diethyl O-phenylphosphorothioate) (S13-8), “mephenate” (4-chlorophenyl methylcarbamate) (S13-9).

S14) Active ingredients which, in addition to herbicidal action against harmful plants, also have safener action on crop plants such as rice, for example "dimepiperate" or "MY-93" (*S*-1-methyl-1-phenylethylpiperidine-1-carbothioate), which is known as a safener for rice against damage by the herbicide molinate, "daimuron" or "SK 23" (1-(1-methyl-1-phenylethyl)-3-p-tolylurea), which is known as a safener for rice against damage by the herbicide imazosulfuron, "cumyluron" = "JC-940" (3-(2-chlorophenylmethyl)-1-(1-methyl-1-phenylethyl)urea, see JP-A-60087254), which is known as a safener for rice against damage by some herbicides, "methoxyphenon" or "NK 049" (3,3'-dimethyl-4-methoxybenzophenone), which is known as a safener for rice against damage by some herbicides, "CSB" (1-bromo-4-(chloromethylsulfonyl)benzene) from Kumiai, (CAS reg. no. 54091-06-4), which is known as a safener against damage by some herbicides in rice.

S15) Compounds of the formula (S15) or tautomers thereof as described in WO-A-2008/131861 and WO-A-2008/131860,



(S15)

in which

R_H^1 is a (C_1-C_6)-haloalkyl radical and

R_H^2 is hydrogen or halogen and

R_H^3, R_H^4 are independently hydrogen, (C_1-C_{16})-alkyl, (C_2-C_{16})-alkenyl or (C_2-C_{16})-alkynyl, where each of the latter 3 radicals is unsubstituted or substituted by one or more radicals from the group of halogen, hydroxy, cyano, (C_1-C_4)-alkoxy, (C_1-C_4)-haloalkoxy, (C_1-C_4)-alkylthio, (C_1-C_4)-alkylamino, di[(C_1-C_4)-alkyl]amino, [(C_1-C_4)-alkoxy]carbonyl, [(C_1-C_4)haloalkoxy]carbonyl, (C_3-C_6)-cycloalkyl which is unsubstituted or substituted, phenyl which is unsubstituted or substituted, and heterocyclyl which is unsubstituted or substituted, or (C_3-C_6)-cycloalkyl, (C_4-C_6)-cycloalkenyl, (C_3-C_6)-cycloalkyl fused on one side of the ring to a 4- to 6-membered saturated or unsaturated carbocyclic ring, or (C_4-C_6)cycloalkenyl fused on one side of the ring to a 4- to 6-membered saturated or unsaturated carbocyclic ring, where each of the latter 4 radicals is unsubstituted or substituted by one or more radicals from the group of halogen, hydroxy, cyano, (C_1-C_4)-alkyl, (C_1-C_4)-haloalkyl, (C_1-C_4)-alkoxy, (C_1-C_4)-haloalkoxy, (C_1-C_4)-alkylthio, (C_1-C_4)-alkylamino, di[(C_1-C_4)-alkyl]amino, [(C_1-C_4)-alkoxy]carbonyl, [(C_1-C_4)-haloalkoxy]carbonyl, (C_3-C_6)-cycloalkyl which is unsubstituted or substituted, phenyl which is unsubstituted or substituted, and heterocyclyl which is unsubstituted or substituted,

or

R_H^3 is (C_1-C_4)-alkoxy, (C_2-C_4)-alkenyloxy, (C_2-C_6)-alkynyloxy or (C_2-C_4)-haloalkoxy

and

R_H^4 is hydrogen or (C_1-C_4)-alkyl, or

R_H^3 and R_H^4 together with the directly bonded nitrogen atom are a four- to eight-membered heterocyclic ring which, as well as the nitrogen atom, may also contain further ring heteroatoms, preferably up to two further ring heteroatoms from the group of N, O and S, and which is unsubstituted or substituted by one or more radicals from the group of halogen, cyano, nitro, (C_1-C_4)-alkyl, (C_1-C_4)-haloalkyl, (C_1-C_4)-alkoxy, (C_1-C_4)-haloalkoxy and (C_1-C_4)-alkylthio.

S16) Active ingredients which are used primarily as herbicides but also have safener action on crop plants, for example (2,4-dichlorophenoxy)acetic acid (2,4-D), (4-chlorophenoxy)acetic acid, (R,S)-2-(4-chloro-o-tolyloxy)propionic acid (mecoprop), 4-(2,4-dichlorophenoxy)butyric acid (2,4-DB), (4-chloro-o-tolyloxy)acetic acid (MCPA), 4-(4-chloro-o-tolyloxy)butyric acid, 4-(4-chlorophenoxy)butyric acid, 3,6-dichloro-2-methoxybenzoic acid (dicamba), 1-(ethoxycarbonyl)ethyl 3,6-dichloro-2-methoxybenzoate (lactidichlor-ethyl).

Biological examples:

A. Post-emergence herbicidal action and crop compatibility of selected compounds of the general formula (I)

Seeds of monocotyledonous and dicotyledonous weeds and crop plants were placed in sandy loam in plastic or wood-fibre pots, covered with soil and cultivated in a greenhouse under controlled growth conditions. 2 to 3 weeks after sowing, the test plants were treated at the one-leaf stage. The compounds of the invention, formulated in the form of wettable powders (WP) or as emulsion concentrates (EC), were then sprayed onto the green parts of the plants as aqueous suspension or emulsion with addition of 0.5% additive at a water application rate of 600 l/ha (converted). After the test plants had been kept in the greenhouse under optimum growth conditions for about 3 weeks, the activity of the preparations was rated visually in comparison to untreated controls. For example, 100% activity = the plants have died, 0% activity = like control plants.

Tables A1 to A13 below show the effects of selected compounds of the general formula (I) according to Tables I.1 to I.33 on various harmful plants and at an application rate corresponding to 20 g/ha and less, which were obtained by the experimental method specified above.

The appendices “a”, “b” and “c” give differentiation by dosage used with otherwise the same harmful plants tested.

