Abstract:
The present invention relates to a composition comprising a pyriproxyfen pesticide of the formula (I) or (II) as defined below and a base. The present invention relates also to methods of preparing and applying such compositions, as well as several uses thereof, and finally seeds, comprising said composition.
Composition Containing a Pyripyropene Insecticide and a Base

The present invention relates to compositions comprising a pyripyropene pesticide as defined below and a base.

When preparing agrochemical formulations of pesticidal compounds different problems can be encounter. One problem may be that the stability of the pesticidal active compound may be affected in the agrochemical formulation, for example especially during storage time. Lack of stability might be particularly problematic in cases, where in the formulation the pesticide compound is present in dissolved form or where the pesticide formulation contains components, which affect the stability of the compound such as water or certain surfactants/adjuvants. Thus one disadvantage of known agrochemical formulations of pesticides is a potentially lower stability of the pesticidal active ingredient in an agrochemical formulation.

One object of the present invention is therefore to find a way to stabilize the pesticide in an agrochemical formulations and to improve, to increase and/or to prolong its storage time in agrochemical formulations.

Especially, it is an object of the present invention to find a way to stabilize insecticidal active pyripyropene derivatives in agrochemical formulations, preferably also at elevated temperatures.

This object was solved by a agrochemical composition comprising a pyripyropene pesticide and a base

The composition of the present invention comprises as pesticide a pyripyropene derivative of the formula (I) or of formula (II).

The pyripyropene pesticide of formula (I)

(Formula I)
(in the following also called "Insecticide A") is known from WO 2009/081851 (Examples, compound 4) and belongs to the class of pyripyropene derivatives.

WO 2009/081851 discloses various agrochemical formulations of Insecticide A and useful additives for agrochemical formulations of it. EP 2 119 361 and EP 1 889 540 disclose various agrochemical formulations of pyripyropene derivatives and useful additives for agrochemical formulations of it. The pyripyropene pesticide of formula (I) may be prepared by the process described in WO 2006/129714 or EP 2 186 815.

Pyripyropene A (formula II herein below), produced e.g. by the method described in Journal of Society of Synthetic Organic Chemistry, Japan (1998), Vol. 56, No. 6, pp. 478-488 or WO 94/09417, may for example be used as starting material for preparing further pyripyropene derivatives.

![Pyripyropene A](image)

(Formula II)

Pyripyropen A of the formula II (in the following also called "Insecticide B") has inhibitory activity against ACAT (acyl-CoA: cholesterol acyltransferase) and is expected to be applied, for example, for the treatment of diseases induced by cholesterol accumulation, as described in Japanese Patent No. 2993767 (Japanese Patent Laid-Open Publication No. 360895/1992) and Journal of Antibiotics (1993), 46(7), 1168-9.

Furthermore, Applied and Environmental Microbiology (1995), 61(12), 4429-35 describes that pyripyropene A ("Insecticide B") itself has insecticidal activity against larvae of Helicoverpa zea. Furthermore, WO 2004/060065 describes that pyripyropene A has insecticidal activity against Plutella xylostella L larvae and Tenebrio molitor L.

When trying to provide agricultural formulations of pyripyropene derivatives, in particular pyripyropene derivatives of formulae I or II, one faces several problems. One problem associated with pyripyropene derivatives of the formulae I and II is their poor stabil-
ity in agricultural formulations. Lack of stability of the compounds of formulae I or II is particularly problematic in cases, where in the formulation the pesticide compound is present in dissolved form or where the pesticide formulation contains components, which affect the stability of the compound such as water or certain surfactants/adjuvants such as alkoxylated aliphatic alcohols. Another problem one may encounter is that the pesticidal activity of the pesticidal active compound may be affected negatively in some way in the agrochemical formulation.

One object of the present invention is therefore to find a way to stabilize the pyripyropene derivatives of the formulae I and II in an agrochemical formulations. A further object of the present invention is to improve the stability of pyripyropene derivates in liquid formulations, where the pyripyropene derivatives of the formula II are present in dissolved form such as in emulsion concentrates or micro-emulsions. A further object of the present invention is to provide stabilization of the pyripyropene derivates of the formulae I and II in agricultural compositions, which contain water or certain surfactants/adjuvants.

The improvement of the insecticidal activity of pyripyropene of the formulae I or II in agrochemical formulations is another aspect of the present invention. The development of a novel pest control composition comprising pyripyropene of the formula I or II itself having effective insecticidal activity is desirable. Therefore, it is an object of the present invention to find a way to stabilize, to improve, to increase and/or to prolong the insecticidal activity of pyripyropene derivatives of the formulae I or II.

These and further objects are solved by a agrochemical composition comprising a pyripyropene pesticide of the formulae I or II and at least one base.

The present invention also relates to methods of preparing and applying such compositions, as well as several uses thereof. In particular, the present invention also relates to a method for preparing said composition comprising contacting, in particular mixing, the pyripyropene pesticide of the formulae I or II and the base.

The invention also relates to a method for preparing an aqueous tank-mix comprising the steps of a) providing a composition containing the pyripyropene pesticide of the formulae I or II; b) providing a composition containing the base; and c) contacting the compositions of steps a) and b) and dilution with water.

The invention also relates to a method for preparing an aqueous tank-mix comprising the steps of a) providing a composition containing the pyripyropene pesticide of the formulae I or II and the base and b') dilution of the composition obtained in step a) with
Furthermore, the invention relates to the use of the base for increasing the stability of the pyripyropene pesticide of the formulae I or II in agricultural compositions; and to a kit of parts comprising, as separate components, a) the pyripyropene of the formulae I or II, and b) the adjuvant, for combined use.

Further subject matters are a method for protecting plants from attack or infestation by insects, acarids or nematodes comprising contacting the plant, or the soil or water in which the plant is growing, with said composition in pesticidally effective amounts; a method for controlling insects, arachnids or nematodes comprising contacting an insect, acarid or nematode or their food supply, habitat, breeding grounds or their locus with said composition in pesticidally effective amounts; a method for protection of plant propagation material comprising contacting the plant propagation material, preferably seeds, with said composition in pesticidally effective amounts; and finally seed, comprising said composition.

The improvement of the insecticidal activity of pyripyropene A in agrochemical formulations is another aspect of the present invention. The development of a novel pest control composition comprising pyripyropene A as naturally derived insecticide itself having effective insecticidal activity is desirable. Therefore it was another object of the present invention to find a way also to stabilize Insecticide B, and to increase, to improve and/or to prolong its storage time in agrochemical formulations.

The pesticide compound of the formulae I or II may be present in the composition in any form, such as dissolved, suspended, or emulsified. Preferably it is present in dissolved form.

Bases are typically compounds, which have a pH value of at least 7.0, preferably at least 7.5, in particular at least 8.0 in water at 20 °C at a concentration of 0.1 mol/l. In other words, bases are compounds an aqueous solution of which has a pH value of at least 7.0, preferably at least 7.5, in particular at least 8.0 in water at 20 °C at a concentration of 0.1 mol/l. Often, said pH value is in a range from 7.0 to 14.0, preferably from 7.5 to 12.0, and in particular from 8.0 to 10.0. Thus, the acidity constant $pK_a$ of the protonated base (i.e. the conjugate acid) at 20°C in water is generally at least 7.0, preferably at least 8.0 in particular at least 8.5, e.g. from 7.0 to 14, in particular from 8.0 to 13.0 and especially from 8.5 to 12.0.

Preferably the base has boiling point at 1013 mbar of at least 40 °C, preferably at least 80 °C, especially at least 150°C.
The base has usually a solubility in water of at least 0.1 g/l at 20 °C, preferably at least 1.0 g/l and in particular at least 10 g/l.

Chemical classes of bases are for example metal hydroxides, inorganic anhydrobases, inorganic salts of weak acids, or in particular amines, including ammonia and organic amines.

Preferred examples for metal hydroxides are water-soluble metal hydroxides with a solubility in water of at least 1 g/l at 20 °C. Examples are sodium, barium-, strontium-, or calcium-hydroxide, preferably sodium- and calcium hydroxide.

Suitable inorganic anhydrobases are inorganic compounds which react with water while forming hydroxide ions. Examples for anhydrobases are bariumoxide or calciumoxide.

Suitable inorganic salts of weak acids are carbonate and phosphate, such as potassium carbonate, sodium carbonate, trisodium phosphate.

Suitable amines are usually organic compounds comprising at least one primary, secondary, and/or tertiary amino group. Preferably the amines comprise at least one secondary and/or tertiary amino group. In particular, the amines comprise at least one tertiary amino group.

The amines have typically a pH value of at least 7.0 (preferably at least 7.5, in particular at least 8.0) in water at 20 °C at a concentration of 0.1 mol/l. In other words, bases are preferably selected from those amines an aqueous solution of which has a pH value of at least 7.0, preferably at least 7.5, in particular at least 8.0 in water at 20 °C at a concentration of 0.1 mol/l. Often, said pH value is in a range from 7.0 to 14.0, preferably from 7.5 to 12.0, and in particular from 8.0 to 10.0. Preferred amines are those, where the acidity constant pKₐ of the conjugate ammonium ion at 20°C in water is generally at least 7.0, preferably at least 8.0 in particular at least 8.5, e.g. from 7.0 to 14, in particular from 8.0 to 13.0 and especially from 8.5 to 12.0.

Usually, the boiling point at 1013 mbar of the amine is at least 40 °C, preferably at least 80 °C, and in particular at least 150 °C. Preferably, the amine is free of an aromatic group.

