

ORGANIC DEOXIDANT

TECHNICAL FIELD

[0001]

5 The present invention relates to an organic deoxidant, more particularly, an organic deoxidant that is not detected by a metal detector and is excellent in safety and superior in deoxidizing performance.

10 BACKGROUND ART

[0002]

When commercial goods, such as foods, drugs, electronic devices, and electrical instruments, are preserved in a sealed packing material, there is a risk that oxygen contained in a
15 preserving atmosphere may oxidize a preserved good or induce mold to make the quality of the goods deteriorate. So, a deoxidant has been enclosed in the packing for foods, drugs and the other goods that are preferable to be kept in an oxygen-free atmosphere.

20 [0003]

Deoxidants constituted with inorganic materials or organic materials absorb oxygen existing in the atmosphere by means of an oxidation reaction to remove the oxygen in the atmosphere. Inorganic deoxidants such as iron powder as a
25 main component has been broadly used because of superior deoxidizing performance.

[0004]

However, the safety of packed preserved goods may be inspected by a metal detector to detect a good contaminated by
30 a foreign substance for an ingesting good such as foods. In

such a case, the problem has been existed that when an inorganic material deoxidant such as iron powder is packed together with the preserved goods, a metal detector detects the deoxidant and the inspection is disturbed.

5 [0005]

So, a deoxidant that is not detected by a metal detector has been demanded, and an organic deoxidant not using a metal such as a reduced iron powder has been proposed. For example, Patent Document 1 discloses a deoxidant of a low molecular weight phenolic compound selected from catechol, resorcinol, 10 hydroquinone, cresol, and pyrogallol as a main component of an organic deoxidant and an activated carbon. Patent Document 2 discloses a deoxidant composed of an easily oxidizable organic composition, such as a polyhydric alcohol compound, a phenolic 15 compound, an unsaturated fat and oil, an unsaturated fatty acid and an unsaturated polymer as a main component, and is supported on the granulated silicon dioxide having an average particle size of 1.0 mm or more prepared by granulating chemically synthesized silicon dioxide having an average 20 particle size of 0.1 μm or less.

DOCUMENTS CITED

[Patent Documents]

[0006]

- 25 [Patent Document 1] Japanese Patent Laid-Open No. 2000-50849.
[Patent Document 2] Japanese Patent Laid-Open No. 2003-38143.
[Patent Document 3] Japanese Patent Laid-Open No. 2007-74962.
[Patent Document 4] Japanese Patent Laid-Open No. 2007-
268326.

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SUMMARY OF THE DISCLOSURE

[Problems to be Solved]

[0007]

In the deoxidant composed of a low molecular weight
5 phenolic compound disclosed in Patent Document 1 as a main
component, the surface of a permeable inner package may cause
so-called "penetration", showing a deep color as if the liquid
had penetrated through. The phenomenon may spoil the
appearance and concerns customer about the safety, one of a
10 problem in the practical use. With respect to a deoxidant
disclosed in Patent Document 2, control factors in a
manufacturing process increases and it increases loss in
manufacturing, because granulation of a support is required to
prepare a deoxidant excellent in fluidizing ability and
15 filling and packaging properties.

[0008]

So, the present applicant has proposed organic deoxidants
in Patent Documents 3 and 4 as a deoxidant that is not
detected by a metal detector. However, in the organic
20 deoxidants disclosed in Patent Documents 3 and 4, the raw
material powder tends to scatter when the raw materials
constituting the deoxidant are mixed, and the fluidizing
ability of the main component is too poor not to increase the
manufacturing efficiency and increase the manufacturing cost
25 of the organic deoxidant. So, the improvement has been
required.

[0009]

Therefore, an object of the present disclosure is to
provide an organic deoxidant of which deoxidizing performance
30 and the manufacturing efficiency are further improved through

investigation on the raw materials constituting the organic deoxidant.

[0009a]

In a first aspect, there is provided an organic deoxidant comprising an organic substance easily oxidized as a main component; an alkaline agent; and water;

characterized in that the alkaline agent is composed of calcium hydroxide and 5 parts by weight to 50 parts by weight of calcium carbonate with respect to 100 parts by weight of calcium hydroxide, and

the content of the alkaline agent is 20 parts by weight to 200 parts by weight with respect to 100 parts by weight of the main component.

