



(86) Date de dépôt PCT/PCT Filing Date: 2000/02/02
(87) Date publication PCT/PCT Publication Date: 2000/08/24
(45) Date de délivrance/Issue Date: 2007/01/16
(85) Entrée phase nationale/National Entry: 2001/07/18
(86) N° demande PCT/PCT Application No.: EP 2000/000835
(87) N° publication PCT/PCT Publication No.: 2000/049107
(30) Priorité/Priority: 1999/02/17 (DE199 06 491.1)

(51) Cl.Int./Int.Cl. *A01N 57/00* (2006.01),
A01N 25/08 (2006.01), *A01N 25/04* (2006.01),
A01N 25/12 (2006.01), *A01N 25/24* (2006.01),
A01N 25/32 (2006.01), *A01N 37/00* (2006.01),
A01N 43/00 (2006.01), *A01N 47/00* (2006.01),
A01N 53/00 (2006.01), *A01N 55/00* (2006.01),
A01N 63/00 (2006.01), *C10G 73/00* (2006.01)

(72) Inventeurs/Inventors:
EHRHARDT, HEINZ, DE;
HEINRICHS, FRANZ-LEO, DE;
KUKULA, KARL, DE;
KAINZ, HANS JURGEN, DE;
BESOLD, BERNHARD, DE

(73) Propriétaire/Owner:

(54) Titre : MELANGE A COMPOSITION PHYTOSANITAIRES AVEC DES CIRES, SA PREPARATION ET SON
UTILISATION

(54) Title: MIXTURE OF PLANT TREATMENT COMPOSITIONS WITH WAXES, THEIR PREPARATION, AND THEIR
USE

(57) **Abrégé/Abstract:**

The present invention relates to a mixture of plant-treatment agents and one or more waxes which are characterised by an acid value of 0-200 and a viscosity of 5 mPas (at 100° C) to 30.000 mPas (at 140° C). The volatility of active substances can thus be increased or toxicity in utilisation can be reduced and the effectiveness can be increased.



(73) **Propriétaires(suite)/Owners(continued):**CLARIANT PRODUKTE (DEUTSCHLAND) GMBH, DE

(74) **Agent:** FETHERSTONHAUGH & CO.

(57) Abstract

The present invention relates to a mixture of plant-treatment agents and one or more waxes which are characterised by an acid value of 0-200 and a viscosity of 5 mPas (at 100° C) to 30,000 mPas (at 140° C). The volatility of active substances can thus be increased or toxicity in utilisation can be reduced and the effectiveness can be increased.

29374-385

1

Mixture of plant treatment compositions with waxes, their preparation, and their use.

Plant treatment compositions are combinations of active substance or active substances and adjuvants such as, for
5 example, solvents or emulsifiers, which allow an application in the form of an aqueous phase. To improve efficacy, they may comprise additions such as oily hydrocarbons or emulsifier systems (for example WO 97/47199). The addition of waxes in combination with fatty acid derivatives, other
10 constituents or microencapsulation has also been proposed, for example WO 95/34200, DE-A-3 334 198, WO 97/27932. Proof of an improved activity in biotests was not provided.

There is therefore a demand for additions for plant treatment compositions which modify the action of the
15 latter, in particular from the aspect of a reduced release of substances into the environment.

The present invention modifies plant treatment compositions in such a way that they exhibit their entire action without hazardous substances being introduced into the environment.

20 Surprisingly, it has now been found that mixtures of plant treatment compositions with one or more waxes have considerable advantages over the products which do not comprise waxes.

The invention therefore relates to mixtures of plant
25 treatment compositions with one or more waxes, these waxes being characterized by an acid number of 0-200 and a viscosity of 5 mPas (at 100°C) to 30,000 mPas (at 140°C).

In one aspect, the invention provides a mixture of a plant treatment composition comprising an active substance and at

29374-385

1a

least one wax, wherein the wax has an acid number of 5-150 and a viscosity of 5-300 mPas at 100°C.

If desired, the following can be realized with these mixtures of plant treatment compositions with waxes:

- 5 • reduced volatility of active substances
- reduced toxicity to the user

- reduced phytotoxic effects of the active substances or the formulation
- increased reliability of action
- increased rain fastness of the film
- 5 • slow release of the active substance
- protection from evaporation in the case of low-volume (or ultra low volume) application.

10 Depending on the desired effect, this allows the amounts of active substance to be reduced or the spray intervals to be extended or the number of treatments to be reduced or the phytotoxic effects to be reduced in favor of the desired action.

15 Well suited mixtures are those in which the waxes have an acid number of 0-150, in particular 5-150, and a viscosity of 5 mPas (at 100°C) to 2000 mPas (at 170 °C), in particular from 5 to 300 mPas (at 100°C).

20 Very particularly preferred mixtures are those in which the waxes have an acid number of 15 – 60 and a viscosity of 150 – 5000 mPas (at 140°C).