The amine has usually a solubility in water of at least 0.1 g/l at 20 °C, preferably at least 1.0 g/l and in particular at least 10 g/l.
Examples of amines are ammonia (NH₃), 2-(2-Aminoethoxy)ethanol (DGA), Dimethylamine (DMA), N-Aminopropylmorpholine (APM), Tetraethylenepentamine (TEPA), Dipropylene Triamine, Diethylenetriamine (DETA), Tetra(2-hydroxypropyl)ethylenediamine (Quadrol®), Triethanolamine (TEA), Hexamethylenediamine, Jeffamine D-230, Triisopropanolamine (TIPA), Hexamethylenetetramine, Diethylenetriamine (DETA), N,N-Dimethylisopropylamine, N-Ethylidiisopropylamine, N-Octylamine, 3-(2-aminoethylamino)propylamine (N3-Amine), Propylamine, Tributylamine, Tripropylamine, Tris-(2-ethylhexyl)amine (TEHA), tert-Butylamine (t-BA), Diisopropylamine (DIPA), N,N-Dimethylethanolamine, N,N-Dimethylethanolamine (NMEA), N-Methylidethanolamine (MDEA), 2,6-Xyldine, Dicykan, Benzylamine, Dimethylcyclohexylamine (DMCHA), N,N-Dimethylbenzylamine (DMBA), N-(2-hydroxyethyl)aniline, o-Toluidine, Ethyl-(2-hydroxyethyl)aniline, 1,2-Propylenediamine (1,2-PDA), 1,3-Diaminopropane (DAP), Dimethylcycykan (DMDC), 3-Aminopropylidethyleneglycol (Mono-TTD), 4,7,10-Trioxadodecane-1,13-Diamine (TTD), 4,9-Dioxadodecane, 1,12-diamine (DODA), Dimethylaminopropylamine (DMAPA), Ethylenediamine (EDA), Isophoronediamine, Triethylenediamine (TEDA), Bis(2-Dimethylaminoethyl)ether (BDMAEE), N-(2-Aminoethyl)ethanolamine (AE), N-Ethylpiperazine, 2,2-Dimethyl-propane-1,3-diamine, Piperazine, Diethanolamine (DEA), N-Ethylethanolamine (EEA), Monoethanolamine (MEOA), N-(2-Aminoethyl)ethanolamine, Polyetheramine D 2000 (PEA D 2000), Polyetheramine D 400 (PEA D 2000), Polyetheramine T403, 1-Methyl Imidazole, 1-Vinylimidazole, 2-Ethyl Imidazole, 2-Methyl Imidazole, Imidazole, 1,2-Dimethyl Imidazole, Morphline, Pyrrolidine, Diisopropanol-p-toluidine (PIIPPT), Isopropanolamine, 2,2'-Dimorpholinyldiethylether (DMDEEE), N-Ethylmorpholine (NEM), N-Methylmorpholine, Dimethylaminoethoxyethanol (DMEE), N,N'-Dimethylpiperazine, Trimethylaminoethylethanolamine (TMAEEA), S-Triazine, 1,8-Diazabicyclo-5,4,0-undecene-7, N-(3-Aminopropyl)imidazole, N-Butylethanolamine (BEA), 3-((2-Hydroxyethyl)amino)propanol, 3-Amino-1-Propanol, 3-Dimethylaminopropane-1-ol, Aminoethylethanolamine (AEAA), M-methylmorpholine oxime (NMNO), N-aminoethylpiperazine (AEP), Dimethylpiperazine (DMP), Methoxypropylamine (MOPA), Tetramethylbis(aminoethyl)ether(ZF-20), N,N-dimethyl-2(2-aminoethoxy)ethanol (Z-70), Pentamethyldiethylenetriamine (ZR-40), Tetramethylpropylentriamine (Z-130), Benzylmorpholine (BDMA), Triethylenetetramine (TETA), Jeffamine® D-400, Monoisopropanolamine (MI PA).
Further suitable amines are amines which comprise an alkoxylated amino group. Preferred are alkoxylated Cs-24 fatty amines, especially ethoxylated C12-20 fatty amines. Examples are ethoxylated coco amine, POE 2 (Agnique® CAM-2), ethoxylated coco amine, POE 10 (Agnique® CAM-10), ethoxylated coco amine, POE 15 (Agnique® CAM-15), ethoxylated coco amine, POE 20 (Agnique® CAM-20), ethoxylated oleyl amine, POE 30 (Agnique® OAM-30), ethoxylated tallow amine, POE 5 (Agnique® TAM-5), ethoxylated tallow amine, POE 10 (Agnique® TAM-10), ethoxylated tallow amine, POE 15 (Agnique® TAM-15), ethoxylated tallow amine, POE 20 (Agnique® TAM-20), ethoxylated tallow amine, POE 50 (Agnique® TAM-50), ethoxylated stearyl amine, POE 50 (Agnique® SAM-50). The Agnique product series is available from Cognis.

Suitable organic amines are in particular those of the formula III

\[
R^2-N^-(A-O)_{m-H}
\]

(III)

where

- \( R^1 \) is H, Ci-C4-alkyl, or a radical \((A-0)_nH\), in particular a radical of the formula \((A-O)nH\),
- \( A \) is C2-C4-alkandiyl, in particular 1,2-ethandiyl or 1,2-propandiyl,
- \( m \) is an integer from 1 to 100, in particular 1 to 50, \( m \) may also be 0, if at least one of \( R^1 \), \( R^2 \) and in particular both \( R^1 \) and \( R^2 \) is/are different from H;
- \( n \) is an integer from 1 to 100, in particular 1 to 50,
- \( \{A\'-N(R^3)\}_k\alpha-A^\prime-NR^4R^5 \), where
  - \( A \) is C2-C4-alkandiyl, in particular 1,2-ethandiyl, 1,2-propandiyl, 1,3-propandiyl or 1,4-butandiyl,
  - \( k \) is an integer from 0 to 10, in particular 0, 1 or 2,
  - \( R^3 \) is H, Ci-C4-alkyl, or a radical \((A-0)_nH\), in particular a radical \((A-0)_nH\),
  - \( R^4 \) is H, Ci-C4-alkyl, or a radical \((A-0)_nH\), in particular a radical \((A-0)_nH\), and
  - \( R^5 \) is H, Ci-C4-alkyl, or a radical \((A-0)_nH\), in particular a radical \((A-0)_nH\), or
  - \( NR^4R^5 \) represent an N-bound pyrrolidinyl, piperidinyl, piperazinyl or morpholinyl radical.

Here and in the following, the suffix \( C_n-C_m \) indicates the number range for the number of possible carbon atoms of the respective radical. Hence, C1-C30 alkyl is a linear or branched alkyl radical having from 1 to 30 carbon atoms. Likewise, C2-C30 alkenyl is a
linear or branched aliphatic radical having from 1 to 30 carbon atoms, which has at least 1, e.g., 1, 2 or 3 C=C-double bonds. C1-C4 Alkyl is a linear or branched alkyl radical having from 1 to 4 carbon atoms, examples including methyl, ethyl, n-propyl, iso-propyl, n-butyl, 2-butyl, isobutyl (= 2-methylpropan-1-yl) or tert.-butyl (= 2-methylpropan-2-yl). C2-C4 Alkandiyl is a linear or branched divalent alkyl radical having from 2 to 4 carbon atoms, examples including 1,2-ethandiyl, 1,2-propandiyl, 1,3-propandiyl, 1,2-butandiyl, 1,3-butandiyl, 1,1-dimethylethan-1,2-diyl, 1,2-dimethylethan-1,2-diyl or 1,4-butandiyl.

Amongst the amines of formula III those are preferred, where m is from 1 to 100, in particular from 1 to 50 and R1 is a radical of the formula (A-0)ₙH, where n is from 1 to 50 in particular from 1 to 50.

Amongst the amines of formula III those are preferred, where R² is C₅-C₃₀ alkyl, C₅-C₃₀ alkenyl or a radical of formula -[A¹-N( R³)]ₙ-A¹-NR⁴R⁵, where A is C₂-C₄ alkandiyl, in particular 1,2-ethandiyl, 1,2-propandiyl, 1,3-propandiyl or 1,4-butandiyl, k is an integer from 0 to 10, in particular 0, 1 or 2, R³, R⁴ and R⁵, independently from each other are selected from the group consisting of H, Cᵣ alkyl and a radical (A-0)ₙH, in particular a radical (A-0)ₙH, where A and n are as defined above and were n is in particular from 1 to 50 and where A is in particular 1,2-ethandiyl or 1,2-propandiyl.

Amongst the amines of formula III those are particularly preferred, where R² is C₅-C₃₀ alkyl or C₅-C₃₀ alkenyl, especially C₈-C₂₄ alkyl or C₈-C₂₄ alkenyl, m is from 1 to 50, in particular from 2 to 50 and R² is a radical of the formula (A-0)ₙH, where A and n are as defined above and were n is in particular from 1 to 50, especially from 2 to 50 and where A is in particular 1,2-ethandiyl or 1,2-propandiyl.

Amongst the amines of formula III those are likewise preferred, where R² is radical of formula -[A-N( R³)]ₙ-A¹-NR⁴R⁵, where A is C₂-C₄ alkandiyl, in particular 1,2-ethandiyl, 1,2-propandiyl, 1,3-propandiyl or 1,4-butandiyl, k is as defined above, in particular 0, 1 or 2, R³, R⁴ and R⁵, independently from each other are selected from the group consisting of H, Cᵣ alkyl and a radical (A-0)ₙH, in particular a radical (A-0)ₙH, where A and n are as defined above and were n is in particular from 1 to 10 and where A is in particular 1,2-ethandiyl or 1,2-propandiyl, m is from 1 to 50, in particular from 1 to 10 and R² is a radical of the formula (A-0)ₙH, where A and n are as defined above and were n is in particular from 1 to 10 and where A is in particular 1,2-ethandiyl or 1,2-propandiyl.

Particularly preferred bases are amines which contain at least one secondary and/or tertiary amino group, especially those amines which contain at least one tertiary amino group.
group, and amines which comprise an alkoxylated amino group, in particular those of
the formula III, preferably alkoxylated C₈-2₄ fatty amines, in particular those of the for-
mula III, where R² is C₈-C₂₄ alkyl or C₈-C₂₄ alkenyl, in particular C₁₀-C₂₂ alkyl or C₁₀-C₂₂
alkenyl, m is from 1 to 50, in particular from 2 to 50 and R² is a radical of the formula
(A-O)nH, where A and n are as defined above and were n is in particular from 1 to 50,
especially from 2 to 50 and where A is in particular 1,2-ethandiyil or 1,2-propandiyil. Ex-
amples such fatty amines include ethoxylated coco amine, POE 2 (Agnique® CAM-2),
ethoxylated coco amine, POE 10 (Agnique® CAM-10), ethoxylated coco amine, POE
15 (Agnique® CAM-15), ethoxylated coco amine, POE 20 (Agnique® CAM-20), eth-
oxylated oleyl amine, POE 30 (Agnique® OAM-30), ethoxylated tallow amine, POE 5
(Agnique® TAM-5), ethoxylated tallow amine, POE 10 (Agnique® TAM-10), ethoxy-
lated tallow amine, POE 15 (Agnique® TAM-15), ethoxylated tallow amine, POE 20
(Agnique® TAM-20), ethoxylated tallow amine, POE 50 (Agnique® TAM-50), ethoxy-
lated stearyl amine, POE 50 (Agnique® SAM-50).

The concentration of the base in the composition according to the invention is prefe-
ribly selected from such an range which results in a pH of at least 6.0 after dilution of the
composition to a concentration of 1.0 wt% in water (usually measured at 20 °C). In
other words, the concentration of the base in the composition according to the inven-
tion is preferably chosen in such a manner that upon dilution of the composition in wa-
ter to a concentration of 1.0 wt% (amount of formulation in water) a pH value of the
aqueous dilution of at least 6.0, in particular at least 7.0, e.g. a pH in the range from 6.0
to 13.0, in particular 7.0 to 12.0 (measured at 20°C will result. An expert may easily
adjust the concentration accordingly, for example with the help of a standard pH-meter.

In case he finds a pH which is below 6.0, he may simply increase the concentration of
the base. In case he finds a pH which is too high, he may simply decrease the concen-
tration of the base. Preferably the concentration of the base in the composition will be
in the range from 0.1 to 10 wt%, in particular from 0.2 to 5 wt%, based on the weight of
the composition.

The term wt%, as used herein, has to be understood as % by weight.