[0009b]

In a second aspect, there is provided a packaged deoxidant, comprising the organic deoxidant as defined above packaged in an oxygen permeable packaging material.

MEANS TO SOLVE THE PROBLEM

[0010]

Therefore, the present inventors further studied on the constituent materials for an organic deoxidant and the above object was achieved by adopting an organic deoxidant described below.

[0011]

An organic deoxidant according to the present invention is an organic deoxidant comprising an organic substance easily oxidized as a main component, an alkaline agent and water characterized in that calcium hydroxide and calcium carbonate are used as the alkaline agent, and the content of the alkaline agent is 20 parts by weight to 200 parts by weight with respect to 100 parts by weight of the main component.

[0012]

In the organic deoxidant according to the present invention, the organic substance easily oxidized is more preferable to be tannin or tannic acid.

[0013]

In the organic deoxidant according to the present invention, the content of the water is more preferable to be 10 parts by weight to 200 parts by weight with respect to 100 parts by weight of the main component.

[0014]

In the organic deoxidant according to the present invention, the content of a catalyst is more preferable to be

15 parts by weight or less with respect to 100 parts by weight of the main component.

[0015]

In the organic deoxidant according to the present invention, pH prepared by mixing the raw materials is more preferably 9 to 12.

[0016]

A packaged organic deoxidant according to the present invention is characterized in that the organic deoxidant described above is packaged in an oxygen permeable packaging material.

ADVANTAGE OF THE INVENTION

[0017]

15 In the organic deoxidant according to the present invention, the scattering of a deoxidant is reduced and the deoxidizing performance is further enhanced by containing an alkaline agent composed of calcium hydroxide and calcium carbonate in an amount of 20 parts by weight to 200 parts by weight with respect to 100 parts by weight of a main component. Accordingly, scattering in mixing of raw materials constituting the deoxidant can be reduced and contamination of the deoxidant at a sealing part of a packaging material when the deoxidant is filled into the packaging material can be inhibited also. As the result, the manufacturing loss can be reduced because scattering and generation of a defective product is reduced when compared to a conventional organic deoxidant. Further, the manufacturing efficiency can be significantly improved because poor fluidizing ability of a

main component in mixing of raw materials constituting the deoxidant is improved.

DETAILED DESCRIPTION OF THE EMBODIMENTS

5 [0018]

A preferable embodiment of an organic deoxidant according to the present invention will be described below. An organic deoxidant according to the present invention is an organic deoxidant comprising an organic substance easily oxidized as a
10 main component, an alkaline agent and water.

[0019]

An organic substance easily oxidized is contained as a main component. As the organic substance easily oxidized, tannin, tannic acid, catechin, quercetin, flavone, flavanone,
15 flavonol, isoflavone, anthocyanin, hydroquinone, and in addition, gallic acid as a main component, and a polyhydric alcohol compound, such as ascorbic acid, glycerol, and glucose can be exemplified. Among these, tannin or tannic acid is preferable. Tannin or tannic acid may be either those
20 manufactured through chemical synthesis, or those extracted from fruit, leaves, flowers, bark and the like. With regard to tannin or tannic acid extracted from plants, the extracts from quebracho, wattle (mimosa), chestnut materials, myrobalan, gambir, hemlock, oak and the like can be exemplified. A
25 deoxidant inexpensive and highly safe can be obtained by using such an organic substance easily oxidized.

[0020]

As for an organic substance easily oxidized in detail, condensed tannin or tannic acid as a main component is
30 especially preferable. The deoxidizing performance of

condensed tannin can be stably maintained in the use of a deoxidant for long-term preservation of a preserved good because the chemical structure of the main skeleton is hardly changed by an alkaline agent or an environmental change, and
5 at the same time a functional group take part in a deoxidizing reaction is maintained.

[0021]

In an organic deoxidant according to the present invention, it is one of characteristics that calcium hydroxide
10 and calcium carbonate are used as an alkaline agent in the organic deoxidant according to the present invention, and content of the alkaline agent is 20 parts by weight to 200 parts by weight with respect to 100 parts by weight of a main component.