In general, the mixtures comprise 0.01 to 95, preferably 1 to 95% by weight of wax and 5 to 99.99, preferably 5 to 99% by weight of plant treatment composition.

25 Plant treatment compositions are to be understood as meaning all active substances and their formulations which are employed as insecticides, fungicides, herbicides and seed treatments. The following may be mentioned individually:

30 1. from the group of the phosphorus compounds
 acephate, azamethiphos, azinphos-ethyl, azinphosmethyl, bromophos, bromophos-ethyl, cadusafos (F-67825), chlorethoxyphos, chlorfenvinphos, chlormephos, chlorpyrifos, chlorpyrifos-methyl, demeton, demeton-S-methyl, demeton-S-methyl sulfone, dialifos, diazinon,
 35 dichlorphos, dimethoate, disulfoton, EPN, ethion, ethoprophos, etrimfos, famphur, fenamiphos, fenitrothion, fensulfothion, fenthion, fonofos, formothion, fosthiazate (ASC-66824) heptenophos, isozophos, isothioate, isoxathion, malathion, methacrifos, methamidophos, methidathion,

salithion, mevinphos, monocrotophos, naled, omethoate, oxydemeton-methyl, parathion, parathion-methyl, phenthoate, phorate, phosalone, phosfolan, phosphocarb (BAS-301), phosmet, phosphamidon, phoxim, pirimiphos, pirimiphos-ethyl, pirimiphos-methyl, profenofos, propaphos,
 5 proetamphos, prothiofos, pyraclofos, pyridaphenthion, quinalphos, sulprofos, temephos, terbufos, tebupirimfos, tetrachlorvinphos, thiodemeton, triazophos, trichlorphon, vamidothion;

2. from the group of the carbamates

10 alanycarb (OK-135), aldicarb, 2-sec-butylphenyl methylcarbamate (BPMC), carbaryl, carbofuran, carbosulfan, cloethocarb, benfuracarb, ethiofencarb, furathiocarb, HCN-801, isoprocab, methomyl, 5-methyl-m-cumenylbutyryl (methyl)carbamate, oxamyl, pirimicarb, propoxur, thiodicarb, thiofanox, 1-methylthio(ethylideneamino)-N-methyl-N-
 15 (morpholinothio)carbamate (UC 51717), triazamate

3. from the group of the carboxylic esters

acrinathrin, allethrin, alphametrin, beta-cypermethrin, 5-benzyl-3-furylmethyl (E), (1R)-cis-2,2-di-methyl-3-(2-oxothiolan-3-ylidenemethyl)-
 20 cyclopropanecarboxylate, beta-cyfluthrin, beta-cypermethrin, bioallethrin, bioallethrin ((S)-cyclopentyl isomer), bioresmethrin, bifenthrin, (RS)-1-cyano-1-(6-phenoxy-2-pyridyl)methyl (1RS)-trans-3-(4-tert-butylphenyl)-2,2-dimethylcyclopropanecarboxylate (NCI 85193), cycloprothrin, cyfluthrin, cyhalothrin, cythrin, cypermethrin, cyphenothrin, deltamethrin,
 25 empenthrin, esfenvalerate, fenfluthrin, fenpropathrin, fenvalerate, flucythrinate, flumethrin, fluvalinate ((D) isomer), imiprothrin (S-41311), lambda-cyhalothrin, permethrin, phenothrin ((R) isomer), prallethrin, pyrethrins (natural materials), resmethrin, tefluthrin, tetramethrin, theta-cypermethrin (TD-2344), tralomethrin, transfluthrin, zeta-cypermethrin
 30 (F-56701);

4. from the group of the amidines

amitraz, chlordimeform;

35 5. from the group of the tin compounds

cyhexatin, fenbutatin oxide;