In a particular embodiment of the invention, the composition comprises at least one
adjuvant, in particular at least one alkoxylated aliphatic alcohol. If the compositions
according to the invention comprise at least one adjuvant, the concentration of the ad-
juvant in the composition is usually at least 10 wt%, e.g. form 10 to 70 wt%, preferably
at least 15 wt%, and in particular from 15 to 50 wt%, based on the composition.

Suitable adjuvants are all known materials of this class and are known to an expert, for
example from Hazen, Weed Technology, 2000, 14, 773-784 “Adjuvants-terminology,
classification and chemistry”. Examples are wetter-spreader adjuvants, sticker adju-
vants, humectants, or penetration agents. Further examples are surfactants (e.g. non-ionic, anionic, cationic or amphoteric), wetting agents, spreading agents, sticking agents, humectants, penetration agents (e.g. paraffinic or vegetable-derived crop oil concentrates, phytobland oils, emulsifiable crop oil, vegetable oil concentrates, modified vegetable oil). The definitions and examples of the aforementioned terms are given in Hazen (2000).

In a particular embodiment of the invention, the composition in addition to the compound of formulae I or II and the base comprises at least one alkoxyalted aliphatic alcohol, hereinafter also termed as alkoxylate. The aliphatic alcohol, on which the alkoxyalted aliphatic alcohol is based, may be linear or branched. The aliphatic alcohol, on which the alkoxyalted aliphatic alcohol is based, may have 5 to 36 carbon atoms, preferably it has 10 to 32 carbon atoms, more preferably 14 to 26 carbon atoms, and in particular 15 to 20 carbon atoms. It is also possible to use a mixture of alkoxyalted aliphatic alcohols with different numbers of carbon atoms in the aliphatic radical of the aliphatic alcohol, on which the alkoxyalted aliphatic alcohol is based. The aliphatic alcohol, on which the alkoxyalted aliphatic alcohol is based, is preferably a linear aliphatic alcohol, and in particular a linear aliphatic alcohol with 14 to 22 carbon atoms or with 16 to 20 carbon atoms.

Alkoxyolated in context with alkoxyalted aliphatic alcohol means that the O-H moiety of the aliphatic alcohol has been replaced by a polyoxyalkylene or polyalkyleneoxide moiety, which are synonyms. Polyoxyalkylene, in terms of the present invention, is an aliphatic polyether radical which build from alkyleneoxide repeating units A-O, where A is alkandiy1, in particular C2-Cs-alkandiy1. Polyoxyalkylene, in terms of the present invention, is preferably a poly-C2-Cs-alkyleneoxide moiety, more preferably a PoIV-C2-C4-alkyleneoxide moiety, especially a poly-C2-C3-alkyleneoxide moiety, e.g. a polyethyleneoxide moiety, a polypropyleneoxide moiety, a poly(ethyleneoxide-co-propyleneoxide) moiety, a poly(ethyleneoxide-co-butyleneoxide) moiety or a poly(ethyleneoxide-co-pentylenoxide) moiety. The number of alkyleneoxide repeating units in the polyoxyalkylene radical is generally from 1 to 100 or from 2 to 100, preferably from 5 to 40, more preferably from 10 to 30 and in particular from 12 to 20.

In a particularly preferred embodiment the alkoxyalted aliphatic alcohol (alkoxylate) is selected from alkoxyalted alcohols of the formula (IV)

\[ R^a -0-(C_{m}H_{2m}O)_{x}(C_{n}H_{2n}O)\_{y}(C_{p}H_{2p}O)_{z}R^b \]  (IV)

in which

- \( R^a \) represents Cs-C36-alkyl, Cs-C36-alkenyl or mixture thereof, preferably linear C5-C9-C36-alkyl, C5-C36-alkenyl, or a mixture thereof, in particular linear C14-C36-alkyl, C14-C36-alkenyl, or mixture thereof, or linear C14-C26-alkyl, C14-C26-alkenyl, or mix-
ture thereof, more preferably linear C_{14}-C_{22}-alkyl, or mixture thereof, especially linear C_{14}-C_{20}-alkyl, or mixture thereof;  
R^b  
represents H or C_{12} -alkyl, in particular H or C_{14} -alkyl, preferably H or methyl, especially H;  

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m, n, p represent, independently of one another, an integer from 2 to 16, preferably from 2 to 5, more preferably 2, 3 or 2 and 3 (in particular 2 and 3);  
x, y, z represent, independently of one another, a number from 0 to 100, preferably a number from 0 to 30, more preferably from 0 to 20; and  
x+y+z corresponds to a value from 1 to 100, preferably from 5 to 40, more preferably from 10 to 30 and in particular from 12 to 20.  

R^a may be linear or branched, preferably it is linear. R^a may be saturated or unsaturated, preferably it is saturated. R^a may be substituted or unsubstituted, preferably it is unsubstituted. Preferably, R^a represents linear C_{6}-C_{36} -alkyl, C_{6}-C_{36} -alkenyl, or a mixture thereof. In particular, R^a represents linear C_{4}-C_{36} -alkyl, C_{4}-C_{36} -alkenyl, or mixture thereof, in particular linear C_{4}-C_{26} -alkyl, C_{4}-C_{26} -alkenyl, or mixture thereof. More preferably, R^a represents a linear C_{4}-C_{22} -alkyl, or mixture thereof. Especially preferred, R^a represents a linear C_{6}-C_{20} -alkyl, or mixture thereof.  

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R^b represents preferably H or methyl, in particular H.  

Preferably, m, n, p represent, independently of one another, an integer from 2 to 5, more preferably 2, 3 or 2 and 3 (in particular 2 and 3).  

Preferably, x, y, z represent, independently of one another, a number from 0 to 30, more preferably from 0 to 20. Preferably, x+y+z corresponds to a value from 5 to 40, more preferably from 10 to 30 and in particular from 12 to 20.  

According to a special embodiment, alcohol alkoxylates of the formula (IV) are used in which m = 2 and the value of x is greater than zero. This relates on this occasion to alcohol alkoxylates of EO type to which belong especially alcohol ethoxylates (m = 2; x > zero; y, z = zero) and alcohol alkoxylates with an EO block bonded to the alcohol portion (m = 2; x > zero; y and/or z > zero). Mention may be made, from the alcohol alkoxylates with an EO block bonded to the alcohol portion, especially of EO-PO block alkoxylates (m = 2; x > zero; y > zero; n = 3; z = 0). EO-PO block alkoxylates (m = 2; x > zero; y > zero; n = 5; z = 0) and EO-PO-EO block alkoxylates (m, p = 2; x, z > zero; y > zero; n = 3). In particular preferred are EO-PO block alkoxylates (m = 2; x > zero; y > zero; n = 3; z = 0).  

Here and in the following EO represents CH2CH2O. PO represents CH(CH3)CH20 or
CH₂CH(CH₃)O. BuO represents CH(C₂H₅)CH₂O, C(CH₃)₂CH₂O, CH₂C(CH₃)₂O, CH(CH₃)CH(CH₃)O or CH₂CH₂C(CH₃)₂O and PeO represents (C₅H₁₀O).

Amongst the alkoxylated alcohols of formula (IV), preference is given to EO-PO block alkoxylates in which the ratio of EO to PO (x to y) is 10:1 to 1:10, preferably 1:1 to 1:12 and in particular 1:2 to 1:8. In this context, the degree of ethoxylation (value of x) is generally 1 to 20, preferably 2 to 15 and in particular 2 to 10 and the degree of propoxyla-
tion (value of y) is generally 1 to 30, preferably 4 to 20 and in particular 8 to 16. The overall degree of alkoxylation, i.e. the sum of EO and PO units, is generally 2 to 50, preferably 4 to 30 and in particular 6 to 20.

Amongst the alkoxylated alcohols of formula (IV), preference is furthermore given to EO-PeO block alkoxylates in which the ratio of EO to PeO (x to y) is 2:1 to 25:1 and in particular 4:1 to 15:1. In this context, the degree of ethoxylation (value of x) is generally 1 to 50, preferably 4 to 25 and in particular 6 to 15 and the degree of pentoxylation (value of y) is generally 0.5 to 20, preferably 0.5 to 4 and in particular 0.5 to 2. The overall degree of alkoxylation, i.e. the sum of EO and PO units, is generally 1.5 to 70, preferably 4.5 to 29 and in particular 6.5 to 17.

According to a further particular embodiment, alcohol alkoxylates of the formula (IV) are used in which n = 2, the values of x and y are both greater than zero and z = 0. On this occasion also, these are alcohol alkoxylates of EO type but in which the EO block is terminally bonded. These include especially PO-EO block alkoxylates (n = 2; x > zero; y > zero; m = 3; z = 0) and PeO-EO block alkoxylates (n = 2; x > zero; y > zero; m = 5; z = 0).

Amongst the alkoxylated alcohols of formula (IV), preference is given to PO-EO block alkoxylates in which the ratio of PO to EO (x to y) is 1:10 to 10:1, preferably 12:1 to 1:1 and in particular 2:1 to 8:1. In this context, the degree of ethoxylation (value of x) is generally 1 to 20, preferably 2 to 15 and in particular 2 to 10. The degree of propoxylation (value of x) is generally 0.5 to 30, preferably 4 to 20 and in particular 6 to 16. The overall degree of alkoxylation, i.e. the sum of EO and PO units, is generally 1.5 to 50, preferably 2.5 to 30 and in particular 8 to 20.

Amongst the alkoxylated alcohols of formula (IV), preference is furthermore given to PeO-EO block alkoxylates in which the ratio of PeO to EO (x to y) is 1:50 to 1:3 and in particular 1:25 to 1:5. In this context, the degree of pentoxylation (value of x) is generally 0.5 to 20, preferably 0.5 to 4 and in particular 0.5 to 2 and the degree of ethoxylation (value of y) is generally 3 to 50, preferably 4 to 25 and in particular 5 to 15. The overall degree of alkoxylation, i.e. the sum of EO and PO units, is generally 3.5 to 70,
preferably 4.5 to 45 and in particular 5.5 to 17.

According to a further particular embodiment, alcohol alkoxylates of the formula (IV) are used in which the values of x, y and z are all greater than zero. These include especially PeO-EO-PO block alkoxylates (m=5; x>zero; n=2; y>zero; m=3; z>zero).

In an especially preferred embodiment the alkoxylate is selected from alkoxylated alcohols of the formula (IV), in which

R^a represents linear C_{12-22} -alkyl, especially linear C_{10-20} alkyl or a mixture thereof;
R^b represents H or C_{1-}C_{4} -alkyl, preferably H or methyl, in particular H;
m, n, p represent, independently of one another, an integer from 2 to 5, preferably from 2 to 3;
x, y, z represent, independently of one another, a number from 0 to 50; and
x+y+z corresponds to a value from 5 to 50, preferably from 8 to 25.

The wetting power by immersion of the alkoxylate is usually at least 120 seconds, preferably at least 180 s, especially at least 220 s. The wetting power is usually analyzed according to DIN 1772 at room temperature at 1 g/L in 2 g/l sodium carbonate.

