Title: USE OF OXYLIPINS AS SAFENERS AND SAFENING HERBICIDAL COMPOSITIONS COMPRISING OXYLIPINS

Abstract: The present invention relates to a method for protecting crop plants against phytotoxic effects caused by a herbicide B, which comprises applying to the locus of the crop plant a safening effective amount of at least one oxylipin A and to compositions comprising at least one oxylipin A.
USE OF OXYLIPINS AS SAFENERS AND SAFENING HERBICIDAL COMPOSITIONS COMPRISING OXYLIPINS

The present invention relates to a method for protecting crops from injury caused by a herbicidal effective amount of a herbicide by applying to the locus of the crop plant, a safening effective amount of at least one oxylipin A.

In crop protection products, it is desirable in principle to increase the specificity and the reliability of the action of active compounds. In particular, it is desirable for the crop protection product to control the harmful plants effectively and, at the same time, to be tolerated by the useful plants (crop plants) in question. It is known that in some cases better crop plant compatibility can be achieved by joint application of specifically acting herbicides with organic active compounds, which act as antidotes or antagonists. Owing to the fact that they can reduce or even prevent damage to the crop plants, they are also referred to as safeners.

One of the most common practices for controlling undesirable plant species is the use of herbicides. However, it is known, that certain herbicides, applied in effective amounts, may also damage the crop plants.

It is therefore an object of the present invention to provide a method for protecting crops from injury caused by one or more herbicides.

WO 07/1 11566 discloses 12-oxophytodienoic acid (ODPA) conjugates and their use for improving a plant's resistance against attacks of pathogenic microorganisms (like viruses, bacteria and fungi).

Surprisingly it has now been found that the application of oxylipins A effectively reduces the injury caused by an herbicidal effective amount of one or more herbicides.

Accordingly, the present invention relates to a method for protecting crop plants against phytotoxic effects caused by a herbicide B, which comprises applying to the locus of the crop plant a safening effective amount of at least one oxylipin A.

The present invention also provides compositions (safening compositions) comprising at least one oxylipin A and auxiliaries customary for formulating crop protection agents.

Furthermore the present invention relates to a safening herbicidal composition comprising a safening effective amount of at least one oxylipin A and at least one further compound selected from herbicides B and safeners C.

The invention also relates to compositions in the form of a crop protection composition formulated as a 1-component composition comprising an active compound combination
comprising at least one oxylipin A and at least one further active compound selected
from the herbicides B and the safeners C, and at least one solid or liquid carrier and/or
one or more surfactants and, if desired, one or more further auxiliaries customary for
crop protection compositions.

The invention also relates to compositions in the form of a crop protection composition
formulated as a 2-component composition comprising
a first component comprises at least one oxylipin A, a solid or liquid carrier and, if ap-
propriate, one or more surfactants, and

a second component comprising at least one further active compound selected from
the herbicides B and safeners C,

where both components may additionally comprise further auxiliaries customary for
crop protection compositions.

In the methods according to the present invention it is immaterial whether the at least
one oxylipin A and the at least one herbicide B and/or safener C are formulated and
applied jointly or separately, and, in the case of separate application, in which order the
application takes place.

Further embodiments of the present invention are evident from the claims, the
description and the examples. It is to be understood that the features mentioned above
and still to be illustrated below of the subject matter of the invention can be applied not
only in the combination given in each particular case but also in other combinations,
without leaving the scope of the invention.

As used herein, the terms "controlling" and "combating" are synonyms.
As used herein, the terms "undesirable vegetation" and "harmful plants" are synonyms.

The preferred embodiments of the invention mentioned herein below have to be under-
stood as being preferred either independently from each other or in combination with
one another.

The oxidation products of unsaturated fatty acids containing at least one (1Z, 4Z)-
pentadiene moiety are collectively known as oxylipins. Examples for such unsaturated
fatty acids containing at least one (1Z, 4Z)-pentadiene moiety are linoleic acid, linolenic
acid and hexadecatrienoic acid. Many of the oxylipins have signaling functions in plants
and are described for example in Mosblech et al., Plant Physiology and Biochemistry
2009, 47, 511-517.

Examples of oxylipins A according to the present invention are the oxylipins of class a1
to a11:
Plant oxylipins can be prepared enzymatically by lipooxygenases LOX, (e.g. Feussner et al., Annu. Rev. Plant Biol. 2002, 53, 275), dioxygenases DOX (e.g. Hamberg et al. Prostaglandins and other lipid mediators 2002, 68, 363), or non-enzymatically by chemical oxidation (e.g. Mosblech et al., Plant Physiology and Biochemistry 2009, 47, 511-517). In the first step an unsaturated fatty acid hydroperoxide is formed. Subsequent reactions further converting these fatty acid hydroperoxides leads to a multitude of oxylipin classes. The structural diversity of oxylipins is further increased by further derivatisation (e.g. esterification) or by conjugation of oxylipins to amino acids or other metabolites.

Oxylipins are also commercially available or can be prepared by synthetic chemical methods.


Phytoprostane type I and II can, for example, be synthesized starting from furfural and n-propylfuran via the preparation of the Freimanis (±)-hydroxycyclopentenone and Wittig coupling using chiral phosphonium salts (see El Fangur et al., Journal of Organic Chemistry 2005, 70(3), 989 - 997).

Preferred examples of oxylipins A which can be used according to the present invention are:

a1) from the group of oxophytodienoic acids:
e.g. 12-oxo phytodienoic acid (hereinafter referred to as "OPDA"; CAS 85551-10-6) and dinor-OPDA (CAS 197247-23-7);
a2) from the group of phytoprostane (hereinafter referred to as "PP") type I and type II series:
   e.g. PPAitype I, PPAtype II, PPBitype I, PPBitype II, PPEitype I, PPEitype II,
      PPFitype I, PPFitype II, PPdtype I and PPdtype II;
a3) from the group of cyclopentanones:
   e.g. jasmonic acid, its derivatives and biosynthetic precursors, e.g. jasmonic acid esters like jasmonic acid methyl ester, jasmonic acid amides, like jasmonic acid isoleucine conjugate.

Preference is also given to those methods and compositions according to the present invention wherein at least one oxylipin A, more preferably the oxylipin A, is selected from the class a1 and a2;
more preferably selected from OPDA, dinor OPDA, PPAitype I, PPAtype II, PPBitype I, PPBitype II, PPEitype I, PPEitype II, PPFitype I, PPFitype II, PPdtype I and PPdtype II;
particularly preferred selected from OPDA, dinor OPDA, PPAitype I and PPAi type II.

Preference is also given to those methods and compositions according to the present invention wherein at least one oxylipin A, more preferably the oxylipin A, is selected from the class a1;
more preferably is selected from OPDA and dinor OPDA;
particularly preferred is selected from OPDA;
also particularly preferred is selected from dinor OPDA.

Preference is also given to those methods and compositions according to the present invention wherein at least one oxylipin A, more preferably the oxylipin A, is selected from the class a2;
more preferably is selected from PPAitype I, PPAtype II, PPBitype I, PPBitype II, PPEitype I, PPEitype II, PPFitype I, PPFitype II, PPdtype I and PPdtype II;
particularly preferred is selected from PPAitype I and PPAi type II.

In one embodiment of the present invention the compositions according to the present invention comprise at least one oxylipin A (a safening effective amount of at least one oxylipin A) and at least one further compound selected from the herbicides B and the safeners C.

In another embodiment of the present invention the compositions according to the present invention comprise at least one oxylipin A and at least one further active compound B (herbicide B).
Examples of herbicides B which can be used according to the present invention are the herbicides of class b1 to b15:

- b1) lipid biosynthesis inhibitors (also referred to as ACCase inhibitors);
- b2) acetolactate synthase inhibitors (ALS inhibitors);
- b3) photosynthesis inhibitors;
- b4) protoporphyrinogen-IX oxidase inhibitors,
- b5) bleacher herbicides;
- b6) enolpyruvyl shikimate 3-phosphate synthase inhibitors (EPSP inhibitors);
- b7) glutamine synthase inhibitors;
- b8) 7,8-dihydropteroate synthase inhibitors (DHP inhibitors);
- b9) mitosis inhibitors;
- b10) inhibitors of the synthesis of very long chain fatty acids (VLCFA inhibitors);
- b11) cellulose biosynthesis inhibitors;
- b12) decoupler herbicides (also referred to as uncoupler herbicides);
- b13) auxinic herbicides;
- b14) auxin transport inhibitors; and
- b15) other herbicides selected from the group consisting of bromobutide, chlorflurenuor, chlorflurenol-methyl, cinmethylin, cumyluron, dalapon, dazomet, difenzoquat, difenzoquat-metilsulfate, dimethipin, DSMA, dymron, endothal and its salts, etobenzanid, flamprop, flamprop-isopropyl, flamprop-methyl, flamprop-M-isopropyl, flamprop-M-methyl, flurenol, flurenol-butyl, furprimidol, fosamine, fosamine-ammonium, indanofan, indaziflam, maleic hydrazide, mefluidide, metam, methiozolin (CAS 403640-27-7), methyl azide, methyl bromide, methyl-dymron, methyl iodide, MSMA, oleic acid, oxadiazon, pelargonic acid, pyributicarb, quinoctlamine, triaziflam, triphane and 6-chloro-3-(2-cyclopropyl-6-methylphenoxy)-4-pyridazinol (CAS 499223-49-3) and its salts and esters;

including their agriculturally acceptable salts or derivatives.

According to one embodiment of the invention the compositions contain at least one inhibitor of the lipid biosynthesis (herbicide b1). These are compounds that inhibit lipid biosynthesis. Inhibition of the lipid biosynthesis can be affected either through inhibition of acetyl-CoA carboxylase (hereinafter termed ACC herbicides) or through a different mode of action (hereinafter termed non-ACC herbicides). The ACC herbicides belong to the group A of the HRAC classification system whereas the non-ACC herbicides belong to the group N of the HRAC classification.

According to another embodiment of the invention the compositions contain at least one ALS inhibitor (herbicide b2). The herbicidal activity of these compounds is based on the inhibition of acetolactate synthase and thus on the inhibition of branched chain
amino acid biosynthesis. These inhibitors belong to the group B of the HRAC classification system.

According to another embodiment of the invention the compositions contain at least one inhibitor of photosynthesis (herbicide b3). The herbicidal activity of these compounds is based either on the inhibition of the photosystem II in plants (so-called PSII inhibitors, groups C1, C2 and C3 of HRAC classification) or on diverting the electron transfer in photosystem I in plants (so-called PSI inhibitors, group D of HRAC classification) and thus on an inhibition of photosynthesis. Amongst these, PSII inhibitors are preferred.

According to another embodiment of the invention the compositions contain at least one inhibitor of protoporphyrinogen-IX-oxidase (herbicide b4). The herbicidal activity of these compounds is based on the inhibition of the protoporphyrinogen-IX-oxidase. These inhibitors belong to the group E of the HRAC classification system.

According to another embodiment of the invention the compositions contain at least one bleacher-herbicide (herbicide b5). The herbicidal activity of these compounds is based on the inhibition of the carotenoid biosynthesis. These include compounds which inhibit carotenoid biosynthesis by inhibition of phytoene desaturase (so-called PDS inhibitors, group F1 of HRAC classification), compounds that inhibit the 4-hydroxyphenylpyruvate-dioxygenase (HPPD inhibitors, group F2 of HRAC classification), compounds that inhibit DOXsynthase (group F4 of HRAC class) and compounds which inhibit carotenoid biosynthesis by an unknown mode of action (bleacher - unknown target, group F3 of HRAC classification).

According to another embodiment of the invention the compositions contain at least one EPSP synthase inhibitor (herbicide b6). The herbicidal activity of these compounds is based on the inhibition of enolpyruvyl shikimate 3-phosphate synthase and thus on the inhibition of aminoacid biosynthesis in plants. These inhibitors belong to the group G of the HRAC classification system.

According to another embodiment of the invention the compositions contain at least one glutamine synthase inhibitor (herbicide b7). The herbicidal activity of these compounds is based on the inhibition of glutamine synthase and thus on the inhibition of aminoacid biosynthesis in plants. These inhibitors belong to the group H of the HRAC classification system.

According to another embodiment of the invention the compositions contain at least one DHP synthase inhibitor (herbicide b8). The herbicidal activity of these compounds is based on the inhibition of 7,8-dihydropteroate synthase. These inhibitors belong to the group I of the HRAC classification system.

According to another embodiment of the invention the compositions contain at least one mitosis inhibitor (herbicide b9). The herbicidal activity of these compounds is based on the disturbance or inhibition of microtubule formation or organization, and
thus on inhibition of mitosis. These inhibitors belong to the groups K1 and K2 of the HRAC classification system. Among these, compounds of the group K1, in particular dinitroanilines, are preferred.

According to another embodiment of the invention the compositions contain at least one VLCFA inhibitor (herbicide b10). The herbicidal activity of these compounds is based on the inhibition of the synthesis of very long chain fatty acids and thus on the disturbance or inhibition of cell division in plants. These inhibitors belong to the group K3 of the HRAC classification system.

According to another embodiment of the invention the compositions contain at least one cellulose biosynthesis inhibitor (herbicide b11). The herbicidal activity of these compounds is based on the inhibition of the biosynthesis of cellulose, and thus on the inhibition of the synthesis of cell walls in plants. These inhibitors belong to the group L of the HRAC classification system.

According to another embodiment of the invention the compositions contain at least one decoupler herbicide (herbicide b12). The herbicidal activity of these compounds is based on the disruption of the cell membrane. These inhibitors belong to the group M of the HRAC classification system.

According to another embodiment of the invention the compositions contain at least one auxinic herbicide (herbicide b13). These include compounds which that mimic auxins, i.e. plant hormones, and affect the growth of the plants. These compounds belong to the group O of the HRAC classification system.

According to another embodiment of the invention the compositions contain at least one auxin transport inhibitor (herbicide b14). The herbicidal activity of these compounds is based on the inhibition of the auxin transport in plants. These compounds belong to the group P of the HRAC classification system.