Table A1a: Post-emergence effect at 1.25 g/ha against ABUTH in %

Example number	Dosage [g/ha]	ABUTH
I.7-12	1.25	90
I.7-1	1.25	90
I.9-1	1.25	100
I.24-1	1.25	100
I.7-5	1.25	100
I.7-6	1.25	100
I.7-2	1.25	80
I.7-8	1.25	100
I.7-9	1.25	100
I.7-13	1.25	80
I.7-14	1.25	100
I.7-10	1.25	100
I.7-16	1.25	80
I.7-19	1.25	100
I.7-18	1.25	100
I.7-4	1.25	100

Table A1b: Post-emergence effect at 5 g/ha against ABUTH in %

Example number	Dosage [g/ha]	ABUTH
I.7-12	5	100
I.7-1	5	100
I.8-1	5	100
I.9-1	5	100
I.24-1	5	100
I.7-5	5	100
I.7-6	5	100
I.7-2	5	100
I.7-8	5	100
I.7-7	5	100
I.7-9	5	100
I.7-13	5	100
I.7-14	5	100
I.7-10	5	100
I.7-16	5	100
I.7-19	5	100
I.7-18	5	100
I.7-4	5	100

Table A1c: Post-emergence effect at 20 g/ha against ABUTH in %

Example number	Dosage [g/ha]	ABUTH
I.7-12	20	100
I.7-1	20	100
I.8-1	20	100
I.9-1	20	100
I.24-1	20	100
I.7-5	20	100
I.7-6	20	100
I.7-2	20	100
I.7-8	20	100
I.7-7	20	100
I.7-9	20	100
I.7-13	20	100
I.7-15	20	100
I.7-14	20	100
I.7-10	20	100
I.7-16	20	100
I.7-19	20	100
I.7-18	20	100
I.7-4	20	100

Table A2a: Post-emergence effect at 1.25 g/ha against ALOMY in %

Example number	Dosage [g/ha]	ALOMY
I.7-6	1.25	80

Table A2b: Post-emergence effect at 5 g/ha against ALOMY in %

Example number	Dosage [g/ha]	ALOMY
I.7-1	5	90
I.9-1	5	100
I.7-5	5	80
I.7-6	5	100
I.7-8	5	80
I.7-7	5	80
I.7-16	5	90
I.7-18	5	80
I.7-4	5	80

Table A2c: Post-emergence effect at 20 g/ha against ALOMY in %

Example number	Dosage [g/ha]	ALOMY
I.7-12	20	100
I.7-1	20	100
I.8-1	20	100
I.9-1	20	100
I.7-5	20	100
I.7-6	20	100
I.7-2	20	80
I.7-8	20	100
I.7-7	20	100
I.7-9	20	100
I.7-13	20	80
I.7-15	20	80
I.7-14	20	100
I.7-10	20	100
I.7-16	20	100
I.7-19	20	100
I.7-18	20	100

Example number	Dosage [g/ha]	ALOMY
I.7-4	20	100

Table A3a: Post-emergence effect at 1.25 g/ha against AMARE in %

Example number	Dosage [g/ha]	AMARE
I.7-12	1.25	100
I.7-1	1.25	100
I.8-1	1.25	100
I.9-1	1.25	100
I.24-1	1.25	100
I.7-5	1.25	100
I.7-6	1.25	100
I.7-2	1.25	100
I.7-8	1.25	100
I.7-7	1.25	100
I.7-9	1.25	100
I.7-13	1.25	100
I.7-15	1.25	100
I.7-14	1.25	100
I.7-10	1.25	100
I.7-16	1.25	100
I.7-19	1.25	100
I.7-18	1.25	100
I.7-4	1.25	100

Table A3b: Post-emergence effect at 5 g/ha against AMARE in %

Example number	Dosage [g/ha]	AMARE
I.7-12	5	100
I.7-1	5	100
I.8-1	5	100
I.9-1	5	100
I.24-1	5	100
I.7-5	5	100
I.7-6	5	100
I.7-2	5	100
I.7-8	5	100
I.7-7	5	100
I.7-9	5	100
I.7-13	5	100
I.7-15	5	100
I.7-14	5	100
I.7-10	5	100
I.7-16	5	100
I.7-19	5	100
I.7-18	5	100
I.7-4	5	100

Table A3c: Post-emergence effect at 20 g/ha against AMARE in %

Example number	Dosage [g/ha]	AMARE
I.7-12	20	100
I.7-1	20	100
I.8-1	20	100
I.9-1	20	100
I.24-1	20	100
I.7-5	20	100
I.7-6	20	100
I.7-2	20	100
I.7-8	20	100
I.7-7	20	100
I.7-9	20	100
I.7-13	20	100
I.7-15	20	100
I.7-14	20	100
I.7-10	20	100
I.7-16	20	100
I.7-19	20	100
I.7-18	20	100
I.7-4	20	100

Table A4a: Post-emergence effect at 1.25 g/ha against ECHCG in %

Example number	Dosage [g/ha]	ECHCG
I.7-1	1.25	100
I.9-1	1.25	80
I.7-9	1.25	80
I.7-13	1.25	80
I.7-14	1.25	90
I.7-10	1.25	100
I.7-16	1.25	100

Table A4b: Post-emergence effect at 5 g/ha against ECHCG in %

Example number	Dosage [g/ha]	ECHCG
I.7-12	5	90
I.7-1	5	100
I.9-1	5	100
I.24-1	5	80
I.7-5	5	100
I.7-6	5	100
I.7-2	5	100
I.7-8	5	100
I.7-7	5	100
I.7-9	5	100
I.7-13	5	90
I.7-15	5	90
I.7-14	5	100
I.7-10	5	100
I.7-16	5	100
I.7-19	5	100
I.7-18	5	100
I.7-4	5	100

Table A4c: Post-emergence effect at 20 g/ha against ECHCG in %

Example number	Dosage [g/ha]	ECHCG
I.7-12	20	100
I.7-1	20	100
I.8-1	20	100
I.9-1	20	100
I.24-1	20	100
I.7-5	20	100
I.7-6	20	100
I.7-2	20	100
I.7-8	20	100
I.7-7	20	100
I.7-9	20	100
I.7-13	20	100
I.7-15	20	100
I.7-14	20	100
I.7-10	20	100
I.7-16	20	100
I.7-19	20	100
I.7-18	20	100
I.7-4	20	100

Table A5a: Post-emergence effect at 20 g/ha against LOLRI in %

Example number	Dosage [g/ha]	LOLRI
I.7-1	20	80
I.7-6	20	80
I.7-2	20	100
I.7-8	20	80
I.7-7	20	100
I.7-9	20	90
I.7-13	20	80
I.7-10	20	100
I.7-19	20	80
I.7-18	20	100
I.7-4	20	100

Table A6a: Post-emergence effect at 1.25 g/ha against MATIN in %

Example number	Dosage [g/ha]	MATIN
I.7-1	1.25	80

Table A6b: Post-emergence effect at 5 g/ha against MATIN in %

Example number	Dosage [g/ha]	MATIN
I.7-1	5	100
I.9-1	5	80
I.7-5	5	100
I.7-8	5	100
I.7-7	5	100
I.7-4	5	100

Table A6c: Post-emergence effect at 20 g/ha against MATIN in %

Example number	Dosage [g/ha]	MATIN
I.7-12	20	100
I.7-1	20	100
I.8-1	20	100
I.9-1	20	80
I.24-1	20	80
I.7-5	20	100
I.7-6	20	100
I.7-2	20	100
I.7-8	20	100
I.7-7	20	100
I.7-9	20	100
I.7-13	20	80
I.7-14	20	90
I.7-10	20	100
I.7-16	20	90
I.7-19	20	100
I.7-18	20	100
I.7-4	20	100

