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DOCUMENT 1/1
DOCUMENT NUMBER
@: unavailable

1. JP.08-099813_A(1996)

DETAIL JAPANESE LEGAL STATUS

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 08-099813
(43)Date of publication of application : 16.04.1996

(51)Int. Cl. A01N 63/02
A01N 25/02
A01N 43/90
// (A01N 63/02
A01N 43/90
A01N 43:16
A01N 35:06
A01N 65:00
A01N 37:10
A01N 37:18)

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(54) WATER-BASED LIQUID AGENT FOR PLANT GROWTH REGULATION
(57)Abstract:
PURPOSE: To provide a water-based liquid agent for plant growth regulation, exhibiting a defense action on disease and insect damage, usable without imparting the pathogen with chemicals resistance and having high safety in the decomposition in soil.
CONSTITUTION: This water-based liquid agent for plant growth regulation contains (A) a component composed of (i) at least one compound selected from berberine, matrine, an anthraquinone derivative, a flavonoid compound, glycyrrhizin, an essential oil, an alkylphthalide, a phthalide derivative and capsaicin and (ii) at least one compound selected from starch, isoflavone compound and sugar and containing berberine as an essential component and (B) a C-6-C-8 linear carboxylic acid.

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WATER-BASED LIQUID AGENT FOR PLANT GROWTH REGULATION

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application]the plant growth adjustment with high safety [in addition to a vegetable growth promotion operation, the present invention has a defense operation on a damage by blight and harmful insects, and moreover do not make a disease germ produce tolerance, and] at the time of decomposition in soil -- service water -- it is related with a sex drug solution.

[0002]

[Description of the Prior Art]Until now, synthetic organic agricultural chemicals etc. have been applied as a direct control means against a pest. Manure etc. have been used about vegetable growth promotion.

[0003]

[Problem to be solved by the invention]However, about use of synthetic organic agricultural chemicals, there is a problem of delay of vegetable growth, the deterioration of a resistance force to a damage by blight and harmful insects, a noxious insect and a disease germ acquiring tolerance further. Destruction of the environmental pollution by use of synthetic organic agricultural chemicals or an ecosystem poses a problem. On the other hand, about manure, it must be embedded in vegetable soil etc., the complicated work of the embedding of digging up of soil, dressing, and soil, etc. is required, and the reduction of work is called for.

[0004]the plant growth adjustment with high safety [this invention was made in view of such a situation, in addition to a vegetable growth promotion operation, has a defense operation on a damage by blight and harmful insects, and moreover do not make a disease germ produce tolerance, and] at the time of decomposition in soil -- service water -- offer of a sex drug solution is set as that purpose.

[0005]

[Means for solving problem]in order to attain the above-mentioned purpose -- plant growth adjustment of this invention -- service water -- a sex drug solution takes the composition of containing the following (A) component and the (B) component.

(A) Berberine, sophocarpidine, the Anthraquinone derivative, flavonoids, glycyrrhizin, oil refinement, alkyl phthalides, a phthalide derivative, and the group which consists of capsaicin, And it is a component containing the compound chosen at least one [at a time] from each group of the group which consists of starch, isoflavone, and sugars, respectively, and berberine is made indispensable.

(B) With a carbon number of four or less low-grade organic acid.

[0006]

[Function]Namely, the place which was asking for what can control a damage by blight and harmful insects without the inventors using synthetic organic agricultural chemicals, The low-grade organic acid which is a common gender anaerobic fermentation thing of a certain kind of crude drug, the berberine which is the crude drug ingredient, etc., It found out that it had a remarkable effect that you make a natural state recover the rhizosphere microorganism (the vital force declines according to environmental aggravation) adhering to a vegetable root etc., or make it activated, and it was effective in not using synthetic organic agricultural chemicals together, but ** making agricultural products harvest by high yield, and this invention was reached.

[0007]First, it describes about the raw material used by this invention.