As to the given mechanisms of action and classification of the active substances, see e.g. "HRAC, Classification of Herbicides According to Mode of Action", http://www.plantprotection.org/hrac/MOA.html).

Preference is given to those compositions according to the present invention comprising at least one herbicide B selected from herbicides of class b2, b3, b4, b5, b6, b9 and b10.

Particular preference is given to those compositions according to the present invention which comprise at least one herbicide B selected from the herbicides of class b4, b6 and b10.
Detailed examples of herbicides B which can be used according to the present invention are:

b1) from the group of the lipid biosynthesis inhibitors:

ACC-herbicides such as alloxydim, alloxydim-sodium, butroxydim, clethodim, clodinafop, clodinafop-propargyl, cycloxydim, cyhalofop, cyhalofop-butyl, diclofop, diclofop-methyl, fenoxaprop, fenoxaprop-ethyl, fenoxaprop-P, fenoxaprop-P-ethyl, fluazifop, fluazifop-butyl, fluazifop-P, fluazifop-P-butyl, haloxyfop, haloxyfop-methyl, haloxyfop-P, haloxyfop-P-methyl, metamifop, pinoxaden, profoxydim, propaquizafop, quizalofop, quizalofop-ethyl, quizalofop-tefuryl, quizalofop-P, quizalofop-P-ethyl, quizalofop-P-tefuryl, sethoxydim, tepraloxydim and tralkoxydim, and non ACC herbicides such as benfuresate, butylate, cycloate, dalapon, dimepiperate, EPTC, esprocarb, ethofumesate, fluazifop-butyl, fluorathiophop, haloxyfop-P, haloxyfop-P-butyl, haloxyfop-P-methyl, metazosulfuron, metsulfuron, metsulfuron-methyl, nicosulfuron, orthosulfuron, oxasulfuron, primisulfuron, primisulfuron-methyl, propoxycarbazon, pyrazosulfuron, pyrazosulfuron-ethyl, rimsulfuron, sulfometuron, sulfometuron-methyl, sulfosulfuron, thifensulfuron, thifensulfuron-methyl, triasulfuron, tribenuron, tribenuron-methyl, trifloxysulfuron, triflusulfuron, triflusulfuron-methyl and tritosulfuron, imidazolinones such as imazamethabenz, imazamethabenz-methyl, imazamox, imazapic, imazapyr, imazaquin and imazethapyr, triazolopyrimidine herbicides and sulfonamides such as cloransulam, cloransulam-methyl, diclosulam, flumetsulam, flumetsulam, flumetsulam, flumetsulam, flumetsulam, flumetsulam, metosulam, penoxsulam, pyrimisulfan and pyroxsulam, pyrimidinylbenzoates such as bispyribac, bispyribac-sodium, pyribenoxim, pyriflailid, pyriminobac, pyriminobac-methyl, pyrithetaic, pyrithetaic-sodium, 4-[[2-[[4,6-dimethoxy-2-pyrimidinyl]oxy]phenyl][methyl][amino]-benzoic acid-1-methyethyl ester (CAS 420138-41-6), 4-[[2-[(4,6-dimethoxy-2-pyrimidinyl)oxy]phenyl][methyl][amino]-benzoic acid propyl ester (CAS 420138-40-5), N-(4-bromophenyl)-2-[(4,6-dimethoxy-2-pyrimidinyl)oxy]benzenemethanamine (CAS 420138-01-8) and sulfonylaminocarbonyl-triazolinone herbicides such as flucarbazone, flucarbazone-sodium, propoxycarbazon, propoxycarbazon-sodium, thienocarbazone and thienocarbazone-methyl. Among these,
a preferred embodiment of the invention relates to those compositions comprising at least one imidazolinone herbicide;

b3) from the group of the photosynthesis inhibitors:

amitraz, inhibiting the photosystem II, e.g. triazine herbicides, including of chlorotriazine, triazinones, triazindiones, methylthiotnazines and pyridazinones such as ametryn, atrazine, chloridazon, cyanazine, desmetryn, dimethametryn, hexazinone, metribuzin, prometon, prometryn, propazine, simazine, simetryn, terbutonem, terbutylazin, terbutryn and trietazin, aryl urea such as chlorobromuron, chlorotoluron, chloroxuron, dimefuron, diuron, fluometuron, isoproturon, isouron, linuron, metamitron, methabenzthiazuron, metabenzuron, metoxuron, monolinuron, neburon, siduron, tebuthiuron and thidiazuron, phenyl carbamates such as desmedipham, karbutilat, phenmedipham, phenmedipham-ethyl, nitrile herbicides such as bromofenoxim, bromoxynil and its salts and esters, ioxynil and its salts and esters, uraciles such as bromacil, lenacil and terbacil, and bentazon and bentazon-sodium, pyridate, pyridafol, pentanochlor and propanil and inhibitors of the photosystem I such as diquat, diquat-dibromide, paraquat, paraquat-dichloride and paraquat-dimethylsulfate. Among these, a preferred embodiment of the invention relates to those compositions comprising at least one aryl urea herbicide. Among these, likewise a preferred embodiment of the invention relates to those compositions comprising at least one triazine herbicide. Among these, likewise a preferred embodiment of the invention relates to those compositions comprising at least one nitrile herbicide;

b4) from the group of the protoporphyrinogen-IX oxidase inhibitors:

acifluorfen, acifluorfen-sodium, azafenidin, bencarbazone, benzoxuron, butafenacil, carbentrazine, carfentrazzone-ethyl, chlomethoxyfen, cinidon-ethyl, flua-zolate, flufenpyr, flufenpyr-ethyl, flumiclorac, flumiclorac-pentyl, flumioxazin, fluoroglycofen, fluoroglycofen-ethyl, fluthiacet, fluthiacet-methyl, fomesafen, halosafen, lactofen, oxadiargyl, oxadiazon, oxyfluoren, pentoxazone, profluazol, pyraclonil, pyraflufen, pyraflufen-ethyl, saflufenacil, sulfentrazone, thidiazimin, ethyl [3-{2-chloro-4-fluoro-5-(1-methyl-6-trifluoromethyl-2,4-dioxo-1 ,2,3,4-tetrahydropyrimidin-3-yl)phenoxy]-2-pyridyloxy}acetate (CAS 353292-31-6; S-3100), N-ethyl-3-(2,6-dichloro-4-trifluoromethylphenoxo)-5-methyl-1 H-pyrazole-1-carboxamide (CAS 452098-92-9), N-tetrahydrofurfuryl-3-(2,6-dichloro-4-trifluoromethylphenoxy)-5-methyl-1 H-pyrazole-1-carboxamide (CAS 915396-43-9), N-ethyl-3-(2-chloro-6-fluoro-4-trifluoromethylphenoxy)-5-methyl-1 H-pyrazole-1-carboxamide (CAS 452099-03-7), 3-[7-fluoro-3-oxo-4-(prop-2-ynyl)-3,4-dihydro-2H-benzo[1,4]oxazin-6-yl]-1 ,5-dimethyl-6-thioxo-[1 ,3,5]triazinan-2,4-dione, 1,5-dimethyl-6-
thioxo-3-(2,2,7-trifluoro-3-oxo-4-(prop-2-ynyl)-3,4-dihydro-2H-benzo[b][1,4]oxazin-6-yl)-1,3,5-triazinane-2,4-dione, 2-(2,2,7-Trifluoro-3-oxo-4-prop-2-ynyl-3,4-dihydro-2H-benzo[1,4]oxazin-6-yl)-4,5,6,7-tetrahydro-isoindole-1,3-dione, and 1-Methyl-6-trifluoromethyl-3-(2,2,7-trifluoro-3-oxo-4-prop-2-ynyl-3,4-dihydro-2H-benzo[1,4]oxazin-6-yl)-1H-pyrimidine-2,4-dione;

b5) from the group of the bleacher herbicides:
PDS inhibitors: befubutamid, diflufenican, fluridone, flurochloridone, flurtamone, norflurazon, picolinafen, and 4-(3-trifluoromethylphenoxo)-2-(4-trifluoromethylphenyl)pyrimidine (CAS 180608-33-7), HPPD inhibitors: benzobicyclon, benzofenap, clomazone, isoxaflutole, mesotrione, pyrasulfotole, pyrazolynate, sulcotrione, tefuryltrione, tembotrione, topramezone and bicyclopyrone, bleacher, unknown target: aclonifen, amitrole and flumeturon;

b6) from the group of the EPSP synthase inhibitors:
glyphosate, glyphosate-isopropylammonium, glyphosate-potassium and glyphosate-trimesium (sulfosate);

b7) from the group of the glutamine synthase inhibitors:
bilanaphos (bialaphos), bilanaphos-sodium, glufosinate, glufosinate-P and glufosinate-ammonium;

b8) from the group of the DHP synthase inhibitors:
asulam;

b9) from the group of the mitosis inhibitors:
compounds of group K1: dinitroanilines such as benfluralin, butralin, dinitramine, ethalfluralin, fluchloralin, oryzalin, pendimethalin, prodiamine and trifluralin, phosphoramidates such as amiprophos, amiprophos-methyl, and butamiphos, benzoic acid herbicides such as chlorthal, chlorthal-dimethyl, pyridines such as dithiopyr and thiazopyr, benzamides such as propyzamide and tebutam; compounds of group K2: chlorpropham, propanil and carbetamide, among these, compounds of group K1, in particular dinitroanilines are preferred;

b10) from the group of the VLCFA inhibitors:
chloroacetamides such as acetochlor, alachlor, butachlor, dimethachlor, dimethenamid, dimethenamid-P, metazachlor, metolachlor, metolachlor-S, pethoxamid, pretilachlor, propachlor, propisochlor and thenylchlor, oxyacetanilides such as flufenacet and mefenacet, acetanilides such as diphenamid, naproanilide and napropamide, tetrazoli-
nones such fentrazamide, and other herbicides such as anilofos, cafenstrole, fenoxasulfone, ipfencarbazone, piperophos, pyroxasulfone and isoxazoline compounds of the formula II,

\[
\begin{align*}
\text{H}_3\text{C} & \begin{array}{c}
\text{O} \\
\text{N}
\end{array} & \text{S} & \text{W} \\
\text{H}_3\text{C} & \begin{array}{c}
\text{O} \\
\text{N}
\end{array} & 
\end{align*}
\]

wherein \( R^{21}, R^{22}, R^{23}, R^{24}, W, Z \) and \( n \) have the following meanings:

- \( R^{21}, R^{22}, R^{23}, R^{24} \) independently of one another hydrogen, halogen or Ci-C4-alkyl;
- \( W \) phenyl or monocyclic 5-, 6-, 7-, 8-, 9- or 10-membered heterocycle containing, in addition to carbon ring members one, two or three same or different heteroatoms selected from oxygen, nitrogen and sulfur as ring members, wherein the phenyl and the heterocycle are unsubstituted or carry 1, 2 or 3 substituents \( R^W \) selected from halogen, Ci-C4-alkyl, Ci-C4-alkoxy, C1-C4-haloalkyl and Ci-C4-haloalkoxy;
- preferably phenyl or 5- or 6-membered aromatic heterocycle (hetaryl) which contains, in addition to carbon ring members, one, two or three nitrogen atoms as ring members, wherein the phenyl and the hetaryl are unsubstituted or carry 1, 2 or 3 substituents \( R^W \);
- \( Z \) oxygen or NH; and
- \( n \) zero or one;

among the isoxazoline compounds of the formula II, preference is given to isoxazoline compounds of the formula II, wherein

- \( R^{21}, R^{22}, R^{23}, R^{24} \) independently of one another are H, F, Cl or methyl;
- \( Z \) is oxygen;
- \( n \) is 0 or 1; and
- \( W \) is phenyl, pyrazolyl or 1,2,3-triazolyl, wherein the three last-mentioned radicals are unsubstituted or carry one, two or three substituents \( R^W \), especially one of the following radicals

\[
\begin{align*}
\text{N} & \begin{array}{c}
\text{R}^{22} \\
\text{R}^{26}
\end{array} \\
\text{N} & \begin{array}{c}
\text{R}^{22} \\
\text{R}^{26}
\end{array} \\
\text{N} & \begin{array}{c}
\text{R}^{22} \\
\text{R}^{26}
\end{array}
\end{align*}
\]

or

\[
\begin{align*}
\text{N} & \begin{array}{c}
\text{R}^{22} \\
\text{R}^{26}
\end{array} \\
\text{N} & \begin{array}{c}
\text{R}^{22} \\
\text{R}^{26}
\end{array} \\
\text{N} & \begin{array}{c}
\text{R}^{22} \\
\text{R}^{26}
\end{array}
\end{align*}
\]

wherein

- \( R^{22} \) is halogen, Ci-C4-alkyl or Ci-C4-haloalkyl;
- \( R^{26} \) is Ci-C4-alkyl;
- \( R^{27} \) is halogen, Ci-C4-alkoxy or Ci-C4-haloalkoxy;
R\(^{28}\) is halogen, Ci-C4-alkyl, Ci-C4-haloalkyl or Ci-C4-haloalkoxy;
m is 0, 1, 2 or 3; and
# denotes the point of attachment to the group C R\(^{23}\) R\(^{24}\);

among the isoxazoline compounds of the formula II, particular preference is
given to those isoxazoline compounds of the formula II, wherein
R\(^{21}\) is hydrogen;
R\(^{22}\) is fluorine;
R\(^{23}\) is hydrogen or fluorine;
R\(^{24}\) is hydrogen or fluorine;
W is one of the radicals of the formulae W\(^{1}\), W\(^{2}\), W\(^{3}\) or W\(^{4}\)

wherein # denotes the point of attachment to the group C R\(^{13}\) R\(^{14}\);
Z is oxygen;
n is zero or 1, in particular 1; and

among these, especially preferred are the isoxazoline compounds of the formulae II.1, II.2, II.3, II.4, II.5, II.6, II.7, II.8 and II.9
the isoxazoline compounds of the formula II are known in the art, e.g. from WO 2006/024820, WO 2006/037945, WO 2007/071900 and WO 2007/096576;

