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(54) **Title**: SYSTEMS AND METHODS FOR GENERATING GERMICIDAL COMPOSITIONS

(57) **Abstract**: The present invention relates to systems and methods for generating germicidal compositions for use in a wide variety of settings, including agricultural settings, food production settings, hospitality settings, health care settings, health club settings, exercise facility settings, research based settings, veterinarian settings, medical settings, hydraulic fracturing settings, and/or any setting requiring disinfection.

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SYSTEMS AND METHODS FOR GENERATING GERMICIDAL COMPOSITIONS

FIELD OF THE INVENTION

The present invention relates to systems and methods for generating germicidal compositions for use in a wide variety of settings, including agricultural settings, food production settings, hospitality settings, health care settings, health club settings, exercise facility settings, research based settings, veterinarian settings, medical settings, hydraulic fracturing settings, and/or any setting requiring disinfection.

BACKGROUND

Today's consumer demands that the product they are provided be of the highest quality and safe to eat or drink. The production and processing of safe, nutritional, high quality milk and food starts on the farm. As farms get larger their ability to defend and control their operations against pest and harmful micro-organisms becomes even more critical. Pure water, animal and premise hygiene are indispensable in a well-managed operation (e.g., agricultural setting).

Improved and more comprehensive on-farm hygiene tools leading to a safe and wholesome agriculturally-based products (e.g., milk and food products) and healthy animals for the generation of such products are needed.

SUMMARY OF THE INVENTION

The present invention relates to systems and methods for generating germicidal compositions for use in a wide variety of settings, including agricultural settings, food production settings, hospitality settings, health care settings, health club settings, exercise facility settings, research based settings, veterinarian settings, medical settings, hydraulic fracturing settings, and/or any setting requiring disinfection.

The systems and methods of the present invention provide new levels of hygiene protection, providing solutions created on-site, with superior germicidal efficacy at a fraction of the cost of current germicidal alternatives. For example, the systems and methods of the present invention provide the ability to create a concentrated germicidal solution, to be used in a multitude of on-farm applications, at a fraction of the cost of common disinfectants. Moreover, the present invention provides compositions configured for specific disinfectant purposes.

Accordingly, in certain embodiments, the present invention provides systems comprising a sodium chloride solution, water, an electrolytic cell, and at least one chamber wherein the

electrolytic cell is configured to a) receive the sodium chloride solution mixed with the water, b) remove hydrogen from the sodium chloride solution mixed with the water, and c) generate a germicidal composition and wherein the chamber is configured to receive the germicidal composition generated with the electrolytic cell.

The systems are not limited to a particular manner of generating the germicidal composition. In some embodiments, the germicidal composition is generated through removal of hydrogen from the sodium chloride solution mixed with the water. In some embodiments, the electrolytic cell is configured to generate the germicidal composition comprising a combination of chlorine, hypochlorite, hypochlorous acid and chlorine dioxide.

In some embodiments, the germicidal composition is measured in parts per million (PPM) of free available chlorine (FAC). The combination of chlorines (e.g., a combination of chlorine, hypochlorite, hypochlorous acid and chlorine dioxide) has been proven to be many times more effective than common chlorine bleach (sodium hypochlorite), and is safe when applied on skin tissue. In some embodiments, the PPM of FAC in a germicidal composition can be modified to meet the needs of a wide range of dairy sizes and desired uses / needs. In some embodiments, the system and methods of the present invention are capable of generating germicidal composition at any desired amount and/or concentration (e.g., in an amount from 125,000 PPM of FAC up to 25,000,000 PPM of FAC within a 24 hour production period) (e.g., in a range from 1,440,000 PPM of FAC (e.g., 180 gallons of 8,000 PPM of FAC) up to 4,800,000 PPM of FAC within a 24 hour production period)).

The systems of the present invention are not limited to use within a particular setting. Indeed, in some embodiments, the systems may be used in facility settings (e.g., external sanitation; flooring sanitation; equipment sanitation; vehicle sanitation; etc.), food settings (e.g., food preparation settings; animal eating settings; storage of food settings), water treatment settings, and/or animal hygiene settings.

In some embodiments, the system further comprises two or more additional agents, wherein the two or more additional agents are stored in a manner permitting combination of a generated germicidal composition with any combination (e.g., via blending / mixing) of two or more of the additional agents.

The present invention is not limited to a particular manner of combination of the germicidal composition and the two or more additional agents. In some embodiments, the combination is configured to occur automatically. In some embodiments, the system is configured to provide any programmed amount of the two or more additional agents for purposes of combination.

The present invention is not limited to particular additional agents. Examples of an additional agent includes, but is not limited to, water, a detergent polymer (e.g., Acusol), a surfactant (e.g., tomadol ethoxylate) (e.g, an ionic surfactant) (e.g., a non-ionic surfactant) (e.g., a cationic quarternary ammonion compound (e.g., cetylpyridinium chloride (e.g., Ammonyx)) (e.g., alkyl dimethyl benzylammonium chloride (e.g., BTC-835)) (e.g., an amphoteric surfactant (e.g., KDC-3) (e.g., amphoteric LH)), a hydrotope (e.g., sodium xylene sulfonate), a dye (e.g., tartrazine (dye keyacid tart yellow)) (e.g., blue dye) (e.g., green grams), citric acid, an emollient (e.g., propylene glycol) (e.g., urea), a sequestration agent (e.g., chelating agent (e.g., versene 100 / sequestrene 30A)) (e.g., potassium hydroxide (e.g., caustic potash)) (e.g., sodium hydroxide (e.g., caustic soda)) (e.g., magnesium hydroxide (e.g., flogel)), an odorant (e.g., perfume), a mineral acid (e.g., Videt A-85), and a medicinal agent for animal hygiene, facility hygiene, general sanitization, disinfection and water treatment preparation purposes.

In some embodiments, the system generates a combination of a germicidal composition and water, a detergent polymer (e.g., Acusol), a surfactant (e.g., tomadol ethoxylate) (e.g, an ionic surfactant) (e.g., a non-ionic surfactant) (e.g., a cationic quarternary ammonion compound (e.g., cetylpyridinium chloride (e.g., Ammonyx)) (e.g., alkyl dimethyl benzylammonium chloride (e.g., BTC-835)) (e.g., an amphoteric surfactant (e.g., KDC-3) (e.g., amphoteric LH)), a hydrotope (e.g., sodium xylene sulfonate), and a dye (e.g., tartrazine (dye keyacid tart yellow)) (e.g., blue dye) (e.g., green grams). In some embodiments, such a combination is configured for pre-milking udder preparation purposes.