The surface tension of the alkoxylate is usually at least 30 mN/m, preferably at least 31 mN/m, and in particular at least 32 mN/m. Further on, the surface tension is preferably from 30 to 40 mN/m, and in particular from 30 to 35 mN/m. The surface tension may be analyzed according to DIN 14370 at room temperature at 1 g/L.

Preferably, the alkoxylate has a wetting power by immersion of at least 120 s and a surface tension of at least 30 mN/m. More preferably, the alkoxylate has a wetting power by immersion of at least 180 s and a surface tension from 30 to 40 mN/m.

Alkoxylates are known and may be prepared by known methods, such as WO 98/35553, WO 00/35278 or EP 0 681 865. Many alkoxylates are commercially available, for example Atplus® 242, Atplus® 245, Atplus® MBA 1303 from Croda, Plurafac® LF types from BASF SE, Agnique® BP 24-24, Agnique® BP 24-36, Agnique® BP 24-45, Agnique® BP 24-54, Agnique® BP24-52R from Cognis.

The particularly preferred compositions according to the invention (most preferably in form of an emulsion concentrate) comprises usually at least 10 wt% of the alkoxylate, e.g. form 10 to 70 wt%, preferably at least 15 wt%, and in particular from 15 to 50 wt% based on the composition.
In the preferred composition according to the invention the alkoxylated aliphatic alcohol (alkoxylate) or the mixture of different alkoxylated alcohols may be the sole adjuvant. However, it is also preferred, if the alkoxylated aliphatic alcohol, in particular the alkoxylated aliphatic alcohol of formula (IV) is combined with a different adjuvant. In the preferred compositions according to the invention (preferably in form of an emulsion concentrate), which comprise at least one alkoxylated aliphatic alcohol and at least one adjuvant different therefrom, the total amount of adjuvant is generally at least 10 wt%, e.g. form 10 to 70 wt%, preferably at least 15 wt%, and in particular from 15 to 50 wt%, based on the composition.

The composition according to the present invention may be present in solid or liquid form, preferably in liquid form (such as aqueous or non-aqueous). Typically the composition is formulation as an agrochemical formulation. Examples of common formulation types are given below. In the composition the pesticide may be present in any form, such as dissolved, suspended, or emulsified. Preferably the pesticide compound of the formulae I or II is present in the composition in dissolved form or in suspended form. In particular, the composition the pesticide compound of the formulae I or II and the base is a liquid composition in the form of a solution or suspension or an emulsion, wherein the pesticide compound of the formulae I or II is present in dissolved form or in the form of suspended particles or in the form of emulsified droplets containing the pesticide compound in dissolved form.

The inventive composition may also comprise auxiliaries which are customary in agrochemical formulations. The auxiliaries used depend on the particular application form and active substance, respectively. Examples for suitable auxiliaries are solvents, solid carriers, dispersants or emulsifiers (such as further solubilizers, protective colloids, surfactants and adhesion agents), organic and inorganic thickeners, bactericides, anti-freezing agents, anti-foaming agents, if appropriate colorants and tackifiers or binders (e.g. for seed treatment formulations).

Suitable solvents are water, organic solvents such as mineral oil fractions of medium to high boiling point, such as kerosene or diesel oil, furthermore coal tar oils and oils of vegetable or animal origin, aliphatic, cyclic and aromatic hydrocarbons, e.g. toluene, xylene, paraffin, tetrahydrophthalene, alkylated naphthenes or their derivatives, alcohols such as methanol, ethanol, propanol, butanol and cyclohexanol, glycols, ketones such as cyclohexanone and gamma-butyrolactone, fatty acid dimethylamides, fatty acids and fatty acid esters and strongly polar solvents, e.g. amines such as N-methylpyrrolidone.
Solid carriers are mineral earths such as silicates, silica gels, talc, kaolins, limestone, lime, chalk, bole, loess, clays, dolomite, diatomaceous earth, calcium sulfate, magnesium sulfate, magnesium oxide, ground synthetic materials, fertilizers, such as, e. g., ammonium sulfate, ammonium phosphate, ammonium nitrate, ureas, and products of vegetable origin, such as cereal meal, tree bark meal, wood meal and nutshell meal, cellulose powders and other solid carriers.

Suitable surfactants (adjuvants, wetters, tackifiers, dispersants or emulsifiers) are alkali metal, alkaline earth metal and ammonium salts of aromatic sulfonic acids, such as ligninsoulsfonic acid (Borresperse® types. Borregard, Norway) phenolsulfonic acid, naphthalenesulfonic acid (Morwet® types. Akzo Nobel, U.S.A.), dibutyl-naphthalenesulfonic acid (Nekal® types. BASF, Germany), and fatty acids, alkylsulfonates, alkylarylsulfonates, alkyl sulfates, lauryl ether sulfates, fatty alcohol sulfates, and sulfated hexa-, hepta- and octadeconates, sulfated fatty alcohol glycol ethers, furthermore condensates of naphthalene or of naphthalenesulfonic acid with phenol and formaldehyde, polyoxyethylene octylphenyl ether, ethoxylated isocetylphenol, octyphenol, nonylphenol, alkylnonylphenyl polyglycol ethers, tributylphenyl polyglycol ether, tristearylphenyl polyglycol ether, alkylaryl polyethers, alcohol and fatty alcohol/ethylene oxide condensates, ethoxylated castor oil, polyoxyethylene alkyl ethers, ethoxylated polyoxypolypropylenes, lauryl alcohol polyglycol ether acetal, sorbitol esters, lignin-sulfite waste liquors and proteins, denatured proteins, polysaccharides (e. g. methylcellulose), hydrophobically modified starches, polyvinyl alcohols (Mowiol® types, Clariant, Switzerland), polycarboxylates (Sokolan® types, BASF, Germany), polyalkoxyxylates, polyvinylamines (Lupasol® types, BASF, Germany), polyvinylpyrrolidone and the copolymers thereof.

Examples for thickeners (i. e. compounds that impart a modified flowability to formulations, i. e. high viscosity under static conditions and low viscosity during agitation) are polysaccharides and organic and anorganic clays such as Xanthan gum (Kelzan®, CP Kelco, U.S.A.), Rhodopol® 23 (Rhodia, France), Veegum® (R.T. Vanderbilt, U.S.A.) or Attaclay® (Engelhard Corp., NJ, USA). Bactericides may be added for preservation and stabilization of the formulation. Examples for suitable bactericides are those based on dichlorophene and benzylic alcohol hemi formal (Proxel® from ICI or Acticide® RS from Thor Chemie and Kathon® MK from Rohm & Haas) and isothiazolinone derivatives such as alkylisothiazolinones and benzisothiazolinones (Acticide® MBS from Thor Chemie). Examples for suitable anti-freezing agents are ethylene glycol, propylene glycol, urea and glycerin. Examples for anti-foaming agents are silicone emulsions (such as e. g. Silikon® SRE, Wacker, Germany or Rhodorsil®, Rhodia, France), long chain alcohols, fatty acids, salts of fatty acids, fluoroorganic compounds and mixtures thereof. Suitable colorants are pigments of low water solubility and water-soluble dyes.
Examples to be mentioned und the designations rhodamin B, C. I. pigment red 112, C. I. solvent red 1, pigment blue 15:4, pigment blue 15:3, pigment blue 15:2, pigment blue 15:1, pigment blue 80, pigment 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, pigment 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 for tackifiers or binders are polyvinylpyrrolidons, polyvinylacetates, polyvinyl alcohols and cellulose ethers (Tylose®, Shin-Etsu, Japan).

Powders, materials for spreading and dusts can be prepared by mixing or concomitantly grinding the compounds the respective active compounds present in the inventive mixtures and, if appropriate, further active substances, with at least one solid carrier. Granules, e.g. coated granules, impregnated granules and homogeneous granules, can be prepared by binding the active substances to solid carriers. Examples of solid carriers are mineral earths such as silica gels, silicates, talc, kaolin, attapulgite, limestone, lime, chalk, bole, loess, clay, dolomite, diatomaceous earth, calcium sulfate, magnesium sulfate, magnesium oxide, ground synthetic materials, fertilizers, such as, e.g., ammonium sulfate, ammonium phosphate, ammonium nitrate, ureas, and products of vegetable origin, such as cereal meal, tree bark meal, wood meal and nutshell meal, cellulose powders and other solid carriers.

Examples for agrochemical formulation types for the inventive composition are:

1. Composition types for dilution with water
   i) Water-soluble concentrates (SL, LS)
      10 parts by weight of active substance (e.g. Insecticide A) is dissolved in 90 parts by weight of water or in a water-soluble solvent. As an alternative, wetting agents or other auxiliaries are added. The active substance dissolves upon dilution with water. In this way, a formulation having a content of 10% by weight of active substance is obtained.
   ii) Dispersible concentrates (DC)
      20 parts by weight of active substance (e.g. Insecticide A) is dissolved in 70 parts by weight of cyclohexanone with addition of 10 parts by weight of a dispersant, e.g. polyvinylpyrrolidone. Dilution with water gives a dispersion. The active substance content is 20% by weight.
   iii) Emulsifiable concentrates (EC)
      15 parts by weight of active substance (e.g. Insecticide A) is dissolved in 75 parts by weight of xylene with addition of calcium dodecylbenzenesulfonate and castor oil ethoxylate (in each case 5 parts by weight). Dilution with water gives an emulsion. The composition has an active substance content of 15% by weight.
   iv) Emulsions (EW, EO, ES)
25 parts by weight of active substance (e.g. Insecticide A) is dissolved in 35 parts by weight of xylene 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 emulsifying machine (Ultraturrax) and made into a homogeneous emulsion. Dilution with water gives an emulsion. The composition has an active substance content of 25% by weight.

v) Suspensions (SC, OD, FS)
In an agitated ball mill, 20 parts by weight of active substance (e.g. Insecticide A) is comminuted with addition of 10 parts by weight of dispersants and wetting agents and 70 parts by weight of water or an organic solvent to give a fine active substance suspension. Dilution with water gives a stable suspension of the active substance. The active substance content in the composition is 20% by weight.

vi) Water-dispersible granules and water-soluble granules (WG, SG)
50 parts by weight of active substance (e.g. Insecticide A) is ground finely with addition of 50 parts by weight of dispersants and wetting agents and prepared as water-dispersible or water-soluble granules by means of technical appliances (e.g. extrusion, spray tower, fluidized bed). Dilution with water gives a stable dispersion or solution of the active substance. The composition has an active substance content of 50% by weight.

vii) Water-dispersible powders and water-soluble powders (WP, SP, SS, WS)
75 parts by weight of active substance (e.g. Insecticide A) is ground in a rotor-stator mill with addition of 25 parts by weight of dispersants, wetting agents and silica gel. Dilution with water gives a stable dispersion or solution of the active substance. The active substance content of the composition is 75% by weight.

viii) Gel (GF)
In an agitated ball mill, 20 parts by weight active substance (e.g. Insecticide A) is comminuted with addition of 10 parts by weight of dispersants, 1 part by weight of a gelling agent wetters and 70 parts by weight of water or of an organic solvent to give a fine suspension of the active substance. Dilution with water gives a stable suspension of the active substance, whereby a composition with 20% (w/w) of active substance is obtained.

