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ALIEN PROPERTY CUSTODIAN

COMPOSITION AND METHOD FOR CONTROLLING NOXIOUS ORGANISMS

Marius Frits Henri Betting, Haarlem, Netherlands; vested in the Alien Property Custodian

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This invention relates to a composition and a method for controlling organisms, particularly micro-organisms, being noxious or injurious to the plant or animal body.

In its broad scope the object of my invention is a composition and a method for controlling such noxious organisms occurring externally as well as internally in the plant or animal body, especially for combating micro-organisms, more in particular viruses.

More particularly an object of my invention is a composition for combating organisms being noxious to the plant body and parts thereof, such as insects, larva and the like and especially micro-organisms such as fungi, bacteria and more particularly viruses.

Another object of my invention is a composition and a method for protecting plants and parts of plants, especially foliage, bulbs, tubers, rhizomes and the like from the attack of noxious micro-organisms, such as fungi, bacteria and more particularly viruses.

Another object of my invention is a composition for remedying plants suffering from the attack of noxious organisms, for their protection from renewed attack and for stimulating their growth and recovery.

Another particular object of my invention is a composition and a method for protecting and/or remedying bulbs, tubers, rhizomes and the like from the attack of viruses.

Another object of my invention is the purification of the soil from noxious fungi, bacteria and particularly viruses.

Another particular object of my invention is the remedying of cattle attacked by foot-and-mouth disease and preventing the spreading of this disease.

The composition according to my invention displaces its action in the plant body as well as in the surrounding soil and atmosphere. I attain this purpose by using volatile active substances of such a nature and in such a form that they are well absorbed in plants or parts of plants and/or in the soil, in which they slowly evaporate and therefore show a good depôt-action. Though I do not wish to be bound to any theory it may be said that the surprising results obtained with my compositions are due to the fact that all internal parts of plants are reached, since the volatile active agents are also present in the air in and around the plants, particularly also in the inter-cellular spaces.

My composition comprises in dispersed condition in an aqueous medium one or more volatile alicyclic (i. e. aliphatic carbocyclic) compounds, particularly one or more terpenes or terpene derivatives. In most cases, however, I prefer to use a composition in which at least one volatile oxygen containing alicyclic compound is present. As examples of kinds of alicyclic compounds which I

may use the following compounds and mixtures thereof may be mentioned: terpineol, pinenes, phellandrenes, camphene, azulenes, sesquiterpenes, cineole, umbelliferone derivatives, bisabolene, aromadendral, piperitone, terpinene, terpinols, pinol, etc. I have found that in many cases particularly mixtures containing cineole are very active and suitable for my purpose. I have further found that in many cases a composition containing moreover a natural or synthetic resin, such as colophony and particularly aloe resin, is advantageous, whereas for special purposes a composition containing phenol and/or its homologues yields particularly good results. As such a phenolic constituent I preferably use phenol, cresol and creosol (hydroxy-1 methoxy-2 methyl-4 benzene) or mixtures thereof.

According to my invention I prefer to use mixtures of alicyclic compounds which to some extent correspond to or resemble such mixtures occurring in nature. Therefore instead of starting from the alicyclic compounds themselves I may compose my compositions with the aid of crude essential oils containing such compounds. I have found that eucalyptus oil, cajepout oil, turpentine oil, lemon oil, camomile oil and the like are particularly suitable for most cases. My composition comprises further preferably an emulsifying agent, e. g. a soap of an alkali metal. The mixture of the alicyclic compounds or of the essential oils and, if desired, a resin and/or one or more phenolic compounds can be dispersed in water as such, but I prefer to dissolve it first in an organic solvent, preferably an alcohol. As such a solvent—commercial spiritus is very suitable.