In some embodiments, the system generates a combination of a germicidal composition and water, a detergent polymer (e.g., Acusol), citric acid, a surfactant (e.g., tomadol ethoxylate) (e.g, an ionic surfactant) (e.g., a non-ionic surfactant) (e.g., a cationic quarternary ammonion compound (e.g., cetylpyridinium chloride (e.g., Ammonyx)) (e.g., alkyl dimethyl benzylammonium chloride (e.g., BTC-835)) (e.g., an amphoteric surfactant (e.g., KDC-3) (e.g., amphoteric LH)), an emollient (e.g., propylene glycol) (e.g., urea), a sequestration agent (e.g., chelating agent (e.g., versene 100 / sequestrene 30A)) (e.g., potassium hydroxide (e.g., caustic potash)) (e.g., sodium hydroxide (e.g., caustic soda)) (e.g., magnesium hydroxide (e.g., flogel)), and a dye (e.g., tartrazine (dye keyacid tart yellow)) (e.g., blue dye) (e.g., green grams). In some embodiments, such a combination is configured for post-milking teat purposes.

The present invention further provides post-milking teat solutions having a noticeable color when applied to a tissue (e.g., a teat) (e.g., blue, red, yellow, black, orange). In some embodiments, the color is configured to remain noticeable when applied to a tissue for an

extended period of time (e.g., 1 minute, 10 minutes, 20 minutes, 1 hour, 6 hours, 12 hours, 1 day, etc.).

In some embodiments, the system generates a combination of a germicidal composition and water, a surfactant (e.g., tomadol ethoxylate) (e.g, an ionic surfactant) (e.g., a non-ionic surfactant) (e.g., a cationic quarternary ammonion compound (e.g., cetylpyridinium chloride (e.g., Ammonyx)) (e.g., alkyl dimethyl benzylammonium chloride (e.g., BTC-835)) (e.g., an amphoteric surfactant (e.g., KDC-3) (e.g., amphoteric LH)), a sequestration agent (e.g., chelating agent (e.g., versene 100 / sequestrene 30A)) (e.g., potassium hydroxide (e.g., caustic potash)) (e.g., sodium hydroxide (e.g., caustic soda)) (e.g., magnesium hydroxide (e.g., flogel)), an odorant (e.g., perfume), and a dye (e.g., tartrazine (dye keyacid tart yellow)) (e.g., blue dye) (e.g., green grams). In some embodiments, such a combination is configured for laundry purposes.

In some embodiments, the system generates a combination of a germicidal composition and water, a sequestration agent (e.g., chelating agent (e.g., versene 100 / sequestrene 30A)) (e.g., potassium hydroxide (e.g., caustic potash)) (e.g., sodium hydroxide (e.g., caustic soda)) (e.g., magnesium hydroxide (e.g., flogel)), and a detergent polymer (e.g., Acusol). In some embodiments, such a combination is configured for cleaning-in-place purposes.

In some embodiments, the system generates a combination of a germicidal composition and water, a detergent polymer (e.g., Acusol), a sequestration agent (e.g., chelating agent (e.g., versene 100 / sequestrene 30A)) (e.g., potassium hydroxide (e.g., caustic potash)) (e.g., sodium hydroxide (e.g., caustic soda)) (e.g., magnesium hydroxide (e.g., flogel)), a **hydrotope** (e.g., sodium xylene sulfonate), a surfactant (e.g., tomadol ethoxylate) (e.g, an ionic surfactant) (e.g., a non-ionic surfactant) (e.g., a cationic quarternary ammonion compound (e.g., cetylpyridinium chloride (e.g., Ammonyx)) (e.g., alkyl dimethyl benzylammonium chloride (e.g., BTC-835)) (e.g., an amphoteric surfactant (e.g., KDC-3) (e.g., amphoteric LH)). In some embodiments, such a combination is configured for premise purposes.

In some embodiments, the system generates a combination of a germicidal composition and water, a surfactant (e.g., tomadol ethoxylate) (e.g, an ionic surfactant) (e.g., a non-ionic surfactant) (e.g., a cationic quarternary ammonion compound (e.g., cetylpyridinium chloride (e.g., Ammonyx)) (e.g., alkyl dimethyl benzylammonium chloride (e.g., BTC-835)) (e.g., an amphoteric surfactant (e.g., KDC-3) (e.g., amphoteric LH)), and a mineral acid (e.g., Videt A-85). In some embodiments, such a combination is configured for footbath purposes.

In some embodiments, the system generates a germicidal composition configured for use in hydraulic fracturing settings. The system is not limited to a particular hydraulic fracturing

setting. In some embodiments, the hydraulic fracturing setting involves extraction of oil. In some embodiments, the hydraulic fracturing setting involves extraction of natural gas. The germicidal compositions are not limited to a particular use within a hydraulic fracturing setting. In some embodiments, the germicidal composition is used to inhibit and/or kill the growth of bacteria and/or microorganisms associated within a hydraulic fracturing setting. In some embodiments, the germicidal compositions are configured to prevent the bacteria and/or microorganisms from producing contaminate byproducts (e.g., gas). In some embodiments, the germicidal compositions are configured to prevent the bacteria and/or microorganisms from interfering with (e.g., breaking down) agents used in hydraulic fracturing (e.g., gelling agents) (e.g., fracturing fluid). In some embodiments, the germicidal compositions used to inhibit and/or kill the growth of bacteria and/or microorganisms associated within a hydraulic fracturing setting is combined with one or more additional agents. Examples of additional agents include, but are not limited to, water, a detergent polymer (e.g., Acusol), a surfactant (e.g., tomadol ethoxylate), cetylpyridinium chloride (e.g., Ammonyx), sodium xylene sulfonate, an amphoteric surfactant (e.g., KDC-3), a surfactant (e.g., tomadol ethoxylate) (e.g, an ionic surfactant) (e.g., a non-ionic surfactant) (e.g., a cationic quarternary ammonion compound (e.g., cetylpyridinium chloride (e.g., Ammonyx)) (e.g., alkyl dimethyl benzylammonium chloride (e.g., BTC-835)) (e.g., an amphoteric surfactant (e.g., KDC-3) (e.g., amphoteric LH)), a dye (e.g., tartrazine (dye keyacid tart yellow)), citric acid, an emollient (e.g., propylene glycol) (e.g., urea), blue dye, a sequestration agent (e.g., chelating agent (e.g., versene 100 / sequestrene 30A)) (e.g., potassium hydroxide (e.g., caustic potash)) (e.g., sodium hydroxide (e.g., caustic soda)) (e.g., magnesium hydroxide (e.g., flogel)), an odorant (e.g., perfume), a dye (e.g., green grams), alkyl dimethyl benzylammonium chloride (e.g., BTC-835), a mineral acid (e.g., Videt A-85), and a medicinal agent. In some embodiments, the germicidal composition is co-administered with an additional bactericide and/or biocide (e.g., 2,2-Dibromo-3-nitrilopropionamide, polynuclear aromatic hydrocarbons, polycyclic organic matter, gluteraldehyde).