2. Composition types to be applied undiluted
ix) Dustable powders (DP, DS)
5 parts by weight of active substance (e.g. Insecticide A) is ground finely and mixed intimately with 95 parts by weight of finely divided kaolin. This gives a dustable composition having an active substance content of 5% by weight.

x) Granules (GR, FG, GG, MG)
0.5 parts by weight of active substance (e.g. Insecticide A) is ground finely and associated with 99.5 parts by weight of carriers. Current methods are extrusion, spray-drying
or the fluidized bed. This gives granules to be applied undiluted having an active substance content of 0.5% by weight.

xi) ULV solutions (UL)
10 parts by weight of active substance (e.g. Insecticide A) is dissolved in 90 parts by weight of an organic solvent, e.g. xylene. This gives a composition to be applied undiluted having an active substance content of 10% by weight.

The agrochemical formulations generally comprise between 0.01 and 95%, preferably between 0.1 and 90%, most preferably between 0.5 and 90%, by weight of active substances. The Insecticide A is employed in a purity of from 90% to 100%, preferably from 95% to 100% (according to NMR spectrum).

The inventive composition can be used as such or in the form of their agrochemical formulations, e.g. in the form of directly sprayable solutions, powders, suspensions, dispersions, emulsions, oil dispersions, pastes, dustable products, materials for spreading, or granules, by means of spraying, atomizing, dusting, spreading, brushing, immersing or pouring. The application forms depend entirely on the intended purposes; it is intended to ensure in each case the finest possible distribution of the compounds present in the inventive compositions.

Aqueous application forms can be prepared from emulsion concentrates, pastes or wettable powders (sprayable powders, oil dispersions) by adding water. To prepare emulsions, pastes or oil dispersions, the substances, as such or dissolved in an oil or solvent, can be homogenized in water by means of a wetter, tackifier, dispersant or emulsifier. Alternatively, it is possible to prepare concentrates composed of active substance, wetter, tackifier, dispersant or emulsifier and, if appropriate, solvent or oil, and such concentrates are suitable for dilution with water.

The active substance concentrations in the ready-to-use preparations can be varied within relatively wide ranges. In general, they are from 0.0001 to 10%, preferably from 0.001 to 1% by weight of compounds of the inventive compositions.

The compounds of the inventive compositions may also be used successfully in the ultra-low-volume process (ULV), it being possible to apply compositions comprising over 95% by weight of active substance, or even to apply the active substance without additives.

Various types of oils, wetters, adjuvants, herbicides, fungicides, other pesticides, or bactericides may be added to the active compounds, if appropriate not until
immediately prior to use (tank mix). These agents can be admixed with the compounds of the inventive composition in a weight ratio of 1:100 to 100:1, preferably 1:10 to 10:1.

Compositions of this invention may also contain fertilizers such as ammonium nitrate, urea, potash, and superphosphate, phytotoxicants and plant growth regulators and safeners. These may be used sequentially or in combination with the above-described compositions, if appropriate also added only immediately prior to use (tank mix). For example, the plant(s) may be sprayed with a composition of this invention either before or after being treated with the fertilizers.

The compounds of the inventive composition can be used individually or already partially or completely mixed with one another to prepare the composition according to the invention. It is also possible for them to be packaged and used further as combination composition such as a kit of parts. In one embodiment of the invention, a kit of parts comprises, as separate components, a) the pesticide, and b) the base, for combined use. The kits may include one or more, including all, components that may be used to prepare a subject agrochemical composition. In those embodiments where more than two components are provided in a kit, the components may already be combined together and as such are packaged in a single container such as a vial, bottle, can, pouch, bag or canister. In other embodiments, two or more components of a kit may be packaged separately, i.e., not pre-formulated. As such, kits may include one or more separate containers such as vials, cans, bottles, pouches, bags or canisters, each container containing a separate component for an agrochemical composition. In both forms, a component of the kit may be applied separately from or together with the further components or as a component of a combination composition according to the invention for preparing the composition according to the invention.

The user applies the composition according to the invention usually from a predosage device, a knapsack sprayer, a spray tank or a spray plane. Here, the agrochemical composition is made up with water and/or buffer to the desired application concentration, it being possible, if appropriate, to add further auxiliaries, and the ready-to-use spray liquor or the agrochemical composition according to the invention is thus obtained. Usually, 50 to 500 liters of the ready-to-use spray liquor are applied per hectare of agricultural useful area, preferably 100 to 400 liters.

The present invention further relates to a method for protecting plants from attack or infestation by insects, acarids or nematodes comprising contacting the plant, or the soil or water in which the plant is growing, with the inventive composition in pesticidally effective amounts.
The present invention further relates to a method for controlling insects, arachnids or nematodes comprising contacting an insect, acarid or nematode or their food supply, habitat, breeding grounds or their locus with the inventive composition in pesticidally effective amounts.

The inventive composition exhibits outstanding action against animal pests (e.g. insects, acarids or nematodes) from the following orders:

- insects from the order of the lepidopterans (Lepidoptera), for example Agrotis ypsilon, Agrotis segetum, Alabama argillacea, Anticarsia gemmatalis, Argyresthia conjugella, Autographa gamma, Bupalus piniarius, Cacoecia muhmana, Capua reticulana, Cheimatobia brumata, Choristoneura fumiferana, Choristoneura occidentalis, Cirphis unipuncta, Cydia pomonella, Dendrolimus pini, Diaphania nitidalis, Diatraea grandiosella, Earias insulana, Elasmopalpus lignosellus, Eucopeelia ambiguella, Evetria bouliana, Feltia subterranea, Galleria mellonella, Grapholitha funebrana, Grapholitha molesta, Heliotis armigera, Heliotis virescens, Heliothis zea, Hellula undalis, Hibernia defoliaria, Hyphantria cunea, Hyponomeuta malinellus, Keiferia lycopersicella, Lambdina fiscellaria, Laphyrgma exigua, Leucoptera coffeella, Leucoptera scitella, Lithocolletis blancardella, Lobesia botrana, Loxostege sticticalis, Lymantria dispar, Lymantria monacha, Lyonetia clerkella, Malacosoma neustria, Mamestra brassicae, Orgyia pseudotsugata, Ostrinia nubilalis, Panolis flammea, Pectinophora gossypiella, Peridroma saucia, Phalera bucephala, Phthorimaea operculella, Phylocnistis citrella, Pieris brassicae, Plathypena scabra, Plutella xylostella, Pseudoplusia includens, Rhyacionia frustrana, Scrobipalpula absoluta, Sitotroga cerealella, Sparganothis pillehana, Spodoptera frugiperda, Spodoptera littoralis, Spodoptera litura, Thaumatopoea pityocampa, Tortrix viridana, Trichoplusia ni and Zeiraphera canadensis,

- beetles (Coleoptera), for example Agrilus sinuatus, Agriotes lineatus, Agriotes obscurus, Amphimallus solstitialis, Anisandrus dispar, Anthonomus grandis, Anthonomus pomorum, Aphthona euphoridae, Athous haemorrhoidalis, Atoma linearis, Blastophagus pini perda, Blitophaga undata, Bruchus rufimanus, Bruchus pisorum, Bruchus lentis, Bytiscus betulae, Cassida nebulosa, Cerotoma trifurcata, Cetonia aurata, Ceuthorhynchus assimilis, Ceuthorhynchus napi, Chaetocnema tibialis, Conoderus vespertinus, Crioceris asparagi, Ctenicera ssp., Diabrotica longicornis, Diabrotica semipunctata, Diabrotica 12-punctata Diabrotica speciosa, Diabrotica virgifera, Epilachna varivestis, Epitrix hirtipennis, Eutinobothrus brasiensis, Hylobius abietis, Hypera brunneipennis, Hypera postica, Ips typographus, Lema bilineata, Lema melanopus, Leptinotarsa decemlineata, Limonius californicus, Lissorhoptrus oryzophilus, Melanotus communis, Meligethes aeneus, Melolontha hippocastani, Melolontha melolontha, Oulema oryzae, Ortiorrhynchus sulcatus, Ortiorrhynchus ovatus, Phaedon cochleariae,
Phyllobius pyri, Phyllotreta chrysocephala, Phyllophaga sp., Phyllopertha horticola, Phyllotreta nemorum, Phyllotreta striolata, Popilia japonica, Sitona lineatus and Sitophilus granaria,

flies, mosquitoes (Diptera), e.g. Aedes aegypti, Aedes albopictus, Aedes vexans, Anastrepha ludens, Anopheles maculipennis, Anopheles crucians, Anopheles albimanus, Anopheles gambiae, Anopheles freeborni, Anopheles leucosphyrus, Anopheles minimus, Anopheles quadramaculatus, Calliphora vicina, Ceratitis capitata, Chrysomya bezziana, Chrysomya hominivorax, Chrysomya macellaria, Chrysops silacea, Chrysops atlanticus, Contarinia sorghicola, Cordylobia anthropophaga, Culicoides fures, Culex pipiens, Culex nigripalpus, Culex quinquefasciatus, Culex tarsalis, Culiseta inornata, Culiseta melanura, Dacus cucurbitae, Dacus oleae, Daseineura brassicaceae, Delia antique, Delia coarctata, Delia platura, Delia radicum, Dermatobia hominis, Fannia canicularis, Geomyza Tripunctata, Gasterophilus intestinalis, Glossina morsitans, Glossina palpalis, Glossina fuscipes, Glossina tachinoides, Haematobia irritans, Haplodiplosis equestris, Hylemyia platura, Hypoderma lineata, Leptocoenops torrens, Liriomyza sativae, Liriomyza trifolii, Lucilia caprina, Lucilia cuprina, Lucilia sericata, Lycoria pectoralis, Mansonia titillans, Mayetiola destructor, Musca domestica, Muscina stabulans, Oestrus ovis, Oomyza florum, Oscinella frit, Pegomya hyoscyami, Phorbia antiqua, Phorbia brassicaceae, Phorbia coarctata, Phlebotomus argentipes, Psorophora columbiae, Psila rosae, Psorophora discolor, Prosimulium mixtum, Rhagoletis cerasi, Rhagoletis pomonella, Sarcophaga haemorrhoidalis, Sarcophaga sp., Simulium vittatum, Stomoxys calcitrans, Tabanus bovinus, Tabanus atratus, Tabanus lineola, and Tabanus similis, Tipula olerveaceae, and Tipula paludosa,

thrips (Thysanoptera), e.g. Dichromothrips corbetti, Dichromothrips ssp, Frankliniella fusca, Frankliniella occidentalis, Frankliniella tritici, Scirtothrips citri, Thrips oryzae, Thrips palmi and Thrips tabaci,

termites (Isoptera), e.g. Calotermes flavicollis, Leucotermes flavipes, Heterotermes aureus, Reticulitermes flavipes, Reticulitermes virginicus, Reticulitermes lucifugus, Termes natalensis, and Coptotermes formosanus,