Table A7a: Post-emergence effect at 1.25 g/ha against PHBPU in %

Example number	Dosage [g/ha]	PHBPU
I.7-12	1.25	80
I.7-1	1.25	80

Example number	Dosage [g/ha]	PHBPU
I.24-1	1.25	80
I.7-5	1.25	100
I.7-8	1.25	80
I.7-7	1.25	100
I.7-9	1.25	100
I.7-13	1.25	100
I.7-14	1.25	100
I.7-16	1.25	80
I.7-19	1.25	80
I.7-4	1.25	80

Table A7b: Post-emergence effect at 5 g/ha against PHBPU in %

Example number	Dosage [g/ha]	PHBPU
I.7-12	5	100
I.7-1	5	100
I.8-1	5	80
I.9-1	5	100
I.24-1	5	100
I.7-5	5	100
I.7-6	5	100
I.7-2	5	100
I.7-8	5	100
I.7-7	5	100
I.7-9	5	100
I.7-13	5	100
I.7-15	5	100
I.7-14	5	100
I.7-10	5	100
I.7-16	5	100
I.7-19	5	100
I.7-18	5	100
I.7-4	5	100

Table A7c: Post-emergence effect at 20 g/ha against PHBPU in %

Example number	Dosage [g/ha]	PHBPU
I.7-12	20	100
I.7-1	20	100
I.8-1	20	100
I.9-1	20	100

Example number	Dosage [g/ha]	PHBPU
I.24-1	20	100
I.7-5	20	100
I.7-6	20	100
I.7-2	20	100
I.7-8	20	100
I.7-7	20	100
I.7-9	20	100
I.7-13	20	100
I.7-15	20	100
I.7-14	20	100
I.7-10	20	100
I.7-16	20	100
I.7-19	20	100
I.7-18	20	100
I.7-4	20	100

Table 8a: Post-emergence effect at 1.25 g/ha against POLCO in %

Example number	Dosage [g/ha]	POLCO
I.7-1	1.25	80
I.7-10	1.25	100
I.7-18	1.25	100

Table A8b: Post-emergence effect at 5 g/ha against POLCO in %

Example number	Dosage [g/ha]	POLCO
I.7-12	5	80
I.7-1	5	100
I.8-1	5	100
I.9-1	5	80
I.7-6	5	100
I.7-2	5	100
I.7-8	5	100
I.7-7	5	100
I.7-13	5	100
I.7-14	5	100
I.7-10	5	100
I.7-16	5	100
I.7-19	5	100
I.7-18	5	100
I.7-4	5	100

Table A8c: Post-emergence effect at 20 g/ha against POLCO in %

Example number	Dosage [g/ha]	POLCO
I.7-12	20	100
I.7-1	20	100
I.8-1	20	100
I.9-1	20	100
I.24-1	20	100
I.7-5	20	100
I.7-6	20	100
I.7-2	20	100
I.7-8	20	100
I.7-7	20	100
I.7-9	20	100
I.7-13	20	100
I.7-15	20	100
I.7-14	20	100
I.7-10	20	100
I.7-16	20	100
I.7-19	20	100
I.7-18	20	100
I.7-4	20	100

Table A9a: Post-emergence effect at 1.25 g/ha against SETVI in %

Example number	Dosage [g/ha]	SETVI
I.7-12	1.25	80
I.7-1	1.25	100
I.9-1	1.25	80
I.24-1	1.25	90
I.7-5	1.25	100
I.7-6	1.25	100
I.7-2	1.25	100
I.7-8	1.25	100
I.7-7	1.25	100
I.7-9	1.25	100
I.7-13	1.25	100
I.7-14	1.25	100
I.7-10	1.25	100
I.7-16	1.25	100
I.7-19	1.25	100
I.7-4	1.25	100

Table A9b: Post-emergence effect at 5 g/ha against SETVI in %

Example number	Dosage [g/ha]	SETVI
I.7-12	5	100
I.7-1	5	100
I.8-1	5	100
I.9-1	5	100
I.24-1	5	100
I.7-5	5	100
I.7-6	5	100
I.7-2	5	100
I.7-8	5	100
I.7-7	5	100
I.7-9	5	100
I.7-13	5	100
I.7-15	5	100
I.7-14	5	100
I.7-10	5	100
I.7-16	5	100
I.7-19	5	100
I.7-18	5	100
I.7-4	5	100

Table A9c: Post-emergence effect at 20 g/ha against SETVI in %

Example number	Dosage [g/ha]	SETVI
I.7-12	20	100
I.7-1	20	100
I.8-1	20	100
I.9-1	20	100
I.24-1	20	100
I.7-5	20	100
I.7-6	20	100
I.7-2	20	100
I.7-8	20	100
I.7-7	20	100
I.7-9	20	100
I.7-13	20	100
I.7-15	20	100
I.7-14	20	100
I.7-10	20	100
I.7-16	20	100
I.7-19	20	100
I.7-18	20	100
I.7-4	20	100

Table A10a: Post-emergence effect at 1.25 g/ha against VERPE in %

Example number	Dosage [g/ha]	VERPE
I.7-12	1.25	90
I.7-1	1.25	100
I.7-5	1.25	100
I.7-6	1.25	100
I.7-2	1.25	100
I.7-8	1.25	100
I.7-7	1.25	100
I.7-9	1.25	90
I.7-13	1.25	100
I.7-15	1.25	80
I.7-14	1.25	100
I.7-10	1.25	100
I.7-16	1.25	80
I.7-19	1.25	90
I.7-18	1.25	80
I.7-4	1.25	100

Table A10b: Post-emergence effect at 5 g/ha against VERPE in %

Example number	Dosage [g/ha]	VERPE
I.7-12	5	100
I.7-1	5	100
I.8-1	5	100
I.9-1	5	100
I.24-1	5	100
I.7-5	5	100
I.7-6	5	100
I.7-2	5	100
I.7-8	5	100
I.7-7	5	100
I.7-9	5	100
I.7-13	5	100
I.7-15	5	100
I.7-14	5	100
I.7-10	5	100
I.7-16	5	100
I.7-19	5	100
I.7-18	5	100
I.7-4	5	100

Table A10c: Post-emergence effect at 20 g/ha against VERPE in %

Example number	Dosage [g/ha]	VERPE
I.7-12	20	100
I.7-1	20	100
I.8-1	20	100
I.9-1	20	100
I.24-1	20	100
I.7-5	20	100
I.7-6	20	100
I.7-2	20	100
I.7-8	20	100
I.7-7	20	100
I.7-9	20	100
I.7-13	20	100
I.7-15	20	100
I.7-14	20	100
I.7-10	20	100
I.7-16	20	100
I.7-19	20	100
I.7-18	20	100
I.7-4	20	100

Table A11a: Post-emergence effect at 1.25 g/ha against VIOTR in %

Example number	Dosage [g/ha]	VIOTR
I.7-12	1.25	100
I.7-1	1.25	100
I.9-1	1.25	100
I.7-5	1.25	100
I.7-6	1.25	100
I.7-2	1.25	100
I.7-8	1.25	100
I.7-7	1.25	100
I.7-9	1.25	100
I.7-13	1.25	90
I.7-14	1.25	100
I.7-10	1.25	100
I.7-16	1.25	100
I.7-19	1.25	100
I.7-18	1.25	100
I.7-4	1.25	100