6. others

abamectin, ABG-9008, acetamiprid, Anagrapha falcitera, AKD-1022, AKD-3059, ANS-118, *Bacillus thuringiensis*, *Beauveria bassiana*, bensultap, bifenazate (D-2341), binapacryl, BJL-932, bromopropylate, BTG-504, BTG-505, buprofezin, camphechlor, cartap, chlorobenzilate, chlorfenapyr, chlorfluazuron, 2-(4-chlorophenyl)-4,5-diphenylthiophene (UBI-T 930), chlorfentezine, chromafenozide (ANS-118), CG-216, CG-217, CG-234, A-184699, 2-naphthylmethyl cyclopropanecarboxylate (Ro12-04770), cyromazin, diaclofen (thiamethoxam), diafenthiuron, ethyl N-(3,5-dichloro-4-(1,1,2,3,3,3-hexafluoro-1-propyloxy)phenyl)carbamoyl)-2-chlorobenzo-carboximidate, DDT, dicofol, diflubenzuron, N-(2,3-dihydro-3-methyl-1,3-thiazol-2-ylidene)-2,4-xylidine, dinobuton, dinocap, diofenolan, DPX-062, emamectin benzoate (MK-244), endosulfan, ethiprole (sulfethiprole), ethofenprox, etoxazole (YI-5301), fenazaquin, fenoxycarb, fipronil, fluazuron, flumite (flufenazine, SZI-121), 2-fluoro-5-(4-(4-ethoxyphenyl)-4-methyl-1-pentyl)diphenyl ether (MTI 800), granulosis and nuclear polyhedrosis viruses, fenpyroximate, fenthio carb, flubenzimine, flucycloxuron, flufenoxuron, flufenprox (ICI-A5683), fluproxyfen, gamma-HCH, halofenozide (RH-0345), halofenprox (MTI-732), hexaflumuron (DE_473), hexythiazox, HOI-9004, hydramethylnon (AC 217300), lufenuron, imidacloprid, indoxacarb (DPX-MP062), kanemite (AKD-2023), M-20, MTI-446, ivermectin, M-020, methoxyfenozide (Intrepid, RH-2485), milbemectin, NC-196, Neemgard, nitenpyram (TI-304), 2-nitromethyl-4,5-dihydro-6H-thiazine (DS 52618), 2-nitromethyl-3,4-dihydrothiazole (SD 35651), 2-nitromethylene-1,2-thiazinan-3-ylcarbamaldehyde (WL108477), pyriproxyfen (S-71639), NC-196, NC-1111, NNI-9768, novaluron (MCW-275), OK-9701, OK-9601, OK-9602, propargite, pymetrozine, pyridaben, pyrimidifen (SU-8801), RH-0345, RH-2485, RYI-210, S-1283, S-1833, SB7242, SI-8601, silafluorfen, silomadine (CG-177), spinosad, SU-9118, tebufenozide, tebufenpyrad (MK-239), teflubenzuron, Tetradifon, tetrasul, thiacloprid, thiocyclam, TI-435, tolfenpyrad (OMI-88), triazamate (RH-7988), triflumuron, verbutin, vertalec (Mykotal), YI-5301;

Fungicides which are known from the literature and which can be combined in accordance with the invention with waxes are, for example, the following products:

aldimorph, andoprim, anilazine, azoxystrobin, azaconazole, BAS 450F, benalaxyl, benodanil, benomyl, bethoxazin, binapacryl, bion

(CGA-245704), bitertanol, bromuconazole, buthiobate, captafol, captan, carbendazim, carboxin, carpropamide, CGA 173506, cymoxanil, cyprodinil, cyprofuram, diflumetorim, dichlofluanid, dichlomezin, diclobutrazol, diclocymet (S-2900), diclomezine, diethofencarb, difenoconazol (CGA 169374), difluconazole, dimethirimol, dimethomorph, diniconazole, dinocap, dithianon, dodemorph, dodine, edifenfos, epoxiconazole, ethirimol, etridiazol, famoxadone, (DPX-JE874), fenarimol, fenbuconazole, fenfuram, fenhexamid, fencpiclonil, fenpropidin, fenpropimorph, fentin acetate, fentin hydroxide, ferimzone (TF164), fluazinam, fluobenzimine, fludioxonil, flumetover (RPA-403397), fluquinconazole, fluorimide, flusilazole, flusulfamide, flutolanil, flutriafol, folpet, fosetyl-aluminum, fuberidazole, furalaxyl, furconazol, furametpyr (S-82658), furmecyclox, guazatine, hexaconazole, imazalil, imibenconazole, ipconazole, iprobenfos, iprodione, Isoprothiolane, KNF-317, kresoxim-methyl (BAS-490F), copper compounds such as copper oxichloride, oxine-copper, copper oxide, mancozeb, maneb, mepanipyrim (KIF 3535), mepronil, metalaxyl, metalaxyl-M (CGA-329351), metconazole, methasulfocarb, methfuroxam, metominofen (SSF-126), metominostrobin (fenominostrobin, SSF-126), MON 24000, MON-6550, MON-41100, myclobutanil, nabam, nitrothalisopropyl, nuarimol, ofurace, OK-9601, OK-9603, oxadixyl, oxycarboxin, paclobutrazol, penconazole, pencycuron, PP 969, polyoxins, probenazole, propineb, prochloraz, procymidon, propamocarb, propiconazole, prothiocarb, pyracarbolid, pyrazophos, pyrifenox, pyrimethanil, pyroquilon, quinoxifen (DE-795), rabenzazole, RH-7592, RH-7281, sulfur, spiroxamine, SSF-109, tebuconazole, tetraconazole, TTF 167, thiabendazole, thicyofen, thifluzamide (RH-130753), thiofanate-methyl, thiram, TM-402, tolclofos-methyl, tolylfluanid, triadimefon, triadimenol, triazoxide, trichoderma harzianum(DHF-471), tricyclazole, tridemorph, triforine, triflumizole (UCC-A815), triticonazole, uniconazole, validamycin, vinchlozolin, XRD 563, zineb, sodium dodecyl sulfonate, sodium dodecyl sulfate, sodium C13/C15-alcohol ether sulfonate, sodium cetostearyl phosphate ester, sodium dioctylsulfosuccinate, sodium isopropyl naphthalenesulfonate, sodium methylenebisnaphthalenesulfonate, cetyltrimethylammonium chloride, salts of long-chain primary, secondary or tertiary amines, alkylpropyleneamine, laurylpyrimidinium bromide, ethoxylated quaternized fatty amines, alkyldimethylbenzylammonium chloride and 1-hydroxyethyl-2-alkylimidazolin.