cockroaches (Blattaria - Blattodea), e.g. Blattella germanica, Blattella asahinae, Periplaneta americana, Periplaneta japonica, Periplaneta brunnea, Periplaneta fuligginosa, Periplaneta australasiae, and Blatta orientalis,

true bugs (Hemiptera), e.g. Acrosternum hilare, Blissus leucopterus, Cyrtopeltis notatus, Dysdercus cingulatus, Dysdercus intermedius, Eurygaster integriceps, Euschistus

ants, bees, wasps, sawflies (Hymenoptera), e.g. Athalia rosae, Atta cephalotes, Atta capiguara, Atta cephalotes, Atta laevigata, Atta robusta, Atta sexdens, Atta texana, Crematogaster spp., Hoplocampa minuta, Hoplocampa testudinea, Monomorium pharaonis, Solenopsis geminata, Solenopsis invicta, Solenopsis richteri, Solenopsis xyloni, Pogonomymex barbatus, Pogonomymex Californicus, Pheidole megacephala, Dasyacuchus occidentalis, Bombus spp., Vespa squamosa, Paravespula vulgaris, Paravespula pennsylvanica, Paravespula germanica, Dolichovespula maculata, Vespa crabro, Polistes rubiginosa, Camponotus floridanus, and Linepithema humile,

crickets, grasshoppers, locusts (Orthoptera), e.g. Acheta domestica, Gryllotalpa gryllotalpa, Locusta migratoria, Melanoplus bivittatus, Melanoplus femurrubrum, Melanoplus mexicanus, Melanoplus sanguinipes, Melanoplus spretus, Nomadacris septemfasciata, Schistocerca americana, Schistocerca gregaria, Docistaurus marocanus, Tachycines aysnamorus, Oedaleus senegalensis, Zonocerus variegatus, Hieroglyphus daganensis, Kraussaria angulifera, Calliptamus italicus, Chortoicetes terminifera, and Locusta pardalina,

Arachnoidea, such as arachnids (Acarina), e.g. of the families Argasidae, Ixodidae and Sarcoptidae, such as Amblyomma americanum, Amblyomma variegatum, Amblyomma maculatum, Argas persicus, Boophilus annulatus, Boophilus decoloratus, Boophilus microplus, Dermacentor silvarum, Dermacentor andersoni, Dermacentor variabilis,
Hyalomma truncatum, Ixodes ricinus, Ixodes rubicundus, Ixodes scapularis, Ixodes holocyclus, Ixodes pacificus, Ornithodorus moubata, Ornithodorus hermsi, Ornithodorus turicata, Ornithonyssus bacoti, Otobius megnini, Dermanyssus gallinae, Psoroptes ovis, Rhipicephalus sanguineus, Rhipicephalus appendiculatus, Rhipicephalus evertsi, Sarcoptes scabiei, and Eriophyidae spp. such as Aculus schlechtendali, Phyllocoptrata oleivora and Eriophyes sheldoni; Tarsonemidae spp. such as Phytonemus pallidus and Polyphagotarsonemus latus; Tenuipalpidae spp. such as Brevipalpus phoenicis; Tetranychidae spp. such as Tetranychus cinnabarinus, Tetranychus kanzawai, Tetranychus pacificus, Tetranychus telarius and Tetranychus urticae, Panonychus ulmi, Panonychus citri, and Oligonychus pratensis; Araneida, e.g. Latrodectus mactans, and Loxosceles reclusa, fleas (Siphonaptera), e.g. Ctenocephalides felis, Ctenocephalides canis, Xenopsylla cheopis, Pulex irritans, Tunga penetrans, and Nosopsyllus fasciatus, silverfish, firebrat (Thysanura), e.g. Lepisma saccharina and Thermobia domestica, centipedes (Chilopoda), e.g. Scutigera coleoptrata, millipedes (Diplopoda), e.g. Narceus spp., Earwigs (Dermaptera), e.g. forficula auricularia, lice (Phthiraptera), e.g. Pediculus humanus capitis, Pediculus humanus corporis, Pthirus pubis, Haematopinus eurysternus, Haematopinus suis, Linognathus vituli, Bovicola bovis, Menopon gallinae, Menacanthus stramineus and Solenopotes capillatus, plant parasitic nematodes such as root-knot nematodes, Meloidogyne arenaria, Meloidogyne chitwoodi, Meloidogyne exigua, Meloidogyne hapla, Meloidogyne incognita, Meloidogyne javanica and other Meloidogyne species; cyst nematodes, Globodera rostochiensis, Globodera pallida, Globodera tabacum and other Globodera species, Heterodera avenae, Heterodera glycines, Heterodera schachtii, Heterodera trifolii, and other Heterodera species; seed gall nematodes, Anguina funesta, Anguina tritici and other Anguina species; stem and foliar nematodes, Aphelenchoides besseyi, Aphelenchoides fragariae, Aphelenchoides ritzembosi and other Aphelenchoides species; sting nematodes, Belonolaimus longicaudatus and other Belonolaimus species; pine nematodes, Bursaphelenchus xylophilus and other Bursaphelenchus species; ring nematodes, Criconema species, Criconemella species, Criconemoides species, and Mesocriconema species; stem and bulb nematodes, Ditylenchus destructor, Ditylenchus dipsaci, Ditylenchus myceliophagus and other Ditylenchus species; awl nematodes,
Dolichodorus species; spiral nematodes, Helicotylenchus dihystera, Helicotylenchus multicinctus and other Helicotylenchus species, Rotylenchus robustus and other Rotylenchus species; sheath nematodes, Hemicyclophora species and Hemicriconemoides species; Hirshmanniella species; lance nematodes, Hoplolaimus columbus, Hoplolaimus galeatus and other Hoplolaimus species; false root-knot nematodes, Nacobbus aberrans and other Nacobbus species; needle nematodes, Longidorus elongates and other Longidorus species; pin nematodes, Paratylenchus species; lesion nematodes, Pratylenchus brachyurus, Pratylenchus coffeae, Pratylenchus curvatus, Pratylenchus goodeyi, Pratylenchus neglectus, Pratylenchus penetrans, Pratylenchus scribneri, Pratylenchus vulnus, Pratylenchus zeae and other Pratylenchus species; Radinaphelenchus cocophilus and other Radinaphelenchus species; burrowing nematodes, Radopholus similis and other Radopholus species; reniform nematodes, Rotylenchulus reniformis and other Rotylenchulus species; Scutellonema species; stubby root nematodes, Trichodorus primitivus and other Trichodorus species; Paratrichodorus minor and other Paratrichodorus species; stunt nematodes, Tylenchorhynchus claytoni, Tylenchorhynchus dubius and other Tylenchorhynchus species and Merlinius species; citrus nematodes, Tylenchulus semipenetrans and other Tylenchulus species; dagger nematodes, Xiphinema americanum, Xiphinema index, Xiphinema diversicaudatum and other Xiphinema species; and other plant parasitic nematode species.

The composition according to the invention can be applied to any and all developmental stages of pests, such as egg, larva, pupa, and adult. The pests may be controlled by contacting the target pest, its food supply, habitat, breeding ground or its locus with a pesticidally effective amount of the inventive compositions. "Locus" means a plant, plant propagation material (preferably seed), soil, area, material or environment in which a pest is growing or may grow.

In general, "pesticidally effective amount" means the amount of the inventive compositions needed to achieve an observable effect on growth, including the effects of necrosis, death, retardation, prevention, and removal, destruction, or otherwise diminishing the occurrence and activity of the animal pest. The pesticidally effective amount can vary for the various compositions used in the invention. A pesticidally effective amount of the compositions will also vary according to the prevailing conditions such as desired pesticidal effect and duration, weather, target species, locus, mode of application, and the like.

The inventive compositions are employed by treating the animal pest or the plants, plant propagation materials (preferably seeds), materials or soil to be protected from pesticidal attack with a pesticidally effective amount of the active compounds. The
application can be carried out both before and after the infection of the materials, plants or plant propagation materials (preferably seeds) by the pests.

Preferably, the inventive compositions are employed by treating the animal pests or the plants or soil to be protected from pesticidal attack via foliar application with a pesticidally effective amount of the active compounds. Also herein, the application can be carried out both before and after the infection of the plants by the pests.

In the method of combating animal pests (insects, acarids or nematodes) depending on the type of compound and the desired effect, the application rates of the compositions according to the invention are from 0.1 g/ha to 10000 g/ha, preferably 1 g/ha to 5000 g/ha, more preferably from 20 to 1000 g/ha, most preferably from 10 to 750 g/ha, in particular from 20 to 500 g/ha.

In the context of the present invention, the term plant refers to an entire plant, a part of the plant or the propagation material of the plant.

Plants and as well as the propagation material of said plants, which can be treated with the inventive compositions include all genetically modified plants or transgenic plants, e.g. crops which tolerate the action of herbicides or fungicides or insecticides owing to breeding, including genetic engineering methods, or plants which have modified characteristics in comparison with existing plants, which can be generated for example by traditional breeding methods and/or the generation of mutants, or by recombinant procedures.

For example, compositions according to the present invention can be applied (as seed treatment, spray treatment, in furrow or by any other means) also to plants which have been modified by breeding, mutagenesis or genetic engineering including but not limited to agricultural biotech products on the market or in development. Genetically modified plants are plants, which genetic material has been so modified by the use of recombinant DNA techniques that under natural circumstances 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-transional 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
hydroxyphenylpyruvate dioxygenase (HPPD) inhibitors; acetolactate synthase (ALS) inhibitors, such as sulfonyl ureas (see e.g. US 6,222,100, WO 01/82685, WO 00/26390, WO 97/41218, WO 98/02526, WO 98/02527, WO 04/106529, WO 05/20673, WO 03/14357, WO 03/13225, WO 03/14356, WO 04/16073) or imidazolinones (see e.g. US 6,222,100, WO 01/82685, WO 00/26390, WO 97/41218, WO 98/002526, WO 98/002527, WO 04/106529, WO 05/20673, WO 03/14357, WO 03/13225, WO 03/14356, WO 04/16073); enolpyruvylshikimate-3-phosphate synthase (EPSPS) inhibitors, such as glyphosate (see e.g. WO 92/00377); glutamine synthetase (GS) inhibitors, such as glufosinate (see e.g. EP-A 242 236, EP-A 242 246) or oxy nil herbicides (see e.g. US 5,559,024) as a result of conventional methods of breeding or genetic engineering. 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. Genetic engineering methods have been used to render cultivated plants such as soybean, cotton, corn, beets and rape, tolerant to herbicides such as glyphosate and glufosinate, some of which are commercially available under the trade names RoundupReady® (glyphosate-tolerant, Monsanto, U.S.A.) 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 δ-endotoxins, e.g. CryIAb(b), CryIA(c), CryIF, CryI(a2), CryIIA(b), CryIIB(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 Streptomycetes 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-hydroxysteroid oxidase, ecdysteroid-IDP-glycosyl-transferase, cholesterol oxidases, ecdysone inhibitors or HMG-CoA-reductase; ion channel blockers, such as blockers of sodium or calcium channels; juvenile hormone esterase; diuretic hormone receptors (helicokinin receptors); stilbene 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 disclosed, 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 Cry1Ab toxin), YieldGard® Plus (corn cultivars producing Cry1Ab and Cry3Bb1 toxins), Starlink® (corn cultivars producing the Cry9c toxin), Herculex® RW (corn cultivars producing Cry34Ab1, Cry35Ab1 and the enzyme Phosphinothricin-N-Acetyltransferase [PAT]); NuCOTN® 33B (cotton cultivars producing the Cry1Ac toxin), Bollgard® I (cotton cultivars producing the Cry1Ac toxin), Bollgard® II (cotton cultivars producing Cry3Ac and Cry2Ab2 toxins); VIPCOT® (cotton cultivars producing a VIP-toxin); NewLeaf® (potato cultivars producing the Cry3Aa1 toxin); Bt-Xtra®, NatureGard®, KnockOut®, BiteGard®, Protecta®, Bt 1 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 producing a modified version of the Cry3Aa1 toxin, c.f. WO 03/01 881 0), MON 863 from Monsanto 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 Cry3Ac toxin) and 1507 from Pioneer Overseas Corporation, Belgium (corn cultivars producing the Cry1 F toxin and PAT enzyme).