15 [0022]

An alkaline agent is a substance that interacts with water to show alkaline, and an essential substance for promotion of a deoxidizing reaction. In the present invention, calcium hydroxide and calcium carbonate are used in
20 combination as an alkaline agent.

[0023]

Calcium hydroxide is less active than another alkaline agent contained for a conventional organic deoxidant in reaction such as hydrolysis of an organic substance easily
25 oxidized that is a main component, and it is considered that a functional group take part in a deoxidizing reaction of an organic substance easily oxidized can be maintained. Further, it is considered that calcium hydroxide can stabilize the pH for causing a deoxidizing reaction by interaction with water,
30 and can achieve the stabilized deoxidizing reaction.

[0024]

With regard to the average particle size D_{50} of calcium hydroxide, 0.5 μm to 200 μm is preferable, 1 μm to 80 μm is more preferable and 2 μm to 60 μm is most preferable. When
5 the calcium hydroxide having such a powder property is used, superior deoxidizing performance and deoxidizing rate can be achieved, and thorough blending with another composition can be achieved in manufacturing of a deoxidant by kneading. When
10 the average particle size D_{50} of calcium hydroxide is less than 0.5 μm , the dust of the calcium hydroxide easily scatter and the dust may contaminate a sealing part when the powder is filled in a packaging material. The imperfect sealing may cause poor appearance, or generate powder leakage or the like, i.e. defectives may be manufactured. Further, troubles such
15 as uneven kneading, or sticking to a mixing vessel may be caused because of poor fluidizing ability by blocking in kneading raw materials constituting the deoxidant. On the other hand, the average particle size D_{50} of calcium hydroxide exceeding 200 μm is not preferable because the reaction rate
20 of a deoxidant decreases due to decrease in the specific surface area of the calcium hydroxide.

[0025]

Seemingly, a fine powder of calcium hydroxide as an alkaline agent would improve a deoxidizing reaction owing to
25 increase in the specific surface area, but a fine calcium hydroxide powder causes drawbacks in scattering tendency, poor kneadability with another composition, and poor fluidizing ability as described above. Then calcium carbonate is used together as an alkaline agent in an organic deoxidant
30 according to the present invention. As a result, even if a

fine calcium hydroxide powder is used, the manufacturing efficiency can be enhanced and the deoxidizing performance can be enhanced without drawbacks described above.

[0026]

5 In the organic deoxidant according to the present invention, addition of calcium carbonate can prevent scattering during mixing a main component solution and calcium hydroxide, and can have both a promoting function for a deoxidizing reaction as an alkaline agent, and a supporting
10 function for a main component solution. Because calcium carbonate is a weak alkaline agent having poor solubility in water and has large specific gravity, scattering of calcium hydroxide can be inhibited effectively when used together with calcium hydroxide as an alkaline agent. Further, calcium
15 carbonate holds a main component and can functions as a support which provides a site for a reaction. In the organic deoxidant according to the present invention, because both calcium carbonate and calcium hydroxide are used in combination as an alkaline agent, even if a fine calcium
20 hydroxide powder preferable for promoting a deoxidizing reaction is contained, scattering can be reduced, and further the calcium carbonate holds a main component, and also functions as an alkaline agent. As the result, a support, such as silicon dioxide contained as a support in a
25 conventional case is not required, and therefore the amount of an alkaline agent with respect to the total amount of an organic deoxidant can be increased, i.e. the deoxidizing performance can be enhanced. Further, although an organic deoxidant can increase the deoxidizing reaction rate by adding
30 a catalyst when required, an organic deoxidant according to

the present invention can promote the reaction by increasing the amount of an alkaline agent, and cost is reduced because amount of a catalyst to be added can be decreased.

[0027]

5 The content of calcium carbonate as an alkaline agent is preferable to be 5 parts by weight to 50 parts by weight with respect to 100 parts by weight of calcium hydroxide. Calcium carbonate content of less than 5 parts by weight is not
10 suitable for a deoxidant which is used by being filled and enclosed in a packaged good because scattering occurs in mixing process, and further the fluidizing ability decreases. Meanwhile, as calcium carbonate is a weak alkaline agent, the deoxidizing performance is not enough when just calcium carbonate is used as an alkaline agent for a deoxidant. So,
15 calcium carbonate content of exceeding 50 parts by weight with respect to 100 parts by weight of calcium hydroxide makes the content of calcium carbonate in an alkaline agent too high and is not preferable, because the deoxidization amount per unit weight of a deoxidant decreases.