among the VLCFA inhibitors, preference is given to chloroacetamides and oxacycletamides;

b) from the group of the cellulose biosynthesis inhibitors:
chlorothiamid, dichlobenil, flupoxam, isoxaben, 1-Cyclohexyl-5-pentafluorphenyloxy-1-[1,2,4,6]thiatriazin-3-ylamine and piperazine compounds of formula III,

in which
A is phenyl or pyridyl where R\(^a\) is attached in the ortho-position to the point of attachment of A to a carbon atom;
R\(^a\) is CN, N0\(_2\), Ci-C\(_4\)-alkyl, D-C\(_3\)-C\(_6\)-cycloalkyl, Ci-C\(_4\)-haloalkyl, Ci-C\(_4\)-alkoxy, Ci-C\(_4\)-haloalkoxy, 0-D-C\(_3\)-C\(_6\)-cycloalkyl, S(0)\(_2\)-R\(_v\), C\(_2\)-C\(_6\)-alkenyl, D-C\(_3\)-C\(_6\)-cycloalkenyl, C\(_3\)-C\(_6\)-alkenyl, C\(_2\)-C\(_6\)-alkynyl, C\(_3\)-C\(_6\)-alkynyloxy, NR\(^A\)R\(^B\), tri-Ci-C\(_4\)-alkylsilyl, D-C(=0)-R\(^{a1}\), D-P(=0)(R\(^{a1}\))\(_2\), phenyl, naphthyl, a 3- to 7-membered monocyclic or 9- or 10-membered bicyclic saturated, unsaturated or aromatic heterocycle which is attached via carbon or nitrogen, which contains 1, 2, 3 or 4 heteroatoms selected from the group
consisting of O, N and S, and which may be partially or fully substituted by groups \( R^a \) and/or \( R^a \), and, if \( R^b \) is attached to a carbon atom, additionally halogen;

\[ R^\gamma \] is \( \text{d-Ce-alkyl, C}_3\text{-C}_4\text{-alkenyl, C}_3\text{-C}_4\text{-alkynyl, N R}^A R^B \text{ or C-I-C}_4\text{-haloalkyl} \)

and \( q \) is 0, 1 or 2;

\( R^A, R^B \) independently of one another are hydrogen, \( \text{C-C}_6\text{-alkyl, C}_3\text{-C}_6\text{-alkenyl and C}_3\text{-C}_6\text{-alkynyl; together with the nitrogen atom to which they are attached, R}^A, R^B \) may also form a five- or six-membered saturated, partially or fully unsaturated ring which, in addition to carbon atoms, may contain 1, 2 or 3 heteroatoms selected from the group consisting of O, N and S, which ring may be substituted by 1 to 3 groups \( R^{aa} \);

\( D \) is a covalent bond, \( \text{C-I-C}_4\text{-alkylene, C}_2\text{-C}_6\text{-alkenyl or C}_2\text{-C}_6\text{-alkynyl;} \)

\( R^{\alpha 1} \) is hydrogen, OH, \( \text{C-I-C}_8\text{-alkyl, C-I-C}_4\text{-haloalkyl, C}_3\text{-C}_6\text{-cycloalkyl,} \)

\( \text{C}_2\text{-C}_6\text{-alkenyl, C}_5\text{-C}_6\text{-alkynyl, C}_5\text{-C}_6\text{-alkoxy, C}_3\text{-C}_6\text{-cycloalkyl, C}_5\text{-C}_6\text{-cycloalkenyl,} N R^A R^B, \)

\( \text{C}_3\text{-C}_6\text{-alkoxy, C}_3\text{-C}_6\text{-alkylaminosulfonylamino, [di-(C}_2\text{-C}_6\text{)alkylamino]sulfonylamino,} \)

\( \text{C}_3\text{-C}_6\text{-alkylaminosulfonylamino, C}_3\text{-C}_6\text{-alkylaminosulfonylamino,} \)

\( \text{N-(C}_2\text{-C}_6\text{-alkenyl)-N-(C}_2\text{-C}_6\text{-alkoxy)-N-(C}_2\text{-C}_6\text{-alkenyl)-N-(C}_2\text{-C}_6\text{-alkoxy)-N-(C}_2\text{-C}_6\text{-alkoxy)-amino,} \)

\( \text{C}_6\text{-alkylsulfonyl, tri-C-I-C}_4\text{-alkylsilyl, phenyl, phenoxy, phenylaminio or a 5- or 6-membered monocyclic or 9- or 10-membered bicyclic heterocycle which contains 1, 2, 3 or 4 heteroatoms selected from the group consisting of O, N and S, where the cyclic groups are unsubstituted or substituted by 1, 2, 3 or 4 groups \( R^{aa} \);

\( R^{aa} \) is halogen, OH, \( \text{C}_3\text{N, NO}_2\), \( \text{C-I-C}_4\text{-alkyl, C-I-C}_4\text{-haloalkyl, C-I-C}_4\text{-alkoxy,} \)

\( \text{C-I-C}_4\text{-haloalkoxy, S (0)_5 R}^\gamma, D-C (\text{=O}) R^{\alpha 1} \) and tri-C-I-C}_4\text{-alkylsilyl;}

\( R^b \) independently of one another are hydrogen, \( \text{C}_3\text{C, NO}_2\), halogen, \( \text{C-I-C}_4\text{-alkyl,} \)

\( \text{C-I-C}_4\text{-haloalkyl, C}_2\text{-C}_6\text{-alkenyl, C}_3\text{-C}_6\text{-alkynyl, C-I-C}_4\text{-alkoxy,} \)

\( \text{C}_1\text{-C}_4\text{-haloalkoxy, benzyl or S (0)_5 R}^\gamma, \)

\( R^b \) together with the group \( R^a \) or \( R^b \) attached to the adjacent ring atom may also form a five- or six-membered saturated or partially or fully unsaturated ring which, in addition to carbon atoms, may contain 1, 2 or 3 heteroatoms selected from the group consisting of O, N and S, which ring may be partially or fully substituted by \( R^{aa} \);

\( p \) is 0, 1, 2 or 3;

\( R^{30} \) is hydrogen, OH, \( \text{C}_3\text{N, CI-C}_2\text{-alkyl, C}_3\text{-Cl-C}_2\text{-alkenyl, C}_3\text{-Cl-C}_2\text{-alkynyl,} \)

\( \text{C}_1\text{-C}_4\text{-alkoxy, C}_3\text{-C}_6\text{-cycloalkyl, C}_3\text{-C}_6\text{-cycloalkenyl,} \)

\( \text{N R}^A R^B, S (0)_5 R^\gamma, S (0)_5 N R^A R^B \).
C(=0)R, CONR, phenyl or a 5- or 6-membered monocyclic or 9- or 10-membered bicyclic aromatic heterocycle which contains 1, 2, 3 or 4 heteroatoms selected from the group consisting of O, N and S, where the cyclic groups are attached via D and are unsubstituted or substituted by 1, 2, 3 or 4 groups R, and also the following partially or fully R-substituted groups: Ci-C4-alkyl, C3-C4-alkenyl and C3-C4-alkynyl; R is hydrogen, Ci-C4-alkyl, Ci-C4-haloalkyl, Ci-C4-alkoxy or Ci-C4-haloalkoxy; D is carbonyl or a group D; where in groups R and their sub-substituents the carbon chains and/or the cyclic groups may carry 1, 2, 3 or 4 substituents R and/or R; R is OH, NH2, Ci-C4-alkyl, Ci-C4-haloalkyl, Ci-C4-alkenyl, Ci-C4-alkynyl, Ci-C4-hydroxyalkyl, Ci-C4-cyanoalkyl, Ci-C4-haloalkyl, Ci-C4-alkoxy-Ci-C4-alkyl or C(=0)R; R is hydrogen, halogen, Ci-C4-alkyl or Ci-C4-haloalkyl, or R and R together are a covalent bond; R, R, independently of one another are hydrogen, halogen, OH, CN, N0, Ci-C4-alkyl, Ci-C4-haloalkyl, Ci-C4-alkenyl, Ci-C4-alkynyl, Ci-C4-alkoxy, Ci-C4-haloalkoxy, C3-C6-cycloalkyl, C2-C6-cycloalkenyl and C2-C6-cycloalkynyl; R, R, independently of one another are hydrogen, halogen, OH, haloalkyl, NR, NR, N=C(0)R, CN, N0, Ci-C4-alkyl, Ci-C4-haloalkyl, Ci-C4-alkenyl, Ci-C4-alkynyl, Ci-C4-alkoxy, Ci-C4-haloalkoxy, 0-C(0)R, phenoxy or benzyloxy, where in groups R and R the carbon chains and/or the cyclic groups may carry 1, 2, 3 or 4 substituents R; R is Ci-C4-alkyl or NR; among the piperazine compounds of formula III, preference is given to the piperazine compounds of the formula III, wherein A is phenyl or pyridyl where R is attached in the ortho-position to the point of attachment of A to a carbon atom; R is CN, N0, Ci-C4-alkyl, Ci-C4-haloalkyl, Ci-C4-alkoxy, Ci-C4-haloalkoxy or D-C(=0)-R; R is d-Ce-alkyl, C3-C4-alkenyl, C3-C4-alkynyl, NR or Ci-C4-haloalkyl and q is 0, 1 or 2; R, independently of one another are hydrogen, Ci-C6-alkyl, Ci-C6-alkenyl and Ci-C6-alkynyl; together with the nitrogen atom to which they are attached, R may also form a five- or six-membered saturated, partially or fully unsaturated ring which, in
addition to carbon atoms, may contain 1, 2 or 3 heteroatoms selected from the group consisting of O, N and S, which ring may be substituted by 1 to 3 groups R<sup>aa</sup>:

D is a covalent bond or C<sub>4</sub>-alkylene;

R<sup>a1</sup> is hydrogen, O, C<sub>4</sub>-alkyl, C<sub>4</sub>-haloalkyl, C<sub>3</sub>–C<sub>6</sub>-cycloalkyl;

R<sup>aa</sup> is halogen, O, CN, NO<sub>2</sub>, C<sub>4</sub>-alkyl, C<sub>4</sub>-haloalkyl, C<sub>4</sub>-alkoxy, C<sub>4</sub>-haloalkoxy, S(0)OR, D-C(=0)-R<sup>a1</sup> and tri-C<sub>4</sub>-alkylsilyl;

R<sup>b</sup> independently of one another is C, C<sub>4</sub>-alkyl, C<sub>1</sub>–C<sub>4</sub>-haloalkyl, C<sub>2</sub>–C<sub>4</sub>-alkenyl, C<sub>3</sub>–C<sub>6</sub>-alkynyl, C<sub>4</sub>-alkoxy, C<sub>4</sub>-haloalkoxy, benzyl or S(0)OR;

R<sup>b</sup> together with the group R<sup>a</sup> or R<sup>b</sup> attached to the adjacent ring atom may also form a five- or six-membered saturated or partially or fully unsaturated ring which, in addition to carbon atoms, may contain 1, 2 or 3 heteroatoms selected from the group consisting of O, N and S, which ring may be partially or fully substituted by R<sup>aa</sup>;

p is 0 or 1;

R<sup>a0</sup> is hydrogen, C<sub>5</sub>-alkyl, C<sub>3</sub>–C<sub>2</sub>-alkenyl, C<sub>3</sub>–C<sub>2</sub>-alkynyl, C<sub>4</sub>-alkoxy or C(=0)R<sup>40</sup>;

R<sup>40</sup> is hydrogen, C<sub>4</sub>-alkyl, C<sub>4</sub>-haloalkyl, C<sub>4</sub>-alkoxy or C<sub>4</sub>-haloalkoxy;

where in groups R<sup>a0</sup>, R<sup>a</sup> and their sub-substituents the carbon chains and/or the cyclic groups may carry 1, 2, 3 or 4 substituents R<sup>aa</sup> and/or R<sup>a1</sup>:

R<sup>a1</sup> is C<sub>4</sub>-alkyl;

R<sup>a2</sup> is OH, NH<sub>2</sub>, C<sub>4</sub>-alkyl, C<sub>3</sub>–C<sub>6</sub>-cycloalkyl, C<sub>4</sub>-haloalkyl or C(=0)R<sup>25</sup>;

R<sup>a3</sup> is hydrogen, or R<sup>a3</sup> and R<sup>a4</sup> together are a covalent bond;

R<sup>a4</sup>, R<sup>a5</sup>, R<sup>a6</sup>, R<sup>a7</sup> independently of one another are hydrogen;

R<sup>a8</sup>, R<sup>a9</sup> independently of one another are hydrogen, halogen or OH;

b12) from the group of the decoupler herbicides:

dinoseb, dinoterb and DNOC and its salts;

b13) from the group of the auxinic herbicides:

2,4-D and its salts and esters, 2,4-DB and its salts and esters, aminopyralid and its salts such as aminopyralid-tris(2-hydroxypropyl)ammonium and its esters, benazolin, benazolin-ethyl, chloramben and its salts and esters, clomeprop, cloyralid and its salts and esters, dicamba and its salts and esters, dichlorprop and its salts and esters, dichlorprop-P and its salts and esters, fluoroxyprop, fluoroxyprop-butomethyl, fluoroxyprop-methyl, MCPA and its salts and esters, MCPA-thioethyl, MCPB and its salts and esters, mecoprop and its salts and esters, mecoprop-P and its salts and esters, picloram and its salts and esters, quinclorac, quinmerac, TBA (2,3,6) and its salts and esters, triclopyr and its salts and esters, and aminocyclopyrachlor and its salts and esters;
b14) from the group of the auxin transport inhibitors: diflufenzopyr, diflufenzopyr-
sodium, naptalam and naptalam-sodium;

b15) from the group of the other herbicides: bromobutide, chlorflurenol, chlorflurenol-
methyl, cinmethylin, cumyluron, dalapon, dazomet, difenzoquat, difenzoquat-
metilsulfate, dimethipin, DSMA, dymron, endothal and its salts, etobenzanid, flamprop,
flamprop-isopropyl, flamprop-methyl, flamprop-M-isopropyl, flamprop-M-methyl, fluore-
nol, flurenol-butyl, flurprimidol, fosamine, fosamine-ammonium, indanofan, indaziflam,
maeic hydrazide, mefluidide, metam, methiozolin (CAS 403640-27-7), methyl azide,
methyl bromide, methyl-dymron, methyl iodide, MSMA, oleic acid, oxaziclomefome, pelargonic acid, pyributicarb, quinoclamine, triaziflam, triphane and 6-chloro-3-(2-
cyclopropyl-6-methylphenoxy)-4-pyridazinol (CAS 499223-49-3) and its salts and es-
ters.