Furthermore, plants are also covered that are by the use of recombinant DNA techniques capable to synthesize one or more proteins to increase the resistance or tolerance 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 Solanum bulbocastanum) or T4-lysozym (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 by the use of recombinant DNA techniques 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), toler-
ance 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 amylopectin (e.g. Amflora® potato, BASF SE, Germany).

The inventive composition are effective through both contact (via soil, glass, wall, bed net, carpet, plant parts or animal parts), and ingestion (bait, or plant part) and through trophallaxis and transfer.

Preferred application methods are into water bodies, via soil, cracks and crevices, pastures, manure piles, sewers, into water, on floor, wall, or by perimeter spray application and bait.

According to another preferred embodiment of the invention, for use against non phytopathogenic pests such as ants, termites, wasps, flies, mosquitoes, crickets, locusts, or cockroaches the inventive composition are prepared into a bait preparation.

The bait can be a liquid, a solid or a semisolid preparation (e.g. a gel). The bait employed in the composition is a product which is sufficiently attractive to incite insects such as ants, termites, wasps, flies, mosquitoes, crickets etc. or cockroaches to eat it. This attractant may be chosen from feeding stimulants or para and / or sex pheromones readily known in the art.

Methods to control infectious diseases transmitted by non-phytopathogenic insects (e.g. malaria, dengue and yellow fever, lymphatic filariasis, and leishmaniasis) with the inventive compositions and their respective compositions also comprise treating surfaces of huts and houses, air spraying and impregnation of curtains, tents, clothing items, bed nets, tsetse-fly trap or the like. Insecticidal compositions for application to fibers, fabric, knitgoods, non-wovens, netting material or foils and tarpaulins preferably comprise a composition including the inventive compositions, optionally a repellent and at least one binder.
The inventive compositions can be used for protecting wooden materials such as trees, board fences, sleepers, etc. and buildings such as houses, outhouses, factories, but also construction materials, furniture, leathers, fibers, vinyl articles, electric wires and cables etc. from ants and/or termites, and for controlling ants and termites from doing harm to crops or human being (e.g. when the pests invade into houses and public facilities).

In the case of soil treatment or of application to the pests dwelling place or nest, the quantity of active ingredient ranges from 0.0001 to 500 g per 100 m², preferably from 0.001 to 20 g per 100 m².

Customary application rates in the protection of materials are, for example, from 0.01 g to 1000 g of active compound per m² treated material, desirably from 0.1 g to 50 g per m².

Insecticidal compositions for use in the impregnation of materials typically contain from 0.001 to 95 weight %, preferably from 0.1 to 45 weight %, and more preferably from 1 to 25 weight % of at least one repellent and/or insecticide.

For use in bait compositions, the typical content of active ingredient is from 0.0001 weight % to 15 weight %, desirably from 0.001 weight % to 5% weight % of active compound. The composition used may also comprise other additives such as a solvent of the active material, a flavoring agent, a preserving agent, a dye or a bitter agent. Its attractiveness may also be enhanced by a special color, shape or texture.

For use in spray compositions, the content of the composition of the active ingredients is from 0.001 to 80 weights %, preferably from 0.01 to 50 weight % and most preferably from 0.01 to 15 weight %.

The invention further relates to a method for protection of plant propagation material comprising contacting the plant propagation material with a composition according to the invention in pesticidally effective amounts.

As mentioned at the outset, in a preferred embodiment of the invention, the inventive compositions are used for the protection of the seed and the seedlings’ roots and shoots, preferably the seeds.

Seed treatment can be made into the seedbox before planting into the field.
For seed treatment purposes, the weight ration in the inventive composition generally depends from the properties of the compounds of the inventive compositions.

Customary formulations, which are especially useful for seed treatment are e.g.:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Soluble concentrates (SL, LS)</td>
</tr>
<tr>
<td>D</td>
<td>Emulsions (EW, EO, ES)</td>
</tr>
<tr>
<td>E</td>
<td>Suspensions (SC, OD, FS)</td>
</tr>
<tr>
<td>F</td>
<td>Water-dispersible granules and water-soluble granules (WG, SG)</td>
</tr>
<tr>
<td>G</td>
<td>Water-dispersible powders and water-soluble powders (WP, SP, WS)</td>
</tr>
<tr>
<td>H</td>
<td>Gel-Formulations (GF)</td>
</tr>
<tr>
<td>I</td>
<td>Dustable powders (DP, DS)</td>
</tr>
</tbody>
</table>

These compositions can be applied to plant propagation materials, particularly seeds, diluted or undiluted. These compositions can be applied to plant propagation materials, particularly seeds, diluted or undiluted. The compositions in question give, after two-to-tenfold dilution, active substance concentrations of from 0.01 to 60% by weight, preferably from 0.1 to 40% by weight, in the ready-to-use preparations. Application can be carried out before or during sowing.

Methods for applying the inventive composition and compositions thereof, respectively, on to plant propagation material, especially seeds, are known in the art, and include but not limited to, seed dressing, seed coating, seed dusting, seed soaking, seed film coating, seed multilayer coating, seed encrusting, seed dripping, and seed pelleting.

In a preferred embodiment, the compounds or the compositions thereof, respectively, are applied on to the plant propagation material by a method such that germination is not induced, e.g. by seed dressing, pelleting, coating and dusting.

In the treatment of plant propagation material (preferably seed), the application rates of the inventive composition are generally for the formulated product (which usually comprises from 10 to 750 g/l of the active(s))

The invention also relates to the propagation products of plants, and especially the seed comprising, that is, coated with and/or containing, an inventive composition as defined above. The plant propagation material (preferably seed) comprises the inventive compositions in an amount of from 0.1 g to 10 kg per 100 kg of plant propagation material (preferably seed), preferably 0.1 g to 1 kg per 100 kg of plant propagation material (preferably seed).
The separate or joint application of the compounds of the inventive compositions is carried out by spraying or dusting the seeds, the seedlings, the plants or the soils before or after sowing of the plants or before or after emergence of the plants.

In accordance with one variant of soil application, a further subject of the invention is in furrow treatment, which comprises adding a solid or liquid formulation comprising the inventive compositions to the open furrow, in which seeds have been sown or, alternatively, applying seeds and formulation simultaneously to the open furrow.

In an especially preferred embodiment, the composition according to the invention is an emulsion concentrate (EC), which comprises the base, in particular an amine, especially an amine of formula III. Preferably the EC comprises 0.5 to 30 wt%, in particular 1 to 15 wt% of Insecticide A, the base, and formulation auxiliaries up to 100%, where the formulation auxiliaries usually comprise from 10 to 70% by weight, in particular form 25 to 60 wt% of at least one organic solvent, wherein all components sum up to 100 wt%, i.e. the wt% values are based on the total weight of the composition. The concentration of the base in these EC's is selected from such an range which results of a pH of at least 6.0, in particular a pH of at least 6.5, especially a pH of at least 7.0, e.g. a pH of from 6.0 to 13, in particular from 6.5 to 12 especially from 7.0 to 10, after dilution to 1.0 wt% with water. Preferably the concentration of the base in the emulsion concentrate is from 0.1 to 10 wt%, in particular from 0.2 to 5.0 wt%, based on the composition.

Likewise, preferably the EC comprises 0.5 to 30 wt%, in particular 1 to 15 wt% of Insecticide B, the base, and formulation auxiliaries up to 100%, where the formulation auxiliaries usually comprise from 10 to 70% by weight, in particular from 25 to 60 wt% of at least one organic solvent, wherein all components sum up to 100 wt%, i.e. the wt% values are based on the total weight of the composition. The concentration of the base in these EC's is selected from such a range which results of a pH of at least 6.0, in particular a pH of at least 6.5, especially a pH of at least 7.0, e.g. a pH of from 6.0 to 13, in particular from 6.5 to 12 especially from 7.0 to 10, after dilution to 1.0 wt% with water. Preferably the concentration of the base in the emulsion concentrate is from 0.1 to 10 wt%, in particular from 0.2 to 5.0 wt%, based on the composition.

In particular, the EC comprises 1 to 15 wt% of Insecticide A or of Insecticide B, the base, in particular an amine, especially an amine of formula III, 25 to 60 wt% of organic solvent, and formulation auxiliaries up to 100 wt%, wherein all components sum up to 100 wt%, i.e. the wt% values are based on the total weight of the composition. The concentration of the base in the EC is selected from such an range which results of a pH of at least 6.5, in particular a pH of at least 7.0, e.g. a pH of from 6.0 to 13, in particular from 6.5 to 12 especially from 7.0 to 10, after dilution to 1.0 wt% with water.
Preferably the concentration of the base in the emulsion concentrate is from 0.1 to 10 wt%, in particular from 0.2 to 5.0 wt%, based on the composition.

In an especially preferred embodiment, the composition according to the invention is an emulsion concentrate (EC), which comprises the base, in particular an amine, especially an amine of formula III and an adjuvant, in particular an alkoxylated aliphatic alcohol, especially an alcohol of formula (IV). Preferably the EC comprises 0.5 to 30 wt%, in particular from 1 to 15 wt% of Insecticide A or of Insecticide B, the base, the adjuvant and formulation auxiliaries up to 100 %, where the formulation auxiliaries usually comprise from 10 to 70 % by weight, in particular form 25 to 60 wt% of at least one organic solvent, wherein all components sum up to 100 wt%, i.e. the wt% values are based on the total weight of the composition. Preferably the concentration of the base in said EC is from 0.1 to 10 wt%, in particular from 0.2 to 5.0 wt%, based on the total weight of the composition. Preferably, the amount of adjuvant in said emulsion concentrate is from 10 to 70 % by weight, in particular from 15 to 50 wt%, based on the total weight of the composition.