[0008]An operation of the (A) component which constitutes this invention, the effect, etc. are as follows. The following component used as such human being's drugs finds out that it is effective also in vegetable growth, and this invention is the characteristics of the maximum [this]. In the following, the operation on a plant is shown with the parenthesis.

- berberine -- the main ingredients of the bark (cork tree bark) except the periderm of a yellowfin tuna (*Phellodendron amurense* Ruprecht) (Rutaceae) or its species of the same genus. Stomachic medicine for intestinal disorders. [Inhibition of the inhibition effect and Acari to an antibacterial action, bacillus subtilis, etc. to *Staphylococcus aureus* etc., inhibition of mold.]

- the root of sophocarpidine Clara (*Sophra flavescens* Aiton) (Leguminosae) -- the main ingredients of the thing [remain as it is or] (*sophorae radix*) except the great portion of periderm. Stomachic, urination, and an antipyretic analgesic. [The growth stop of antiprotozoal action, an antifungal action, and *Trichophyton*, the necrosis reaction of TMV, the eradication activity of a virus.]

- The main ingredients of the usually rhizome (*rhei rhizoma*) of Anthraquinone derivative *Rheum palmatum* Linn., *R.tangticum* Maxim., *R.officinale* Baillon, and *R.coreanum* Nakai (Polygonaceae). Stomachic. [The synthesis depressant action of bacterial nucleic acid and protein, the antibacterial action to *Staphylococcus aureus*, an antiviral action.]

- Flavonoids *Scutellaria baicalensis* (*Scutellaria*) The root (*Scutellaria root*) or Satsuma orange (*Citrus unshiu* Markovich) except periderm of *baicalensis* Georgi (*Labiatae*) (*C. aurantium*Linn. subsp.) The main ingredients of the fruits (*Aurantii nobllis pericarpium*) in which nobilis Markino (*Rutaceae*) or close species matured. Aroma stomachic. [The strong antibacterial action to an antibacterial action, a dysentery bacillus, a *staphylococcus*, etc. to gram positive bacteria.]

- The glycyrrhizin *Glycyrrhiza*. The liquorice with a hide by the root and stolon (liquorice) of *glabra* Linn. var. *glandulifera* Regel et Herder, *G.uralensis* Fischer (*Leguminosae*), or

these congeners as it is, The main ingredients of the thing excluding [leather **** liquorice] periderm. Detoxication, resolution, and antitussive. [Antiviral action.]

- The main ingredients of the rhizome (ginger) of oil-refinement ginger (*Zingiber officinale* Roscoe) (*Zingiberaceae*). It is contained also in an *angericae radix* and a *cnidium rhizome*. Aroma stomachic. [Antibacterial properties and antiprotozoal action.]

- The main ingredients of what (*angericae radix*) passed the root of alkyl phthalide *Angelica acutiloba* Kitagawa (*Umbelliferae*) or allied species through hot water usually. A drug for female use and the tonic. [The antibacterial action to a dysentery bacillus, *Escherichia coli*, etc.]

- The main ingredients of what (*cnidium rhizome*) passed the rhizome of the phthalide derivative *cnidium rhizome* (*Cnidium Officinale* Makino) (*Umbelliferae*) through hot water usually. A drug for female use and the tonic. [Depressant action to gram-negative disease germs, such as a dysentery bacillus and *Salmonella typhi*.]

- Capsaicin *capsici fructus* (*Capsicum annuum* Linn.) (*Solanaceae*) or the main ingredients of the fruits (*capsici fructus*) of the variety. Circulation sthenia agent. [Antibacterial properties and an insecticidal action.]

- Starch, isoflavone kudzu (*Pueraria*) The main ingredients of the root (*pueraria root*) of the root except the periderm of *lobata Ohwi* (*P. pseudo-hirusta* Tang et Wang) or *P.lobata Ohwi* var. *chinensis*(Benth.) *Ohwi* (*Leguminosae*). Perspiration and an antipyretic. [The nutrient of wild type yeast.]

