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(54) Title: FUNGICIDAL COMPOSITION AND METHOD FOR CONTROLLING PLANT DISEASES

(57) Abstract: The present invention provides a fungicidal composition useful as an agricultural and horticultural fungicide having remarkably improved controlling effects against plant diseases, and a method for controlling plant diseases using the composition. A fungicidal composition comprising, as active ingredients, (a) 3-(2,3,4-trimethoxy-6-methylbenzoyl)-5-chloro-2-methoxy-4-methylpyridine or its salt and (b) captan, and a method for controlling plant diseases, which comprises applying the fungicidal composition to plants.



DESCRIPTION

TITLE OF INVENTION: FUNGICIDAL COMPOSITION AND METHOD FOR CONTROLLING PLANT DISEASES

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TECHNICAL FIELD

The present invention relates to a fungicidal composition useful as an agricultural and horticultural fungicide having remarkably improved controlling effects against plant diseases, and a method for controlling plant diseases by using such a composition.

10

BACKGROUND ART

Patent Document 1 discloses that a benzoylpyridine derivative which is an active ingredient of the fungicidal composition in the present invention is useful as a fungicide and may be mixed with or used in combination with another fungicide as the case requires. Further, Patent Documents 2 and 3 disclose that by use of the benzoylpyridine derivative in combination with another specific fungicide, it is possible to obtain a fungicidal composition having excellent synergistic effects.

Patent Document 4 and Non-Patent Document 1 disclose that captan which is an active ingredient of the fungicidal composition in the present invention is useful against plant diseases.

However, it has not been known that the fungicidal composition in the present invention has remarkably excellent fungicidal effects.

PRIOR ART DOCUMENTS

25 PATENT DOCUMENTS

Patent Document 1: WO02/02527

Patent Document 2: WO2005/041663

Patent Document 3: WO2010/002026

Patent Document 4: US Patent No. 2,553,770

30 NON-PATENT DOCUMENT

Non-Patent Document 1: The Pesticide Manual (15th edition, BRITISH CROP PROTECTION COUNCIL) pages 154 to 156

DISCLOSURE OF INVENTION

TECHNICAL PROBLEM

Each of benzoylpyridine derivative and captan which are active ingredients of the fungicidal composition in the present invention, may be inadequate in its controlling effect against a specific plant disease, or its residual effect may last only a relatively short time, and thus, depending upon the condition for application, it may practically have only an inadequate controlling effect against plant diseases.

SOLUTION TO PROBLEM

The present inventors have conducted a research to solve the above problems and as a result, found that when (a) 3-(2,3,4-trimethoxy-6-methylbenzoyl)-5-chloro-2-methoxy-4-methylpyridine or its salt and (b) captan are used in combination, an unexpectedly excellent fungicidal effect can be obtained as compared with a case where the respective compounds are used alone, and accomplished the present invention.

That is, the present invention provides a fungicidal composition comprising, as active ingredients, (a) 3-(2,3,4-trimethoxy-6-methylbenzoyl)-5-chloro-2-methoxy-4-methylpyridine or its salt (hereinafter sometimes referred to simply as a component (a)) and (b) captan (hereinafter sometimes referred to simply as a component (b)).

Further, the present invention provides a method for controlling plant diseases, which comprises applying the above fungicidal composition to plants.

ADVANTAGEOUS EFFECTS OF INVENTION

The fungicidal composition of the present invention presents a synergistic effect i.e. a fungicidal effect higher than the mere addition of the respective fungicidal effects of the active ingredients, against plant diseases. The fungicidal composition of the present invention presents a synergistic controlling effect against plant diseases against which the fungicidal effects of the respective active ingredients alone are inadequate. Accordingly, a highly active agricultural and horticultural fungicidal having a wider fungicidal spectrum can be provided.

DESCRIPTION OF EMBODIMENTS

3-(2,3,4-Trimethoxy-6-methylbenzoyl)-5-chloro-2-methoxy-4-methylpyridine as the component (a) in the present invention can be obtained by a production process as disclosed in the above Patent Documents 1 and 2. Further, this is a compound known by a common name pyriofenone.