Preferred herbicides B that can be used according to the present invention are:

b1) from the group of the lipid biosynthesis inhibitors:
clethodim, clodinafop-propargyl, cycloxydim, cyhalofop-butyl, diclofop-methyl, feno-
xaprop-P-ethyl, fluazifop-P-butyl, haloxyfop-P-methyl, metamifop, pinoxaden, profoxy-
dim, propaquizafop, quinalofop-P-ethyl, quinalofop-P-ethyl, sethoxydim, tepraloxydim,
tralkoxydim, benfuresate, dimepiperate, EPTC, esprocarb, ethofumesate, molinate,
orbencarb, prosulfocarb, thiobencarb and triallate;

b2) from the group of the ALS inhibitors:
amidosulfuron, azimsulfuron, bensulfuron-methyl, bispyribac-sodium, chlorimuron-
eethyl, chlorsulfuron, cloransulam-methyl, cyclosulfamuron, diclosulam, ethametsulfu-
ron-methyl, ethoxysulfuron, flazasulfuron, florasulam, flucarbazone-sodium, fluotosul-
fururon, flumetsulam, flupyr-sulfuron-methyl-sodium, foramsulfuron, halosulfuron-methyl,
imazamethabenz-methyl, imazamox, imazapic, imazapyr, imazaquin, imazethapyr,
imazosulfuron, iodosulfuron, iodosulfuron-methyl-sodium, mesosulfuron, metazosulfu-
ron, metosulam, metsulfuron-methyl, nicosulfuron, orthosulfuron, oxasulfuron, pe-
noxulam, primisulfuron-methyl, propoxycarbazon-sodium, propyr-sulfuron, prosulfuron,
pyrazosulfuron-ethyl, pyribenoxim, pyrimisulfan, pyrflialid, pyriminobac-methyl, py-
rithiobac-sodium, pyroxulam, rimsulfuron, sulfometuron-methyl, sulfosulfuron, thien-
carbazone-methyl, thiensulfuron-methyl, triasulfuron, tribenuron-methyl, trifloxysulfu-
uron, triflussulfuron-methyl and tritosulfuron;
b3) from the group of the photosynthesis inhibitors:
ametryn, amicarbazone, atrazine, bentazone, bentazone-sodium, bromoxynil and its salts and esters, chloridazon, chlorotoluron, cyanazine, desmedipham, diquat-dibromide, diuron, fluometuron, hexazinone, ioxynil and its salts and esters, isoproturon, lenacil, linuron, metamitron, methabenzthiazuron, metribuzin, paraquat, paraquat-dichloride, phenmedipham, propanil, pyridate, simazine, terbutryn, terbuthylazine and thidiazuron;

b4) from the group of the protoporphyrinogen-IX oxidase inhibitors:
acifluorfen-sodium, bencarbazone, benzfendizone, butafenacil, carfentrazone-ethyl, cinidon-ethyl, flufenpyr-ethyl, flumiclorac-pentyl, flumioxazin, fluoroglycofen-ethyl, fomesafen, lactofen, oxadiargyl, oxadiazon, oxyfluoren, pentoxazone, pyraflufen-ethyl, saflufenacil, sulfentrazone, ethyl [3-[2-chloro-4-fluoro-5-(1-methyl-6-trifluoromethyl-2,4-dioxo-1,2,3,4-tetrahydropyrimidin-3-yl)phenoxy]-2-pyridyloxy]acetate (CAS 353292-31-6; S-3100), N-ethyl-3-(2,6-dichloro-4-trifluoromethylphenoxy)-5-methyl-1 H-pyrazole-1-carboxamide (CAS 452098-92-9), N-tetrahydrofurfuryl-3-(2,6-dichloro-4-trifluoromethylphenoxy)-5-methyl-1 H-pyrazole-1-carboxamide (CAS 915396-43-9), N-ethyl-3-(2-chloro-6-fluoro-4-trifluoromethylphenoxy)-5-methyl-1 H-pyrazole-1-carboxamide (CAS 452099-05-7), N-tetrahydrofurfuryl-3-(2-chloro-6-fluoro-4-trifluoromethylphenoxy)-5-methyl-1 H-pyrazole-1-carboxamide (CAS 451 00-03-7), 3-[7-fluoro-3-oxo-4-(prop-2-ynyl)-3,4-dihydro-2H-benzo[1,4]oxazin-6-yl]-1,5-dimethyl-6-thioxo-[1,3,5]triazinan-2,4-dione, 1,5-dimethyl-6-thioxo-3-(2,2,7-trifluoro-3-oxo-4-(prop-2-ynyl)-3,4-dihydro-2H-benzo[b][1,4]oxazin-6-yl)-1,3,5-triazinane-2,4-dione, 2-(2,2,7-Trifluoro-3-oxo-4-prop-2-ynyl-3,4-dihydro-2H-benzo[1,4]oxazin-6-yl)-4,5,6,7-tetrahydroisindole-1,3-dione and 1-Methyl-6-trifluoromethyl-3-(2,2,7-trifluoro-3-oxo-4-prop-2-ynyl-3,4-dihydro-2H-benzo[1,4]oxazin-6-yl)-1 H-pyrimidine-2,4-dione;

b5) from the group of the bleacher herbicides:
aclonifen, befubutamide, benzbicyclon, clomazone, diflufenican, flurochloridone, flurtamone, isoxaflutole, mesotrione, norflurazon, picolinafen, pyrasulfotole, pyrazolinate, sulcotrione, tebufuriltrione, tembotrione, topramezone, bicyclopyrone, 4-(3-trifluoromethylphenoxy)-2-(4-trifluoromethylphenyl)pyrimidine (CAS 180608-33-7), amitrole and flumeturon;

b6) from the group of the EPSP synthase inhibitors:
glyphosate, glyphosate-isopropylammonium, glyphosate-potassium and glyphosate-trimesium (sulfosate);

b7) from the group of the glutamine synthase inhibitors:
glufosinate, glufosinate-P, glufosinate-ammonium;

b8) from the group of the DHP synthase inhibitors: asulam;

b9) from the group of the mitosis inhibitors: benfluralin, dithiopyr, ethalfluralin, oryzalin, pendimethalin, thiazopyr and trifluralin;

b10) from the group of the VLCFA inhibitors: acetochlor, alachlor, anilofos, butachlor, cafenstrole, dimethenamid, dimethenamid-P, fentrazamide, flufenacet, mefenacet, metazachlor, metolachlor, S-metolachlor, naproanilide, napropamide, pretilachlor, fenoxasulfone, ipfencarbazone, pyroxasulfone thenylchlor and isoxazoline-compounds of the formulae 11.1, II.2, II.3, II.4, II.5, II.6, II.7, II.8 and II.9 as mentioned above;

b11) from the group of the cellulose biosynthesis inhibitors: dichlobenil, flupoxam, isoxaben, 1-Cyclohexyl-5-pentafluorphenyloxy-1,4-[1,2,4,6]thiatriazin-3-ylamine and the piperazine compounds of formula III as mentioned above;

b13) from the group of the auxinic herbicides: 2,4-D and its salts and esters, aminopyralid and its salts such as aminopyralid-tris(2-hydroxypropyl)ammonium and its esters, clopyralid and its salts and esters, dicamba and its salts and esters, dichlorprop-P and its salts and esters, fluroxypyr-mepht, MCPA and its salts and esters, MCPB and its salts and esters, mecoprop-P and its salts and esters, picloram and its salts and esters, quinclorac, quinmerac, triclopyr and its salts and esters, and aminocyclopyrachlor and its salts and esters;

b14) from the group of the auxin transport inhibitors: diflufenzopyr and diflufenzopyr-sodium;

b15) from the group of the other herbicides: bromobutide, cinmethylin, cumyluron, dalapon, difenzoquat, difenzoquat-metilsulfate, DSMA, dymron (= daimuron), flamprop, flamprop-isopropyl, flamprop-methyl, flamprop-M-isopropyl, flamprop-M-methyl, indanofan, indaziflam, metam, methylbromide, MSMA, oxaziclomefone, pyributicarb, triaziflam, tridiphane and 6-chloro-3-(2-cyclopropyl-6-methylphenoxy)-4-pyridazinol (CAS 499223-49-3) and its salts and esters.

Particularly preferred herbicides B that can be used according to the present invention are:
b1) from the group of the lipid biosynthesis inhibitors: clodinafop-propargyl, cycloxydim, cyhalofop-butyl, fenoxaprop-P-ethyl, pinoxaden, profoxydim, tepraloxydim, tralkoxydim, esprocarb, prosulfocarb, thiobencarb and triallate;

b2) from the group of the ALS inhibitors: bensulfuron-methyl, bispyribac-sodium, cyclosulfuron, diclosulam, flumetsulam, flupyrsulfuron-methyl-sodium, foramsulfuron, imazamox, imazapic, imazethapyr, imazosulfuron, iodosulfuron, iodosulfuron-methyl-sodium, mesosulfuron, metazosulfuron, nicosulfuron, penoxsulam, propoxycarbazon-sodium, pyrazosulfuron-ethyl, pyroxsulam, rimsulfuron, sulfosulfuron, thiencarbazone-methyl and tritosulfuron;

b3) from the group of the photosynthesis inhibitors: ametryn, atrazine, diuron, flumetsulam, hexazinone, isoproturon, linuron, metribuzin, paraquat, paraquat-dichloride, propanil, terbutryn and terbuthylazine;

b4) from the group of the protoporphyrinogen-IX oxidase inhibitors: flumioxazin, oxyfluorfen, saflufenacil, sulfentrazone, ethyl [3-[2-chloro-4-fluoro-5-(1-methyl-6-trifluoromethyl-2,4-dioxo-1,2,3,4-tetrahydropyrimidin-3-yl)phenoxy]-2-pyridyloxy]acetate (CAS 353292-31-6; S-3100), 3-[7-fluoro-3-oxo-4-(prop-2-ynyl)-3,4-dihydro-2H-benzo[1,4]oxazin-6-yl]-1,5-dimethyl-6-thioxo-1,3,5-triazinan-2,4-dione, 1,5-dimethyl-6-thioxo-3-(2,2,7-trifluoro-3-oxo-4-prop-2-ynyl)-3,4-dihydro-2H-benzo[b][1,4]oxazin-6-yl)-1,3,5-triazinane-2,4-dione and 2-(2,2,7-Trifluoro-3-oxo-4-prop-2-ynyl)-3,4-dihydro-2H-benzo[1,4]oxazin-6-yl)-4,5,6,7-tetrahydro-isocinodole-1,3-dione, and 1-Methyl-6-trifluoromethyl-3-(2,2,7-trifluoro-3-oxo-4-prop-2-ynyl)-3,4-dihydro-2H-benzo[1,4]oxazin-6-yl)-1-H-pyrimidine-2,4-dione;

b5) from the group of the bleacher herbicides: clomazone, diflufenican, flurochloridone, isoxaflutole, mesotrione, picolinifen, sulcotrione, tefurylirrone, tembotrione, toprazomezone, bicyclopyrione, amitrole and flumeturon;

b6) from the group of the EPSP synthase inhibitors: glyphosate, glyphosate-isopropylammonium and glyphosate-trimesium (sulfosate);

b7) from the group of the glutamine synthase inhibitors: glufosinate, glufosinate-P and glufosinate-ammonium;

b9) from the group of the mitosis inhibitors: pendimethalin and trifluralin;
b10) from the group of the VLCFA inhibitors: acetochlor, cafenstrole, dimethenamid-P, fentrazamide, flufenacet, mefenacet, metazachlor, metolachlor, S-metolachlor, fenoxasulfone, ipfencarbazone and pyroxasulfone; likewise, preference is given to isoxazoline compounds of the formulae 11.1, II.2, II.3, II.4, II.5, II.6, II.7, II.8 and II.9 as mentioned above;

b11) from the group of the cellulose biosynthesis inhibitors: isoxaben and the piperazine compounds of formula III as mentioned above;

b13) from the group of the auxinic herbicides: 2,4-D and its salts and esters, aminopyralid and its salts and esters, clopyralid and its salts and esters, dicamba and its salts and esters, fluroxypyr-methyl, quinclorac, quinmerac and aminocyclopyrachlor and its salts and esters;

b14) from the group of the auxin transport inhibitors: diflufenzopyr and diflufenzopyr-sodium,

b15) from the group of the other herbicides: dymron (= daimuron), indanofan, indaziflam, oxaziclomefone and triaziflam.

In another embodiment of the present invention the compositions according to the present invention comprise at least one oxylipin A and at least one further safener C.

Safeners are chemical compounds which prevent or reduce damage on useful plants without having a major impact on the herbicidal action of the herbicidal active components of the present compositions towards unwanted plants. They can be applied either before sowings (e.g. on seed treatments, shoots or seedlings) or in the pre-emergence application or post-emergence application of the useful plant. The safeners C and the at least one oxylipin A and/or the herbicides B can be applied simultaneously or in succession.

Examples of preferred safeners C are benoxacor, cloquintocet, cyometrinil, cyprosulfamide, dichlorimid, dicyclonon, dietholate, fenchlorazole, fenclorim, flurazole, fluxofenin, furilazole, isoxadifen, mefenpyr, mephenate, naphthalic anhydride, oxabetrinil, 4-(dichloroacetyl)-1-oxa-4-azaspiro[4.5]decane (MON4660, CAS 71526-07-3) and 2,2,5-trimethyl-3-(dichloroacetyl)-1,3-oxazolidine (R-29148, CAS 52836-31-4).

