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DESCRIPTION CN1830259A

A chlorine dioxide disinfectant and its preparation method

[0001]

Technical Field

[0002]

This invention relates to a chlorine dioxide disinfectant and its preparation method, specifically to a bagged chlorine dioxide disinfectant and its preparation method.

[0003]

Background Technology

[0004]

Chlorine dioxide (ClO₂) is a strong oxidant and an excellent, efficient, broad-spectrum, non-toxic, and residue-free disinfectant.

Because it does not produce "carcinogenic, teratogenic, or mutagenic" effects, it is currently hailed worldwide as a fourth-generation disinfectant. It has the best overall performance among the four commonly used bactericidal disinfectants (O₃, ClO₂,

Cl₂ and chloramine), and its safety is classified as A1 by the World Health Organization. It is a recognized ideal replacement for chlorine-based disinfectants.

Chlorine dioxide can kill almost all common pathogenic microorganisms, fungi, and viruses. Its applications cover almost all industries. In addition to being used as a disinfectant, it can also be used as a water treatment agent, oxidizing decolorizing and deodorizing agent, bleaching agent, preservative, food additive, and cleaning agent.

[0005]

Currently used disinfectants with chlorine dioxide as the active ingredient are mainly in liquid, liquid-solid mixture, and solid formulations.

[0006]

The liquid dosage forms are mainly stable chlorine dioxide solutions and liquid acids, and most of them are packaged in binary liquid form.

This system, which uses liquid acid to activate stable chlorine dioxide, requires a pH value below 0.5 for complete activation.

However, the high acidity makes the system highly corrosive, which limits the use of liquid chlorine dioxide disinfectant in some places, and it is also very inconvenient to transport and store.

[0007]

Liquid-solid mixture formulations mainly consist of stable chlorine dioxide solutions and solid acids. On the one hand, this type of chlorine dioxide disinfectant, like liquid chlorine dioxide disinfectant, suffers from inconveniences in transportation, storage, and use; on the other hand, activation with solid acids results in low activation efficiency and high costs.

[0008]

Currently, common solid-form chlorine dioxide disinfectants mainly include the following types: First, sodium chlorite plus solid acid, packaged separately in binary packaging; Second, sodium chlorite plus passivating agent, packaged together with solid acid in mono-form

packaging; Third, stable chlorine dioxide solution is adsorbed onto a porous material with a high specific surface area, packaged together with solid acid in mono-form or binary form.

While solid chlorine dioxide disinfectant is convenient for transportation and storage, the pH value of the system is difficult to reach below 0.5 when sodium chlorite is activated with solid acid. This results in a low activation rate of chlorine dioxide in the system and a large amount of chlorite ions, leading to high costs and acid corrosion.

[0009]

Summary of the Invention

[0010]

The purpose of this invention is to overcome the shortcomings of existing chlorine dioxide disinfectants, which have high acidity when activated with liquid acid, resulting in strong corrosiveness, low activation efficiency when activated with solid acid, and inconvenience in transportation, storage, and use of liquid and liquid-solid mixtures. The invention aims to provide a chlorine dioxide disinfectant with high activation efficiency, moderate acidity, and ease of transportation, storage, and use.

[0011]

The objective of this invention is achieved through the following technical solution:

[0012]

The chlorine dioxide disinfectant provided by this invention comprises the following components in the following weight ratios:

[0013]

Chlorite 1–80 parts by weight; and

[0014]

Persulfate: 1-80 parts by weight.

[0015]

The chlorites include ammonium chlorite, lithium chlorite, sodium chlorite, and potassium chlorite; the persulfates include ammonium persulfate, lithium persulfate, sodium persulfate, and potassium persulfate.

[0016]

The chlorine dioxide disinfectant provided by this invention further includes:

[0017]

Water absorbent agent: 1-60 parts by weight; or/and

[0018]

Activator: 1-38 parts by weight; or/and

[0019]

Sodium chloride: 1-50 parts by weight;

[0020]

The activator is sodium dodecyl sulfate or sodium dodecylbenzene sulfonate.

[0021]

The absorbent agents include anhydrous sodium sulfate, anhydrous magnesium sulfate, and anhydrous calcium chloride.

[0022]

The chlorine dioxide disinfectant provided by the present invention further includes: the mixture being packaged in an inner bag and an outer bag thereon; the inner bag is made of one selected from cellulose and its derivatives, polysulfone, polyamide, polyester, polyolefin, silicon-containing polymer, fluoropolymer, and chitosan; the outer bag is made of a mixture of cellophane and polyethylene, or a mixture of polyester and polyethylene.