In some embodiments, the system is a closed system (e.g., for maintaining a sterile setting) (e.g., for maintaining a controlled setting).

In some embodiments, the systems further comprise a processor running an algorithm. In some embodiments, the algorithm is configured regulate the generation of the germicidal composition. In some embodiments, the algorithm is configured to regulate the combination of the germicidal composition with the two or more additional agents. In some embodiments, the algorithm is configured to present alerts regarding the system. Examples of such alerts include, but are not limited to, germicidal composition amount levels, time periods, identifications of

used additional agents, system malfunctions, additional agent amount levels, sterility contaminations, amount levels of the germicidal composition combined with the additional agents.

In certain embodiments, the present invention provides methods for generating compositions comprising germicidal compositions combined with additional agents with such a system.

In certain embodiments, the present invention provides compositions generated with such systems and/or methods.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 depicts a process involving Electro-Chemical Activation, which involves the process of passing a sodium chloride solution, and treated water (1) through an electrolytic cell (2) in order to generate, by electro-chemical energy conversion, a germicidally active solution (3).

Figure 2 shows a system for generating ECAcept Concentrate (see, e.g., Brine Tank and Process Tank), and combining it with additional agents (see, e.g., Additive 1A, Additive 2A, and Additive 3A) via the mixing station to create modified EACcept Concentrate (see, e.g., 1B, 2B, 3B).

DETAILED DESCRIPTION

The systems and methods of the present invention are not limited to use and/or application within a particular setting. In some embodiments, the systems and methods of the present invention are used within an animal-based setting (e.g., agricultural, veterinarian, academic, research based, etc). In some embodiments, the systems and methods of the present invention are used within a hydraulic fracturing setting. In some embodiments, the systems and methods of the present invention are used within any setting requiring use and/or application of a disinfectant.

In particular, the present invention utilizes Electro-Chemical Activation (ECA). The present invention is not limited to particular technique or mechanism associated with ECA. In some embodiments, ECA involves the process of passing a sodium chloride solution, and treated water (1) through an electrolytic cell (2) in order to generate, by electro-chemical energy conversion, a germicidally active solution (3) (see, e.g., Figure 1). Accordingly, the present invention provides devices, systems and methods utilizing ECA.

The present invention are not limited to a particular sodium chloride solution. In some embodiments, the sodium chloride solution is ECAcept Activator solution. The present invention is not limited to a particular ECAcept Activator solution. In some embodiments, the ECAcept Activator solution comprises an aqueous, purified sodium chloride solution. In some embodiments, the sodium chloride solution is a brine solution. The present invention is not limited to particular concentration and/or purification parameters for the sodium chloride solution.

The present invention is not limited to a particular electrolytic cell. In some embodiments, the electrolytic cell is configured to efficiently and reliably generate chlorine from a base solution (e.g., a base solution comprising a sodium chloride solution). In some embodiments, the electrolytic cell is configured to liberate hydrogen from a base solution (e.g., a base solution comprising a sodium chloride solution). In some embodiments, the electrolytic cell is configured for passive and/or active hydrogen removal. In some embodiments, the electrolytic cell is configured for high velocity electrolyte flow, sodium chloride solution conductivity control, full wave D.C. rectification, recirculating cell loop, and/or no cell electrode penetrations. In some embodiments, the electrolytic cell is configured to generate a solution comprising chlorine, hypochlorite, hypochlorous acid and chlorine dioxide from a sodium chloride solution. In some embodiments, the electrolytic cell is as described or similar to the electrolytic cells described in U.S. Patent No. 7,897,022, U.S. Patent Application Serial Nos. 13/026,947 and 13/026,939; each of which are herein incorporated by reference in their entireties.

The present invention is not limited to a particular germicidally active solution. In some embodiments, the germicidally active solution is ECAcept Concentrate. The systems and methods of the present invention are not limited to a particular ECAcept Concentrate. In some embodiments, the ECAcept Concentrate solution is, for example, a combination of chlorine, hypochlorite, hypochlorous acid and chlorine dioxide.

Accordingly, the present invention provides compositions comprising ECAcept Concentrate. The ECAcept Concentrate is not limited to particular measurement and/or concentration parameters. In some embodiments, the ECAcept Concentrate is measured in parts per million (PPM) of free available chlorine (FAC). The combination of chlorines has been proven to be many times more effective than common chlorine bleach (sodium hypochlorite), and is safe when applied on skin tissue. In some embodiments, the PPM of FAC in a ECAcept Concentrate can be modified to meet the needs of a wide range of dairy sizes and desired uses / needs. In some embodiments, the system and methods of the present invention are capable of generating ECAcept Concentrate at any desired amount and/or concentration (e.g., in an amount

from 125,000 PPM of FAC up to 25,000,000 PPM of FAC within a 24 hour production period) (e.g., in a range from 1,440,000 PPM of FAC (e.g., 180 gallons of 8,000 PPM of FAC) up to 4,800,000 PPM of FAC within a 24 hour production period).