The abovementioned components in combinations are known active substances, most of which are described in C.D.S. Tomlin, S.B. Walker, The Pesticide Manual, 11th Edition (1997), British Crop Protection Council.

- 5 Substances which can be employed as components in combination with the waxes are, for example, known active substances as they are described in Weed Research 26, 441-445 (1986), or "The Pesticide Manual", 10th edition, The British Crop Protection Council and the Royal Soc. of Chemistry, 1994 and the literature cited therein. Herbicides which
- 10 are known from the literature and which can be combined with the waxes are the following active substances (note: either the common name of the International Organization for Standardization (ISO) or the chemical names of the compounds are given, if appropriate together with the customary code number):
- 15 acetochlor; acifluorfen; aclonifen; AKH 7088, i.e. [[[1-[5-[2-chloro-4-(trifluoromethyl)phenoxy]-2-nitrophenyl]-2-methoxyethylidene]amino]-oxy]acetic acid and its methyl ester; alachlor; alloxymid; ametryn; amidosulfuron; amitrole; AMS, i.e. ammonium sulfamate; anilofos; asulam;
- 20 atrazine; azimsulfuron (DPX-A8947); aziprotryn; barbane; BAS 516 H, i.e. 5-fluoro-2-phenyl-4H-3,1-benzoxazin-4-one; benazolin; benfluralin; benfuresate; bensulfuron-methyl; bensulide; bentazone; benzofenap; benzofluor; benzoylprop-ethyl; benzthiazuron; bialaphos; bifenox; bromacil; bromobutide; bromofenoxim; bromoxynil; bromuron; buminafos;
- 25 busoxinone; butachlor; butamifos; butenachlor; buthidazole; butralin; butylate; cafenstrole (CH-900); carbetamide; cafentrazone (ICI-A0051); CDAA, i.e. 2-chloro-N,N-di-2-propenylacetamide; CDEC, i.e.. 2-chloroallyl diethyldithiocarbamate; chlomethoxyfen; chloramben; chlorazifop-butyl, chlormesulon (ICI-A0051); chlorbromuron; chlorbufam; chlorfenac;
- 30 chlorflurecol-methyl; chloridazon; chlorimuron-ethyl; chlornitrofen; chlorotoluron; chloroxuron; chlorpropham; chlorsulfuron; chlorthal-dimethyl; clethodim; clodinafop and its ester derivatives (for example clodinafop-propargyl); clomazone; clomeprop; cloproxydim; clopyralid; cumyluron (JC 940); cyanazine; cycloate; cyclosulfamuron (AC 104);
- 35 cycloxydim; cycluron; cyhalofop and its ester derivatives (for example the butyl ester, DEH-112); cyperquat; cyprazine; cyprazole; daimuron; 2,4-DB; dalapon; desmedipham; desmetryn; di-allate; dicamba; dichlobenil; dichlorprop; diclofop and its esters such as diclofop-methyl; diethatyl; difenoxuron; difenzoquat; diflufenican; dimefuron; dimethachlor;