- A sugars jujube tree (*Zizyphus jujuba* Miller var. *inermis* Rebder) (*Rhamnaceae*) (*Z. vulgaris*Lamark var. *inermis* Bunge) or the main ingredients of the fruits (*zizyphi fructus*) of the close species. Relaxation, urination, and tonic. [The nutrient of the wild type yeast of *sophorae radix* origin.]

[0009]The mutual using rate of the component contained in groups, such as berberine in the above (A) component, and the component contained in groups, such as starch, is a weight ratio, and group =1:1.5-1.5:1, such as group:starch, such as berberine, is preferable. If antibacterial properties, anti-mold, and an antiviral action become will be hard to exert if the ratio of groups, such as berberine, becomes small and the ratio of groups, such as starch, becomes small, The nutrients of useful microorganisms will run short and the alimentation power, natural healing energy, and enemy control power of the plant which should be activated through activity of useful microorganisms will be deteriorated.

[0010]As the operation and effect over the plant of the low-grade organic acid (acetic acid, propionic acid, succinic acid, etc.) which is the (B) components which constitute this invention, there are the hormone Mr. effect by use, vegetable spindly growth inhibition, a rooting facilitatory effect, etc. in proper quantity.

[0011]As for the mutual content ratio of the above-mentioned (A) component and the (B) component, 1:4-1:2 are preferable. If a defense operation on the damage by blight and harmful insects by a crude drug ingredient if the ratio of (A) becomes small is no longer exerted sufficiently and becomes largely, the effect for hormone by low-grade organic acid, vegetable spindly growth inhibition, a rooting facilitatory effect, etc. will become are hard to exert.

[0012]the next -- plant growth adjustment of this invention -- service water -- it describes about the process of a sex drug solution.

[0013]plant growth adjustment of this invention -- service water -- the process of a sex drug solution, ** There are a case where a crude drug is fermented on a common gender aversion target by the wild type yeast of *sophorae radix* origin, ** common gender

anaerobic yeast, and a case where prepare independently a common gender ** (A) component and the (B) component, and it mixes with the case where it is made to ferment anaerobically, when using it, about a crude drug by the above-mentioned microorganism preferably.

[0014]First, when fermenting a crude drug on a common gender aversion target by the wild type yeast of ** sophorae radix origin, it prepares as follows. A cork tree bark, a sophorae radix, rhei rhizoma, a pueraria root, a Scutellaria root, zizyphi fructus, a ginger, liquorice, Aurantii nobllis pericarpium, an angericae radix, a cnidium rhizome, and 12 kinds of crude drugs of capsici fructus, It is supplied to about 20-40 degrees C warm water, and on a common gender aversion target's, i.e., the sometimes stirred degree, conditions, in ordinary temperature, it does not aerate specially, but the degree of 30 - 60 schedule is period-neglected, and it ferments. During the above-mentioned period, it is long, and in a summer, it is adjusted by temperature at winter as short. Under the present circumstances, auxiliary ingredients, such as a compost, chicken droppings, and an oil cake, may be added in order to promote fermentation. While helping vegetable nutrient uptake, the animal protein which has a repellent action to a noxious insect may be added. Since the evasion effect over small harmful animals, such as a rat and a mole, is increased, hop may be added. The surface of the liquid after the end of fermentation is covered by the white flora by the wild type yeast of sophorae radix origin, etc. This bacillus acts on the autonomic nervous system of an insect or a mite, excites [this is paralyzed, or] it, and carries out activation of the plant cell further at the same time it inhibits generating of a fusarium bacillus and other plant pathogenic microbes in cooperation with a crude drug ingredient which is a subject.

On the other hand, it has a good operation of inhibiting abnormal growth.

That is, an important operation is synergistically performed on the invention purpose with the above-mentioned crude drug ingredient. Therefore, this flora is also used as it is as a component of the crude drug liquid of the invention in this application. Even if it keeps fermented material in a container as it is, there is no possibility of decomposing over a long period of time. however -- making it dry at low temperature, if it is with necessity -- powder -- or it can also granulate.