5 The component (a) may be a salt. The salt may be any agriculturally acceptable salt, and may, for example, be an inorganic acid salt such as a hydrochloride, a perchlorate, a sulfate or a nitrate; or an organic acid salt such as an acetate, a fumarate or a methanesulfonate.

Captan as the component (b) in the present invention is a compound as
10 disclosed in The Pesticidal Manual (15th edition, BRITISH CROP PROTECTION COUNCIL) at pages 154 to 156, and it is disclosed that captan is applicable against various plant diseases. However, the document failed to disclose that captan is applicable to powdery mildew, and it is known that captan has no activity against powdery mildew.

15 The fungicidal composition of the present invention is useful particularly as an agricultural and horticultural fungicide. As the agricultural and horticultural fungicide, it is effective for controlling diseases such as powdery mildew, scab, rust, snow mold, snow blight, loose smut, eye spot, leaf spot or glume blotch of cereals (Hordeum vulgare, Tricum aestivum, etc.); melanose or scab of citrus (Citrus spp., etc.); blossom
20 blight, powdery mildew, Alternaria leaf spot, scab, anthracnose, blotch, ring rot, fly speck, sooty blotch or fruit spot of apple (Malus pumila); scab, black spot, powdery mildew or Phytophthora rot of pear (Pyrus Pyrifolia, var. culta); ring rot or powdery mildew of European pear (Pyrus communis); brown rot, scab or Phomopsis rot of peach (Prunus persica, etc.); anthracnose, ripe rot, powdery mildew, downy mildew, gray
25 mold, Isariopsis leaf spot or swelling arm of grape (Vitis vinifera spp., etc.); anthracnose, leaf spot, powdery mildew or fly speck of Japanese persimmon (Diospyros kaki, etc.); anthracnose, powdery mildew, gummy stem blight, downy mildew, Phytophthora rot or Cercospora leaf spot of cucurbit (Cucumis melo, etc.); early blight, leaf mold, late blight, gray mold or powdery mildew of tomato
30 (Lycopersicon esculentum); Alternaria leaf spot of cruciferous vegetables (Brassica sp., Raphanus sp., etc.); early blight or late blight of potato (Solanum tuberosum); powdery mildew, gray mold or anthracnose of strawberry (Fragaria, etc.); and gray mold or

powdery mildew of various crops. It is particularly effective against plant diseases of cereals, fruits (particularly apple, pear and European pear) and vegetables (particularly cucurbit and tomato). Further, it is effective also for controlling soil diseases caused by plant pathogens such as Fusarium, Pythium, Rhizoctonia, Verticillium and

5 Plasmodiophora.

The components (a) and (b) constituting the fungicidal composition of the present invention are, in the same manner as conventional agricultural chemicals, mixed with various adjuvants and formulated into various formulations such as a dust, granules, water dispersible granules, a wettable powder, a water-based suspension concentrate,

10 an oil-based suspension concentrate, water soluble granules, an emulsifiable concentrate, a soluble concentrate, a paste, an aerosol and an ultra low-volume formulation. However, so long as the purpose of the present invention can be accomplished, any type of formulation which is commonly used in this field is applicable. Such adjuvants include solid carriers such as diatomaceous earth, slaked

15 lime, calcium carbonate, talc, white carbon, kaoline, bentonite, a mixture of kaolinite and sericite, clay, sodium carbonate, sodium bicarbonate, mirabilite, zeolite and starch; solvents such as water, toluene, xylene, solvent naphtha, dioxane, acetone, isophorone, methyl isobutyl ketone, chlorobenzene, cyclohexane, dimethyl sulfoxide, dimethylformamide, dimethylacetamide, N-methyl-2-pyrrolidone and alcohol; anionic

20 surfactants and spreaders such as a salt of fatty acid, a benzoate, an alkylsulfosuccinate, a dialkylsulfosuccinate, a polycarboxylate, a salt of alkylsulfuric acid ester, an alkyl sulfate, an alkylaryl sulfate, an alkyl diglycol ether sulfate, a salt of alcohol sulfuric acid ester, an alkyl sulfonate, an alkylaryl sulfonate, an aryl sulfonate, a lignin sulfonate, an alkyldiphenyl ether disulfonate, a polystyrene sulfonate, a salt of