20 [0028]

 Next, water is indispensable in an organic deoxidant according to the present invention. Water makes composition constituting a deoxidant easily blendable and provides a site for a reaction. Water content is preferable to be 10 parts by
25 weight to 200 parts by weight with respect to 100 parts by weight of a main component. Because the organic deoxidant according to the present invention contains calcium carbonate as an alkaline agent, even if the water content with respect to the main component is made high, acceptable fluidizing
30 ability can be ensured practically. When the water content is

less than 10 parts by weight with respect to 100 parts by weight of the main component, mixing of compositions of an organic deoxidant is made difficult to decrease the deoxidizing performance. By the way, because the organic deoxidant according to the present invention is used as enclosed state in a permeable packaging material, even if the organic deoxidant lacks water, deoxidizing performance can be performed by absorbing the water contained in a preserved good. However, minimum water content is 10 parts by weight with respect to 100 parts by weight of the main component even taking into consideration the above. Meanwhile, water content of exceeding 200 parts by weight with respect to 100 parts by weight of the main component is not suitable for automatic filling and packaging in a packaging material because fluidizing ability is made poor.

[0029]

In the organic deoxidant according to the present invention, a catalyst to enhance the reaction rate may be contained. As an applicable catalyst, inorganic catalysts including namely a hydrochlorate, a nitrate, and a sulfate of a transition metal, such as iron, nickel, copper, and manganese, or a salt of alkali metal such as sodium chloride or a salt of alkaline-earth metal; and organic catalysts including naphthohydroquinone, fluoroglycine, t-butylcatechol, t-butylhydroquinone and 5-methylresorcinol can be exemplified. In particular, organic catalysts not detected by a metal detector are preferable. Content of the catalyst is preferable to be 15 parts by weight or less with respect to 100 parts by weight of a main component. The organic deoxidant according to the present invention can achieve

enough deoxidizing performance even when the catalyst content is as low as 15 parts by weight or less because content of an alkaline agent is high as described above.

[0030]

5 Further, an activated carbon may be added. An activated carbon is effective for preventing the low molecular weight substance from scattering because the activated carbon captures a low molecular weight substance generated as the result of a deoxidizing reaction. Content of an activated
10 carbon is preferable to be 50 parts by weight or less with respect to 100 parts by weight of a main component. Activated carbon content of exceeding 50 parts by weight is not preferable because the deoxidizing reaction rate occasionally decreases.

15 [0031]

Then, the pH of the organic deoxidant prepared by mixing the raw materials is preferable to be 9 to 12. Because the organic deoxidant according to the present invention contains an organic substance easily oxidized, the organic substance
20 easily oxidized can exist stably and can stabilize the deoxidizing performance when the pH is within the range.

[0032]

Next, a manufacturing method of the organic deoxidant according to the present invention will be described. First,
25 to predetermined amount of a main component, water and a catalyst if required are added and mixed. To the mixture, calcium hydroxide and calcium carbonate are added in this order as alkaline agents and kneaded, followed by pulverization. Then, an activated carbon is added and mixed
30 if required, followed by filling and packaging in a permeable

packaging material to prepare a product of a packaged organic deoxidant.

[0033]

Packaged deoxidant: A packaged deoxidant according to the
5 present invention is the material that the deoxidant described
above is packaged in an oxygen permeable packaging material.
Because an organic deoxidant contains the constituent
materials described above and is a powder, the organic
deoxidant is packaged in an oxygen permeable packaging
10 material for convenience of practical use.

[0034]

A packaging material used for a packaged organic
deoxidant will be described. Any packaging material having
gas permeability in the thickness direction and permeate
15 oxygen can be used, but a laminate having both adequate gas
permeability and heat-sealability is preferable. Further,
materials water resistant and oil resistant are preferable.
For example, a laminate of a porous (polyester/polyethylene)
film, paper, and a porous polyethylene film laminated in this
20 order; and a laminate of paper or a nonwoven fabric and a
porous polyethylene film are used. Although a polyethylene
nonwoven fabric can be used alone, but a packaging material
that can prevent a deoxidant from spilling out of the
packaging material, and has superior sealability.