[0015]Next, ** common gender anaerobic yeast and when fermenting a crude drug on a common gender aversion target by the above-mentioned microorganism preferably, it prepares as follows. With the above-mentioned yeast, the above-mentioned crude drug is thrown in in about 20-40 degrees C warm water, on a common gender aversion target, i.e., the bottom of the condition of the degree which is not aerated specially but is sometimes stirred, the 30 to 60th [about (short / in a summer / In winter. /)] day, is neglected and will ferment. Under the present circumstances, a compost, chicken droppings, an oil cake, an animal protein, hop, etc. are added by request like the case of **. This fermentation form is organic acid fermentation intrinsically. Therefore, although water, a raw material crude drug, and other sterilization are not usually required, in order to avoid the influence of the wild type yeast accompanied to a sophorae radix, it is necessary to sterilize on the sterilization conditions of a common microorganism, for example, 120 degrees C, and the conditions for about 15 to 30 minutes. in addition -- making it for there to be no possibility of decomposing over a long period of time, even if it keeps this fermented mash in a container as it is like the case of **, but dry at low temperature, if it is with necessity -- powder -- or it can also granulate. As long as the yeast which is used for the common gender anaerobic fermentation of the above-mentioned crude drugs and in which it deals exists in a nature and a common gender anaerobic fermentation operation is played in itself,

there is no restriction in the kind exceptionally, but each following publicly known fungi are used especially preferably.

- Kluyveromyces MARUKISHI anus (Zygosaccharomyces MARUKISHI anus)
(Kluyveromyces marxianus (Zygosaccharomyces marxianus)) GRIF--C.Wehmer. IFO 0219, BURETTANO Mrs. KUSUTERUSHIANUSU (Brettanomyces custersianus) vander Walt IFO 1585, and BURETTANO Mrs. knurl DENENSHISU (B. naardenensis). Kolfshoten & Yarrow. IFO 1588 - Dekkera BURUKU selenium cis- (Dekkera bruxellensis) van der Walt IFO1590 and Dekkera Intel Medea (D. intermedia) van der. Walt (torulopsis silyne DORIKA (Torulopsis cylindrica) IFO 1591 and Hansenula ANOMARA (Hansenula anomala) IFO1760) [0016] When preparing ** (A) component and the (B) component independently and mixing when using it, it prepares as follows, for example. First, commercial starch, such as berberine, etc. are purchased, and mixing preparation of the component of both groups is carried out so that both percentage may be set to 1:1. On the other hand, low-grade organic acid (acetic acid, propionic acid, succinic acid, etc.) is added suitably, and the (B) component is prepared. blending next, so that the above-mentioned (A) component and the (B) component may be set to 1:3, and adding water, such as distilled water, to this -- plant growth adjustment of this invention -- service water -- a sex drug solution is prepared. Water etc. are added by the plant etc. to be used and concentration is prepared.

[0017] thus, the obtained plant growth adjustment -- service water -- in a sex drug solution, As a component, (A) Berberine, sophocarpidine, the Anthraquinone derivative, flavonoids, glycyrrhizin, oil refinement, alkyl phthalides, a phthalide derivative, and the group which consists of capsaicin, And it is a component containing at least one or more compounds chosen from each group of the group which consists of starch, isoflavone, and sugars, respectively, and the component which makes berberine indispensable is contained and low-grade organic acid (acetic acid, propionic acid, succinic acid, etc.) is contained as a (B) component. For this reason, berberine, sophocarpidine, the Anthraquinone derivative, flavonoids, glycyrrhizin, oil refinement, alkyl phthalides, a phthalide derivative and the antibacterial properties by the component of the group which consists of capsaicin, anti-mold, an antiviral action, etc. work. Starch, isoflavone, and sugars serve as a nutrient of yeast. There are the hormone Mr. effect by low-grade organic acid (acetic acid, propionic acid, succinic acid, etc.), vegetable spindly growth inhibition, a rooting facilitatory effect, etc. in addition, the above-mentioned plant growth adjustment -- service water -- in a sex drug solution, very a variety of substances, such as emission matter outside a fungus body from the derivative, the decomposition product, yeast, and the bacterial flora of a crude drug ingredient based on fermentation, are included. As these substances, vitamins, such as amino acid, such as aniline and proline, niacin, and biotin, lactic acid bacteria, etc. are contained, for example. Lactic acid bacteria activate vegetable alimentation power, natural healing energy, and enemy control power as a useful rhizosphere microorganism, and amino acid and vitamins are used as a nutrient of lactic acid bacteria.