Especially preferred safeners C are benoxacor, cloquintocet, cyprosulfamide, dichlorimid, fenchlorazole, fenclorim, flurazole, fluxofenin, furilazole, isoxadifen, mefenpyr,
naphthalic anhydride, oxabetrinil, 4-(dichloroacetyl)-1-oxa-4-azaspiro[4.5]decane (MON4660, CAS 71526-07-3) and 2,2,5-trimethyl-3-(dichloroacetyl)-1,3-oxazolidine (R-29148, CAS 52836-31-4).

Particularly preferred safeners C are benoxacor, cloquintocet, cyprosulfamide, dichlorim, fenclorazole, fenclorim, furilazole, isoxadifen, mefenpyr, naphtalic anhydride, 4-(dichloroacetyl)-1-oxa-4-azaspiro[4.5]decane (MON4660, CAS 71526-07-3).


The assignment of the active compounds to the respective mechanisms of action is based on current knowledge. If several mechanisms of action apply to one active compound, this substance was only assigned to one mechanism of action.

If the herbicides B and/or the safeners C are capable of forming geometrical isomers, for example E/Z isomers, both the pure isomers and mixtures thereof may be used in the compositions according to the invention.

If the oxylipins A, the herbicides B and/or the safeners C have one of more centers of chirality and are thus present as enantiomers or diastereomers, both the pure enantiomers and diastereomers and mixtures thereof may be used in the compositions according to the invention.

If the oxylipins A, the herbicides B and/or the safeners C have ionizable functional groups, they can also be employed in the form of their agriculturally acceptable salts. Suitable are, in general, the salts of those cations and the acid addition salts of those acids whose cations and anions, respectively, have no adverse effect on the activity of the active compounds.
Preferred cations are the ions of the alkali metals, preferably of lithium, sodium and potassium, of the alkaline earth metals, preferably of calcium and magnesium, and of the transition metals, preferably of manganese, copper, zinc and iron, further ammonium and substituted ammonium in which one to four hydrogen atoms are replaced by Cl-C4 -alkyl, hydroxy-Ci-C4 -alkyl, Cl-C4 -alkoxy-Ci-C4 -alkyl, hydroxy-Ci-C4 -alkoxy-Ci-C4 -alkyl, phenyl or benzyl, preferably ammonium, methylammonium, isopropylammonium, dimethylammonium, diisopropylammonium, trimethylammonium, tetramethylammonium, tetraethylammonium, tetrabutylammonium, 2-hydroxyethylammonium, 2-(2-hydroxyethyl-1-oxy)eth-1 -ylammonium, di(2-hydroxyeth-1 -yl)ammonium, benzyl-trimethylammonium, benzyltriethylammonium, furthermore phosphonium ions, sulfonium ions, preferably tri(Ci-C4 -alkyl)sulfonium, such as trimethylsulphonium, and sulfoxonium ions, preferably tri(Ci-C4 -alkyl)sulfoxonium.

Anions of useful acid addition salts are primarily chloride, bromide, fluoride, iodide, hydrogensulfate, methylsulfate, sulfate, dihydrogenphosphate, hydrogenphosphate, nitrate, bicarbonate, carbonate, hexafluorosilicate, hexafluorophosphate, benzoate and also the anions of Cl-C4 -alkanoic acids, preferably formate, acetate, propionate and butyrate.

Oxylipins A, herbicides B and/or safeners C having a carboxyl group can be employed in the form of the acid, in the form of an agriculturally suitable salt or else in the form of an agriculturally acceptable derivative in the compositions according to the invention, for example as amides, such as mono- and di-Ci-C6 -alkylamides or arylamides, as esters, for example as allyl esters, propargyl esters, Cl-Ci-C6 -alkyl esters, alkoxyalkyl esters and also as thiesters, for example as Cl-Ci-C6 -alkylthio esters. Preferred mono- and di-Ci -C6 -alkylamides are the methyl and the dimethylamides. Preferred arylamides are, for example, the anilides and the 2-chloroanilides. Preferred alkyl esters are, for example, the methyl, ethyl, propyl, isopropyl, butyl, isobutyl, pentyl, mexyl (1-methylhexyl) or isooctyl (2-ethylhexyl) esters. Preferred Cl-C4 -alkoxy-Ci-C4 -alkyl esters are the straight-chain or branched Cl-C4 -alkoxy ethyl esters, for example the methoxyethyl, ethoxyethyl or butoxyethyl ester. An example of a straight-chain or branched Cl-Ci-C6 -alkylthio ester is the ethylthio ester.

According to a preferred embodiment of the invention, the composition comprises as herbicidal active compound B (component B), at least one, preferably exactly one herbicide B.
According to another preferred embodiment of the invention, the composition comprises as component B at least two, preferably exactly two herbicides B different from each other.

According to another preferred embodiment of the invention, the composition comprises as component B, at least three, preferably exactly three herbicides B different from each other.

According to another preferred embodiment of the invention, the composition comprises as additional safening component C at least one, preferably exactly one safener C.

According to another preferred embodiment of the invention, the composition comprises as component B, at least one, preferably exactly one herbicide B, and as additional safening component C at least one, preferably exactly one, safener C.

According to another preferred embodiment of the invention, the composition comprises as component B, preferably exactly two herbicides B different from each other, and as additional safening component C at least one, preferably exactly one, safener C.

According to another preferred embodiment of the invention, the composition comprises as safening effective oxylipin A (safening component A) at least one, preferably exactly one, oxylipin A, preferably oxylipin A selected from groups a1 and a2, more preferably OPDA, dinor OPDA, PPAitype I and PPAitype II, and as component B at least one, preferably exactly one, herbicide B.

According to another preferred embodiment of the invention, the composition comprises as safening component A at least one, preferably exactly one, oxylipin A, preferably oxylipin A selected from groups a1 and a2, more preferably OPDA, dinor OPDA, PPAitype I and PPAitype II, and as component B at least two, preferably exactly two, herbicides B different from each other.
erably oxylipin A selected from groups a1 and a2, more preferably OPDA, dinor OPDA, PPA-itype I and PPA-itype II, and as component B at least three, preferably exactly three herbicides, B different from each other.

A first preferred embodiment of the invention relates to compositions according to the invention comprising, in addition to an oxylipin A, especially an oxylipin A selected from groups a1 and a2, more preferably selected from OPDA, dinor OPDA, PPA-itype I and PPA-itype II, at least one and especially exactly one herbicidally active compound from group b1), in particular selected from the group consisting of clodinafop-propargyl, cycloxydim, cyhalofop-butyl, fenoxaprop-P-ethyl, pinoxaden, profoxydim, tepraloxydim, tralkoxydim, esprocarb, prosulfocarb, thiobencarb and triallate.

A second preferred embodiment of the invention relates to compositions according to the invention comprising, in addition to an oxylipin A, especially an oxylipin A selected from groups a1 and a2, more preferably selected from OPDA, dinor OPDA, PPA-itype I and PPA-itype II, at least one and especially exactly one herbicidally active compound from group b2), in particular selected from the group consisting of bensulfuron-methyl, bispyribac-sodium, cylosulfamuron, diclosulam, flumetsulam, flupyrsulfuron-methyl-sodium, foramsulfuron, imazamox, imazapic, imazaquin, imazethapyr, imazosulfuron, iodosulfuron, iodosulfuron-methyl-sodium, mesosulfuron, metazosulfuron, nicosulfuron, penoxsulam, propoxycarbazon-sodium, pyrazosulfuron-ethyl, pyroxsulam, rimsulfuron, sulfosulfuron, thiencarbazon-methyl and tritosulfuron.

A third preferred embodiment of the invention relates to compositions according to the invention comprising, in addition to an oxylipin A, especially an oxylipin A selected from groups a1 and a2, more preferably selected from OPDA, dinor OPDA, PPA-itype I and PPA-itype II, at least one and especially exactly one herbicidally active compound from group b3), in particular selected from the group consisting of ametryn, atrazine, bentazon, bromoxynil, diuron, fluometuron, hexazinone, isoxalin, isoproturon, linuron, metribuzin, paraquat, paraquat-dichloride, propanil, terbutryn and terbutylazine.

A fourth preferred embodiment of the invention relates to compositions according to the invention comprising, in addition to an oxylipin A, especially an oxylipin A selected from groups a1 and a2, more preferably selected from OPDA, dinor OPDA, PPA-itype I and PPA-itype II, at least one and especially exactly one herbicidally active compound from group b4), in particular selected from the group consisting of flumioxazin, oxyfluorfen, saflufenacil, carfentrazone, sulfentrazone, ethyl [3-[2-chloro-4-fluoro-5-(1-methyl-6-trifluoromethyl-2,4-dioxo-1,2,3,4-tetrahydropyrimidin-3-yl)phenoxy]-2-pyridoxy]acetate
A fifth preferred embodiment of the invention relates to compositions according to the invention comprising, in addition to an oxylipin A, especially an oxylipin A selected from groups a1 and a2, more preferably selected from OPDA, dinor OPDA, PPAitype I and PPAitype II, at least one and especially exactly one herbicidally active compound from group b5), in particular selected from the group consisting of clomazone, diflufenican, flurochloridone, isoxaflutole, mesotrione, picolinafen, sulcotrione, tefurylitrione, tembotrione, topramezone, bicyclopyrone, amitrole and flumeturon.

A sixth preferred embodiment of the invention relates to compositions according to the invention comprising, in addition to an oxylipin A, especially an oxylipin A selected from groups a1 and a2, more preferably selected from OPDA, dinor OPDA, PPAitype I and PPAitype II, at least one and especially exactly one herbicidally active compound from group b6), in particular selected from the group consisting of glyphosate, glyphosate-isopropylammonium, glyphosate-potassium and glyphosate-trimesium (sulfosate).

A seventh preferred embodiment of the invention relates to compositions according to the invention comprising, in addition to a an oxylipin A, especially an oxylipin A selected from groups a1 and a2, more preferably selected from OPDA, dinor OPDA, PPAitype I and PPAitype II, at least one and especially exactly one herbicidally active compound from group b7), in particular selected from the group consisting of glufosinate, glufosinate-P and glufosinate-ammonium.

An eighth preferred embodiment of the invention relates to compositions according to the invention comprising, in addition to an oxylipin A, especially an oxylipin A selected from groups a1 and a2, more preferably selected from OPDA, dinor OPDA, PPAitype I and PPAitype II, at least one and especially exactly one herbicidally active compound from group b9), in particular selected from the group consisting of pendimethalin and trifluralin.

A ninth preferred embodiment of the invention relates to compositions according to the invention comprising, in addition to an oxylipin A, especially an oxylipin A selected from
groups a₁ and a₂, more preferably selected from OPDA, dinor OPDA, PPAItype I and PPAItype II, at least one and especially exactly one herbicidally active compound from group b₁₀), in particular selected from the group consisting of acetoxychlor, cafenstroie, dimethenamid-P, fentrazamide, fluoxacet, mafenacet, metazachlor, metolachlor, S-metolachlor, fenoxasulfone and pyroxasulfone. Likewise, preference is given to compositions comprising in addition to a an oxylipin A, especially an oxylipin A selected from groups a₁ and a₂, more preferably selected from OPDA, dinor OPDA, PPAItype I and PPAItype II, at least one and especially exactly one herbicidally active compound from group b₁₀), in particular selected from the group consisting of isoxazoline compounds of the formulae 11.1, II.2, II.3, II.4, II.5, II.6, II.7, II.8 and II.9, as defined above.

A tenth preferred embodiment of the invention relates to compositions according to the invention comprising, in addition to a an oxylipin A, especially an oxylipin A selected from groups a₁ and a₂, more preferably selected from OPDA, dinor OPDA, PPAItype I and PPAItype II, at least one and especially exactly one herbicidally active compound from group b₁₁), in particular isoxaben. Likewise, preference is given to compositions comprising in addition to a benoxazinone of the formula I, preferably of formula I.a, especially an active compound from the group consisting of I.a.35, at least one and especially exactly one herbicidally active compound from group b₁₀), in particular selected from the group consisting of piperazine compounds of formula III as defined above.

An eleventh preferred embodiment of the invention relates to compositions according to the invention comprising, in addition to a an oxylipin A, especially an oxylipin A selected from groups a₁ and a₂, more preferably selected from OPDA, dinor OPDA, PPAItype I and PPAItype II, at least one and especially exactly one herbicidally active compound from group b₁₃), in particular selected from the group consisting of 2,4-D and its salts and esters, aminopyralid and its salts such as aminopyralid-tris(2-hydroxypropyl)ammonium and its esters, clopyralid and its salts and esters, dicamba and its salts and esters, fluroxypr-mepyl, quinclorac, quinmerac and aminocyclopyrchlor and its salts and esters.

A twelfth preferred embodiment of the invention relates to compositions according to the invention comprising, in addition to a an oxylipin A, especially an oxylipin A selected from groups a₁ and a₂, more preferably selected from OPDA, dinor OPDA, PPAItype I and PPAItype II, at least one and especially exactly one herbicidally active compound from group b₁₄), in particular selected from the group consisting of diflufenzopyr and diflufenzopyr-sodium.
A 13th preferred embodiment of the invention relates to compositions according to the invention comprising, in addition to a an oxylipin A, especially an oxylipin A selected from groups a1 and a2, more preferably selected from OPDA, dinor OPDA, PPAitype I and PPAitype II, at least one and especially exactly one herbicidally active compound from group b15), in particular selected from the group consisting of dymron (= daimuron), indanofan, indaziflam, oxaziclomefone and triaziflam.