25 [0035]

Examples of an applicable packaging material include a
laminate of paper and a polyethylene sheet, a micro porous
membrane, a nonwoven fabric of a synthetic resin or a
composite film laminating an outer layer material and an inner
30 layer material. In particular, a composite film whose oxygen

permeability and the like is adjustable is especially preferable for a packaging material for a deoxidant. As a composite film, a laminate prepared by laminating an outer layer material and an inner layer material is especially
5 preferable. Materials constituting the respective layers of a composite film will be described below.

[0036]

An inner layer material is a film having oxygen permeability provided with fine through-holes in the thickness
10 direction. In addition, a material able to be bonded to an outer layer material by lamination is preferable. As a film material having such properties, polyethylene (PE) is preferable, and especially, low density polyethylene (LDPE), and linear low density polyethylene (LLDPE) are preferably
15 used.

[0037]

An outer layer material is preferable to be a material able to be bonded to an inner layer material by lamination and has oxygen permeability after bonding. A paper, a woven
20 fabric, a nonwoven fabric, and a micro porous membrane can be exemplified. Examples of a paper include a kraft paper, an oil repellent paper and a water repellent paper. Examples of a woven fabric and a nonwoven fabric include those using a material, such as polyester or polyamide.

25 [0038]

Further, the outer layer material may have an outermost layer film constituted of a film having a plurality of fine through-holes in the thickness direction. As for the outermost layer film, a film of a resin, such as polyester,
30 polyethylene, and polypropylene, may be used. The fine

through-holes provided in the outermost layer film may be formed either before or after the lamination. However, to assure reliable permeability, it is better to form the fine through-holes before the lamination. Furthermore, the shape
5 of the fine through-holes is not always a circle, various shapes are available depending on a piercing process.

[0039]

An outer layer material may be a laminate of a paper and a film of polyethylene terephthalate (hereinafter referred to
10 as "PET") as an outermost layer film, for example. That is, the manner that an outermost layer film prepared by coating polyethylene on a polyester film is used and the coated polyethylene surface of the outermost layer film is laminated by thermal compression bonding by contacting with a paper
15 makes lamination easy. When an outer layer material provided with such an outermost layer film is used, the air permeability can be more accurately adjusted by forming a plurality of fine through-holes also in the outermost layer film.

20 [0040]

With an outer layer material and an inner layer material prepared as described above, a composite film may prepared by laminating a film constituting an inner layer material and a paper constituting an outer layer material by thermal
25 compression bonding. As a process for laminating the respective layers, a thermal compression bonding process or a dry lamination process may be applied.

[0041]

Although materials and the like for an outer layer
30 material and an inner layer material are exemplified above,

there is no particular restriction on a composite film with respect to a combination of materials for the respective layers. Materials at least having oxygen permeability, and are able to have the configuration by laminating outer layer material and inner layer material are applicable.

[0042]

The present invention will be described more specifically by showing Example and Comparative Example. It should be noted that the Examples do not limit the scope of the invention in any way.

[Example 1]

[0043]

11 g of condensed tannin (tannin extracted from quebracho) as a main component and 11 g of water were mixed. Then, 9.1 g of calcium hydroxide (average particle size D_{50} of 4.7 μm) and 3.9 g of calcium carbonate were added to the mixture as alkaline agents in this order followed by kneading. In this operation, the fluidizing ability of the main component was excellent and kneading was easy. Thereafter, 2.0 g of an activated carbon was added to prepare an organic deoxidant. To measure the pH of the prepared organic deoxidant, 99 g of distilled water was added to one gram of the organic deoxidant followed by stirring to prepare a suspension of 1%; temperature of the suspension was kept at 25°C and the pH was measured by a pH meter HK-1K by DKK-Toa Corporation. As the result, pH of the organic deoxidant of Example 1 was 11.1.