The ECAcept Concentrate is not limited to a particular use or function. In some embodiments, the ECAcept Concentrate is a powerful disinfectant. Indeed, experiments conducted during the course of developing embodiments for the present invention demonstrated that generated ECAcept Concentrate is 10 times more efficient at the same dilution rate at killing harmful micro-organisms than standard commercial bleach (e.g., 5.25% - 12.5% sodium hypochlorite), without having caustic, corrosive, skin harming characteristics. The ECAcept Concentrate is not limited to particular disinfectant uses. In some embodiments, the ECAcept Concentrate is used for animal hygiene disinfectant purposes. For example, in some embodiments, the ECAcept Concentrate is used for pre and/or post milking hygiene purposes. For example, in some embodiments, the ECAcept Concentrate is used for hoof treatment. In some embodiments, the ECAcept Concentrate is used for premise hygiene purposes. For example, in some embodiments, the ECAcept Concentrate is used for cleaning, disinfecting, and/or sanitizing the structural premise (e.g., the exterior walls, platforms, etc). In some embodiments, the ECAcept Concentrate is used for equipment cleaning, disinfecting, and/or sanitizing. In some embodiments, the ECAcept Concentrate is used for cleaning, disinfecting, and/or sanitizing the calf hutches, treatment, and/or hospital areas. In some embodiments, the ECAcept Concentrate is used for cleaning, disinfecting, and/or sanitizing the cleaning-in-place (CIP) locations. In some embodiments, the ECAcept Concentrate is used for cleaning, disinfecting, and/or sanitizing the laundry locations. In some embodiments, the ECAcept Concentrate is used for water treatment. For example, in some embodiments, the ECAcept Concentrate is used for iron and/or manganese remediation from a water source. In some embodiments, the ECAcept Concentrate is used for biofilm removal from a water source. In some embodiments, the ECAcept Concentrate is used for disinfecting a water source. In some embodiments, the ECAcept Concentrate is generated with a relatively neutral pH so as to keep the solution safe for skin contact (e.g., contact with cow teats and skin tissue).

In some embodiments, following its generation, the ECAcept Concentrate is further modified for enhanced purposes and/or uses. The present invention is not limited to a particular manner of modifying the ECAcept Concentrate. In some embodiments, the ECAcept Concentrate is further modified through combination with additional agents.

For example, in some embodiments, pre-milking udder preparation solutions are generated by combining the ECAcept Concentrate with additional agents. The present invention

is not limited to particular agents. In some embodiments, a pre-milking udder preparation solution is generated by combining the ECAcept Concentrate with, for example, one or more of water, a detergent polymer (e.g., Acusol), a surfactant (e.g., tomadol ethoxylate) (e.g, an ionic surfactant) (e.g., a non-ionic surfactant) (e.g., a cationic quarternary ammonion compound (e.g., cetylpyridinium chloride (e.g., Ammonyx)) (e.g., alkyl dimethyl benzylammonium chloride (e.g., BTC-835)) (e.g., an amphoteric surfactant (e.g., KDC-3) (e.g., amphoteric LH)), a hydrotope (e.g., sodium xylene sulfonate), and a dye (e.g., tartrazine (dye keyacid tart yellow)) (e.g., blue dye) (e.g., green grams). In some embodiments, the pre-milking udder preparation solution further comprises an emollient (e.g., propylene glycol) (e.g., urea). The pre-milking udder preparation solutions are not limited to particular ingredient parameters (e.g., amounts relative to other ingredients, concentrations, pH levels, dilution amounts, etc.).

In some embodiments, post-milking teat solutions are generated by combining the ECAcept Concentrate with additional agents. The present invention is not limited to particular agents. In some embodiments, the post-milking teat solution is generated by combining the ECAcept Concentrate with, for example, one or more of water, a detergent polymer (e.g., Acusol), citric acid, a surfactant (e.g., tomadol ethoxylate) (e.g, an ionic surfactant) (e.g., a non-ionic surfactant) (e.g., a cationic quarternary ammonion compound (e.g., cetylpyridinium chloride (e.g., Ammonyx)) (e.g., alkyl dimethyl benzylammonium chloride (e.g., BTC-835)) (e.g., an amphoteric surfactant (e.g., KDC-3) (e.g., amphoteric LH)), an emollient (e.g., propylene glycol) (e.g., urea), a sequestration agent (e.g., chelating agent (e.g., versene 100 / sequestrene 30A)) (e.g., potassium hydroxide (e.g., caustic potash)) (e.g., sodium hydroxide (e.g., caustic soda)) (e.g., magnesium hydroxide (e.g., flogel)), and a dye (e.g., tartrazine (dye keyacid tart yellow)) (e.g., blue dye) (e.g., green grams). In some embodiments, the post-milking teat solution further comprises a polyvinyl alcohol (e.g., celvol 205-S). The post-milking teat solutions are not limited to particular ingredient parameters (e.g., amounts relative to other ingredients, concentrations, pH levels, dilution amounts, etc.).

In some embodiments, laundry solutions are generated by combining the ECAcept Concentrate with additional agents. The present invention is not limited to particular agents. In some embodiments, the laundry solutions are generated by combining the ECAcept Concentrate with, for example, one or more of water, a surfactant (e.g., tomadol ethoxylate) (e.g, an ionic surfactant) (e.g., a non-ionic surfactant) (e.g., a cationic quarternary ammonion compound (e.g., cetylpyridinium chloride (e.g., Ammonyx)) (e.g., alkyl dimethyl benzylammonium chloride (e.g., BTC-835)) (e.g., an amphoteric surfactant (e.g., KDC-3) (e.g., amphoteric LH)), a sequestration agent (e.g., chelating agent (e.g., versene 100 / sequestrene 30A)) (e.g., potassium hydroxide

(e.g., caustic potash)) (e.g., sodium hydroxide (e.g., caustic soda)) (e.g., magnesium hydroxide (e.g., flogel)), an odorant (e.g., perfume), and a dye (e.g., tartrazine (dye keyacid tart yellow)) (e.g., blue dye) (e.g., green grams). The laundry solutions are not limited to particular ingredient parameters (e.g., amounts relative to other ingredients, concentrations, pH levels, dilution amounts, etc.).

In some embodiments, cleaning-in-place (CIP) solutions are generated by combining the ECAcept Concentrate with additional agents. The present invention is not limited to particular agents. In some embodiments, the cleaning-in-place solutions are generated by combining the ECAcept Concentrate with, for example, one or more of water, a sequestration agent (e.g., chelating agent (e.g., versene 100 / sequestrene 30A)) (e.g., potassium hydroxide (e.g., caustic potash)) (e.g., sodium hydroxide (e.g., caustic soda)) (e.g., magnesium hydroxide (e.g., flogel)), and a detergent polymer (e.g., Acusol). The cleaning-in-place solutions are not limited to particular ingredient parameters (e.g., amounts relative to other ingredients, concentrations, pH levels, dilution amounts, etc.).