25 alkylphosphoric acid ester, an alkylaryl phosphate, a styrylaryl phosphate, a salt of polyoxyethylene alkyl ether sulfuric acid ester, a polyoxyethylene alkylaryl ether sulfate, a salt of polyoxyethylene alkylaryl ether sulfuric acid ester, a polyoxyethylene alkyl ether phosphate, a salt of polyoxyethylene alkylaryl phosphoric acid ester, and a salt of a condensate of naphthalene sulfonate with formalin; nonionic surfactants and

30 spreaders such as a sorbitan fatty acid ester, a glycerin fatty acid ester, a fatty acid polyglyceride, a fatty acid alcohol polyglycol ether, acetylene glycol, acetylene alcohol, an oxyalkylene block polymer, a polyoxyethylene alkyl ether, a polyoxyethylene

alkylaryl ether, a polyoxyethylene styrylaryl ether, a polyoxyethylene glycol alkyl ether, a polyoxyethylene fatty acid ester, a polyoxyethylene sorbitan fatty acid ester, a polyoxyethylene glycerin fatty acid ester, a polyoxyethylene hydrogenated castor oil, and a polyoxypropylene fatty acid ester; and vegetable and mineral oils such as olive oil, kapok oil, castor oil, palm oil, camellia oil, coconut oil, sesame oil, corn oil, rice bran oil, peanut oil, cottonseed oil, soybean oil, rapeseed oil, linseed oil, tung oil, and liquid paraffins. Such adjuvants may be selected from those known in this field so long as the purpose of the present invention can thereby be accomplished. Further, various additives which are commonly used, such as a filler, a thickener, an anti-settling agent, an anti-freezing agent, a dispersion stabilizer, a phytotoxicity reducing agent, and an anti-mold agent, may also be employed. The blend ratio of the components (a) and (b) to the various adjuvants is usually from 0.005:99.995 to 95:5, preferably from 0.2:99.8 to 90:10. In the actual application of such a formulation, it may be used as it is, or may be diluted to a predetermined concentration with a diluent such as water, and various spreaders may be added thereto, as the case requires.

Further, the fungicidal composition of the present invention may be mixed with or used in combination with other agricultural chemicals such as a fungicide, an insecticide, a miticide, a nematocide, a soil pesticide, an antiviral agent, an attractant, a herbicide and a plant growth regulating agent, whereby more excellent effects may sometimes be obtained.

The active ingredient compounds of a fungicide in the above-mentioned other agricultural chemicals, include, for example, (by common names, some of them are still in an application stage, or test codes of Japan Plant Protection Association):

anilinopyrimidine compounds such as mepanipyrim, pyrimethanil and cyprodinil;

triazolopyrimidine compounds such as 5-chloro-7-(4-methylpiperidin-1-yl)-6-(2,4,6-trifluorophenyl)[1,2,4]triazolo[1,5-a]pyrimidine;

pyridinamine compounds such as fluazinam;

azole compounds such as triadimefon, bitertanol, triflumizole, etaconazole, propiconazole, penconazole, flusilazole, myclobutanil, cyproconazole, tebuconazole, hexaconazole, furconazole-cis, prochloraz, metconazole, epoxiconazole, tetraconazole, oxpoconazole fumarate, prothioconazole, triadimenol, flutriafol, difenoconazole, fluquinconazole, fenbuconazole, bromuconazole, diniconazole, tricyclazole,

probenazole, simeconazole, pefurazoate, ipconazole, imibenconazole, azaconazole, triticonazole and imazalil;

quinoxaline compounds such as quinomethionate;

dithiocarbamate compounds such as maneb, zineb, mancozeb, polycarbamate,

5 metiram, propineb and thiram;

organic chlorine compounds such as fthalide, chlorothalonil and quintozone;

imidazole compounds such as benomyl, thiophanate-methyl, carbendazim, thiabendazole, fuberiazole and cyazofamid;

cyanoacetamide compounds such as cymoxanil;

10 anilide compounds such as matalaxyl, metalaxyl-M (another name: mefenoxam), oxadixyl, ofurace, benalaxyl, benalaxyl-M (another name: kiralaxyl, chiralaxyl), furalaxyl, cyprofuram, carboxin, oxycarboxin, thifluzamide, boscalid, bixafen, isotianil, tiadinil and sedaxane;

sulfamide compounds such as dichlofluanid;