[0044]

As a packaging material for a deoxidant, an oxygen permeable composite film having the Gurley air permeability of 8000 sec/100 mL-air prepared by thermal lamination of an outer layer material of a porous polyester/polyethylene laminate film with the thickness of 12 μm , a middle layer material of a 50 g/m² water-proof, oil-proof paper, and an inner layer material of a porous polyethylene film with the thickness of 25 μm . A packaging bag in the outer size of 65 mm $\times$ 55 mm was prepared by sealing 3 sides of the packaging material, and 4 g of the organic deoxidant was filled in the packaging bag; then the opening was sealed by thermal lamination to prepare a packaged organic deoxidant. In the enclosing process of the organic deoxidant into the packaging material, scattering could be suppressed, and there was substantially no contamination of the organic deoxidant at a sealing part after thermal lamination; so, there was no defective product generated even with a manufacturing rate and manufacturing volume for mass production.

[0045]

Next, the packaged organic deoxidant together with an absorbent cotton soaked with a sodium chloride aqueous solution with the water activity of 0.95 were placed in a hermetic bag A prepared using a gas barrier bag (220 $\times$ 300 mm) made of a polyvinylidene chloride coat/polyethylene laminate film, and then 1500 mL of air was filled followed by closing hermetically. Further, a hermetic bag B was prepared using a gas barrier bag (220 $\times$ 150 mm) made of a polyvinylidene chloride coat/polyethylene laminate film, the packaged organic deoxidant together with an absorbent cotton soaked with a sodium chloride aqueous solution with the water activity of

0.95 were placed in the bag, and then 500 mL of air was filled, followed by closing hermetically.

[0046]

The absorbed oxygen quantity of the prepared packaged
5 organic deoxidant was measured. The hermetic bag A was kept
at room temperature (25°C) and the oxygen concentration (%) in
the bag after 7 days was measured by a zirconia-based oxygen
analyzer LC-700F manufactured by Toray Engineering Co., Ltd.
to calculate an oxygen absorption quantity per 1 package of
10 the deoxidant (mL/package). An oxygen absorption quantity per
one gram of the main component (mL/g-main component) was
evaluated by calculation. Further, the hermetic bag B was
kept at room temperature (25°C) and the oxygen concentration
after 24 hours was measured and the oxygen absorption rate was
15 evaluated. The results are shown in Table 1.

[Example 2]

[0047]

11 g of condensed tannin (tannin extracted from
20 quebracho) as a main component and 11 g of water were mixed.
0.14 g of t-butylcatechol as a catalyst was then added and
mixed. To the mixture, 9.1 g of calcium hydroxide (average
particle size D_{50} of 4.7 μm) and 3.9 g of calcium carbonate
were added in this order as alkaline agents followed by
25 kneading. Then, 2.0 g of an activated carbon was added,
kneaded, and ripened to prepare an organic deoxidant. The pH
of the prepared organic deoxidant measured as in Example 1 was
11.0.

[0048]

The organic deoxidant prepared in Example 2 was filled and enclosed in the packaging bag as same with Example 1. In the enclosing process of the organic deoxidant into the packaging material, scattering could be suppressed, and there
5 was substantially no contamination of the organic deoxidant at a sealing part after thermal lamination. Further, there was no defective product generated even with a manufacturing rate and manufacturing volume for mass production. The oxygen absorption quantity and the oxygen absorption rate were
10 measured by the same methods as in Example 1. The results are shown in Table 1.

[Comparative Example]

[0049]

15 In Comparative Example, calcium hydroxide alone was used as an alkaline agent and silicon dioxide was used as a support will be exemplified. 8.0 g of condensed tannin (tannin extracted from quebracho) as a main component and 7.3 g of water were mixed. To the mixture, 0.72 g of t-butylcatechol
20 was added as a catalyst. Then, 2.2 g of silicon dioxide was added to the mixture and mixed. Next, 5.4 g of calcium hydroxide (average particle size D_{50} of 4.7 μm) was added as an alkaline agent and kneaded. Thereafter, 0.4 g of an activated carbon was added to prepare an organic deoxidant.
25 In the kneading process, the organic deoxidant of Comparative Example was poorer in fluidizing ability compared to Examples 1 and 2 and required longer time for kneading. The pH of the prepared organic deoxidant measured as in Example 1 was 9.7.