My composition has appeared to be very suitable for controlling viruses, bacteria, fungi and also insects, larva and the like. I have obtained surprising results in combating viruses in bulb-plants, e. g. tulip-virus, hyacinth-virus, daffodil- and narcissus-virus, iris-virus, crocus-virus, lily-virus, etc. and also of viruses in seed-plants, e. g. bean-virus, onion-virus and tomato-virus. I also have combated in an excellent manner e. g. bacteria causing rotting, such as the bacteria occurring on cyclamens, gladioluses, carnations, etc. As examples of fungi which have been successfully combated with my compositions kinds of Pythium and Verticillium fungi occurring on dahlias and cyclamens may be mentioned and as examples of insects and larva the chrysanthemum fly and the larva of the Scaria fly.

The results which I have obtained in many experiments, also on a large scale, are surprising, since besides a vigorous combating of the injurious organisms also a recovery and remedying of the attacked plants or their parts occur. For instance colours of foliage and flowers having been broken by viruses are closed and the normal growth and the normal character are restored,

Moreover these favourable results are rapidly obtained and they are permanent. Still further advantages of my compositions are that they are easily absorbed by the plants and do not show any noxious or injurious action. The slow evaporation of the composition causes a permanent and vigorous action and the treatment can be repeated without danger for the plants. The washing out of the compositions is limited by their absorption in the plants and the presence of a resin counteracts the deposition of dew on the parts of the plants above the soil, while it further protects wounds and openings (e. g. stomata in the leaves) against the penetration of noxious organisms. Moreover, however, the compositions containing resin surprisingly appear to stimulate the growth and the development of the plants, particularly the development of the root system and the germination of the seeds, which has a great importance for the normalisation of attacked plants, since the plant now can rapidly recover. From experiments with suckers of e. g. carnations, dahlias and chrysanthemums it appeared that the action of the resin containing compositions according to my invention in many cases is even better than that of phytohormone products, such as Auxan, Hortomone A, Root Gro and Roche 202.

The treatment with my compositions can be executed e. g. by sprinkling or spraying and/or immersion. Plants, foliages and the like may be treated by spraying the composition on the plants, etc. Parts of plants, such as bulbs, tubers, rhizomes and the like may be treated by immersing them during some time in the composition, e. g. in closed spaces. Plants and parts of plants in the soil can be sprayed and sprinkled with the compositions, while the soil itself can be purified, e. g. for the combatment of soil viruses, by moistening the soil with the composition and subsequent covering of the moistened soil. In the case of bulbs, tubers, rhizomes and the like the results by treatment before the planting are much better than by treatment after the planting, since in the first case the active compounds are brought into the soil before the planting and the evaporation is limited, whereby by a slow evaporation in the soil and in the atmosphere a long purifying action on the soil and the plant is obtained. Spraying with or immersion in my compositions is also a good remedy by small wounds, e. g. caused by breaking of the roots by replanting, cracking of bulbs, etc., since it entirely prevents attack by penetrating viruses. The treatment with my compositions is particularly suitable for an efficient disinfection of the soil and the whole space in hothouses in which usually very much sources of infection are present. In contradistinction with the known disinfection with steam, methanol, etc. the treatment with my composition can even be executed during the cultivation of the plants.

In order to elucidate further my invention the following prescriptions are given, which, however, are only intended as mere examples and do not limit my invention in any manner.

Example I

A mixture of

Crude turpentine oil.....cubic centimeters..	100
Cajeput oil.....do.....	100
Colophony.....grams..	5
Potassium linolate.....do.....	5
Crude cresol.....do.....	5

is dissolved in 500 cm³ of commercial spiritus. By mixing 100 cm³ of this solution with 10-15 l of water an emulsion is obtained which is particularly suitable for the treatment by immersion of bulbs, tubers, rhizomes and the like being attacked by viruses. The plants obtained from thus treated bulbs, etc. show a striking improvement, closing of the broken colours of the flowers and the leaves and normal growth and development.

Example II

By spraying the emulsion according to Example I on gladioluses, carnations and cyclamens being attacked by bacteria, a good recovery is obtained and the growth and development of the root system are stimulated without any detrimental effect to the leaves or the flowers.