15 copper compounds such as cupric hydroxide and oxine copper;

isoxazole compounds such as hymexazol;

organophosphorus compounds such as fosetyl-Al, tolclofos-methyl, S-benzyl O,O-diisopropylphosphorothioate, O-ethyl S,S-diphenylphosphorodithioate, aluminum ethylhydrogen phosphonate, edifenphos and iprobenfos;

20 phthalimide compounds such as captafol and folpet;

dicarboxyimide compounds such as procymidone, iprodione and vinclozolin;

benzanilide compounds such as flutolanil, mepronil and benodanil;

amide compounds such as penthiopyrad, penflufen, furametpyr, isopyrazam, silthiopham, fenoxanil, fenfuram and fluxapyroxad;

25 benzamide compounds such as fluopyram and zoxamide;

piperazine compounds such as triforine;

pyridine compounds such as pyrifenox;

carbinol compounds such as fenarimol and nuarimol;

piperidine compounds such as fenpropidin;

30 morpholine compounds such as fenpropimorph and tridemorph;

organotin compounds such as fentin hydroxide and fentin acetate;

urea compounds such as pencycuron;

cinnamic acid compounds such as dimethomorph and flumorph;

phenyl carbamate compounds such as diethofencarb;

cyanopyrrole compounds such as fludioxonil and fenpiclonil;

strobilurin compounds such as azoxystrobin, kresoxim-methyl, metominostrobin,

5 trifloxystrobin, picoxystrobin, oryzastrobin, dimoxystrobin, pyraclostrobin, fluoxastrobin, enestroburin, pyraoxystrobin and pyrametostrobin;

oxazolidinone compounds such as famoxadone;

thiazolecarboxamide compounds such as ethaboxam;

valinamide compounds such as iprovalicarb and benthiavalicarb-isopropyl;

10 acylamino acid compounds such as methyl N-(isopropoxycarbonyl)-L-valyl-(3RS)-3-(4-chlorophenyl)- β -alaninate (valiphenalate);

imidazolinone compounds such as fenamidone;

hydroxyanilide compounds such as fenhexamid;

benzenesulfonamide compounds such as flusulfamide;

15 oxime ether compounds such as cyflufenamid;

anthraquinone compounds;

crotonic acid compounds;

antibiotics such as validamycin, kasugamycin and polyoxins;

guanidine compounds such as iminoctadine and dodine;

20 quinoline compounds such as tebufloquin;

thiazolidine compounds such as flutianil;

sulfur compounds such as sulfur;

and other compounds such as pyribencarb, isoprothiolane, pyroquilon,

diclomezine, quinoxifen, propamocarb hydrochloride, chloropicrin, dazomet, metam-

25 sodium, metrafenone, UBF-307, diclocymet, proquinazid, amisulbrom (another name:

amibromdole), mandipropamid, fluopicolide, carpropamid, meptyldinocap, N-[(3',4'-

dichloro-1,1-dimethyl)phenacyl]-3-trifluoromethyl-2-pyridinecarboxamide, N-[(3',4'-

dichloro-1,1-dimethyl)phenacyl]-3-methyl-2-thiophenecarboxamide, N-[(3',4'-dichloro-

1,1-dimethyl)phenacyl]-1-methyl-3-trifluoromethyl-4-pyrazolecarboxamide, N-[[2'-

30 methyl-4'-(2-propyloxy)-1,1-dimethyl]phenacyl]-3-trifluoromethyl-2-

pyridinecarboxamide, N-[[2'-methyl-4'-(2-propyloxy)-1,1-dimethyl]phenacyl]-3-methyl-2-

thiophenecarboxamide, N-[[2'-methyl-4'-(2-propyloxy)-1,1-dimethyl]phenacyl]-1-methyl-

3-trifluoromethyl-4-pyrazolecarboxamide, N-[[4'-(2-propyloxy)-1,1-dimethyl]phenacyl]-
3-trifluoromethyl-2-pyridinecarboxamide, N-[[4'-(2-propyloxy)-1,1-dimethyl]phenacyl]-3-
methyl-2-thiophenecarboxamide, N-[[4'-(2-propyloxy)-1,1-dimethyl]phenacyl]-1-methyl-
3-trifluoromethyl-4-pyrazolecarboxamide, N-[[2'-methyl-4'-(2-pentyloxy)-1,1-
5 dimethyl]phenacyl]-3-trifluoromethyl-2-pyridinecarboxamide, N-[[4'-(2-pentyloxy)-1,1-
dimethyl]phenacyl]-3-trifluoromethyl-2-pyridinecarboxamide, ferimzone, spiroxamine,
fenpyrazamine, ametocradin, S-2200, ZF-9646, BCM-061 and BCM-062.