[0023]

This invention provides a method for preparing the above-mentioned chlorine dioxide disinfectant, comprising the following steps:

[0024]

After drying 1-80 parts by weight of chlorite and 1-80 parts by weight of persulfate, they are pulverized to 15-1200 mesh and then mixed evenly.

[0025]

The chlorites include ammonium chlorite, lithium chlorite, sodium chlorite, and potassium chlorite; the persulfates include ammonium persulfate, lithium persulfate, sodium persulfate, and potassium persulfate.

[0026]

The method for preparing chlorine dioxide disinfectant provided by the present invention further includes the following steps:

[0027]

Dry 1-60 parts by weight of water absorbent, and/or 1-38 parts by weight of activator, and/or 1-50 parts by weight of sodium chloride separately, pulverize them to 15-1200 mesh, add them to the above mixture, and mix evenly.

[0028]

The activator is sodium dodecyl sulfate or sodium dodecylbenzene sulfonate.

[0029]

The absorbent agents include anhydrous sodium sulfate, anhydrous magnesium sulfate, and anhydrous calcium chloride.

[0030]

The method for preparing chlorine dioxide disinfectant provided by the present invention further includes the following steps:

[0031]

The chlorine dioxide disinfectant provided by the present invention further includes:

packaging the mixture in an inner bag according to the required amount for use, and having an outer bag thereon, and sealing it; the inner bag is made of one selected from cellulose and its derivatives, polysulfone, polyamide, polyester, polyolefin, silicon-containing polymer, fluoropolymer, and chitin; the outer bag is made of a mixture of cellophane and polyethylene, or a mixture of polyester and polyethylene.

[0032]

When using, the chlorine dioxide disinfectant powder mixture provided by this invention can be directly added to water according to the required concentration; alternatively, the outer bag of the bagged chlorine dioxide disinfectant provided by this invention can be opened, and the inner bag can be directly placed into a certain amount of water. The disinfectant continuously generates chlorine dioxide in the water, forming a chlorine dioxide aqueous solution.

[0033]

The chlorine dioxide disinfectant provided by this invention has the following advantages compared with existing chlorine dioxide disinfectants that use acid as an activator:

[0034]

1. The chlorine dioxide solution obtained by this invention has a pH value between 6 and 8, which solves the problem of acid corrosion of chlorine dioxide disinfectant, especially the problem of equipment corrosion in field hospitals or rescue units under wartime conditions;

[0035]

2. The chlorine dioxide of this invention has a high activation rate, which can reach over 90%;

[0036]

3. The activator used in this invention can more effectively kill viruses, such as pathogenic microorganisms, fungi and viruses, especially various pathogenic microorganisms, fungi and viruses in biological warfare;

[0037]

4. This invention uses a bagged form, which can create a high concentration of chlorite and persulfate ions in a localized manner. This solves the problem of slow activation of chlorine dioxide from a chemical kinetics perspective, achieving an activation rate of over 80% within 5 minutes.

[0038]

5. This invention adopts a bagged form, which is suitable for the needs of troops in field operations, especially in wartime. Its small packaging volume is convenient for troop transportation, especially for each member of a small troop to carry with them. It has good stability and is conducive to long-term storage, especially in high humidity environments.

[0039]

6. The preparation method of the present invention uses readily available and inexpensive raw materials, has low cost, simple process, requires few equipment, and is suitable for small-scale and large-scale industrial production, which can fully meet the needs of emergency production and equipment during wartime.

[0040]

Detailed Implementation

[0041]

Example 1

[0042]

1g ammonium chlorite, 80g sodium persulfate, 18g anhydrous sodium sulfate and 1g sodium dodecyl sulfate were dried separately and then pulverized to 1200 mesh. Anhydrous sodium sulfate was added to ammonium chlorite and mixed evenly. Then sodium dodecyl sulfate was added and mixed evenly. Finally, 50g sodium chloride was added and mixed evenly. Finally, sodium persulfate was added and mixed evenly to obtain the chlorine dioxide disinfectant powder provided by this invention.

[0043]

Pack 100 grams of chlorine dioxide disinfectant powder into an inner bag made of cellulose and seal the inner bag.

Place the inner bag inside the outer bag made of cellophane/polyethylene, seal it, and you will get the chlorine dioxide disinfectant in a pouch for later use.

[0044]

When using, the chlorine dioxide disinfectant powder can be directly added to water according to the required concentration; alternatively, the outer bag of the chlorine dioxide disinfectant can be opened and the inner bag can be placed directly into a certain amount of water. The disinfectant will continuously produce chlorine dioxide in the water, forming a chlorine dioxide aqueous solution.

[0045]

Examples 2-4

[0046]

Chlorine dioxide disinfectant powder and bagged formulation were prepared according to the method in Example 1, and their components are shown in the table below:

[0047]

Table 1