Table A11b: Post-emergence effect at 5 g/ha against VIOTR in %

Example number	Dosage [g/ha]	VIOTR
I.7-12	5	100
I.7-1	5	100
I.9-1	5	100
I.24-1	5	100
I.7-5	5	100
I.7-6	5	100
I.7-2	5	100
I.7-8	5	100
I.7-7	5	100
I.7-9	5	100
I.7-13	5	100
I.7-15	5	100
I.7-14	5	100
I.7-10	5	100
I.7-16	5	100
I.7-19	5	100
I.7-18	5	100
I.7-4	5	100

Table A11c: Post-emergence effect at 20 g/ha against VIOTR in %

Example number	Dosage [g/ha]	VIOTR
I.7-12	20	100
I.7-1	20	100
I.8-1	20	100
I.9-1	20	100
I.24-1	20	100
I.7-5	20	100
I.7-6	20	100
I.7-2	20	100
I.7-8	20	100
I.7-7	20	100
I.7-9	20	100
I.7-13	20	100
I.7-15	20	100
I.7-14	20	100
I.7-10	20	100
I.7-16	20	100
I.7-19	20	100
I.7-18	20	100
I.7-4	20	100

Table A12a: Post-emergence effect at 1.25 g/ha against DIGSA in %

Example number	Dosage [g/ha]	DIGSA
I.7-12	1.25	100
I.24-1	1.25	80
I.7-6	1.25	100
I.7-2	1.25	100
I.7-8	1.25	100
I.7-9	1.25	100
I.7-10	1.25	80
I.7-16	1.25	90
I.7-18	1.25	100

Table A12b: Post-emergence effect at 5 g/ha against DIGSA in %

Example number	Dosage [g/ha]	DIGSA
I.7-12	5	100
I.24-1	5	100
I.7-5	5	100
I.7-6	5	100
I.7-2	5	100
I.7-8	5	100
I.7-7	5	100
I.7-9	5	100
I.7-13	5	100
I.7-14	5	100
I.7-10	5	100
I.7-16	5	100
I.7-19	5	100
I.7-18	5	100
I.7-4	5	100

Table A12c: Post-emergence effect at 20 g/ha against DIGSA in %

Example number	Dosage [g/ha]	DIGSA
I.7-12	20	100
I.24-1	20	100
I.7-5	20	100
I.7-6	20	100
I.7-2	20	100
I.7-8	20	100

I.7-7	20	100
I.7-9	20	100
I.7-13	20	100
I.7-15	20	100
I.7-14	20	100
I.7-10	20	100
I.7-16	20	100
I.7-19	20	100
I.7-18	20	100
I.7-4	20	100

Table A13a: Post-emergence effect at 1.25 g/ha against KCHSC in %

Example number	Dosage [g/ha]	KCHSC
I.24-1	1.25	100
I.7-5	1.25	100
I.7-6	1.25	100
I.7-2	1.25	100
I.7-8	1.25	100
I.7-7	1.25	100
I.7-9	1.25	90
I.7-14	1.25	100
I.7-10	1.25	100
I.7-16	1.25	100
I.7-19	1.25	80
I.7-18	1.25	100
I.7-4	1.25	100

Table A13b: Post-emergence effect at 5 g/ha against KCHSC in %

Example number	Dosage [g/ha]	KCHSC
I.24-1	5	100
I.7-5	5	100
I.7-6	5	100
I.7-2	5	100
I.7-8	5	100
I.7-7	5	100
I.7-9	5	100
I.7-13	5	100
I.7-15	5	100
I.7-14	5	100
I.7-10	5	100

Example number	Dosage [g/ha]	KCHSC
I.7-16	5	100
I.7-19	5	80
I.7-18	5	100
I.7-4	5	100

Table A13c: Post-emergence effect at 20 g/ha against KCHSC in %

Example number	Dosage [g/ha]	KCHSC
I.24-1	20	100
I.7-5	20	100
I.7-6	20	100
I.7-2	20	100
I.7-8	20	100
I.7-7	20	100
I.7-9	20	100
I.7-13	20	100
I.7-15	20	100
I.7-14	20	100
I.7-10	20	100
I.7-16	20	100
I.7-19	20	100
I.7-18	20	100
I.7-4	20	100

Tables A14 to A17 below show the crop plant compatibilities of selected compounds of the general formula (I) according to tables I.1 to I.33 at an application rate corresponding to 20 g/ha or less, which were observed in trials by the experimental procedure mentioned above.
The observed effects on selected crop plants are reported here in comparison to the untreated controls (values in %).
The appendices “a”, “b” and “c” give differentiation by dosages used with otherwise the same crop plants tested.

Table A14a: Post-emergence effect at 1.25 g/ha against ZEAMX in %

Example number	Dosage [g/ha]	ZEAMX
I.7-12	1.25	10
I.7-1	1.25	20
I.8-1	1.25	0
I.9-1	1.25	10
I.7-16	1.25	20
I.7-18	1.25	20

Table A14b: Post-emergence effect at 5 g/ha against ZEAMX in %

Example number	Dosage [g/ha]	ZEAMX
I.7-12	5	20
I.9-1	5	20

Table A15a: Post-emergence effect at 1.25 g/ha against TRZAS in %

Example number	Dosage [g/ha]	TRZAS
I.7-12	1.25	10
I.7-1	1.25	0
I.8-1	1.25	0
I.9-1	1.25	0
I.24-1	1.25	20
I.7-6	1.25	20
I.7-2	1.25	10
I.7-8	1.25	20
I.7-7	1.25	10
I.7-9	1.25	20
I.7-13	1.25	20
I.7-15	1.25	20
I.7-14	1.25	20
I.7-10	1.25	20
I.7-16	1.25	10
I.7-19	1.25	10
I.7-18	1.25	10
I.7-4	1.25	20

Table A15b: Post-emergence effect at 20 g/ha against TRZAS in %

Example number	Dosage [g/ha]	TRZAS
I.7-12	5	20
I.7-1	5	0
I.8-1	5	0

I.9-1	5	20
I.7-9	5	20
I.7-13	5	20
I.7-15	5	20
I.7-16	5	20
I.7-19	5	10

Table A16a: Post-emergence effect at 1.25 g/ha against ORYSA in %

Example number	Dosage [g/ha]	ORYSA
I.7-12	1.25	0
I.7-1	1.25	0
I.8-1	1.25	0
I.9-1	1.25	0