A 14th preferred embodiment of the invention relates to compositions according to the invention comprising, in addition to a an oxylipin A, especially an oxylipin A selected from groups a1 and a2, more preferably selected from OPDA, dinor OPDA, PPAitype I and PPAitype II, at least one and especially exactly one herbicidally active compound from the safeners C, in particular selected from the group consisting of benoxacor, cloquintocet, cyprosulfamide, dichlormid, fenchlorazole, fenclorim, furilazole, isoxadifen, mfenpyr, 4-(dichloroacetyl)-1-oxa-4-azaspiro[4.5]decane (MON4660, CAS 71526-07-3) and 2,2,5-trimethyl-3-(dichloroacetyl)-1,3-oxazolidine (R-29148, CAS 52836-31-4).

Here and below, the term "binary compositions" includes compositions comprising one or more, for example 1, 2 or 3, oxylipins A and either one or more, for example 1, 2 or 3, herbicides B or one or more safeners C. Correspondingly, the term "ternary compositions" includes compositions comprising one or more, for example 1, 2 or 3, oxylipins A, one or more, for example 1, 2 or 3, herbicides B and one or more, for example 1, 2 or 3, safeners C.

In binary compositions comprising at least one oxylipin A as component A and at least one herbicide B, the weight ratio of the active compounds A:B is generally in the range of from 1:1000 to 1000:1, preferably in the range of from 1:500 to 500:1, in particular in the range of from 1:250 to 250:1 and particularly preferably in the range of from 1:75 to 75:1.

In binary compositions comprising at least one oxylipin A as component A and at least one safener C, the weight ratio of the active compounds A:C is generally in the range of from 1:1000 to 1000:1, preferably in the range of from 1:500 to 500:1, in particular in the range of from 1:250 to 250:1 and particularly preferably in the range of from 1:75 to 75:1.

In ternary compositions comprising both at least one oxylipin A as component A, at least one herbicide B and at least one safener C, the relative proportions by weight of the components A:B are generally in the range of from 1:1000 to 1000:1, preferably in the range of from 1:500 to 500:1, in particular in the range of from 1:250 to 250:1 and
particularly preferably in the range of from 1:75 to 75:1, the weight ratio of the components A:C is generally in the range of from 1:1000 to 1000:1, preferably in the range of from 1:500 to 500:1, in particular in the range of from 1:250 to 250:1 and particularly preferably in the range of from 1:75 to 75:1, and the weight ratio of the components B:C is generally in the range of from 1:1000 to 1000:1, preferably in the range of from 1:500 to 500:1, in particular in the range of from 1:250 to 250:1 and particularly preferably in the range of from 1:75 to 75:1. The weight ratio of components A + B to component C is preferably in the range of from 1:500 to 500:1, in particular in the range of from 1:250 to 250:1 and particularly preferably in the range of from 1:75 to 75:1.

Particularly preferred herbicides B are the herbicides B as defined above; in particular the herbicides B.1 - B.144 listed below in Table B:

<table>
<thead>
<tr>
<th>Herbicide B</th>
<th>Herbicide B</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.1 clethodim</td>
<td>B.26 flumetsulam</td>
</tr>
<tr>
<td>B.2 clodinafop-propargyl</td>
<td>B.27 flupyrdsulfuron-methyl-sodium</td>
</tr>
<tr>
<td>B.3 cycloxydim</td>
<td>B.28 foramsulfuron</td>
</tr>
<tr>
<td>B.4 cyhalofop-butyl</td>
<td>B.29 imazamox</td>
</tr>
<tr>
<td>B.5 fenoxaprop-P-ethyl</td>
<td>B.30 imazapic</td>
</tr>
<tr>
<td>B.6 metamifop</td>
<td>B.31 imazapyr</td>
</tr>
<tr>
<td>B.7 pinoxaden</td>
<td>B.32 imazaquin</td>
</tr>
<tr>
<td>B.8 profoxydim</td>
<td>B.33 imazethapyr</td>
</tr>
<tr>
<td>B.9 sethoxydim</td>
<td>B.34 imazosulfuron</td>
</tr>
<tr>
<td>B.10 tepraloxydim</td>
<td>B.35 iodosulfuron-methyl-sodium</td>
</tr>
<tr>
<td>B.11 tralkoxydim</td>
<td>B.36 mesosulfuron</td>
</tr>
<tr>
<td>B.12 esprocarb</td>
<td>B.37 metazosulfuron</td>
</tr>
<tr>
<td>B.13 ethofumesate</td>
<td>B.38 metsulfuron</td>
</tr>
<tr>
<td>B.14 molinate</td>
<td>B.39 metosulam</td>
</tr>
<tr>
<td>B.15 prosulfocarb</td>
<td>B.40 nicosulfuron</td>
</tr>
<tr>
<td>B.16 thiobencarb</td>
<td>B.41 penoxsulam</td>
</tr>
<tr>
<td>B.17 triallate</td>
<td>B.42 propoxycarbazone-sodium</td>
</tr>
<tr>
<td>B.18 bensulfuron-methyl</td>
<td>B.43 pyrazosulfuron-ethyl</td>
</tr>
<tr>
<td>B.19 bipyrribac-sodium</td>
<td>B.44 pyribenzoxim</td>
</tr>
<tr>
<td>B.20 cloransulam</td>
<td>B.45 pyriflaild</td>
</tr>
<tr>
<td>B.21 clorsulfuron</td>
<td>B.46 pyroxasulam</td>
</tr>
<tr>
<td>B.22 clorimuron</td>
<td>B.47 rimsulfuron</td>
</tr>
<tr>
<td>B.23 cyclosulfamuron</td>
<td>B.48 sulfosulfuron</td>
</tr>
<tr>
<td>B.24 diclosulam</td>
<td>B.49 thiencarbazone-methyl</td>
</tr>
<tr>
<td>B.25 florasulam</td>
<td>B.50 thifensulfuron</td>
</tr>
<tr>
<td>B.26 flumetsulam</td>
<td></td>
</tr>
<tr>
<td>Herbicide B</td>
<td>Herbicide B</td>
</tr>
<tr>
<td>------------</td>
<td>------------</td>
</tr>
<tr>
<td>B.51 tribenuron</td>
<td>B.80 1,5-dimethyl-6-thioxo-3-(2,2,7-trifluoro-3-oxo-4-(prop-2-ynyl)-3,4-dihydro-2H-benzo[b][1,4]-oxazin-6-yl)-1,3,5-triazinan-2,4-dione</td>
</tr>
<tr>
<td>B.52 tritosulfuron</td>
<td>B.81 2-(2,2,7-Trifluoro-3-oxo-4-prop-2-ynyl-3,4-dihydro-2H-benzo[1,4]oxazin-6-yl)-4, 5,6,7-tetrahydro-isindole-1,3-dione</td>
</tr>
<tr>
<td>B.53 ametryne</td>
<td>B.82 1-Methyl-6-trifluoromethyl-3-(2,2,7-trifluoro-3-oxo-4-prop-2-ynyl-3,4-dihydro-2H-benzo[1,4]oxazin-6-yl)-1H-pyrimidine-2,4-dione</td>
</tr>
<tr>
<td>B.54 atrazine</td>
<td>B.83 benzobicyclon</td>
</tr>
<tr>
<td>B.55 bentazon</td>
<td>B.84 clomazone</td>
</tr>
<tr>
<td>B.56 bromoxynil</td>
<td>B.85 diflufenican</td>
</tr>
<tr>
<td>B.57 diuron</td>
<td>B.86 flurochloridone</td>
</tr>
<tr>
<td>B.58 fluometuron</td>
<td>B.87 isoxaflutole</td>
</tr>
<tr>
<td>B.59 hexazinone</td>
<td>B.88 mesotrione</td>
</tr>
<tr>
<td>B.60 isoproturon</td>
<td>B.89 norflurzone</td>
</tr>
<tr>
<td>B.61 linuron</td>
<td>B.90 picolinafen</td>
</tr>
<tr>
<td>B.62 metamitron</td>
<td>B.91 sulcotrione</td>
</tr>
<tr>
<td>B.63 metribuzin</td>
<td>B.92 tefuryltrione</td>
</tr>
<tr>
<td>B.64 propanil</td>
<td>B.93 tembotrione</td>
</tr>
<tr>
<td>B.65 simazin</td>
<td>B.94 topramezone</td>
</tr>
<tr>
<td>B.66 terbutylazine</td>
<td>B.95 bicyclopyrone</td>
</tr>
<tr>
<td>B.67 terbutryn</td>
<td>B.96 amitrole</td>
</tr>
<tr>
<td>B.68 paraquat-dichloride</td>
<td>B.97 fluometuron</td>
</tr>
<tr>
<td>B.69 acifluorfen</td>
<td>B.98 glyphosate</td>
</tr>
<tr>
<td>B.70 butafenacil</td>
<td>B.99 glyphosate-isopropylammonium</td>
</tr>
<tr>
<td>B.71 carfentrazone-ethyl</td>
<td>B.100 glyphosate-trimesium (sulfosate)</td>
</tr>
<tr>
<td>B.72 flumioxazin</td>
<td>B.101 glufosinate</td>
</tr>
<tr>
<td>B.73 fomesafen</td>
<td>B.102 glufosinate-P</td>
</tr>
<tr>
<td>B.74 oxadiargyl</td>
<td>B.103 glufosinate-ammonium</td>
</tr>
<tr>
<td>B.75 oxyfluorfen</td>
<td>B.104 pendimethalin</td>
</tr>
<tr>
<td>B.76 saflufenacil</td>
<td>B.105 trifluralin</td>
</tr>
<tr>
<td>B.77 sulfentrazone</td>
<td>B.106 acetochlor</td>
</tr>
<tr>
<td>B.78 ethyl [3-[2-chloro-4-fluoro-5-(1-methyl-6-trifluoromethyl-2,4-dioxo-1,2,3,4-tetrahydropyrimidin-3-yl)phenoxyl]-2-pyridyl-oxylacetate (CAS 353292-31-6)</td>
<td>B.107 butachlor</td>
</tr>
<tr>
<td>B.79 3-[7-fluoro-3-oxo-4-(prop-2-ynyl)-3,4-dihydro-2H-benzo[1,4]oxazin-6-yl]-1,5-dimethyl-6-thioxo-[1,3,5]triazinan-2,4-dione</td>
<td></td>
</tr>
</tbody>
</table>
Particularly preferred safeners C, which, as component C, are constituent of the composition according to the invention are the safeners C as defined above; in particular the safeners C.1 - C.12 listed below in Table C:

<table>
<thead>
<tr>
<th>Safener C</th>
<th>Safener C</th>
</tr>
</thead>
<tbody>
<tr>
<td>benoxacor</td>
<td>cloquintocet</td>
</tr>
<tr>
<td>cyprosulfamide</td>
<td>dichlormid</td>
</tr>
<tr>
<td>fenchlorazole</td>
<td>furilazole</td>
</tr>
<tr>
<td>fenclorim</td>
<td>isoxadifen</td>
</tr>
<tr>
<td>mefenpyr</td>
<td>naphtalic acid anhydride</td>
</tr>
<tr>
<td>4-(dichloroacetyl)-1-oxa-4-azaspiro[4.5]decane (MON4660, CAS 71526-07-3)</td>
<td></td>
</tr>
<tr>
<td>2,2,5-trimethyl-3-(dichloroacetyl)-1,3-oxazolidine (R-29148, CAS 52836-31-4)</td>
<td></td>
</tr>
</tbody>
</table>
Particularly preferred are the compositions mentioned below comprising the oxylipins A as defined and the substance(s) as defined in the respective row of table 1;

especially preferred comprising as only safening active compounds the oxylipins A as defined and the substance(s) as defined in the respective row of table 1;

most preferably comprising as only active compounds the oxylipins A as defined and the substance(s) as defined in the respective row of table 1.

Particularly preferred are compositions 1.1 to 1.144, comprising OPDA and the substance(s) as defined in the respective row of table 1:

Table 1 (compositions 1.1 to 1.144):

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The specific number for each single composition is deductible as follows:
Composition 1.77 for example comprises OPDA and sulfentrazone \((B.77)\).
Composition 2.77 for example comprises dinor OPDA (see the definition for compositions 2.1 to 2.144 below) and sulfentrazone \((B.77)\).

Also especially preferred are compositions 2.1 to 2.144 which differ from the corresponding compositions 1.1 to 1.144 only in that they comprise as compound A dinor OPDA.

Also especially preferred are compositions 3.1 to 3.144 which differ from the corresponding compositions 1.1 to 1.144 only in that they comprise as compound A PPA-itype I.

Also especially preferred are compositions 4.1 to 4.144 which differ from the corresponding compositions 1.1 to 1.144 only in that they comprise as compound A PPA-itype II.

Depending on the application method in question, the compositions according to the invention can be employed in a further number of crop plants for eliminating undesirable plants. Examples of suitable crops are the following:


Preferred crops are: Arachis hypogaea, Beta vulgaris spec. altissima, Brassica napus var. napus, Brassica oleracea, Citrus limon, Citrus sinensis, Coffea arabica (Coffea
canephora, Coffea liberica), Cynodon dactylon, Glycine max, Gossypium hirsutum, (Gossypium arboreum, Gossypium herbaceum, Gossypium vitifolium), Helianthus annuus, Hordeum vulgare, Juglans regia, Lens culinaris, Linum usitatissimum, Lycopersicon lycopersicum, Malus spec, Medicago sativa, Nicotiana tabacum (N.rustica), Olea europaea, Oryza sativa, Phaseolus lunatus, Phaseolus vulgaris, Pistacia vera, Pisum sativum, Prunus dulcis, Saccharum officinarum, Secale cereale, Solanum tuberosum, Sorghum bicolor (s. vulgare), Triticale, Triticum aestivum, Triticum durum, Vicia faba, Vitis vinifera and Zea mays

The compositions according to the invention can also be used in genetically modified plants. The term "genetically modified plants" is to be understood as plants, which genetic material has been modified by the use of recombinant DNA techniques in a way that under natural circumstances it cannot readily be obtained by cross breeding, mutations or natural recombination. Typically, one or more genes have been integrated into the genetic material of a genetically modified plant in order to improve certain properties of the plant. Such genetic modifications also include but are not limited to targeted post-translational modification of protein(s), oligo- or polypeptides e.g. by glycosylation or polymer additions such as prenylated, acetylated or farnesylated moieties or PEG moieties.