The active ingredient compounds of insect pest control agents, such as the
insecticide, the miticide, the nematocide and the soil insect pesticide in the above-
10 mentioned other agricultural chemicals, include, for example, (by common names,
some of them are still in an application stage, or test codes of Japan Plant Protection
Association):

organic phosphate compounds, such as profenofos, dichlorvos, fenamiphos,
fenitrothion, EPN, diazinon, chlorpyrifos, chlorpyrifos-methyl, acephate, prothiofos,
15 fosthiazate, cadusafos, disulfoton, isoxathion, isofenphos, ethion, etrimfos, quinalphos,
dimethylvinphos, dimethoate, sulprofos, thiometon, vamidothion, pyraclofos,
pyridaphenthion, pirimiphos-methyl, propaphos, phosalone, formothion, malathion,
tetrachlorvinphos, chlorfenvinphos, cyanophos, trichlorfon, methidathion, phenthoate,
ESP, azinphos-methyl, fenthion, heptenophos, methoxychlor, parathion, phosphocarb,
20 demeton-S-methyl, monocrotophos, methamidophos, imicyafos, parathion-methyl,
terbufos, phosphamidon, phosmet and phorate;

carbamate compounds, such as carbaryl, propoxur, aldicarb, carbofuran,
thiodicarb, methomyl, oxamyl, ethiofencarb, pirimicarb, fenobucarb, carbosulfan,
benfuracarb, bendiocarb, furathiocarb, isoprocarb, metolcarb, xylylcarb, XMC and
25 fenothiocarb;

nereistoxin derivatives, such as cartap, thiocyclam, bensultap and thiosultap-
sodium;

organic chlorine compounds, such as dicofol, tetradifon, endosulfan, dienochlor
and dieldrin;

30 organic metal compounds, such as fenbutatin oxide and cyhexatin;

pyrethroid compounds, such as fenvalerate, permethrin, cypermethrin,
deltamethrin, cyhalothrin, tefluthrin, ethofenprox, flufenprox, cyfluthrin, fenpropathrin,

flucythrinate, fluvalinate, cycloprothrin, lambda-cyhalothrin, pyrethrins, esfenvalerate, tetramethrin, resmethrin, protrifenbute, bifenthrin, zeta-cypermethrin, acrinathrin, alpha-cypermethrin, allethrin, gamma-cyhalothrin, theta-cypermethrin, tau-fluvalinate, tralomethrin, profluthrin, beta-cypermethrin, beta-cyfluthrin, metofluthrin, phenothrin
5 and flumethrin;

benzoylurea compounds, such as diflubenzuron, chlorfluazuron, teflubenzuron, flufenoxuron, triflumuron, hexaflumuron, lufenuron, novaluron, noviflumuron, bistrifluron and fluazuron;

juvenile hormone-like compounds, such as methoprene, pyriproxyfen, fenoxycarb
10 and diofenolan;

pyridazinone compounds, such as pyridaben;

pyrazole compounds, such as fenpyroximate, fipronil, tebufenpyrad, ethiprole, tolfenpyrad, acetoprole, pyrafluprole and pyriprole;

neonicotinoids, such as imidacloprid, nitenpyram, acetamiprid, thiacloprid,
15 thiamethoxam, clothianidin, nidinotefuran, dinotefuran and nithiazine;

hydrazine compounds, such as tebufenozide, methoxyfenozide, chromafenozide and halofenozide;

pyridine compounds, such as flonicamid;

tetronic acid compounds, such as spirodiclofen;

20 strobilurin compounds, such as fluacrypyrim;

pyrimidinamine compounds, such as flufenimer;

dinitro compounds;

organic sulfur compounds;

urea compounds;