dimethametryn; dimethenamid (SAN-582H); dimethazone; clomazon;
 dimethipin; dimetrasulfuron; dinitramine; dinoseb; dinoterb; diphenamid;
 dipropetryn; diquat; dithiopyr; diuron; DNOC; eglinazine-ethyl; EL 77, i.e.
 5-cyano-1-(1,1-dimethylethyl)-N-methyl-1H-pyrazole-4-carboxamide;
 5 endothal; EPTC; esprocarb; ethalfluralin; ethametsulfuron-methyl;
 ethidimuron; ethiozin; ethofumesate; F5231, i.e.. N-[2-chloro-4-fluoro-
 5-[4-(3-fluoropropyl)-4,5-dihydro-5-oxo-1H-tetrazol-1-yl]-phenyl]-ethane-
 sulfonamide; ethoxyfen and its esters (for example the ethyl ester, HN-
 252); etobenzanid (HW 52); fenoprop; fenoxan, fenoxaprop and
 10 fenoxaprop-P and their esters, for example fenoxaprop-P-ethyl and
 fenoxaprop-ethyl; fenoxydim; fenuron; flamprop-methyl; flazasulfuron;
 fluazifop and fluazifop-P and their esters, for example fluazifop-butyl and
 fluazifop-P-butyl; fluchloralin; flumetsulam; flumeturon; flumiclorac and its
 esters (for example the pentyl ester, S-23031); flumioxazin (S-482);
 15 flumipropyn; flupoxam (KNW-739); fluorodifen; fluoroglycofen-ethyl;
 flupropacil (UBIC-4243); fluridone; flurochloridone; fluroxypyr; flurtamone;
 fomesafen; fosamine; furyloxyfen; glufosinate; glyphosate; halosafen;
 halosulfuron and its esters (for example the methyl ester, NC-319);
 haloxyfop and its esters; haloxyfop-P (= R-haloxyfop) and its esters;
 20 hexazinone; imazamethabenz-methyl; imazapyr; imazaquin and salts,
 such as the ammonium salt; imazethamethapyr; imazethapyr;
 imazosulfuron; ioxynil; isocarbamid; isopropalin; isoproturon; isouron;
 isoxaben; isoxapyrifop; karbutilate; lactofen; lenacil; linuron; MCPA;
 MCPB; mecoprop; mefenacet; mefluidid; metamitron; metazachlor;
 25 methabenzthiazuron; metham; methazole; methoxyphenone;
 methyldymron; metabenzuron; methobenzuron; metobromuron;
 metolachlor; metosulam (XRD 511); metoxuron; metribuzin; metsulfuron-
 methyl; MH; molinate; monalide; monocarbamide dihydrogensulfate;
 monolinuron; monuron; MT 128, i.e. 6-chloro-N-(3-chloro-2-propenyl)-
 30 5-methyl-N-phenyl-3-pyridazinamin; MT 5950, i.e. N-[3-chloro-
 4-(1-methylethyl)phenyl]-2-methylpentanamide; naproanilide;
 napropamide; naptalam; NC 310, i.e. 4-(2,4-dichlorobenzoyl)-1-methyl-
 5-benzyloxy-pyrazole; neburon; nicosulfuron; nipyracllophen; nitralin;
 nitrofen; nitrofluorfen; norflurazon; orbencarb; oryzalin; oxadiargyl (RP-
 35 020630); oxadiazon; oxyfluorfen; paraquat; pebulate; pendimethalin;
 perfluidone; phenisopham; phenmedipham; picloram; piperophos;
 piributicarb; pirifenop-butyl; pretilachlor; primisulfuron-methyl; procyazine;
 prodiamine; profluralin; proglinazine-ethyl; prometon; prometryn;
 propachlor; propanil; propaquizafop and its esters; propazine; propham;

propisochlor; propyzamide; prosulfalin; prosulfocarb; prosulfuron (CGA-152005); prynachlor; pyrazolynate; pyrazon; pyrazosulfuron-ethyl; pyrazoxyfen; pyridate; pyrithiobac (KIH-2031); pyroxfop and its esters (for example the propargyl ester); quinclorac; quinmerac; quinofof and its ester derivatives, quizalofop and quizalofop-P and their ester derivatives, for example quizalofop-ethyl; quizalofop-P-tefuryl and -ethyl; renriduron; rimsulfuron (DPX-E 9636); S 275, i.e. 2-[4-chloro-2-fluoro-5-(2-propynyloxy)phenyl]-4,5,6,7-tetrahydro-2H-indazol; secbumeton; sethoxydim; siduron; simazine; simetryn; SN 106279, i.e. 2-[[7-[2-chloro-4-(trifluoromethyl)phenoxy]-2-naphthalenyl]oxy]propanoic acid and its methyl ester; sulfentrazon (FMC-97285, F-6285); sulfazuron; sulfometuron-methyl; sulfosate (ICI-A0224); TCA; tebutam (GCP-5544); tebuthiuron; terbacil; terbucarb; terbuchlor; terbumeton; terbuthylazine; terbutryn; TFH 450; i.e. N,N-diethyl-3-[(2-ethyl-6-methylphenyl)sulfonyl]-1H-1,2,4-triazole-1-carboxamide; thenylchlor (NSK-850); thiazafluron; thiazopyr (Mon-13200); thidiazimin (SN-24085); thifensulfuron-methyl; thiobencarb; tiocarbazil; tralkoxydim; tri-allate; triasulfuron; triazofenamide; tribenuron-methyl; triclopyr; tridiphane; trietazine; trifluralin; triflusulfuron and its esters (for example the methyl ester, DPX-66037); trimeturon; tsitodef; vernolate; WL 110547, i.e. 5-phenoxy-1-[3-(trifluoromethyl)phenyl]-1H-tetrazole; UBH-509; D-489; LS 82-556; KPP-300; NC-324; NC-330; KH-218; DPX-N8189; SC-0774; DOWCO-535; DK-8910; V-53482; PP-600; MBH-001; KIH-9201; ET-751; KIH-6127 and KIH-2023.

25

Waxes are known materials of natural or synthetic origin as they are described, for example, in Ullmann's Encyclopedia of Industrial Chemistry Vol. A 28, 103. They constitute chemical substance mixtures which are usually defined by, for example, their viscosity and acid number. Pure hydrocarbon waxes do not contain functional groups and therefore have an acid number of 0. Their viscosity range can be between 5 mPas (at 100°C) and 30,000 mPas (at 140°C).