Table A16b: Post-emergence effect at 5 g/ha against ORYSA in %

Example number	Dosage [g/ha]	ORYSA
I.7-12	5	20
I.7-1	5	20
I.8-1	5	0
I.9-1	5	0

Table A16c: Post-emergence effect at 20 g/ha against ORYSA in %

Example number	Dosage [g/ha]	ORYSA
I.8-1	20	20
I.9-1	20	0

Table A17a: Post-emergence effect at 1.25 g/ha against GLXMA in %

Example number	Dosage [g/ha]	GLXMA
I.8-1	1.25	0
I.7-13	1.25	20

As these results show, inventive compounds of the general formula (I) in the case of post-emergence treatment (a) have good herbicidal efficacy against harmful plants, for example *Abutilon theophrasti* (ABUTH), *Alopecurus myosuroides* (ALOMY), *Amaranthus retroflexus* (AMARE), *Digitaria sanguinalis* (DIGSA), *Echinochloa crus-galli* (ECHCG), *Bassia scoparia* (KCHSC), *Lolium rigidum* (LOLRI), *Tripleurospermum inodorum* (MATIN), *Pharbitis* *purpurea* (PHBPU), *Polygonum convolvulus* (POLCO), *Setaria viridis* (SETVI), *Veronica persica* (VERPE) and *Viola tricolor* (VIOTR) at an application rate of 0.02 kg of active substance or less per hectare, and (b) good crop plant compatibility in the case of organisms such as *Oryza sativa* (ORYSA), *Zea mays* (ZEAMX), *Glycine max* (GLXMA) and *Triticum aestivum* (TRZAS) at an application rate of 0.02 kg or less per hectare.

B. Comparative post-emergence herbicidal action and crop plant compatibility of illustratively selected compounds of the invention (I.7-12, I.7-14, I.7-16) with structurally similar compounds known from the literature (WO2002/098227, structures "a-27" and "a-29").

Tables B1-B5 below show the effects of inventive compounds (I.7-12, I.7-14, I.7-16) that have been obtained by the test method specified above on various harmful plants at an application rate corresponding to 20 g/ha or lower by comparison with structurally similar compounds known from the literature ("a-27", "a-29", disclosed in WO2002/098227).

In this case, the tested inventive compounds (I.7-12, I.7-14, I.7-16) each differ by variance of a significant structural feature from the compounds known from the literature with regard to the ester unit, with the same "cycloalkyl group", by the incorporation of a methylene bridge ($-CH_2-$).

Table B1

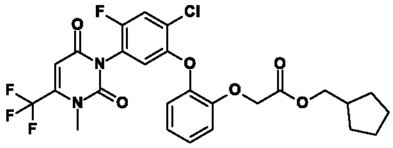
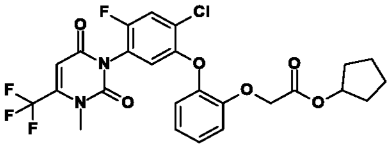
Compound	*ALOMY* (efficacy in %)	Application rate [g/ha]
I.7-12 (inventive) 	100	20
a-27 (WO2002/098227) 	80	20

Table B2

Compound	*ECHCG* (efficacy in %)	Application rate [g/ha]
I.7-12 (inventive)	60	1.25
a-27 (WO2002/098227)	30	1.25

Table B3

Compound	*AVEFA* (efficacy in %)	Application rate [g/ha]
I.7-12 (inventive)	70	20
a-27 (WO2002/098227)	40	20

Table B4

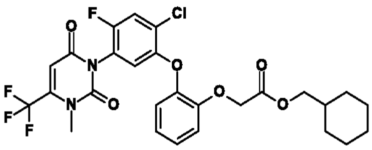
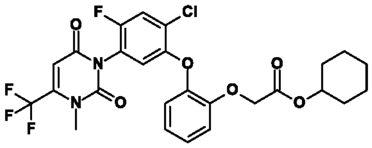
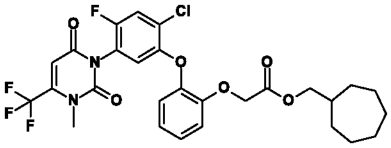
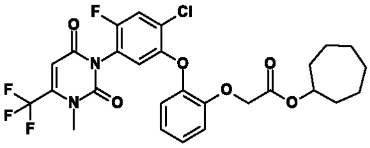
Compound	*VERPE* (efficacy in %)	Application rate [g/ha]
I.7-14 (inventive) 	100	1.25
a-29 (WO2002/098227) 	90	1.25

Table B5

Compound	*ECHCG* (efficacy in %)	Application rate [g/ha]
I.7-16 (inventive)	100	1.25

Compound	*ECHCG* (efficacy in %)	Application rate [g/ha]
		
The following structure which is not specifically disclosed in WO2002/098227 but is generically encompassed: 	80	1.25

As the results shown in tables B1 to B5 show, inventive compounds I.7-12, I.7-14, I.7-16, by comparison with the structurally similar compounds "a-27", "a-29" known from literature (WO2002/098227) or a structure generically encompassed therein, show a distinctly improved herbicidal efficacy against harmful plants such as *Alopecurus myosuroides* (ALOMY), *Echinochloa crus-galli* (ECHCG), *Avena fatura* (AVEFA) and *Veronica persica* (VERPE) at an application rate of 20 g or less per hectare.

Tables B6 to B10 below show the effects of inventive compounds (I.7-12, I.7-14, I.7-16) that have been obtained by the test method specified above on the crop plants *Oryza sativa* (ORYSA), *Zea mays* (ZEAMX) and *Triticum aestivum* (TRZAS) at an application rate corresponding to 5 g/ha or lower by comparison with structurally similar compounds known from the literature ("a-27", "a-29", disclosed in WO2002/098227).

Table B6

Compound	*ORYSA* (efficacy in %)	Application rate [g/ha]
I.7-12 (inventive)	0	1.25
a-27 (WO2002/098227)	20	1.25

Table B7

Compound	*ZEAMX* (efficacy in %)	Application rate [g/ha]
I.7-12 (inventive)	10	1.25
a-27 (WO2002/098227)	30	1.25

Table B8

Compound	*TRZAS* (efficacy in %)	Application rate [g/ha]
I.7-14 (inventive)	20	1.25
a-29 (WO2002/098227)	30	1.25

Table B9

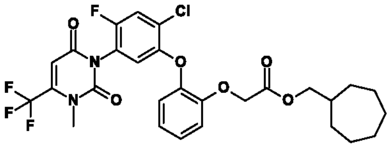
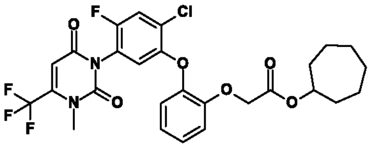
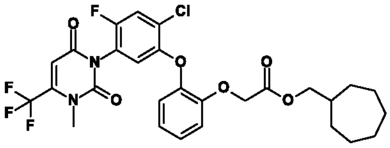
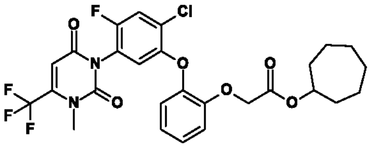
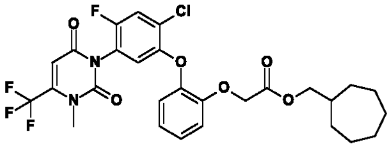
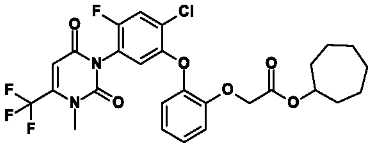
Compound	*TRZAS* (efficacy in %)	Application rate [g/ha]
I.7-16 (inventive) 	10	1.25
The following structure which is not specifically disclosed in WO2002/098227 but is generically encompassed: 	30	1.25
I.7-16 (inventive) 	20	5
The following structure which is not specifically disclosed in WO2002/098227 but is generically encompassed: 	50	5