In particular, the EC comprises 1 to 15 wt% Insecticide A or of Insecticide B, the base, in particular an amine, especially an amine of formula III, 25 to 60 wt% organic solvent, and formulation auxiliaries up to 100 wt%, wherein all components sum up to 100 wt%, i.e. the wt% values are based on the total weight of the composition. Preferably the concentration of the base in the EC is from 0.1 to 10 wt%, in particular from 0.2 to 5.0 wt%, based on the composition. Preferably, the amount of adjuvant in said emulsion concentrate is from 10 to 70 % by weight, in particular from 15 to 50 wt%, based on the total weight of the composition.

The present invention further relates to a method for preparing the inventive composition comprising contacting the pesticide and the base. Usually, the contacting takes place when preparing an agrochemical formulation by known means. The contacting of the components may be achieved by conventional equipment at any temperature, such as room temperature. Preferred mixing methods are those which are applied to prepare agrochemical compositions.

The present invention further relates to a method for preparing an aqueous tank-mix comprises the steps of
a) providing a composition containing the pesticide;
b) providing a composition containing the base; and
c) contacting water and the compositions of steps a) and b).

The present invention further relates to a method for preparing an aqueous tank-mix
comprises the steps of
a') providing a composition containing the pesticide and the base;
c') contacting water and the composition of steps a').

5 Preferably, the composition of step a) is an emulsion concentrate (EC), in particular an emulsion concentrate as described above.

The present invention further relates to a use of the base for increasing the stability of the pesticide of formulae I or II. The stability of the pesticide may be analyzed storage for 14 days at 65 °C. An increase of the stability of the pesticide may be identified by analyzing the chemical recovery after said storage.

Advantages of the present invention are for example, that the composition according to the invention has increased stability and that it may be stored longer without decrease of the active compound, even at elevated temperatures. Apart from that, the compositions of the invention have high pesticidal activity, in particular if in the form of an EC which contains an adjuvant.

Examples

Insecticide A: Pesticide of formula (I).

Alcohol alkoxylation A: linear C_{16}/C_{18} alcohol, ethoxylated and propoxylated, liquid at room temperature, wetting power by immersion: at least 240 s (according to DIN 1772 at room temperature at 1 g/L in 2 g/l sodium carbonate), water content 5-10 wt%, surface tension: 30-35 mN/m (according to DIN 14370 at room temperature at 1 g/L), pH in water about 7.

Example 1- Stabilizing of emulsion concentrate

An emulsion concentrate (EC A) having the following composition was prepared from 5.0 wt% Insecticide A, 14 wt% polyarylphenyl ether sulfate ammonium salt, 11.5 wt% ethoxylated iso-C_{13} alcohol (surface tension 27-29 mN/m according to DIN 53914, at 1 g/l at 23 °C in distilled water), 20 wt% Alcohol alkoxylation A, 10.5 wt% 2-heptanone, and 39 wt% heavy aromatic solvent naphtha (initial boiling point 240 °C). The EC were prepared by following procedure: Insecticide A was first dissolved in 2-heptanone and solvent naphtha with good agitation. After that, the other formulation additives were added into the above solvent solution and mixed until a clear solution of EC A (200 g) was obtained.

40 a) EC B with Stabilizer A:
30 g of EC A was weighted out in a separated container, and back added 0.201 g of N,N,N',N'-Tetakis(2-hydroxypropyl) ethylenediamine (Stabilizer A) and mixed well until uniformly. This emulsion concentrate EC B comprised 0.66 wt% of Stabilizer A.

b) EC C with Stabilizer B:
30 g of EC A was weighted out in a separated container, and back added 0.708 g Stabilizer B (ethoxylated tallow amine, about 20 mol EO) and mixed well until uniformly. The resulting EC C comprised 2.3 wt% Stabilizer B.

Finally, all samples of the emulsion concentrates were stored at 65 °C up to 2 weeks, and chemical assay was determined before and after storage. The chemical stability results as well as initial formulation pH (measured at 1% formulation dilution in water at room temperature) were listed in Table 1. It was found that by addition of Stabilizer A, the chemical stability of Insecticide A was dramatically improved and chemically stable.

<table>
<thead>
<tr>
<th>EC</th>
<th>pH</th>
<th>4 days</th>
<th>14 days</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>5.64</td>
<td>0 %</td>
<td>--</td>
</tr>
<tr>
<td>B</td>
<td>7.30</td>
<td>100 %</td>
<td>100 %</td>
</tr>
<tr>
<td>C</td>
<td>7.18</td>
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a) comparative, not according to the invention.
We claim:

1. An agrochemical composition comprising a pyhpyropene pesticide of formula I or of formula II and a base.

2. The composition according to claim 1, wherein the pyhpyropene pesticide is the pesticide of formula I.

3. The composition according to claim 1 or 2, wherein the concentration of the base is selected from such an range that after dilution of the composition to a concentration of 1.0 wt% in water a pH of at least 6.0 results.

4. The composition according to any of claims 1 to 3, where the concentration of the base is in the range from 0.1 to 10 wt%, based on the total weight of the composition.

5. The composition according to claim 1 to 4, wherein the composition comprises not more than 5 wt% water.

6. The composition according to any of claims 1 to 5, wherein the base has a solubility in water of at least 0.1 g/l at 20 °C.

7. The composition according to any of claims 1, 2, 3, 4 or 6, wherein the composition comprises at least 40 wt% water and the base has a solubility in water of at least 1.0 g/l at 20 °C.

8. The composition according to any of claims 1 to 7, wherein the base is selected from those bases, a mixture of which base with water at a concentration of 0.1
mol/l has a pH of at least 7.0 in water at 20 °C.

9. The composition according to any of claims 1 to 8, wherein the base comprises a secondary or tertiary amino group.

10. The composition according to any of claims 1 to 9, where the base is selected from a compound of the formula III

\[
\text{R}^1 - (\text{A-O}) - \text{H} \\
\text{R}^2 - \text{N} \ 	ext{R}^3
\]

where

- \( \text{R}^1 \) is \( \text{H}, \text{Ci-C}_4\text{-alkyl}, \text{or a radical (A-0)}_n \text{H} \),
- \( \text{A} \) is \( \text{C}_2\text{-C}_4\text{-alkandiyl} \),
- \( \text{m} \) is an integer from 1 to 100, \( \text{m} \) may also be 0, if at least one of \( \text{R}^1, \text{R}^2 \) is different from \( \text{H} \);
- \( \text{n} \) is an integer from 1 to 100,
- \( \text{R}^2 \) is \( \text{H}, \text{Ci-C}_3\text{0 alkyl}, \text{C}_2\text{-C}_3\text{0 alkenyl or a radical of formula }\)

\[-[\text{A}'-\text{N}(\text{R}^3)]\text{A}'-\text{NR}^4 \text{R}^5, \] where

- \( \text{A} \) is \( \text{C}_2\text{-C}_4\text{-alkandiyl} \),
- \( \text{k} \) is an integer from 0 to 10,
- \( \text{R}^3 \) is \( \text{H}, \text{Ci-C}_4\text{-alkyl}, \text{or a radical (A-0)}_n \text{H} \),
- \( \text{R}^4 \) is \( \text{H}, \text{Ci-C}_4\text{-alkyl}, \text{or a radical (A-0)}_n \text{H} \), and
- \( \text{R}^5 \) is \( \text{H}, \text{Ci-C}_4\text{-alkyl}, \text{or a radical (A-0)}_n \text{H} \), or
- \( \text{NR}^4 \text{R}^5 \) represent an N-bound pyrrolidinyl, piperidinyl, piperazinyl or morpholinyl radical.

11. The composition according to any of claims 1 to 10, further comprising an alkoxylated aliphatic alcohol.

12. The composition according to claim 11, wherein the alkoxylated aliphatic alcohol is selected from compounds of the formula (IV)

\[
\text{R}^a - \text{O} \text{(C}_m\text{H}_2\text{mO})_x \text{(C}_n\text{H}_2\text{mO})_y \text{(C}_p\text{H}_2\text{pO})_z \text{R}^b \] (IV)

in which

- \( \text{R}^a \) represents Cs-C36-alkyl, Cs-C36-alkenyl or a mixture thereof;
- \( \text{R}^b \) represents \( \text{H} \) or \( \text{Ci-C}_2\text{-alkyl} \);
- \( \text{m,n,p} \) represent, independently of one another, an integer from 2 to 16;
- \( \text{x}, \text{y}, \text{z} \) represent, independently of one another, a number from 0 to 100; and
- \( \text{x+y+z} \) corresponds to a value from 1 to 100.
13. The composition according to claim 11 or 12, wherein Ra represents a linear C5-C36-alkyl, Cs-C36-alkenyl, or a mixture thereof.

14. The composition according to any of claims 11 to 13, wherein Ra represents a linear Cl4-C36-alkyl, C14-C36-alkenyl, or a mixture thereof.

15. The composition according to any of claims 11 to 14, wherein m, n, p represent, independently of one another, an integer from 2 to 5.

16. The composition according to any of claims 11 to 15, wherein x+y+z corresponds to a value from 10 to 30.

17. The composition according to any of preceding claims, wherein the pesticide is present in dissolved form.

18. The composition according to any of the preceding claims, which is an emulsion concentrate.

19. A method for preparing the composition as defined in claims 1 to 18 comprising contacting said pesticide and said base.

20. A method for preparing an aqueous tank-mix comprising the steps of
   a) providing a composition containing a pesticide as defined in claim 1 or 2;
   b) providing a composition containing the base as defined in any of claims 1 or 6 to 10; and
   c) contacting water and the compositions of steps a) and b).

21. A use of the base as defined in any of claims 1 and 6 to 10 for increasing the stability of the pesticide as defined in claim 1 or 2.

22. Kit of parts comprising, as separate components, a) the pesticide as defined in claim 1 or 2, and b) the base as defined in any of claims 1 or 6 to 10, for combined use.

23. A method for protecting plants from attack or infestation by insects, acarids or nematodes comprising contacting the plant, or the soil or water in which the plant is growing, with a composition according to any of claims 1 to 18 in pesticidally effective amounts.

24. A method for controlling insects, arachnids or nematodes comprising contacting
an insect, acarid or nematode or their food supply, habitat, breeding grounds or their locus with a composition according to any of claims 1 to 18 in pesticidally effective amounts.

25. A method for protection of plant propagation material comprising contacting the plant propagation material with a composition as defined in any of claims 1 to 18 in pesticidally effective amounts.

26. Seed, comprising the composition according to any of claims 1 to 18.
A. CLASSIFICATION OF SUBJECT MATTER
INV. A01N25/22 A01N53/00 A01N43/90 A01P5/00 A01N7/00
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, CHEM ABS Data, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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Further documents are listed in the continuation of Box C.

* Special categories of cited documents:

* A* document defining the general state of the art which is not considered to be of particular relevance
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* Z* document member of the same patent family

Date of the actual completion of the international search

6 October 2011

Date of mailing of the international search report

18/10/2011

Name and mailing address of the ISA/    /European Patent Office, P.B. 5818 Patentilaan 2 /NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040,    /Fax: (+31-70) 340-3016

Authorized officer

Bertrand, Franck
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