30

Preferred waxes are those which have an acid number of 0 – 150 and a viscosity of between 5 mPas and 2000 mPas (at 170°C) Examples which may be mentioned are: polyethylene waxes (homo- or copolymers), which are prepared by the Ziegler-method or the high-pressure method, or polypropylene waxes (synthesis or degradation product).

35

Particularly preferred waxes are those which, owing to their acid number of 5 – 150, have carboxyl groups and, if appropriate, other polar functional groups and which have viscosities of 5 mPas - 2000 mPas (at 170 °C).

- 5 Very particularly preferred waxes are those whose acid number is 5 - 150 and whose viscosity is 5 - 300 mPas or those whose acid number is 15 - 60 and whose viscosity is 150 (at 100°C) - 5000 mPas (at 120°C).

10 Examples which may be mentioned are: montan wax acids, their soaps of mono- and polyvalent cations, and montan wax esters of mono- and polyhydric alcohols, carnauba wax, candelilla wax, sugar cane wax, peat wax and hydrocarbon compounds which have been oxidized or grafted by a variety of processes.

- 15 The invention furthermore relates to methods for the preparation of the abovementioned mixtures. The ground wax, which has a particle size of less than 100 μm and a d50 value (d50 = median of the particle size distribution) of 5 – 30 μm is mixed with the active substance in suitable form and the mixture is incorporated into a suitable formulation. A
20 preferred process consists in coating the active substance with the wax in solid form, if appropriate ground or finely ground with particle size distribution in the region of < 40 μm and d50 values of 3 - 15 μm , or with the melt, with the aid of a mixer and converting this material into a formulation which can be applied, as is customary for the pure active
25 substance.

However, the active substance may also be coated with wax by means of dispersing in a wax dispersion, where the finely divided wax precipitates onto the active substance by adding suitable adjuvants (such as, for
30 example, CaCl_2 solution, dilute acids).

Another preferred process for the preparation of the mixtures consists in treating formulated plant treatment compositions, for example an EC (emulsifiable concentrate) with a wax or adding the desired amount of wax
35 by adding a compatible wax dispersion, and, if appropriate, producing a stable preparation by means of heating.

A particularly preferred process for the preparation of the mixtures according to the invention consists in first preparing a ready to-use spray mixture of the plant treatment compositions in water and then adding the desired amount of a wax dispersion. The sequence of the addition can be varied, and, if appropriate, it may be necessary to predilute the wax dispersion and/or the formulated plant treatment composition so as to avoid flocculation.

The use concentrations of the plant treatment compositions are predetermined by the activity of the active substance and its approved application rate. The added amounts of wax, termed solids, may be varied within wide limits. They depend on the active substance of the plant treatment composition and, on the nature of the desired effect. They are within a range of 5 g/ha to 4 kg/ha of wax, with 5 g/ha to 1 kg/ha of wax being preferred and 10 g/ha to 0.5 kg/ha of wax being particularly preferred.

The invention furthermore relates to the use of the mixtures according to the invention as plant treatment compositions.

Examples:

Example 1

In an IKA laboratory kneader ($v = 500$ ml) 65 g of Goltix™ VM 90 are mixed for 1 hour with 11.5 g of ®Hostalub WE 4 at a temperature of 90°C. During this time, the wax absorbs the active substance. An analogous treatment was given to, for example, endosulfan.

Example 2

The active substance is dispersed or emulsified in water as fine particles. The wax dispersion is added, and the dispersion is coagulated by changing the pH. Wax and active substance are bound to one another in the coagulate. When the procedure is carried out under controlled conditions, the particle size can be adjusted. Otherwise, the material is subjected to wet grinding, formulating and drying.

This process can be employed when the active substance is not highly sensitive to water and alkalis/acids. If the active substance is basic, precipitation can be provoked directly by adding a cationic dispersion. If

the active substance is acidic, precipitation can be provoked with an anionic dispersion.

The quantity of wax and active substance can be matched to each other as desired if the precipitation conditions can be provoked.

- 5 To adjust redispersibility, the dried product must still undergo formulation. In this manner, for example, Goltix VM 90 was coated from dispersion 04 with 5, 10, 15 and 20% by weight of wax.

Example 3

- 10 5 g of montanic acid polyglycol ester are dissolved in 95 g of ®Corbel (EC) with gentle warming. The resulting combination is to be brought with water to the required use concentration, as usual.

Example 4

- 15 15.0 g of montan wax acids (AN = 140) + 4.5 g of Sapogenat™ T 500 are molten at 105°C. The melt is poured into 58.5 g of boiling drinking water in a thin stream, with stirring. Then, 22.0 g of cold ®Thiodan 35 are added. The mixture is boiled up and rapidly cooled in a water-bath, with stirring. The resulting wax-comprising dispersion, employed at the usual
20 application rate, showed a markedly improved long-term action against *Heliothis virescens* larvae on cotton compared with Thiodan 35. Analogously, montan wax acids can be incorporated into ®Desgan or ®Brestan.