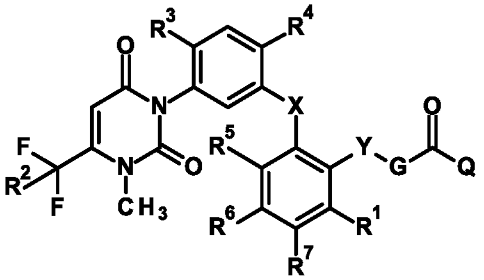
Table B10

Compound	*ZEAMX* (efficacy in %)	Application rate [g/ha]
I.7-16 (inventive) 	20	1.25
The following structure which is not specifically disclosed in WO2002/098227 but is generically encompassed: 	30	1.25

As the results shown in tables B6 to B10 show, inventive compounds (I.7-12, I.7-14, I.7-16), by direct comparison with structurally similar compounds "a-27", "a-29" known from the literature (WO2002/098227) or a structure generically encompassed therein, show distinctly improved compatibility with respect to the crop plants *Oryza sativa* (ORYSA), *Zea mays* (ZEAMX) and *Triticum aestivum* (TRZAS) at an application rate of 5 g or less per hectare.

Claims:

1. A substituted N-phenyluracil of the general formula (I) or salts thereof



(I)

in which

R^1 is hydrogen, halogen, cyano, (C$_1$-C$_8$)-alkyl, (C$_1$-C$_8$)-haloalkyl, (C$_1$-C$_8$)-alkoxy or (C$_1$-C$_8$)-haloalkoxy,

R^2 is hydrogen, fluorine, chlorine, bromine, trifluoromethyl or (C$_1$-C$_8$)-alkoxy,

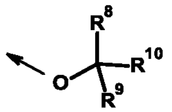
R^3 is hydrogen, halogen or (C$_1$-C$_8$)-alkoxy,

R^4 is halogen, cyano, NO$_2$, C(O)NH$_2$, C(S)NH$_2$, (C$_1$-C$_8$)-haloalkyl or (C$_2$-C$_8$)-alkynyl,

R^5, R^6 and R^7 are independently hydrogen, halogen, cyano, (C$_1$-C$_8$)-alkyl, (C$_1$-C$_8$)-haloalkyl, (C$_1$-C$_8$)-alkoxy or (C$_1$-C$_8$)-haloalkoxy,

G is unbranched or branched (C$_1$-C$_8$)-alkylene,

Q is a radical of the formula



,

R^8 is hydrogen, (C$_1$-C$_8$)-alkyl or cyano,

R^9 is hydrogen or (C$_1$-C$_8$)-alkyl,

R^{10} is $(C_3\text{-}C_8)$-cycloalkyl which is unsubstituted or in each case independently substituted by “m” radicals selected from the group consisting of halogen, $(C_1\text{-}C_6)$-alkyl, $(C_1\text{-}C_6)$-haloalkyl, $(C_3\text{-}C_6)$-cycloalkyl, (C_{16})-alkoxy, (C_{16})-haloalkoxy, cyano and nitro, or

is spiro-$(C_5\text{-}C_9)$-alkanyl or dispiro-$(C_7\text{-}C_8)$-alkanyl, which is unsubstituted or in each case independently substituted by “m” radicals selected from the group consisting of halogen, $(C_1\text{-}C_6)$-alkyl, $(C_1\text{-}C_6)$-haloalkyl, $(C_1\text{-}C_6)$-alkoxy, $(C_1\text{-}C_6)$-haloalkoxy and cyano,

m is 0, 1, 2 or 3

and

X and Y are independently O (oxygen) or S (sulfur).

2. A compound of the general formula (I) as claimed in claim 1 and/or salt thereof, characterized in that

R^1 is hydrogen, halogen, cyano, $(C_1\text{-}C_6)$-alkyl, $(C_1\text{-}C_6)$-haloalkyl, $(C_1\text{-}C_6)$-alkoxy or $(C_1\text{-}C_6)$-haloalkoxy,

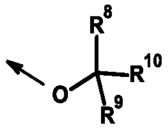
R^2 is hydrogen, fluorine, chlorine, bromine, trifluoromethyl or $(C_1\text{-}C_6)$-alkoxy,

R^3 is hydrogen, halogen or $(C_1\text{-}C_6)$-alkoxy,

R^4 is halogen, cyano, NO_2, $C(O)NH_2$, $C(S)NH_2$, $(C_1\text{-}C_6)$-haloalkyl or $(C_2\text{-}C_6)$-alkynyl,

R^5, R^6 and R^7 are independently hydrogen, halogen, cyano, $(C_1\text{-}C_6)$-alkyl, $(C_1\text{-}C_6)$-haloalkyl, $(C_1\text{-}C_6)$-alkoxy or $(C_1\text{-}C_6)$-haloalkoxy,

G is unbranched or branched $(C_1\text{-}C_6)$-alkylene, Q is a radical of the formula



,

R^8 is hydrogen, (C_1-C_6)-alkyl or cyano,

R^9 is hydrogen or (C_1-C_6)-alkyl,

R^{10} is (C_3-C_7)-cycloalkyl which is unsubstituted or in each case independently substituted by "m" radicals selected from the group consisting of halogen, (C_1-C_3)-alkyl, (C_1-C_3)-haloalkyl, (C_3-C_6)-cycloalkyl, (C_1-C_3)-alkoxy, (C_1-C_3)-haloalkoxy, cyano, nitro, or

is spiro-(C_5-C_7)-alkanyl or dispiro-(C_7-C_8)-alkanyl, which is unsubstituted or in each case independently substituted by "m" radicals selected from the group consisting of halogen, (C_1-C_6)-alkyl, (C_1-C_6)-haloalkyl, (C_1-C_6)-alkoxy,

m is 0, 1, 2 or 3

and

X and Y are independently O (oxygen) or S (sulfur).