[0018]

[Effect of the Invention] as mentioned above, plant growth adjustment of this invention -- service water -- a sex drug solution, As a component, (A) Berberine, sophocarpidine, the Anthraquinone derivative, flavonoids, glycyrrhizin, oil refinement, alkyl phthalides, a phthalide derivative, and the group which consists of capsaicin, And are a component containing at least one or more compounds chosen from each group of the group which consists of starch, isoflavone, and sugars, respectively, contain the component which makes

berberine indispensable, and as a (B) component, Since low-grade organic acid (acetic acid, propionic acid, succinic acid, etc.) is contained, the dramatically outstanding cultivation results are acquired as synergistic effects, such as a growth promotion operation of the plant by these components, and a defense operation on a damage by blight and harmful insects. Since the above-mentioned component is a crude drug ingredient etc., it does not make a disease germ produce tolerance, and its safety at the time of decomposition in soil is high. Thus, it can contribute to the productivity drive of agriculture and horticulture, laborsaving, and an environmental clean-up by providing stably safe agricultural chemicals without a possibility of destroying a natural ecosystem.

[0019]Next, this invention is described in detail based on an working example.

[0020]

[Work example 1]35 kg of cork tree barks, 6 kg of rhei rhizoma, and 29 kg of sophorae radixes are added to 1000 liters of water, Add 50 parts by weight (it omits the following "part") of pueraria roots, 50 copies of Scutellaria roots, 50 copies of zizyphi fructus, 15 copies of gingers, five copies of liquorices, 30 kg of mixtures which consists of five copies of Aurantii nobllis pericarpium and 50 copies of angericae radixes, 50 copies of cnidium rhizomes, and 5 kg of mixtures which consists of five copies of capsici fructuses to this, and After mixing, When it allowed to stand for two months at the room temperature, stirring 2 to 3 times every day, the fermented material covered by the bacterial flora with the white surface was obtained. thus, the obtained plant growth adjustment -- service water -- the result about the main constituents produced by high performance chromatography etc. analyzing a sex drug solution is shown in Table 1. As for the weight ratio of berberine:all sugar, Table 1 shows that the weight ratio of an abbreviated 1:1 and (A) component:(B) component serves as the abbreviation 1:3.

[0021]

[Table 1]

組 成 物	結 果	分 析 方 法
ベルベリン	2 7 0 m g / 1 0 0 g	高速液体クロマトグラフ法
全糖*	0 . 2 9 (組成%)	アンスロン硫酸法
有機酸	1 . 3 2 (組成%)	高速液体クロマトグラフ法
酢酸	0 . 6 6	
乳酸	0 . 5 6	
プロピオン酸	0 . 0 8	
コハク酸	0 . 0 2	
遊離アミノ酸	3 2 m g / 1 0 0 g	アミノ酸自動分析法
アラニン	8 m g	
プロリン	8 m g	
その他	1 6 m g	
ビタミン類	3 5 2 . 5 μ g / 1 0 0 g	微生物定量法
ナイアシン	3 5 0 μ g	
ビオチン	2 . 5 μ g	
乳酸菌	7 . 6 $\times 10^6$ / g (菌数)	MRS 寒天平板嫌気培養法

* Compute a sample by using it as the grape sugar produced by carrying out acidolysis processing. [0022]the above-mentioned plant growth adjustment -- service water -- the result of having used the sex drug solution for bentgrass is shown in Table 2. per [1 m of bentgrass ²] -- the above-mentioned plant growth adjustment -- service water -- sprinkling 1 liter of 500 dispensing solutions of a sex drug solution -- as contrast -- plant growth adjustment -- service water -- tales doses of water was sprinkled instead of the sex drug solution. Comparison testing of the thing on Heisei 6(1994) April 11, April 26, May 9, and May 23 which was sprinkled 4 times, was sampled on June 6, and was air-dried after rinsing was carried out on June 13. the effect that a leave and stem root promotes growth capable is accepted -- plant growth adjustment -- service water -- although the bentgrass which sprinkled the sex drug solution became vivid green till the checking date and the goodness of **** was accepted, the bentgrass which sprinkled water had shrunken.