25 Example 5

- First, the ready-to-use spray mixture of the plant treatment composition is prepared in a suitable amount of water, and then such an amount of dispersion 02 as is required for achieving the desired effect is added, the dispersion 02 being obtained as follows:; 29.2 g of "wax LP" and 5.80 g of
30 Sapogenat T 500 are melted at 105°C and, with stirring, poured into boiling drinking water. The mixture is boiled up and cooled in a water-bath, with stirring.

Example 6

- 35 In a drum, 100 g of wheat which has been dressed in the known manner with ®Landor are treated with 3 g of the dispersion 02, which had been adjusted to a solids content of 10% by dilution with water, mixing is then

continued for 10 minutes, and the mixture is allowed to dry. The thickness of the wax coating produced on the wheat kernel is approx. 3 μm .

Example 7

- 5 ®Corbel with and without added wax dispersion is applied to a PE film, allowed to dry, and the decrease in the content of the active substance fenpropimorph is monitored by FTIR spectroscopy. For example, the combinations with the dispersions 01 and 02 show a markedly reduced volatility of fenpropimorph; while 50% of active substance were still
10 detected after 4 days (23°C, atmospheric humidity 60%) without wax, 85 and 83% of active substance are still present when (1 kg of wax per ha) are added as dispersion 01 and dispersion 02, respectively.

Example 8

- 15 The dispersion 04 is diluted to almost the desired end concentration of the wax (0.5 kg of wax per hectare) in the spray mixture, plant treatment composition which has also been diluted with water is added, with stirring, and the mixture is finally diluted to the end concentration. When ®Folicur or ®Corbel were used and the mixture was applied to wheat, a markedly
20 reduced phytotoxicity was observed, in particular at higher fungicide concentrations.

Example 9 (herbicide experiment)

- 25 ®Basta and ®Roundup were used alone and in combination with waxes on non-resistant maize (site: Wolfsthal, Austria). A markedly improved initial action of Roundup against dicots is achieved by adding, for example, dispersions 01, 02, 03. In the case of both herbicides, a markedly improved long-term action is achieved by adding, for example, dispersions 01, 02 or 03.

30

Example 10 (fungicide experiment)

- Winter wheat (variety Monopol, site: Altenlengbuch, Austria), was treated once (5th May 1998) at stage 31-32 with the recommended application rates of the fungicides ®Amistar or ®Juwel, with or without addition of wax
35 (1 kg/ha) and compared with untreated plots, and the disease level of Erysiphe graminis was scored. On the 15th June, the combination of Amistar or Juwel and dispersion 02, for example, showed no symptoms of mildew disease; untreated showed a disease level of 10%, Amistar 8%

and Juwel 7%. The low disease levels achieved with the wax combinations were not even achieved by two treatments with Amistar or Juwel.

Example 11

- 5 Control of *Phytophthora infestans* in potatoes (variety: Quarta, outdoor conditions)

A combination of ®Shirlane and the respective wax dispersion is prepared analogously to Example 5 and applied as usual. The number of spray treatments and the spray intervals was decided by the regional institute for
10 agronomy. Weather and other parameters which allow infection constitute reasons for carrying out a spray treatment. ®Shirlane was very effective. At the time of haulm wilting, a disease level of 30% was found. Combinations of Shirlane with the wax emulsions 01, 02, 03 which were applied at the same spray timing showed an improved action resulting in a
15 *Phytophthora* disease level which was up to 50% lower. A lower disease level did not produce a significant difference between the individual wax dispersions. However, the consistency of the effect is notable. The strips treated with wax emulsions had a healthier appearance until the time when the haulm was destroyed with a mechanical beater, while the crop in toto
20 showed earlier wilting.

Example 12

Experiments with ®Juwel, ®Opus Top and ®Bion with and without wax were set up on winter wheat (variety Monopol, site: Paar, Germany) and
25 evaluated analogously to Example 10. The combination of the fungicides with, for example, dispersion 02 (1 kg/ha wax) reduced the *Erysiphe graminis* and *Septoria nodorum* disease levels markedly compared with the fungicides ®Juwel and ®Opus Top alone. When the wax mixtures were used, the yields were up to 40% higher compared with the untreated
30 control and up to 32% higher compared with the fungicide treatment without wax.

Example 13

Dispersion 01

35

At approximately 105°C, melt 25 g of montan wax ester + 5 g of "wax emulgator 4106", and portionwise stir 69.9 g of boiling drinking water into the melt. Boil up the emulsion and then rapidly cool to room temperature in

14

a water-bath. Add 0.1 g of preservative SANIPROT™ 94-08* and make up the water which has evaporated.