Plants that have been modified by breeding, mutagenesis or genetic engineering, e.g. have been rendered tolerant to applications of specific classes of herbicides, such as auxinic herbicides such as dicamba or 2,4-D; bleacher herbicides such as hydroxyphenylpyruvate dioxygenase (HPPD) inhibitors or phytoene desaturase (PDS) inhibitors; acetolactate synthase (ALS) inhibitors such as sulfonylureas or imidazolinones; enolpyruvyl shikimate 3-phosphate synthase (EPSP) inhibitors such as glyphosate; glutamine synthase (GS) inhibitors such as glufosinate; protoporphyrinogen-IX oxidase inhibitors; lipid biosynthesis inhibitors such as acetyl-CoA carboxylase (ACCase) inhibitors; or oxynil (i. e. bromoxynil or ioxynil) herbicides as a result of conventional methods of breeding or genetic engineering; furthermore, plants have been made resistant to multiple classes of herbicides through multiple genetic modifications, such as resistance to both glyphosate and glufosinate or to both glyphosate and a herbicide from another class such as ALS inhibitors, HPPD inhibitors, auxinic herbicides, or ACCase inhibitors. These herbicide resistance technologies are, for example, described in Pest Management Science 61, 2005, 246; 61, 2005, 258; 61, 2005, 277; 61, 2005, 269; 61, 2005, 286; 64, 2008, 326; 64, 2008, 332; Weed Science 57, 2009, 108; Australian Journal of Agricultural Research 58, 2007, 708; Science 316, 2007, 1185; and references quoted therein. Several cultivated plants have been rendered tolerant to herbicides by conventional methods of breeding (mutagenesis), e.g. Clearfield® summer rape (Canola, BASF SE, Germany) being tolerant to imidazolinones, e.g. imazamox, or ExpressSun® sunflowers (DuPont, USA) being tolerant to sulfonyl ureas, e.g. tribeuron. Genetic engineering methods have been used to render cultivated plants such
as soybean, cotton, corn, beets and rape, tolerant to herbicides such as glyphosate, imidazolinones and glufosinate, some of which are under development or commercially available under the brands or trade names RoundupReady® (glyphosate tolerant, Monsanto, USA), Cultivance® (imidazolinone tolerant, BASF SE, Germany) and LibertyLink® (glufosinate tolerant, Bayer CropScience, Germany).

Furthermore, plants are also covered that are by the use of recombinant DNA techniques capable to synthesize one or more insecticidal proteins, especially those known from the bacterial genus Bacillus, particularly from Bacillus thuringiensis, such as α-endotoxins, e.g. CryIA(b), CryIA(c), CryIF, CryLF(a2), CryIIA(b), CryIIIA, CryIIIb(bl) or Cry9c; vegetative insecticidal proteins (VIP), e.g. VIP1, VIP2, VIP3 or VIP3A; insecticidal proteins of bacteria colonizing nematodes, e.g. Photorhabdus spp. or Xenorhabdus spp.; toxins produced by animals, such as scorpion toxins, arachnid toxins, wasp toxins, or other insect-specific neurotoxins; toxins produced by fungi, such Streptomyces toxins, plant lectins, such as pea or barley lectins; agglutinins; proteinase inhibitors, such as trypsin inhibitors, serine protease inhibitors, patatin, cystatin or papain inhibitors; ribosome-inactivating proteins (RIP), such as ricin, maize-RIP, abrin, luffin, saporin or bryodin; steroid metabolism enzymes, such as 3-hydroxy-steroid oxidase, ecdysteroid-IDP-glycosyl-transferase, cholesterol oxidases, edysone inhibitors or HMG-CoA-reductase; ion channel blockers, such as blockers of sodium or calcium channels; juvenile hormone esterase; diuretic hormone receptors (helicokinin receptors); stilben synthase, bibenzyl synthase, chitinases or glucanases. In the context of the present invention these insecticidal proteins or toxins are to be understood expressly also as pre-toxins, hybrid proteins, truncated or otherwise modified proteins.

Hybrid proteins are characterized by a new combination of protein domains, (see, e.g. WO 02/015701). Further examples of such toxins or genetically modified plants capable of synthesizing such toxins are dis-closed, e.g., in EP-A 374 753, WO 93/007278, WO 95/34656, EP-A 427 529, EP-A 451 878, WO 03/18810 und WO 03/52073. The methods for producing such genetically modified plants are generally known to the person skilled in the art and are described, e.g. in the publications mentioned above.

These insecticidal proteins contained in the genetically modified plants impart to the plants producing these proteins tolerance to harmful pests from all taxonomic groups of arthropods, especially to beetles (Coleoptera), two-winged insects (Diptera), and moths (Lepidoptera) and to nematodes (Nematoda). Genetically modified plants capable to synthesize one or more insecticidal proteins are, e.g., described in the publications mentioned above, and some of which are commercially available such as YieldGard® (corn cultivars producing the CryIAb toxin), YieldGard® Plus (corn cultivars producing Cry1 Ab and Cry3Bb1 toxins), Starlink® (corn cultivars producing the Cry9c toxin), Hercules® RW (corn cultivars producing Cry34Ab1, Cry35Ab1 and the enzyme Phosphorothricin-N-Acetyltransferase [PAT]); NuCOTN® 33B (cotton cultivars producing the CrylAc toxin), Bollgard® I (cotton cultivars producing the CryIAc toxin), Bollgard® II (cotton cultivars producing CryIAc and Cry2Ab2 toxins); VIPCOT® (cotton cultivars
producing a VIP-toxin); NewLeaf® (potato cultivars producing the Cry3A toxin); Bt-
Xtra®, NatureGard®, KnockOut®, BiteGard®, Protecta®, Bt1 1 (e.g. Agrisure® CB) and
Bt176 from Syngenta Seeds SAS, France, (corn cultivars producing the CryAb toxin
and PAT enzyme), MIR604 from Syngenta Seeds SAS, France (corn cultivars produc-
ing a modified version of the Cry3A toxin, c.f. WO 03/01 881 0), MON 863 from Mon-
santo Europe S.A., Belgium (corn cultivars producing the Cry3Bb1 toxin), IPC 531
from Monsanto Europe S.A., Belgium (cotton cultivars producing a modified version
of the CryLa toxin) and 1507 from Pioneer Overseas Corporation, Belgium (corn culti-
vars producing the Cry1 F toxin and PAT enzyme).

Furthermore, plants are also covered that are by the use of recombinant DNA tech-
niques capable to synthesize one or more proteins to increase the resistance or toler-
ance of those plants to bacterial, viral or fungal pathogens. Examples of such proteins
are the so-called "pathogenesis-related proteins" (PR proteins, see, e.g. EP-A 392
225), plant disease resistance genes (e.g. potato cultivars, which express resistance
genes acting against Phytophthora infestans derived from the mexican wild potato So-
lanum bulbocastanum) or T4-lyso-zym (e.g. potato cultivars capable of synthesizing
these proteins with increased resistance against bacteria such as Erwinia amylovora).
The methods for producing such genetically modified plants are generally known to the
person skilled in the art and are described, e.g. in the publications mentioned above.

Furthermore, plants are also covered that are by the use of recombinant DNA tech-
niques capable to synthesize one or more proteins to increase the productivity (e.g. bio
mass production, grain yield, starch content, oil content or protein content), tolerance to
drought, salinity or other growth-limiting environmental factors or tolerance to pests and
fungal, bacterial or viral pathogens of those plants.

Furthermore, plants are also covered that contain by the use of recombinant DNA
techniques a modified amount of substances of content or new substances of content,
specifically to improve human or animal nutrition, e.g. oil crops that produce health-
promoting long-chain omega-3 fatty acids or unsaturated omega-9 fatty acids (e.g. Nexera® rape, DOW Agro Sciences, Canada).

Furthermore, plants are also covered that contain by the use of recombinant DNA
techniques a modified amount of substances of content or new substances of content,
specifically to improve raw material production, e.g. potatoes that produce increased
amounts of amyllopectin (e.g. Amflora® potato, BASF SE, Germany).

The compositions according to the invention or the crop protection compositions com-
prising them or formulated thereof can be used, for example, in the form of ready-to-
spray aqueous solutions, powders, suspensions, also highly concentrated aqueous,
oily or other suspensions or dispersions, emulsions, oil dispersions, pastes, dusts, ma-
terials for broadcasting, or granules, by means of spraying, atomizing, dusting, broadcast-
ing or watering or treatment of the seed or mixing with the seed. The use forms
depend on the intended purpose; in any case, they should ensure the finest possible
distribution of the active compounds according to the invention.

The crop protection compositions comprise a herbicidal effective amount of the compo-
sition according to the invention, i.e. at least one compound I or at least one compound
I or an agriculturally useful salt of I and at least one further active compound, selected
from herbicides B and the abovementioned safeners C, and also auxiliaries customary
for formulating crop protection agents.

Examples of auxiliaries customary for the formulation of crop protection agents
are inert auxiliaries, solid or liquid carriers, surfactants (such as dispersants, protective
colloids, emulsifiers, wetting agents and tackifiers), organic and inorganic thickeners,
bactericides, antifreeze agents, antifoams, optionally colorants and, for seed formul-
ations, adhesives.

Examples of thickeners (i.e. compounds which impart to the formulation modified
flow properties, i.e. high viscosity in the state of rest and low viscosity in motion) are
polysaccharides, such as xanthan gum (Kelzan® from Kelco), Rhodopol® 23 (Rhone
Poulenc) or Veegum® (from R.T. Vanderbilt), and also organic and inorganic sheet
minerals, such as Attaclay® (from Engelhardt).

Examples of antifoams are silicone emulsions (such as, for example, Silikon®
SRE, Wacker or Rhodorsil® from Rhodia), long-chain alcohols, fatty acids, salts of fatty
acids, organofluorine compounds and mixtures thereof.

Bactericides can be added for stabilizing the aqueous herbicidal formulations.

Examples of bactericides are bactericides based on diclorophen and benzyl alcohol
hemiformal (Proxel® from ICI or Acticide® RS from Thor Chemie and Kathon® MK
from Rohm & Haas), and also isothiazolinone derivates, such as alkylisothiazolinones
and benzisothiazolinones (Acticide MBS from Thor Chemie).

Examples of antifreeze agents are ethylene glycol, propylene glycol, urea or
glycerol.

Examples of colorants are both sparingly water-soluble pigments and water-
soluble dyes. Examples which may be mentioned are the dyes known under the names
Rhodamin B, C.I. Pigment Red 112 and C.I. Solvent Red 1, and also pigment blue
15:4, pigment blue 15:3, pigment blue 15:2, pigment blue 15:1, pigment blue 80, pig-
ment yellow 1, pigment yellow 13, pigment red 112, pigment red 48:2, pigment red
48:1, pigment red 57:1, pigment red 53:1, pigment orange 43, pigment orange 34, pig-
ment orange 5, pigment green 36, pigment green 7, pigment white 6, pigment brown
25, basic violet 10, basic violet 49, acid red 51, acid red 52, acid red 14, acid blue 9,
acid yellow 23, basic red 10, basic red 108.
Examples of adhesives are polyvinylpyrrolidone, polyvinyl acetate, polyvinyl alcohol and tylose.

Suitable inert auxiliaries are, for example, the following: mineral oil fractions of medium to high boiling point, such as kerosene and diesel oil, furthermore coal tar oils and oils of vegetable or animal origin, aliphatic, cyclic and aromatic hydrocarbons, for example paraffin, tetrahydronaphthalene, alkylated naphthalenes and their derivatives, alkylated benzenes and their derivatives, alcohols such as methanol, ethanol, propanol, butanol and cyclohexanol, ketones such as cyclohexanone or strongly polar solvents, for example amines such as N-methylpyrrolidone, and water.

Suitable carriers include liquid and solid carriers. Liquid carriers include e.g. non-aqueous solvents such as cyclic and aromatic hydrocarbons, e.g. paraffins, tetrahydronaphthalene, alkylated naphthalenes and their derivatives, alkylated benzenes and their derivatives, alcohols such as methanol, ethanol, propanol, butanol and cyclohexanol, ketones such as cyclohexanone, strongly polar solvents, e.g. amines such as N-methylpyrrolidone, and water as well as mixtures thereof.

Solid carriers include e.g. mineral earths such as silicas, silica gels, silicates, talc, kaolin, limestone, lime, chalk, bole, loess, clay, dolomite, diatomaceous earth, calcium sulfate, magnesium sulfate and magnesium oxide, ground synthetic materials, fertilizers such as ammonium sulfate, ammonium phosphate, ammonium nitrate and ureas, and products of vegetable origin, such as cereal meal, tree bark meal, wood meal and nutshell meal, cellulose powders, or other solid carriers.

Suitable surfactants (adjuvants, wetting agents, tackifiers, dispersants and also emulsifiers) are the alkali metal salts, alkaline earth metal salts and ammonium salts of aromatic sulfonic acids, for example lignosulfonic acids (e.g. Borrespers-types, Borregaard), phenolsulfonic acids, naphthalenesulfonic acids (Morwet types, Akzo Nobel) and dibutylnaphthalenesulfonic acid (Nekal types, BASF AG), and of fatty acids, alkyl- and alkylarylsulfonates, alkyl sulfates, lauryl ether sulfates and fatty alcohol sulfates, and salts of sulfated hexa-, hepta- and octadecanols, and also of fatty alcohol glycol ethers, condensates of sulfonated naphthalene and its derivatives with formaldehyde, condensates of naphthalene or of the naphthalenesulfonic acids with phenol and formaldehyde, polyoxyethylene octylphenol ether, ethoxylated isooctyl-, octyl- or nonylphenol, alkylphenyl or tributylphenyl polyglycol ether, alkylaryl polyether alcohols, isodecyl alcohol, fatty alcohol/ethylene oxide condensates, ethoxylated castor oil, polyoxyethylene alkyl ethers or polyoxypropylene alkyl ethers, lauryl alcohol polyglycol ether acetate, sorbitol esters, lignosulfite waste liquors and proteins, denaturated proteins, polysaccharides (e.g. methylcellulose), hydrophobically modified starches, polyvinyl alcohol (Mowiol types Clariant), polycarboxylates (BASF AG, Sokalan types), polyalkoxylates, polyvinylamine (BASF AG, Lupamine types), polyethyleneimine (BASF AG, Lupasol types), polyvinylpyrrolidone and copolymers thereof.
Powders, materials for broadcasting and dusts can be prepared by mixing or grinding the active ingredients together with a solid carrier.