3. A compound of the general formula (I) as claimed in claim 1 and/or salt thereof, characterized in that

R^1 is hydrogen, fluorine, chlorine, bromine, iodine, cyano, methyl, ethyl, prop-1-yl, 1-methylethyl, but-1-yl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl, 1-methylbutyl, 2-methylbutyl, 3-methylbutyl, 1,1-dimethylpropyl, 1,2-dimethylpropyl, 2,2-dimethylpropyl, 1-ethylpropyl, n-hexyl, 1-methylpentyl, 2-methylpentyl, 3-methylpentyl, 4-methylpentyl, 1,1-dimethylbutyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl, 2,2-dimethylbutyl, 2,3-dimethylbutyl, 3,3-dimethylbutyl, 1-ethylbutyl, 2-ethylbutyl, 1,1,2-trimethylpropyl, 1,2,2-trimethylpropyl, 1-ethyl-1-methylpropyl, 1-ethyl-2-methylpropyl, trifluoromethyl, difluoromethyl, pentafluoroethyl, 2,2-difluoroethyl, 2,2,2-trifluoroethyl, methoxy, ethoxy, prop-1-yloxy, prop-2-yloxy, but-1-yloxy, but-2-yloxy, 2-methylprop-1-yloxy, 1,1-dimethyleth-1-yloxy, difluoromethoxy, trifluoromethoxy, pentafluoroethoxy, 2,2-difluoroethoxy, 2,2,2-trifluoroethoxy,

R^2 is hydrogen, fluorine, chlorine, bromine, trifluoromethyl, methoxy, ethoxy, prop-1-yloxy, but-1-yloxy,

R^3 is hydrogen, fluorine, chlorine, bromine, methoxy, ethoxy, prop-1-yloxy, prop-2-yloxy, but-1-yloxy, but-2-yloxy, 2-methylprop-1-yloxy, 1,1-dimethyleth-1-yloxy,

R^4 is fluorine, chlorine, bromine, cyano, NO_2, $C(O)NH_2$, $C(S)NH_2$, trifluoromethyl, difluoromethyl, pentafluoroethyl, ethynyl, propyn-1-yl, 1-butyn-1-yl, pentyn-1-yl, hexyn-1-yl,

R^5, R^6 and R^7 are independently hydrogen, fluorine, chlorine, bromine, iodine, cyano, methyl, ethyl, prop-1-yl, 1-methylethyl, but-1-yl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl, 1-methylbutyl, 2-methylbutyl, 3-methylbutyl, 1,1-dimethylpropyl, 1,2-dimethylpropyl, 2,2-dimethylpropyl, 1-ethylpropyl, n-hexyl, 1-methylpentyl, 2-methylpentyl, 3-methylpentyl, 4-methylpentyl, 1,1-dimethylbutyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl, 2,2-dimethylbutyl, 2,3-dimethylbutyl, 3,3-dimethylbutyl, 1-ethylbutyl, 2-ethylbutyl, 1,1,2-trimethylpropyl, 1,2,2-trimethylpropyl, 1-ethyl-1-methylpropyl, 1-ethyl-2-methylpropyl, trifluoromethyl, difluoromethyl, pentafluoroethyl, 2,2-difluoroethyl, 2,2,2-trifluoroethyl, methoxy, ethoxy, prop-1-yloxy, prop-2-yloxy, but-1-yloxy, but-2-yloxy, 2-methylprop-1-yloxy, 1,1-dimethyleth-1-yloxy, difluoromethoxy, trifluoromethoxy, pentafluoroethoxy, 2,2-difluoroethoxy, 2,2,2-trifluoroethoxy,

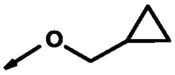
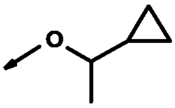
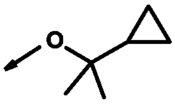
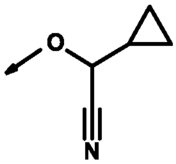
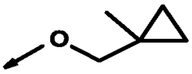
G is methylene, (methyl)methylene, (ethyl)methylene, (prop-1-yl)methylene, (prop-2-yl)methylene, (but-1-yl)methylene, (but-2-yl)methylene, (pent-1-yl)methylene, (pent-2-yl)methylene, (pent-3-yl)methylene, (dimethyl)methylene, (diethyl)methylene, ethylene, n-propylene, (1-methyl)ethyl-1-ene, (2-

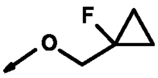
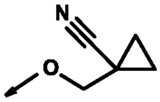
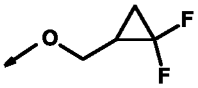
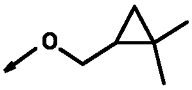
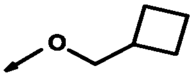
methyl)ethyl-1-ene, n-butylene, 1-methylpropyl-1-ene, 2-methylpropyl-1-ene, 3-methylpropyl-1-ene, 1,1-dimethylethyl-1-ene, 2,2-dimethylethyl-1-ene, 1-ethylethyl-1-ene, 2-ethylethyl-1-ene, 1-(prop-1-yl)ethyl-1-ene, 2-(prop-1-yl)ethyl-1-ene, 1-(prop-2-yl)ethyl-1-ene, 2-(prop-2-yl)ethyl-1-ene, 1,1,2-trimethylethyl-1-ene, 1,2,2-trimethylethyl-1-ene, 1,1,2,2-tetramethylethyl-1-ene, n-pentylene, 1-methylbutyl-1-ene, 2-methylbutyl-1-ene, 3-methylbutyl-1-ene, 4-methylbutyl-1-ene, 1,1-dimethylpropyl-1-ene, 2,2-dimethylpropyl-1-ene, 3,3-dimethylpropyl-1-ene, 1,2-dimethylpropyl-1-ene, 1,3-dimethylpropyl-1-ene, 1-ethylpropyl-1-ene, n-hexylene, 1-methylpentyl-1-ene, 2-methylpentyl-1-ene, 3-methylpentyl-1-ene, 4-methylpentyl-1-ene, 1,1-dimethylbutyl-1-ene, 1,2-dimethylbutyl-1-ene, 1,3-dimethylbutyl-1-ene, 2,2-dimethylbutyl-1-ene, 2,3-dimethylbutyl-1-ene, 3,3-dimethylbutyl-1-ene, 1-ethylbutyl-1-ene, 2-ethylbutyl-1-ene, 1,1,2-trimethylpropyl-1-ene, 1,2,2-trimethylpropyl-1-ene, 1-ethyl-1-methylpropyl-1-ene, 1-ethyl-2-methylpropyl-1-ene,

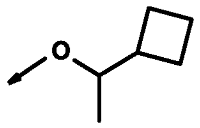
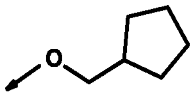
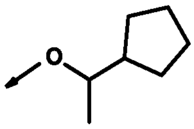
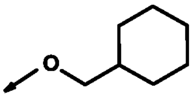
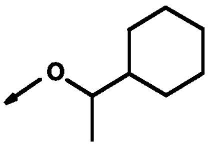
X and Y are independently O (oxygen) or S (sulfur)

and

Q is one of the moieties Q-1 to Q-25 specifically mentioned below, where the arrow in the structural formulae in the table below represents a bond of the respective Q group to carbonyl group in the general formula (I),