*Supplier: SANITIZED AG

5 Example 14
Dispersion 02

At approximately 105°C, melt 25 g of montan wax ester + 5 g of Sapogenat T 500, and portionwise stir 69.9 g of boiling drinking water into the melt.
10 Briefly boil up the emulsion and then rapidly cool to room temperature in a water-bath. Add 0.1 g of preservative SANIPROT 94-08 and make up the water which has evaporated.

Example 15
15 Dispersion 03

At approximately 105°C, melt 25 g of montan wax ester, bring 45 g of demineralized water to the boil and stir portionwise into the molten wax. Briefly boil up the emulsion, switch off the heating and then stir 29.9 g of
20 cold demineralized water into the mixture and rapidly cool the emulsion to room temperature in a water-bath. Add 0.1 g of preservative SANIPROT 94-08 and make up the water which has evaporated.

Example 16
25 Dispersion 04

At approximately 110-115°C, melt 20 g of montan wax ester + 5 g of "Emulgator™ S 3267/3", add 0.6 g of glacial acetic acid, and smartly stir the melt into 74.3 g of boiling drinking water.
30 Briefly boil up the emulsion and then rapidly cool to room temperature in a water-bath. Add 0.1 g of preservative SANIPROT 94-08 and make up the water which has evaporated.

Example 17
35 Dispersion 05

At approximately 105°C, melt 25 g of montan wax ester + 5 g of "wax emulgator 4106", and portionwise stir 69.9 g of boiling drinking water into the melt. Briefly boil up the emulsion and then rapidly cool to room

temperature in a water-bath. Add 0.1 g of preservative SANIPROT 94-08 and make up the water which has evaporated.

Example 18

5 Dispersion 06

A 1-liter autoclave is charged with 320 g of wax oxidate of AN 17; 60 g of Genapol™ T 250; 20 g Genapol™ T 500 and 2 g of sodium sulfite together with 597 g of drinking water. Within 30 minutes, the
10 internal temperature of the autoclave is brought to 140-145°C while stirring with an anchor mixer. The mixture is then emulsified for 20 min at the same temperature and the same stirring speed and subsequently cooled to approximately 30°C in the course of 40 min. 1 g of preservative SANIPROT 94-08 is
15 stirred into the cold dispersion.

Example 19

Dispersion 07

Part I

20 A 1-liter autoclave is charged with 273 g of wax oxidate of AN 25; 68 g of emulsifier Synperonic™ 13/12*; 2 g of sodium pyrosulfite ($=\text{Na}_2\text{S}_2\text{O}_5$) and 7 g of potassium hydroxide purity 86% (= caustic potash) together with 649 g of demineralized water. Within 30 minutes, the internal temperature of the autoclave is brought to 130°C
25 while stirring with an anchor mixer. The mixture is then emulsified for 20 minutes at the same temperature and the same stirring speed and subsequently cooled to approximately 30°C in the course of 40 minutes. 1 g of preservative SANIPROT 94-08 is
30 stirred into the cold dispersion.

*Supplier: ICI, Essen

Part II

33.7 g of the dispersion prepared in part I are diluted with 33.5 g of drinking water, and 32.8 g of dispersion 03 are then added and the mixture is
35 stirred. The solids content of the mixture is 20%.

Example 20

Dispersion 08

Part I

- At approximately 110-115°C, 24.4 g of montan wax and 4.9 g of "wax emulgator 4106" are melted. The melt is saponified with 43% strength potassium hydroxide solution. The saponified melt is stirred as a thin stream into 69.2 g of boiling demineralized water, with mechanical stirring, briefly boiled up and rapidly cooled in a water-bath. The emulsion is stabilized with 0.1 g of preservative SANIPROT 94-08, and the lost water is made up.

10 Part II

38.7 g of the dispersion made as in part I is diluted with 27.7 g of drinking water, and 33.6 g of dispersion 03 are then added and the mixture is stirred. The solids content of the mixture is 20%.

29374-385

17

CLAIMS:

1. A mixture of a plant treatment composition comprising an active substance and at least one wax, wherein the wax has an acid number of 5-150 and a viscosity of
5 5-300 mPas at 100°C.
2. A process for the preparation of a mixture as claimed in claim 1, which comprises combining the active substance with the wax in solid form or melt.
3. A process for the preparation of a mixture as
10 claimed in claim 1, wherein the active substance is combined with a wax which has been finely ground and has a particle size of <100 µm and a d50 of 5 µm-50 µm.
4. A process for the preparation of a mixture as claimed in claim 1, wherein the active substance is treated
15 with a wax dispersion.
5. A process for the preparation of a mixture as claimed in claim 1, wherein a formulated plant treatment composition comprising the active substance is combined with a wax dispersion.
- 20 6. A process for the preparation of mixture as claimed in claim 1, wherein a ready-to-use spray mixture comprising the active substance is treated with a wax dispersion.
7. Use of a mixture as claimed in claim 1, as a plant
25 treatment composition.

FETHERSTONHAUGH & CO.
OTTAWA, CANADA

PATENT AGENTS