In some embodiments, premise solutions are generated by combining the ECAcept Concentrate with additional agents. The present invention is not limited to particular agents. In some embodiments, the premise solutions are generated by combining the ECAcept Concentrate with, for example, one or more of water, a detergent polymer (e.g., Acusol), a sequestration agent (e.g., chelating agent (e.g., versene 100 / sequestrene 30A)) (e.g., potassium hydroxide (e.g., caustic potash)) (e.g., sodium hydroxide (e.g., caustic soda)) (e.g., magnesium hydroxide (e.g., flogel)), a hydrotope (e.g., sodium xylene sulfonate), a surfactant (e.g., tomadol ethoxylate) (e.g, an ionic surfactant) (e.g., a non-ionic surfactant) (e.g., a cationic quarternary ammonion compound (e.g., cetylpyridinium chloride (e.g., Ammonyx)) (e.g., alkyl dimethyl benzylammonium chloride (e.g., BTC-835)) (e.g., an amphoteric surfactant (e.g., KDC-3) (e.g., amphoteric LH)). The premise solutions are not limited to particular ingredient parameters (e.g., amounts relative to other ingredients, concentrations, pH levels, dilution amounts, etc.).

In some embodiments, footbath solutions are generated by combining the ECAcept Concentrate with additional agents. The present invention is not limited to particular agents. In some embodiments, the footbath solutions are generated by combining the ECAcept Concentrate with, for example, one or more of water, a surfactant (e.g., tomadol ethoxylate) (e.g, an ionic surfactant) (e.g., a non-ionic surfactant) (e.g., a cationic quarternary ammonion compound (e.g., cetylpyridinium chloride (e.g., Ammonyx)) (e.g., alkyl dimethyl benzylammonium chloride (e.g., BTC-835)) (e.g., an amphoteric surfactant (e.g., KDC-3) (e.g., amphoteric LH)), and a mineral

acid (e.g., Videt A-85). The footbath solutions are not limited to particular ingredient parameters (e.g., amounts relative to other ingredients, concentrations, pH levels, dilution amounts, etc.).

In some embodiments, medicinal solutions are generated by combining the ECAcept Concentrate with additional agents. In some embodiments, the medicinal solutions are configured for topical application. In some embodiments, the medicinal solutions are configured for oral administration. In some embodiments, the medicinal solutions are configured for intravenous administration. The present invention is not limited to particular agents. In some embodiments, the medicinal solutions are generated by combining the ECAcept Concentrate with, for example, one or more agents designed to prevent and/or treat a medical condition (e.g., anti-biotic agents, anti-microbial agents, sedating agents, analgesic agents, specific medical condition treatment agents (e.g., agents designed to treat and/or prevent mastitis) (e.g., agents designed to treat and/or prevent conditions associated with mucosal and non-mucosal tissue) (e.g., agents designed to treat and/or prevent pink eye, tissue rash) (e.g., agents designed to treat and/or prevent conditions associated with wounds), growth inducing agents (e.g., hormones), vitamins, etc.).

The present invention is not limited to a particular technique for combining the ECAcept Concentrate with additional agents. In some embodiments, the additional agents are stored within a system / device that generates the ECAcept Concentrate. For example, Figure 2 shows a system for generating ECAcept Concentrate (see, e.g., Brine Tank and Process Tank), and combining it with additional agents (see, e.g., Additive 1A, Additive 2A, and Additive 3A) via the mixing station to create modified EACcept Concentrate (see, e.g., 1B, 2B, 3B) (e.g., a pre-milking udder preparation solution; a post-milking teat solution; a laundry solution; a cleaning-in-place solution; a premise solution; a footbath solution). In some embodiments, the additional agents are stored within a system / device that generates the ECAcept Concentrate in a manner that permits combination with generated ECAcept Concentrate in a closed setting (e.g., thereby maintaining a controlled and/or a sterile setting) (e.g., the system shown in Figure 2). In some embodiments, the additional agents are stored in a manner compatible with RFID technology (e.g., the additional agent container if flagged with an RFID tag) and the system is has RFID tags. In some such embodiments, the systems are configured to operate only if the RFID tags match in a desired manner (e.g., additional agents stored in a manner not having RFID tag matching with the system RFID tag results in non-system operation). In some embodiments, the system is configured such that generation of ECAcept Concentrate and combination with additional agents occurs within the same setting (e.g., the same location). In some embodiments, the system is configured such that generation of ECAcept Concentrate and combination with

additional agents occurs at different locations. In some embodiments, generation of a modified ECAcept Concentrate (e.g., a pre-milking udder preparation solution; a post-milking teat solution; a laundry solution; a cleaning-in-place solution; a premise solution; a footbath solution) is controlled by a user prior to generation of ECAcept Concentrate. In some embodiments, generation of a modified ECAcept Concentrate (e.g., a pre-milking udder preparation solution; a post-milking teat solution; a laundry solution; a cleaning-in-place solution; a premise solution; a footbath solution) is controlled by a user following generation of ECAcept Concentrate. In some embodiments, generation of a modified ECAcept Concentrate is physically accomplished by a user. In some embodiments, generation of a modified ECAcept Concentrate is occurs automatically (e.g., user-free).

The present invention provides systems configured to generate ECAcept Concentrate and/or modified ECAcept Concentrate (e.g., a pre-milking udder preparation solution; a post-milking teat solution; a laundry solution; a cleaning-in-place solution; a premise solution; a footbath solution). In some embodiments, the system comprises a sodium chloride solution, water, an electrolytic cell, and chamber for collecting / storing generated ECAcept Concentrate. In some embodiments, the system comprises a sodium chloride solution, water, an electrolytic cell, additional agents for generating modified ECAcept Concentrate, and chamber for collecting / storing generated ECAcept Concentrate and/or modified ECAcept Concentrate. In some embodiments, all aspects of the system are controllable by a user. For example, the amount of ECAcept Concentrate and/or modified ECAcept Concentrate (e.g., over a period of time) may be controlled, the particular concentrations (e.g., PPM of FAC) may be controlled. In addition, the amount of additional agents to use when generating modified ECAcept Concentrate (e.g., a pre-milking udder preparation solution; a post-milking teat solution; a laundry solution; a cleaning-in-place solution; a premise solution; a footbath solution) may be controlled so as to generate a precisely desired end product. In addition, in some embodiments, the system has a processor (e.g., a computer interface) (e.g., an algorithm) for facilitating such control. In some embodiments, the processor is compatible with html5 or higher format. In some embodiments, the system may be controlled either on-site or off-site (e.g., via wireless (e.g., wi-fi) interaction). In some embodiments, the system may be controlled via an application (e.g., a downloadable phone application). In some embodiments, the system is configured to present data to a user (e.g., concentration levels of particular ECAcept Concentrate solutions and/or modified ECAcept Concentrate solutions) (e.g., amounts of particular ECAcept Concentrate solutions and/or modified ECAcept Concentrate solutions) (e.g., warnings as to particular ECAcept Concentrate solutions and/or modified ECAcept Concentrate solutions (e.g., warnings that amounts are too