Granules, for example coated granules, impregnated granules and homogeneous granules, can be prepared by binding the active ingredients to solid carriers.

Aqueous use forms can be prepared from emulsion concentrates, suspensions, pastes, wettable powders or water-dispersible granules by adding water. To prepare emulsions, pastes or oil dispersions, the compounds of the formula I, specially I.a and I.b., either as such or dissolved in an oil or solvent, can be homogenized in water by means of a wetting agent, tackifier, dispersant or emulsifier. Alternatively, it is also possible to prepare concentrates comprising active compound, wetting agent, tackifier, dispersant or emulsifier and, if desired, solvent or oil, which are suitable for dilution with water.

In the formulation of the compositions according to the present invention the active ingredients are present in suspended, emulsified or dissolved form. The formulation according to the invention can be in the form of aqueous solutions, powders, suspensions, also highly-concentrated aqueous, oily or other suspensions or dispersions, aqueous emulsions, aqueous microemulsions, aqueous suspo-emulsions, oil dispersions, pastes, dusts, materials for spreading or granules.

The oxylipins A and the compositions comprising them can for example be formulated as follows:

1. Products for dilution with water
   A Water-soluble concentrates
   10 parts by weight of active compound are dissolved in 90 parts by weight of water or a water-soluble solvent. As an alternative, wetters or other adjuvants are added. The active compound dissolves upon dilution with water. This gives a formulation with an active compound content of 10% by weight.
   B Dispersible concentrates
   20 parts by weight of active compound are dissolved in 70 parts by weight of cyclohexanone with addition of 10 parts by weight of a dispersant, for example polyvinylpyrrolidone. Dilution with water gives a dispersion. The active compound content is 20% by weight
   C Emulsifiable concentrates
   15 parts by weight of active compound are dissolved in 75 parts by weight of an organic solvent (eg. alkylaromatics) with addition of calcium dodecybenzenesulfonate and castor oil ethoxylate (in each case 5 parts by weight). Dilution with water gives an emulsion. The formulation has an active compound content of 15% by weight.
   D Emulsions
   25 parts by weight of active compound are dissolved in 35 parts by weight of an
organic solvent (e.g. alkylaromatics) with addition of calcium dodecylbenzenesulfonate and castor oil ethoxylate (in each case 5 parts by weight). This mixture is introduced into 30 parts by weight of water by means of an emulsifier (e.g. Ultraturrax) and made into a homogeneous emulsion. Dilution with water gives an emulsion. The formulation has an active compound content of 25% by weight.

E Suspensions
In an agitated ball mill, 20 parts by weight of active compound are comminuted with addition of 10 parts by weight of dispersants and wetters and 70 parts by weight of water or an organic solvent to give a fine active compound suspension. Dilution with water gives a stable suspension of the active compound. The active compound content in the formulation is 20% by weight.

F Water-dispersible granules and water-soluble granules
50 parts by weight of active compound are ground finely with addition of 50 parts by weight of dispersants and wetters and made into water-dispersible or water-soluble granules by means of technical appliances (for example extrusion, spray tower, fluidized bed). Dilution with water gives a stable dispersion or solution of the active compound. The formulation has an active compound content of 50% by weight.

G Water-dispersible powders and water-soluble powders
75 parts by weight of active compound are ground in a rotor-stator mill with addition of 25 parts by weight of dispersants, wetters and silica gel. Dilution with water gives a stable dispersion or solution of the active compound. The active compound content of the formulation is 75% by weight.

H Gel formulations
In a ball mill, 20 parts by weight of active compound, 10 parts by weight of dispersant, 1 part by weight of gelling agent and 70 parts by weight of water or of an organic solvent are mixed to give a fine suspension. Dilution with water gives a stable suspension with active compound content of 20% by weight.

2. Products to be applied undiluted

I Dusts
5 parts by weight of active compound are ground finely and mixed intimately with 95 parts by weight of finely divided kaolin. This gives a dusting powder with an active compound content of 5% by weight.

J Granules (GR, FG, GG, MG)
0.5 parts by weight of active compound are ground finely and associated with 99.5 parts by weight of carriers. Current methods here are extrusion, spray-drying or the fluidized bed. This gives granules to be applied undiluted with an active compound content of 0.5% by weight.

K ULV solutions (UL)
10 parts by weight of active compound are dissolved in 90 parts by weight of an organic solvent, for example xylene. This gives a product to be applied undiluted
with an active compound content of 10% by weight.

The concentrations of the active compounds in the ready-to-use preparations can be varied within wide ranges. In general, the formulations comprise from 0.001 to 98% by weight, preferably 0.01 to 95% by weight of at least one active compound. The active compounds are employed in a purity of from 90% to 100%, preferably 95% to 100% (according to NMR spectrum).

In the ready-to-use preparations, i.e. in the compositions according to the invention in the form of crop protection compositions, the components A and B can be present formulated jointly or separately in suspended, emulsified or dissolved form. The use forms depend entirely on the intended applications.

Accordingly, a first embodiment of the invention relates to compositions in the form of a crop protection composition formulated as a 1-component composition comprising the at least one active compound of the formula I (herein also referred to as safening effective oxylipin A, safening component A, compound A, oxylipin(s) A) or the at least one active compound of the formula I and at least one further active compound selected from the herbicides B and also a solid or liquid carrier and, if appropriate, one or more surfactants.

Accordingly, a second embodiment of the invention relates to compositions in the form of a crop protection composition formulated as a 2-component composition comprising a first formulation (component) comprising the at least one active compound A, a solid or liquid carrier and, if appropriate, one or more surfactants, and a second component comprising at least one further active compound selected from the herbicides B, a solid or liquid carrier and, if appropriate, one or more surfactants.

The active compound A and the at least one further active compound B and/or C can be applied jointly or separately, simultaneously or in succession, before, during or after the emergence of the plants. The order of the application of the active compounds A and B is of minor importance. The only thing that is important is that the at least one active compound A and the at least one further active compound B and are present simultaneously at the site of action, i.e. are at the same time in contact with or taken up by the plant to be safened.

The required application rate of pure active compound composition, i.e. A and B without formulation auxiliaries depends on the composition of the plant stand, on the development stage of the plants, on the climatic conditions at the site of use and on the application technique. In general, the application rate of A and B is from 0.001 to 3 kg/ha,
preferably from 0.005 to 2.5 kg/ha and in particular from 0.01 to 2 kg/ha of active substance (a.s.).

The required application rates of oxylipins A are generally in the range of from
0.0005 kg/ha to 2.5 kg/ha and preferably in the range of from 0.005 kg/ha to 2 kg/ha or
0.01 kg/ha to 1.5 kg/h of a.s.

The required application rates of compounds B are generally in the range of from
0.0005 kg/ha to 2.5 kg/ha and preferably in the range of from 0.005 kg/ha to 2 kg/ha or
0.01 kg/ha to 1.5 kg/h of a.s.

The compositions according to the invention are applied to the plants mainly by spraying the leaves. Here, the application can be carried out using, for example, water as carrier by customary spraying techniques using spray liquor amounts of from about 100 to 1000 l/ha (for example from 300 to 400 l/ha). The herbicidal compositions may also be applied by the low-volume or the ultra-low-volume method, or in the form of microgranules.

The herbicidal compositions according to the present invention can be applied pre- or post-emergence, or together with the seed of a crop plant. It is also possible to apply the compounds and compositions by applying seed, pre-treated with a composition of the invention, of a crop plant. If the active compounds A and B and, if appropriate C, are less well tolerated by certain crop plants, application techniques may be used in which the herbicidal compositions are sprayed, with the aid of the spraying equipment, in such a way that as far as possible they do not come into contact with the leaves of the sensitive crop plants, while the active compounds reach the leaves of undesirable plants growing underneath, or the bare soil surface (post-directed, lay-by).

In a further embodiment, the composition according to the invention can be applied by treating seed. The treatment of seed comprises essentially all procedures familiar to the person skilled in the art (seed dressing, seed coating, seed dusting, seed soaking, seed film coating, seed multilayer coating, seed encrusting, seed dripping and seed pelleting) based on the compounds of the formula I according to the invention or the compositions prepared thereof. Here, the herbicidal compositions can be applied diluted or undiluted.

The term seed comprises seed of all types, such as, for example, corns, seeds, fruits, tubers, seedlings and similar forms. Here, preferably, the term seed describes corns
and seeds. The seed used can be seed of the useful plants mentioned above, but also the seed of transgenic plants or plants obtained by customary breeding methods.

The rates of application of the active compound are from 0.001 to 3.0, preferably 0.01 to 1.0, kg/ha of active substance (a.s.), depending on the control target, the season, the target plants and the growth stage. To treat the seed, the compounds I are generally employed in amounts of from 0.001 to 10 kg per 100 kg of seed.

Moreover, it may be advantageous to apply the compounds I or the compositions of the present invention on their own or jointly in combination with other crop protection agents, for example with agents for controlling pests or phytopathogenic fungi or bacteria or with groups of active compounds which regulate growth. Also of interest is the miscibility with mineral salt solutions which are employed for treating nutritional and trace element deficiencies. Non-phytotoxic oils and oil concentrates can also be added.

The following examples serve to illustrate the invention.
Claims:

1. A method for protecting crop plants against phytotoxic effects caused by a herbicide B, which comprises applying to the locus of the crop plant a safening effective amount of at least one oxylipin A.

2. A method as claimed in claim 1, wherein the oxylipin A is applied to the crop plant, the seed of the crop, or the soil or the water surrounding the crop or crop seed.

3. A method as claimed in claim 1 or 2, wherein the oxylipin A is selected from the oxylipins of class a1) to a11):
   - a1) oxophytodienoic acids;
   - a2) phytoprostane type I and type II series;
   - a3) cyclopentanones;
   - a4) fatty acid hydroperoxides;
   - a5) mono-, di and trihydroxy fatty acids;
   - a6) keto- or ω-ω-oxy-fatty acids;
   - a7) epoxy alcohols of unsaturated fatty acids;
   - a8) fatty acids containing ketodiene and ketotriene groups;
   - a9) alkenals and hydroxyalkenals;
   - a10) fatty acids containing α- and γ-ketol groups; and
   - a11) fatty acids containing divinyl ether groups; including their agriculturally acceptable salts or derivatives.

4. A method as claimed in claims 1 to 3, wherein the oxylipin A is selected from the oxylipins of class a1 and a2.

5. A method as claimed in claims 1 to 5, wherein the herbicide B is selected from the herbicides of class b1) to b15):
   - b1) lipid biosynthesis inhibitors (ACCase inhibitors);
   - b2) acetalactate synthase inhibitors (ALS inhibitors);
   - b3) photosynthesis inhibitors;
   - b4) protoporphyrinogen-IX oxidase inhibitors;
   - b5) bleacher herbicides;
   - b6) enolpyruvyl shikimate 3-phosphate synthase inhibitors (EPSP inhibitors);
   - b7) glutamine synthase inhibitors;
   - b8) 7,8-dihydropteroate synthase inhibitors (DHP inhibitors);
   - b9) mitosis inhibitors;
   - b10) inhibitors of the synthesis of very long chain fatty acids (VLCFA inhibitors);
b11) cellulose biosynthesis inhibitors;
b12) decoupler (uncoupler) herbicides;
b13) auxinic herbicides;
b14) auxin transport inhibitors; and
b15) other herbicides selected from the group consisting of bromobutide, chlorflurenol, chlorflurenol-methyl, cinmethylin, cumyluron, dalapon, dazomet, difenzoquat, difenzoquat-metilsulfate, dimethipin, DSMA, dymron, endothal and its salts, etobenzenid, flamprop, flamprop-isopropyl, flamprop-methyl, flamprop-M-isopropyl, flamprop-M-methyl, flurenol, flurenol-butyl, fluorprimidol, fosamine, fosamine-ammonium, indanofan, indaziflam, maleic hydrazide, mefluidide, metam, methiozolin (CAS 403640-27-7), methyl azide, methyl bromide, methyl-dymron, methyl iodide, MSMA, oleic acid, oxaziclomefone, pelargonic acid, pyributicarb, quinoclamine, triaziflam, tridiphane and 6-chloro-3-(2-cyclopropyl-6-methylphenoxy)-4-pyridazinol (CAS 499223-49-3) and its salts and esters;

including their agriculturally acceptable salts or derivatives.

6. A composition comprising at least one oxylipin A and auxiliaries customary for formulating crop protection agents.

7. A process for the preparation of compositions as claimed in claim 6, which comprises mixing a safening effective amount of at least one oxylipin A and at least one inert liquid and/or solid carrier and, if desired, at least one surface-active substance.

8. A safening herbicidal composition comprising a safening effective amount of at least one oxylipin A and at least one further compound selected from herbicides B and safeners C.

9. A composition as claimed in claim 7, wherein the oxylipin A is selected from the oxylipins of class a1 and a2.

10. The use of oxylipins A as safeners.
**INTERNATIONAL SEARCH REPORT**

**A. CLASSIFICATION OF SUBJECT MATTER**

INV. A01N25/32

ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

A01N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, CHEM ABS Data, BIOSIS

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
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<tr>
<td>Y</td>
<td></td>
<td>4,8,9</td>
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[ ] Further documents are listed in the continuation of Box C. See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"*" document member of the same patent family

Date of the actual completion of the international search

13 April 2011

Date of mailing of the international search report

03/05/2011

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Sawicki, Marcin
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<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
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Form PCT/ISA/210 (continuation of second sheet) (April 2005)