[0023]

[Table 2]

	全 重		茎 葉 重		マット部重		根 重	
	g	%	g	%	g	%	g	%
薬液散布	1.07	155	0.16	229	0.66	150	0.25	139
水散布	0.69	100	0.07	100	0.44	100	0.18	100

* Weight is a dry matter weight. [0024]

[Work example 2]The sophorae radix is beforehand sterilized on 120 degrees C and the conditions for about 15 to 30 minutes. 35 g of cork tree barks, 6g of rhei rhizoma, and 29 g of sophorae radices are added to 1000 ml of distilled water, 50 parts by weight (it is below the same) of pueraria roots, 50 copies of Scutellaria roots, 50 copies of zizyphi fructus, 15 copies of gingers, five copies of liquorices, the mixture 30g which consists of five copies of Aurantii nobllis pericarpium and 50 copies of angericae radices, 50 copies of cnidium rhizomes, and the mixture 5g which consists of five copies of capsici fructuses are added to this, 2 ml of pure culture things (a 10⁶ - 10⁷ individual / ml) of Kluyveromyces MARUKISHI anus IFO 0219 were added, and it was neglected for two months in 28 degrees C humidistat. thus, the obtained plant growth adjustment -- service water -- the result about the main constituents produced by high performance chromatography etc. analyzing a sex drug solution is shown in Table 3. As for the weight ratio of berberine:all sugar, Table 3 shows that the weight ratio of an abbreviated 1:1 and (A) component:(B) component serves as the abbreviation 1:3.

[0025]

[Table 3]

組 成 物	結 果	分 析 方 法
ベルベリン	275mg/100g	高速液体クロマトグラフ法
全糖*	0.26 (組成%)	アンスロン硫酸法
有機酸	1.41 (組成%)	高速液体クロマトグラフ法
酢酸	0.67	
乳酸	0.58	
プロピオン酸	0.11	
コハク酸	0.05	
遊離アミノ酸	30mg/100g	アミノ酸自動分析法
アラニン	7mg	
プロリン	9mg	
その他	14mg	
ビタミン類	346.3μg/100g	微生物定量法
ナイアシン	344μg	
ビオチン	2.3μg	
乳酸菌	7.2×10 ⁶ /g (菌数)	MRS 寒天平板嫌気培養法

* Compute a sample by using it as the grape sugar produced by carrying out acidolysis processing.

[Translation done.]

TECHNICAL FIELD

[Industrial Application]the plant growth adjustment with high safety [in addition to a vegetable growth promotion operation, the present invention has a defense operation on a damage by blight and harmful insects, and moreover do not make a disease germ produce tolerance, and] at the time of decomposition in soil -- service water -- it is related with a sex drug solution.

CLAIMS

[Claim(s)]

[Claim 1]plant growth adjustment currently containing the following (A) component and the (B) component -- service water -- a sex drug solution.

(A) Berberine, sophocarpidine, the Anthraquinone derivative, flavonoids, glycyrrhizin, oil refinement, alkyl phthalides, a phthalide derivative, and a group which consists of capsaicin, And it is a component containing a compound chosen at least one [at a time] from each group of a group which consists of starch, isoflavone, and sugars, respectively, and berberine is made indispensable.

(B) With a carbon number of four or less low-grade organic acid.

[Claim 2]wild type yeast which low-grade organic acid of the above (B) accompanies to a sophorae radix -- a crude drug -- common gender -- the plant growth control according to claim 1 produced by fermenting anaerobically -- service water -- a sex drug solution.