Example III

In 10-15 l of water is emulsified 40 cm³ of a mixture of 60 cm³ of turpentine oil, 60 cm³ of eucalyptus oil, 30 g of gum-arabic and 15 cm³ of creosol. By immersion of tulip bulbs in this emulsion a striking recovery of the tulip plants is obtained. Rembrandt-Copland tulips showing a flower pattern being broken to a very great extent and also the often occurring breaking in the leaves, yield beautiful green plants, the condition and the growth being 30-50% better and higher, the breaking in the leaves disappears and the colours of the flower pattern are deepened and closed.

By large experiments with tulips by treatment of the plants before digging the bulbs at different moments and by treatment of the dug up bulbs at different moments it has appeared that the results are the better the sooner the treatment is executed. Minister Hull (broken Bartigon), Rembrandt-Copland, Rembrandt-Solida, Rembrandt Moor, Rembrandt Viola, etc. and other kinds of tulips by early treatment show a complete or substantially complete closing of the colours; e. g. broken Minister Hull becomes completely closed red Bartigon.

Example IV

For the treatment of hyacinths an emulsion is prepared by dispersing in 15 l of water 100 cm³ of a mixture of

Crude turpentine oil.....cubic centimeters..	120
Cajeput oil.....do.....	60
Creosol.....do.....	20
Potassium soap.....grams..	20
Commercial spiritus.....cubic centimeters..	400

By treating with this emulsion seriously attacked bulbs of gray Yellow-hammers, Dr. Lieber-hyacinths, etc. before the planting a recovery of the growth and the green leaves and also a normal flower are obtained.

Example V

The emulsion according to Example IV is also particularly suitable for the treatment of daffodils and narcissuses. By immersion of the bulb of Rembrandt narcissuses 50% of which were gray on the field, a complete normalisation is obtained and even traces of attack disappear. The spraying of narcissuses plants on the fields, e. g. Golden Harvest, King Alfred, etc. already yield considerable results, since the growth is restored, leaf tissue being attacked by virus becomes still active, the early dying does no longer occur and the condition and growth of the plants are 100% better.

Example VI

Iris plants appear to be very sensitive to a treatment of the bulbs and plants with an emulsion according to the preceding examples, so that a complete normalisation of the colour breaking in the flowers and the leaves of e. g. Wegdwood Iris plants, English Iris plants, etc. is easily obtained.

Example VII

With an emulsion obtained by adding an aqueous amyllum emulsifying agent to a mixture of 50 g of turpentine oil, 25 g of cajeput oil and 10 g of colophony to a total volume of 100 cm³ and emulsifying 20 cm³ of this mixture in 10 l of water, excellent results can be obtained with horticultural plants. Kinds of onions which are attacked by viruses and consequently show bad plants and stop the growth and die, show by spraying already after 1 week a visible improvement and after 2 weeks the growth is clearly restored, forming of new leaves occurs, etc. Also kinds of French beans, potatoes and tomatoes show by spraying with this composition a soon and permanent improvement.

Example VIII

For the treatment of e. g. potatoes a mixture of

Crude turpentine oil	-----cubic centimeters	200
Cajeput oil	-----do	50
Alcali soap	-----grams	40
Cresol	-----do	40
Commercial spiritus	-----cubic centimeters	800

is prepared. For the treatment of the seed-material by immersion 100 cm³ of this mixture are dispersed in 20 l of water and for the spraying of the plants in the field an emulsion of 100 cm³ of the mixture in 10 l of water is prepared.

Example IX

For combating rotting and disease bacteria 100 cm³ of a mixture of

Crude turpentine oil	-----cubic centimeters	100
Eucalyptus oil	-----do	20
Creosol	-----do	25
Alcali soap	-----grams	25
Commercial spiritus	-----cubic centimeters	400

are emulsified in 10 l of water. With this emulsion e. g. the disease of gladioluses caused by *Bacterium marginatum* can be treated. Spraying of this emulsion on potato-plants on the field prevents the disease caused by *Bacterium phytophthorum*.