high or low)) (e.g., sterility contaminations). In some embodiments, the systems may be programmable to automatically generate desired ECAcept Concentrate and/or modified ECAcept Concentrate solutions (e.g., programmed to automatically generate more solution upon the occurrence of certain events (e.g., stored amounts reaching particular levels, elapsing of a particular time-span, etc.)). In some embodiments, the systems are configured to monitor the generation of ECAcept Concentrate and/or modified ECAcept concentrate to ensure proper generation according to programmed parameters and/or to ensure quality control. The systems are further configured to store generated ECAcept Concentrate and/or modified ECAcept Concentrate in a controlled and/or sterile manner, in any desired amount, for any extended amount of time. The systems are further configured to store generated ECAcept Concentrate and/or modified ECAcept Concentrate in a tightly controlled manner, in any desired amount, for any extended amount of time. The systems are further configured to store multiple solutions of ECAcept Concentrate, modified ECAcept Concentrate, and/or additional agents at any given time. The systems are further configured to dispense generated ECAcept Concentrate and/or modified ECAcept Concentrate in a controlled and/or sterile manner, in any desired amount, for any extended amount of time. The systems are further configured to dispense generated ECAcept Concentrate and/or modified ECAcept Concentrate in a tightly controlled manner, in any desired amount, for any extended amount of time. The present invention provides methods for generating ECAcept Concentrate and/or modified ECAcept Concentrate (e.g., a pre-milking udder preparation solution; a post-milking teat solution; a laundry solution; a cleaning-in-place solution; a premise solution; a footbath solution) with such a system.

In some embodiments, the system generates a germicidal composition configured for use in hydraulic fracturing settings. The system is not limited to a particular hydraulic fracturing setting. In some embodiments, the hydraulic fracturing setting involves extraction of oil. In some embodiments, the hydraulic fracturing setting involves extraction of natural gas. Hydraulic fracturing is used to, for example, increase or restore the rate at which fluids, such as petroleum, water, or natural gas can be produced from subterranean natural reservoirs. Reservoirs are typically, for example, porous sandstones, limestones or dolomite rocks, but also include 'unconventional reservoirs' such as shale rock or coal beds. Hydraulic fracturing enables the production of natural gas and oil from rock formations deep below the earth's surface (generally 5,000–20,000 feet (1,500–6,100 m)). At such depth, there may not be sufficient permeability or reservoir pressure to allow natural gas and oil to flow from the rock into the wellbore at economic rates. Thus, creating conductive fractures in the rock is essential to extract gas from shale reservoirs because of the extremely low natural permeability of shale. Fractures provide a

conductive path connecting a larger area of the reservoir to the well, thereby increasing the area from which natural gas and liquids can be recovered from the targeted formation.

Problems associated with efficient hydraulic fracturing yields include, for example, bacteria and microorganisms that produce contaminant gas, break down gelling agents, and reduce the viscosity of fracturing fluid. In order to overcome such problems, the present invention provides germicidal compositions used to inhibit and/or kill the growth of bacteria and/or microorganisms associated within a hydraulic fracturing setting. In some embodiments, the germicidal compositions are configured to prevent the bacteria and/or microorganisms from producing contaminate byproducts (e.g., gas). In some embodiments, the germicidal compositions are configured to prevent the bacteria and/or microorganisms from interfering with (e.g., breaking down) agents used in hydraulic fracturing (e.g., gelling agents) (e.g., fracturing fluid). In some embodiments, the germicidal compositions used to inhibit and/or kill the growth of bacteria and/or microorganisms associated within a hydraulic fracturing setting is combined with one or more additional agents. Examples of additional agents include, but are not limited to, water, a detergent polymer (e.g., Acusol), a surfactant (e.g., tomadol ethoxylate) (e.g, an ionic surfactant) (e.g., a non-ionic surfactant) (e.g., a cationic quarternary ammonion compound (e.g., cetylpyridinium chloride (e.g., Ammonyx)) (e.g., alkyl dimethyl benzylammonium chloride (e.g., BTC-835)) (e.g., an amphoteric surfactant (e.g., KDC-3) (e.g., amphoteric LH)), cetylpyridinium chloride (e.g., Ammonyx), sodium xylene sulfonate, a dye (e.g., tartrazine (dye keyacid tart yellow)), citric acid, an emollient (e.g., propylene glycol) (e.g., urea), blue dye, a sequestration agent (e.g., chelating agent (e.g., versene 100 / sequestrene 30A)) (e.g., potassium hydroxide (e.g., caustic potash)) (e.g., sodium hydroxide (e.g., caustic soda)) (e.g., magnesium hydroxide (e.g., flogel)), an odorant (e.g., perfume), a dye (e.g., green grams), sodium xylene sulfonate, alkyl dimethyl benzylammonium chloride (e.g., BTC-835), a mineral acid (e.g., Videt A-85), and a medicinal agent. In some embodiments, the germicidal composition is co-administered with an additional bactericide and/or biocide (e.g., 2,2-Dibromo-3-nitrilopropionamide, polynuclear aromatic hydrocarbons, polycyclic organic matter, gluteraldehyde).

INCORPORATION BY REFERENCE

The entire disclosure of each of the patent documents and scientific articles referred to herein is incorporated by reference for all purposes.

EQUIVALENTS

The invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The foregoing embodiments are therefore to be considered in all respects illustrative rather than limiting the invention described herein. Scope of the invention is thus indicated by the appended claims rather than by the foregoing description, and all changes that come within the meaning and range of equivalency of the claims are intended to be embraced therein.

CLAIMS

We claim:

1. A system comprising a sodium chloride solution, water, an electrolytic cell, and at least one chamber,

wherein the electrolytic cell is configured to a) receive said sodium chloride solution mixed with said water, b) remove hydrogen from said sodium chloride solution mixed with said water, and c) generate a germicidal composition,

wherein said chamber is configured to receive said germicidal composition generated with said electrolytic cell.