[0050]

The organic deoxidant prepared in Comparative Example was filled in the same packaging bag as in Examples. In filling and packaging process, scattering of the organic deoxidant was heavy. In a manufacturing test for mass production, the
5 packaging bag could not be sealed hermitically by means of thermal lamination due to contamination of an organic deoxidant at a sealing part, and some defective products were generated. The oxygen absorption quantity and the oxygen absorption rate were measured by the same methods as in
10 Examples. The results are shown in Table 1.

[0051]

[Table 1]

		Example 1	Example 2	Comparative Example
Composition	Main component (g)	1.189	1.185	1.336
	Calcium hydroxide (g)	0.984	0.980	0.908
	Calcium carbonate (g)	0.422	0.420	-
	Water (g)	1.189	1.185	1.212
	t-Butylcatechol (g)	-	0.015	0.12
	Activated carbon (g)	0.216	0.215	0.06
	Support (g)	-	-	0.364
Oxygen absorption quantity per one package of packaged organic deoxidant after 7 days (ml)		225	231	233
Oxygen absorption quantity per one gram of main component by packaged organic deoxidant after 7 days (ml)		172	205	175
Oxygen concentration in hermetic bag B after 24 hours (vol %)		1.9	less than 0.1	less than 0.1

[0052]

In Example 1, the oxygen concentration in the hermetic bag B after 24 hours was higher than in Example 2, and it shows that oxygen absorption rate is lower. The difference
5 may be caused by no addition of a catalyst. However, in the hermetic bag B in Example 1 further kept at room temperature (25°C) showed the oxygen concentration of less than 0.1 vol% after 42 hours. That is, the organic deoxidant prepared in Example 1 satisfies a level of the oxygen absorption
10 performance required for a slow-acting deoxidant to be used for mainly a long-term preserved good.

[0053]

Examples and Comparative Example will be compared. With regard to the oxygen absorption quantities after 7 days, the
15 oxygen concentrations in a hermetic bag after 7 days in Example 2 and Comparative Example are almost same and are considered to be acceptable in practical use. However, the oxygen absorption quantity per one gram of the main component of the packaged organic deoxidant prepared in Example 2 is
20 much higher than that of Comparative Example. The matters demonstrate that the deoxidizing performance of the main component was improved. In comparison of Example 1 and Comparative Example, the oxygen absorption quantities are almost same. However, Example 1 is excellent in scattering
25 suppression at filling and packaging, i.e. the filling property is superior. So, generation of defective products can be suppressed and the manufacturing efficiency can be improved.

INDUSTRIAL APPLICABILITY

[0054]

An organic deoxidant according to the present invention is a deoxidant not detected by a metal detector and the
5 deoxidizing performance is improved, and same time, suppressed scattering of raw materials during the manufacturing and excellent fluidizing ability make the manufacturing efficiency improve. So, an organic deoxidant according to the present invention is applicable as a deoxidant used in preserved goods
10 subjected to an inspection by a metal detector such as a processed marine good, and a processed agricultural good.

CLAIMS

[Claim 1]

An organic deoxidant comprising an organic substance easily oxidized as a main component; an alkaline agent; and water;

characterized in that the alkaline agent is composed of calcium hydroxide and 5 parts by weight to 50 parts by weight of calcium carbonate with respect to 100 parts by weight of calcium hydroxide, and

the content of the alkaline agent is 20 parts by weight to 200 parts by weight with respect to 100 parts by weight of the main component.

[Claim 2]

The organic deoxidant according to claim 1, wherein the organic substance easily oxidized is tannin or tannic acid.

[Claim 3]

The organic deoxidant according to claim 1 or claim 2, wherein the content of the water is 10 parts by weight to 200 parts by weight with respect to 100 parts by weight of the main component.

[Claim 4]

The organic deoxidant according to any one of claim 1 to claim 3, wherein the content of a catalyst is 15 parts by weight or less with respect to 100 parts by weight of the main component.

[Claim 5]

The organic deoxidant according to any one of claim 1 to claim 4, wherein pH after mixing the raw materials is 9 to 12.

[Claim 6]

A packaged deoxidant, comprising the organic deoxidant according to any one of claim 1 to claim 5 packaged in an oxygen permeable packaging material.