By adding a resin, e. g. colophony to this emulsion a composition is obtained with which rotting bacteria in hothouses can be combated, e. g. *Bacterium cyclami*, which causes rotting in the roots of cyclamen.

Particularly striking results are obtained in hothouses with carnations being attacked by rotting of the stem. By experiments in a hothouse with 200 suckers of sensitive kinds no or at most 1-2 minus cases were obtained. Attacked suckers the stem of which was already brown and torn, recover and grow further well.

By repeated spraying also a complete annihilation of the sources of e. g. *Bacterium pseudomonas tumef.* in dahlia plants is obtained.

Example X

For combating fungi, e. g. mildew of roses,

Fusarium fungi on summer asters, etc., 10 cm³ of a mixture of

Crude turpentine oil	-----cubic centimeters	50
Cajeput oil	-----do	50
Alcali soap	-----grams	20
Water	-----cubic centimeters	60

is emulsified in 5 l of water. If desired, 20 g of colloidal sulphur (vomasol) may be added.

Example XI

A very vigorous composition for combating fungi is obtained by emulsifying in 10 l water 100 cm³ of a mixture of

Crude turpentine oil	-----cubic centimeters	100
Eucalyptus oil	-----do	50
Colophony	-----grams	20
Alcali soap	-----do	20
Commercial spiritus	-----cubic centimeters	310

With this emulsion particularly the winter fungus of dahlies (*Verticillium Alboratum*) can be successfully combated and the attack of *Pythium debar.* and *Rhizoctonia sol.* can be prevented.

By using this emulsion for combating fungi on begonias and fern plants, e. g. *Myxomycetus* and *Thielavia basicola*, very good results are obtained. Also for combating spores of fungi in seeds and in the cultivation soil for bulb plants (such as kinds of *Rhizoctonia* and *Sclerotium*) the emulsion according to this example is very suitable.

Example XII

For combating the larva of the scaria fly and such larva the young seed plants of ferns are sprayed with an emulsion prepared by dispersing in 5 l of water 60 cm³ of a mixture of

Crude turpentine oil	-----cubic centimeters	100
Eucalyptus oil	-----do	100
Aloe resin	-----grams	50
Commercial spiritus	-----cubic centimeters	350

This emulsion kills also e. g. caterpillars and the larva of the chrysanthemum fly in the leaf tissue.

Example XIII

By experiments relating to controlling animal viruses I have obtained considerable results in the case of foot-and-mouth disease. Thereby in two manners confirmation of the fact has been obtained that a complete combating can only be obtained when the exact origin of the virus is found locally and the treatment is soon executed. In the period in which the disease shows itself treatment of the plants on the land in order to prevent spreading of the virus as well as treatment of the wounds of the attacked animals have to be executed. Two emulsions are prepared, viz.:

A

Crude turpentine oil	-----cubic centimeters	50
Eucalyptus oil	-----do	50
Aqueous protein emulsifying agent		
(cont. 2 beaten up eggs)	-----do	200

B

Crude turpentine oil	-----cubic centimeters	100
Eucalyptus oil	-----do	50
Alcali soap	-----grams	25
Creosol	-----cubic centimeters	25
Commercial spiritus	-----do	300

The attack in the mouth is treated by rinsing with emulsion A, whereby by immediate treatment by the first attack remedying occurs. In case of stronger attack, however, sometimes by a

longer treatment still a visible improvement, viz. diminishing of the blisters, is obtained. The attack of the hoofs and the meadows are treated by spraying with emulsion B. The wounds recover by repeated spraying and the spreading of the disease in the infected country is prevented by treating the infected places, the animals, the

plants and the material also with this emulsion.

Various changes may be made in the details disclosed in the foregoing specification without departing from the invention or sacrificing the advantages thereof.

MARIUS FRITS HENRI BETTING.