2. The system of Claim 1, wherein said germicidal composition is generated through removal of hydrogen from said sodium chloride solution mixed with said water.

3. The system of Claim 1, wherein said electrolytic cell is configured to generate said germicidal composition comprising a combination of chlorine, hypochlorite, hypochlorous acid and chlorine dioxide.

4. The system of Claim 1, wherein said system is configured to generate an amount selected from the group consisting of

an amount approximately 1,440,000 PPM of FAC up to approximately 4,800,000 PPM of FAC within a 24 hour period; and

in an amount from 125,000 PPM of FAC up to 25,000,000 PPM of FAC within a 24 hour production period

5. The system of Claim 1, further comprising one or more additional agents, wherein said one or more additional agents are stored in a manner permitting combination of a generated germicidal composition with any combination of one or more of said additional agents.

6. The system of Claim 5, wherein said combination is configured to occur automatically.

7. The system of Claim 6, wherein said system is configured to provide any programmed amount of said one or more additional agents for purposes of combination.

8. The system of Claim 5, wherein said one or more additional agents are selected from the group consisting of water, a detergent polymer, a surfactant, a dye, citric acid, an emollient, an odorant, a sequestration agent, a mineral acid, and a medicinal agent.

9. The system of Claim 5, wherein said one or more agents are water, a detergent polymer, a surfactant, a **hydrotope**, and a dye.

10. The system of Claim 9, wherein said combination generates a composition configured for pre-milking udder preparation purposes.

11. The system of Claim 5, wherein said one or more agents are water, a detergent polymer, citric acid, a surfactant, an emollient, a sequestration agent, and a dye

12. The system of Claim 11, wherein said combination generates a composition configured for post-milking teat purposes.

13. The system of Claim 5, wherein said one or more agents are water, a surfactant, a sequestration agent, an odorant, and a dye.

14. The system of Claim 13, wherein said combination generates a composition configured for laundry purposes.

15. The system of Claim 5, wherein said one or more agents are water, a sequestration agent and a detergent polymer.

16. The system of Claim 15, wherein said combination generates a composition configured for cleaning-in-place purposes.

17. The system of Claim 5, wherein said one or more agents are water, a detergent polymer, sodium hydroxide, a hydrotope, and a surfactant.

18. The system of Claim 17, wherein said combination generates a composition configured for premise purposes.

19. The system of Claim 5, wherein said one or more agents are water, a surfactant, and a mineral acid.

20. The system of Claim 19, wherein said combination generates a composition configured for footbath purposes.

21. The system of Claim 1, wherein said system is a closed system.

22. The system of Claim 1, further comprising a processor running an algorithm.

23. The system of Claim 22, wherein said algorithm is configured regulate said generation of said germicidal composition.

24. The system of Claim 5, wherein said algorithm is configured to regulate said combination of said germicidal composition with said two or more additional agents.

25. The system of Claim 22, wherein said algorithm is configured to present alerts regarding said system.

26. The system of Claim 25, wherein said alerts are selected from the group consisting of germicidal composition amount levels, time periods, additional agent amount levels, identifications of used additional agents, system malfunctions, sterility contaminations, amount levels of said germicidal composition combined with said additional agents.

27. The system of Claim 1, wherein said germicidal composition is configured to kill bacteria and/or microorganisms associated with hydraulic fracturing.

28. A method for generating compositions comprising germicidal compositions combined with additional agents with a system of any of Claims 1-27.

29. A composition as generated with a system of any of Claims 1-28.

Figure 1.