25 triazine compounds;

hydrazone compounds;

other compounds, such as buprofezin, hexythiazox, amitraz, chlordimeform, silafluofen, triazamate, pymetrozine, pyrimidifen, chlorfenapyr, indoxacarb, acequinocyl, etoxazole, cyromazine, 1,3-dichloropropene, diafenthiuron, benclothiaz, bifenazate,
30 spiromesifen, spirotetramat, propargite, clofentezine, metaflumizone, flubendiamide, cyflumetofen, chlorantraniliprole, cyenopyrafen, pyrifluquinazone, fenazaquin, amidoflumet, chlorobenzoate, sulfluramid, hydramethylnon, metaldehyde, HGW-86,

AKD-1022, ryanodine, pyridalyl and verbutin. Further, it may be mixed with or used in combination with microbial agricultural chemicals, such as *Bacillus thuringiensis* aizawai, *Bacillus thuringiensis* kurstaki, *Bacillus thuringiensis* israelensis, *Bacillus thuringiensis* japonensis, *Bacillus thuringiensis* tenebrionis or insecticidal crystal proteins produced by *Bacillus thuringiensis*, insect viruses, entomopathogenic fungi, and nematophagous fungi; antibiotics or semisynthetic antibiotics, such as avermectin, emamectin benzoate, milbemectin, milbemycin, spinosad, ivermectin, lepipmectin, DE-175, abamectin, emamectin and spinetoram; natural products, such as azadirachtin, and rotenone; and repellents, such as deet.

In the fungicidal composition of the present invention, the suitable mixing weight ratio of the component (a) to the component (b) is preferably from 1:400 to 400:1, more preferably from 1:50 to 50:1, particularly preferably from 1:20 to 20:1.

A method for controlling plant diseases, which comprises applying the fungicidal composition of the present invention to agricultural and horticultural plants, is also included in the present invention. The concentration of the fungicidal composition of the present invention cannot generally be defined, as it varies depending upon the crop plants to be treated, the application method, the type of the formulation, the dose, etc. However, it is adjusted so that the concentration of the component (a) is preferably from 5 to 500 ppm, more preferably from 20 to 200 ppm, and the concentration of the component (b) is preferably from 100 to 3,000 ppm, more preferably from 300 to 1,500 ppm, in the case of foliar treatment. In the case of soil treatment, the concentration is adjusted so that the concentration of the component (a) is preferably from 5 to 2,500 g/ha, more preferably from 20 to 1,000 g/ha and the concentration of the component (b) is preferably from 100 to 10,000 g/ha, more preferably from 300 to 5,000 g/ha.

The formulation containing the fungicidal composition of the present invention or a diluted product thereof may be applied by an application method which is commonly used, such as spraying (such as spraying, jetting, misting, atomizing, powder or grain scattering, or dispersing in water), soil application (such as mixing or drenching) or surface application (such as coating, powdering or covering). Further, it may be applied also by a so-called ultra low-volume application method. In this method, the formulation may be composed of 100% of the active ingredients.

EXAMPLES

Now, the present invention will be described in further detail with reference to Examples. However, it should be understood that the present invention is by no means restricted thereto.

5 TEST EXAMPLE 1: Cucumber powdery mildew field test (preventive application)

In a cucumber (cultivar: Sagami Hanjiro) open field, a chemical solution adjusted to the predetermined concentration was applied by a knapsack power sprayer in an application amount of from 200 to 300 L/10 a three times on September 17 and 27 and October 6.

10 On both days of October 6 and 18, 8 leaves per plant were examined based on the following evaluation standards, and the disease severity was calculated to obtain the control value. The results are shown in Table 1.

Evaluation Standards

0: No disease outbreak

15 1: Lesion area being less than 5%

2: Lesion area being at least 5% and less than 25%

3: Lesion area being from at least 25% and less than 50%

4: Lesion area being at least 50%

Calculation Formula for Disease Severity

20
$$\text{Disease Severity} = \Sigma (\text{disease index} \times \text{number of leaves of each index}) \times 100 / (\text{number of leaves examined} \times 4)$$

Calculation Formula for Control value

$$\text{Control value} = (1 - \text{disease severity in treated plot} / \text{disease severity in non-treated plot}) \times 100$$

25 Based on the obtained control value, an expected value was calculated by the Colby's formula. The expected values by the Colby's formula are also shown in brackets () in Table 1.