				
Q-1	Q-2	Q-3	Q-4	Q-5

				
Q-6	Q-7	Q-8	Q-9	Q-10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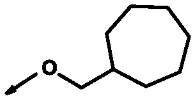
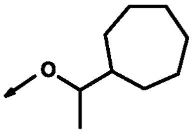
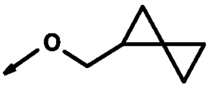
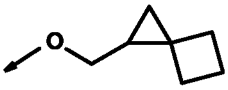
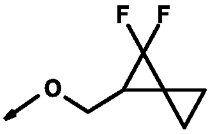
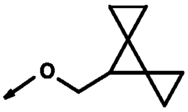
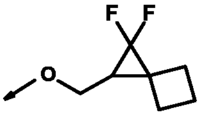
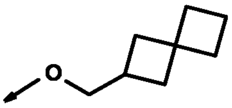
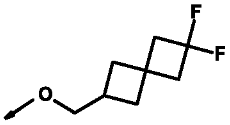
			 	
Q-16	Q-17	Q-18	Q-19	Q-20

 		 		
Q-21	Q-22	Q-23	Q-24	Q-25

4. A compound of the general formula (I) as claimed in claim 1 and/or salt thereof, characterized in that

R^1 is hydrogen, fluorine, chlorine, bromine, iodine, cyano, methyl, ethyl, trifluoromethyl, difluoromethyl, methoxy, ethoxy, difluoromethoxy, trifluoromethoxy,

R^2 is hydrogen, fluorine or chlorine,

R^3 is hydrogen, fluorine, chlorine, bromine or methoxy,

R^4 is fluorine, chlorine, bromine, cyano, NO_2, $C(O)NH_2$, $C(S)NH_2$, trifluoromethyl, ethynyl or propyn-1-yl,

R^5, R^6 and R^7 are independently hydrogen, fluorine, chlorine, bromine, iodine, cyano, methyl, ethyl, trifluoromethyl, difluoromethyl, methoxy, ethoxy, difluoromethoxy or trifluoromethoxy, G is methylene, (methyl)methylene, (ethyl)methylene, (dimethyl)methylene, ethylene, n-propylene, (1-methyl)ethyl-1-ene, (2-methyl)ethyl-1-ene, n-butylene, 1-methylpropyl-1-ene, 2-methylpropyl-1-ene, 3-methylpropyl-1-ene, 1,1-dimethylethyl-1-ene, 2,2-dimethylethyl-1-ene, 1-ethylethyl-1-ene, 2-ethylethyl-1-ene, 1-(prop-1-yl)ethyl-1-ene, 2-(prop-1-yl)ethyl-1-ene, 1-(prop-2-yl)ethyl-1-ene, 2-(prop-2-yl)ethyl-1-ene, n-pentylene, 1-methylbutyl-1-ene, 2-methylbutyl-1-ene, 3-methylbutyl-1-ene, 4-methylbutyl-1-ene, 1,1-dimethylpropyl-1-ene, 2,2-dimethylpropyl-1-ene, 3,3-dimethylpropyl-1-ene, 1,2-dimethylpropyl-1-ene, 1,3-dimethylpropyl-1-ene, 1-ethylpropyl-1-ene or n-hexylene,

X and Y are independently O (oxygen) or S (sulfur)

and

Q is one of the moieties Q-1 to Q-25 specifically mentioned in claim 3.

5. A compound of the general formula (I) as claimed in claim 1 and/or salt thereof, characterized in that

R^1 is hydrogen, fluorine, chlorine, bromine, cyano, methyl, trifluoromethyl, methoxy or trifluoromethoxy,

R^2 is fluorine,

R^3 is fluorine,

R^4 is chlorine, bromine, cyano, NO_2, $C(O)NH_2$ or $C(S)NH_2$,

R^5, R^6 and R^7 are independently hydrogen, fluorine, chlorine, bromine, cyano, methyl, trifluoromethyl, methoxy or trifluoromethoxy,

G is methylene, (methyl)methylene, (ethyl)methylene, (dimethyl)methylene, ethylene, n-propylene, (1-methyl)ethyl-1-ene, (2-methyl)ethyl-1-ene, n-butylene, 1-methylpropyl-1-ene, 2-methylpropyl-1-ene, 3-methylpropyl-1-ene, n-pentylene or n-hexylene,

X and Y are independently O (oxygen) or S (sulfur)

and

Q is one of the moieties Q-1 to Q-25 specifically mentioned in claim 3.

6. A compound of the general formula (I) as claimed in claim 1 and/or salt thereof, characterized in that

R^1 is hydrogen, fluorine, chlorine or bromine,

R^2 is fluorine,

R^3 is fluorine,

R^4 is chlorine, bromine, cyano or NO_2,

R^5 is hydrogen, fluorine, chlorine or bromine,

R^6 is hydrogen, fluorine, chlorine, bromine or cyano,

R^7 is hydrogen, fluorine, chlorine or bromine,

G is methylene, (methyl)methylene or (ethyl)methylene,

X and Y are independently O (oxygen) or S (sulfur)

and

Q is one of the moieties Q-1 to Q-25 specifically mentioned in claim 3.

7. A compound of the general formula (I) as claimed in claim 1 and/or salt thereof, characterized in that

R^1 is hydrogen,

R^2 is fluorine,

R^3 is fluorine,

R^4 is chlorine, bromine, cyano or NO_2,

R^5 is hydrogen,

R^6 is hydrogen, fluorine, chlorine,

R^7 is hydrogen,

G is methylene, (methyl)methylene,

X is O (oxygen) or S (sulfur),

Y is O (oxygen)

and

Q is one of the moieties Q-1 to Q-25 specifically mentioned in claim 3.

8. A compound of the general formula (I) as claimed in claim 1 and/or salt thereof, characterized in that

R^1 is hydrogen,

R^2 is fluorine,

R^3 is fluorine,

R^4 is chlorine, bromine or cyano,

R^5 is hydrogen,

R^6 is hydrogen or fluorine,

R^7 is hydrogen,

G is methylene,

X is O (oxygen),

Y is O (oxygen)

and

Q represents one of the moieties Q-1, Q-2, Q-4, Q-5. Q-6, Q-7, Q-8, Q-9, Q-10, Q-12, Q-13, Q-14, Q-15, Q-16, Q-18 or Q-19 specifically mentioned in claim 3.

9. The use of one or more compounds of the general formula (I) as defined in any of claims 1 to 8 and/or salts thereof, as herbicide and/or plant growth regulator, preferably in crops of useful plants and/or ornamentals.

10. A herbicidal and/or plant growth-regulating composition, characterized in that the composition comprises one or more compounds of the general formula (I) as defined in any of claims 1 to 8 and/or salts thereof, and one or more further substances selected from groups (i) and/or (ii), comprising

(i) one or more further agrochemically active substances, preferably selected from the group consisting of insecticides, acaricides, nematicides, further herbicides, fungicides, safeners, fertilizers and/or further growth regulators,

(ii) one or more formulation auxiliaries customary in crop protection.

11. A method of controlling harmful plants or for regulating the growth of plants, characterized in that an effective amount of

- one or more compounds of the general formula (I), as defined in any of claims 1 to 8 and/or salts thereof, or
- a composition as claimed in claim 10,

is applied to the plants, seeds of plants, the soil in which or on which the plants grow or the area under cultivation.