When the experimental value is higher than the expected value, the fungicidal composition of the present invention has a synergistic effect against cucumber
30 powdery mildew.

(Table 1)

	Concentration (ppm)	Control value	
		October 6	October 18
Component (a)	50	77	43
Component (b)	500	5	0
Component (a)+ Component (b)	50+500	94 (78.2)	56 (43)
Average disease severity in non- treated plot		47	93

TEST EXAMPLE 2: Cucumber downy mildew field test (preventive application)

In a cucumber (cultivar: Sagami Hanjiro) open field, a chemical solution adjusted
 5 to the predetermined concentration was applied by a knapsack power sprayer in an
 application amount of from 200 to 300 L/10 a three times on September 17 and 27 and
 October 6.

On both days of October 6 and 18, 8 leaves per plant were examined based on
 the same evaluation standards as in Test Example 1, and the disease severity was
 10 calculated to obtain the control value. The results are shown in Table 2.

Based on the obtained control value, an expected value was calculated by the
 Colby's formula in the same manner as in Test Example 1. The expected values by
 the Colby's formula are also shown in brackets () in Table 2.

(Table 2)

	Concentration (ppm)	Control value	
		October 6	October 18
Component (a)	50	9	0
Component (b)	500	45	3
Component (a)+ Component (b)	50+500	74 (50)	15 (3)
Average disease severity in non- treated plot		54.2	91

Now, Formulation Examples of the present invention will be described below.
 However, the blend ratio, the type of formulation or the like in the present invention is
 by no means restricted to the following Examples.

FORMULATION EXAMPLE 1

(a) Kaolin

78 parts by weight

(b) Condensate of β -naphthalenesulfonic acid sodium salt with formalin

2 parts by weight

(c) Polyoxyethylene alkylaryl sulfate 5 parts by weight

(d) Hydrated amorphous silicon dioxide 15 parts by weight

A mixture of the above components, the component (a) and the component (b)

5 are mixed in a weight ratio of 8:1:1 to obtain a wettable powder.

FORMULATION EXAMPLE 2

(a) Component (a) 0.5 part by weight

(b) Component (b) 0.5 part by weight

(c) Bentonite 20 parts by weight

10 (d) Kaolin 74 parts by weight

(e) Sodium lignin sulfonate 5 parts by weight

An appropriate amount of water for granulation is added to the above components and mixed, and the mixture is granulated to obtain granules.

FORMULATION EXAMPLE 3

15 (a) Component (a) 2 parts by weight

(b) Component (b) 3 parts by weight

(c) Talc 95 parts by weight

The above components are uniformly mixed to obtain a dust.

20 The entire disclosure of Japanese Patent Application No. 2011-115946 filed on May 24, 2011 including specification, claims and summary is incorporated herein by reference in its entirety.

CLAIMS

1. A fungicidal composition comprising, as active ingredients, (a) 3-(2,3,4-trimethoxy-6-methylbenzoyl)-5-chloro-2-methoxy-4-methylpyridine or its salt and (b) captan.
- 5 2. The fungicidal composition according to Claim 1, wherein the mixing weight ratio of (a) to (b) is from 1:400 to 400:1.
3. The fungicidal composition according to Claim 1, wherein the fungicidal composition is an agricultural and horticultural fungicidal composition.
4. A method for controlling plant diseases, which comprises applying a fungicidal
10 composition comprising, as active ingredients, (a) 3-(2,3,4-trimethoxy-6-methylbenzoyl)-5-chloro-2-methoxy-4-methylpyridine or its salt and (b) captan, to plants.
5. The method according to Claim 4, wherein the fungicidal composition is applied to agricultural and horticultural plants.
- 15 6. The method according to Claim 4, wherein the mixing weight ratio of (a) to (b) is from 1:400 to 400:1.
7. The method according to Claim 4, wherein the concentration of (a) is from 5 to 500 ppm, and the concentration of (b) is from 100 to 3,000 ppm, in the case of foliar treatment.
- 20 8. The method according to Claim 4, wherein the concentration of (a) is from 5 to 2,500 g/ha, and the concentration of (b) is from 100 to 10,000 g/ha, in the case of soil treatment.