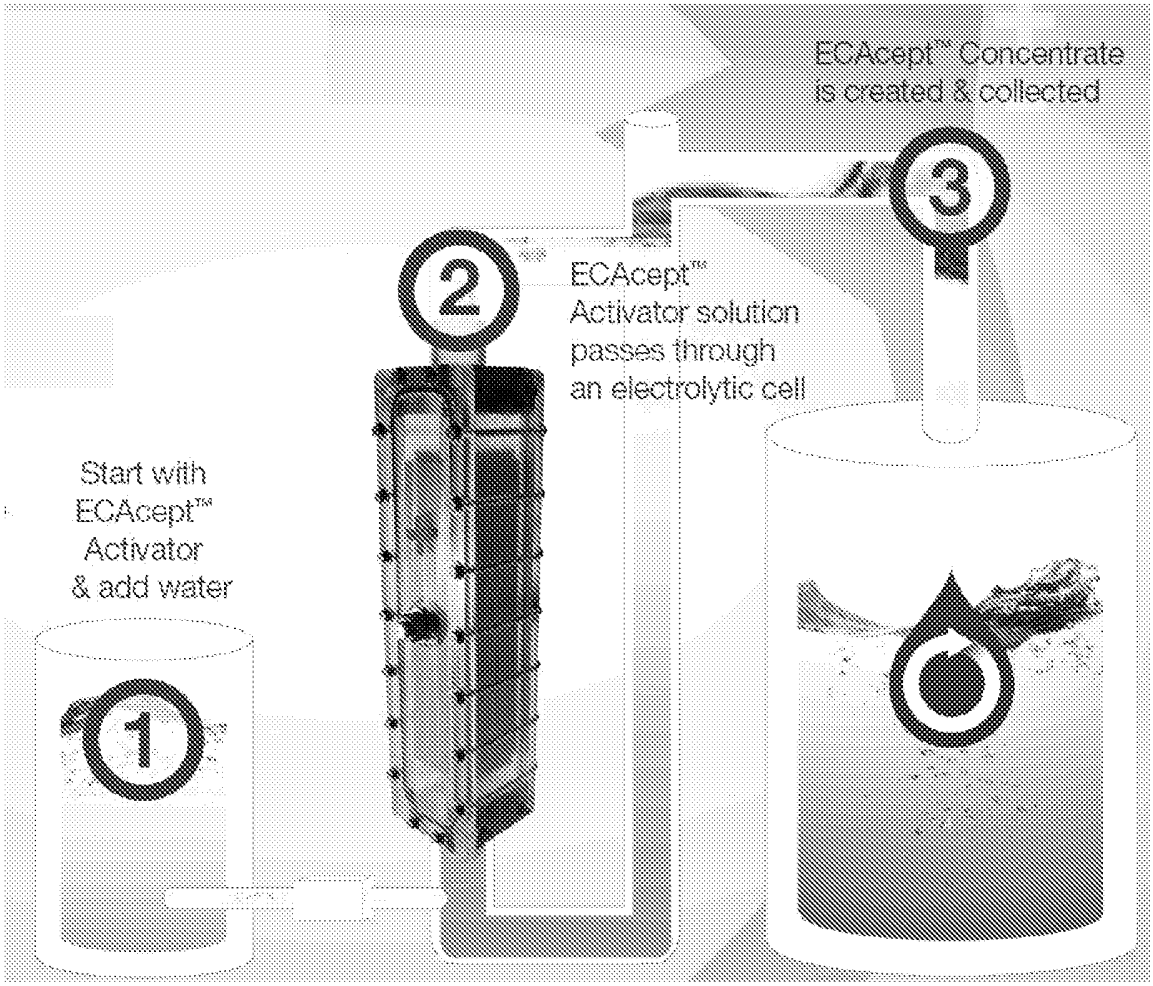
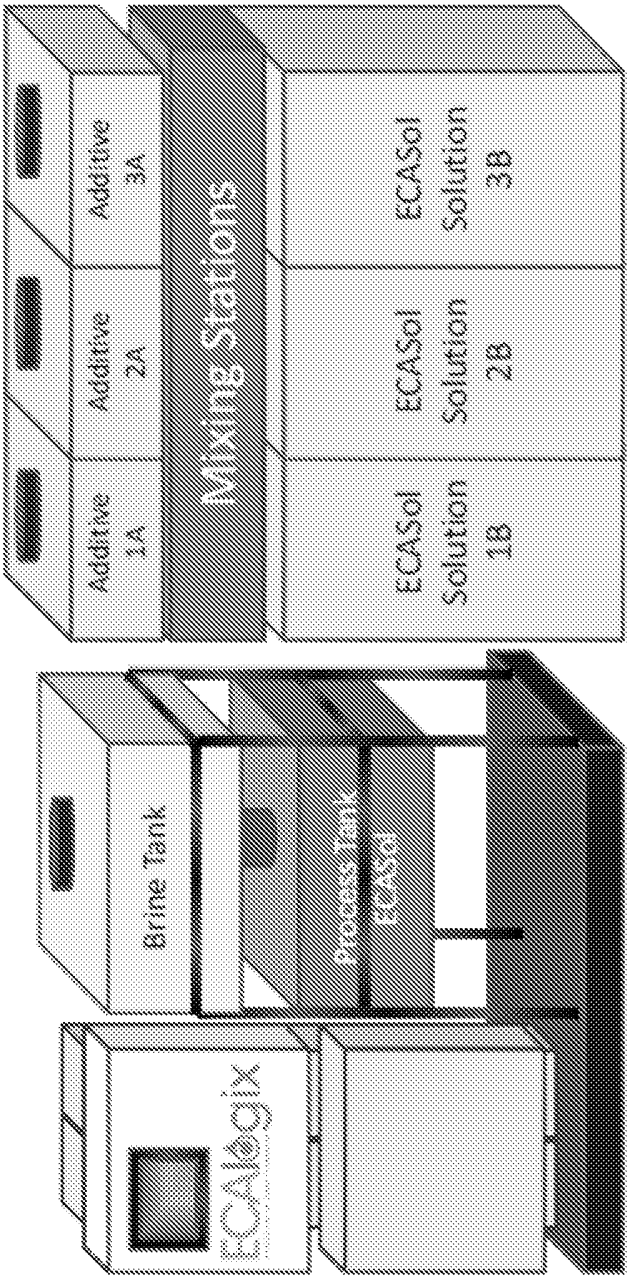

ECAcept™ Concentrate
is created & collected
3
2
ECAcept™
Activator solution
passes through
an electrolytic cell
Start with
ECAcept™
Activator
& add water
1

Figure 2.


Additive 3A
Additive 2A
Additive 1A
Mixing Stations
ECASol Solution 3B
ECASol Solution 2B
ECASol Solution 1B
Brine Tank
Process Tank
ECASol
ECAlogix

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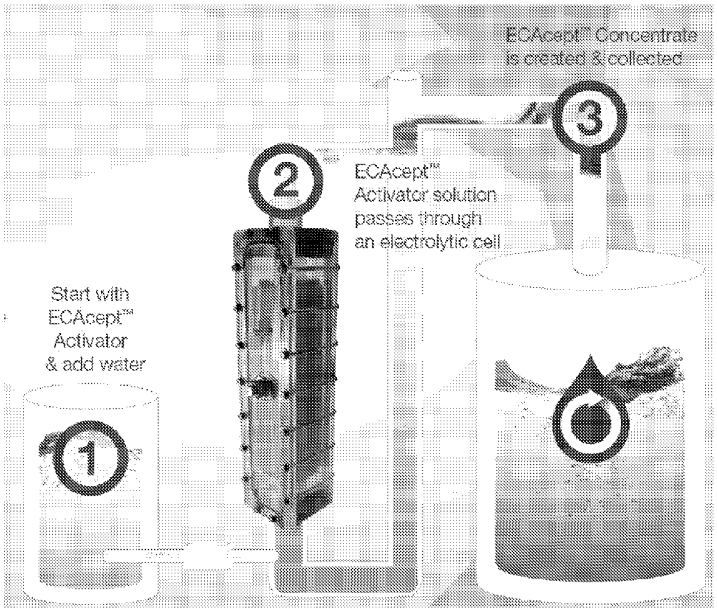
[Continued on next page]

(54) Title: SYSTEMS AND METHODS FOR GENERATING GERMICIDAL COMPOSITIONS

Figure 1.



(57) Abstract: The present invention relates to systems and methods for generating germicidal compositions for use in a wide variety of settings, including agricultural settings, food production settings, hospitality settings, health care settings, health club settings, exercise facility settings, research based settings, veterinarian settings, medical settings, hydraulic fracturing settings, and/or any setting requiring disinfection.

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TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

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eKOMPASS(KIPO internal) & Keywords: sodium chloride, electrolytic cell, germicidal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2007-0138020 A1 (SHEKAR BALAGOPAL et al.) 21 June 2007 See abstract, paragraphs [0011]-[0014], [0057] and claim 1.	1-29
A	US 2008-0200355 A1 (EMMONS STUART A.) 21 August 2008 See abstract, paragraphs [0005], [0026], claims 1-2	1-29
A	US 2004-0055896 A1 (DAVID ANDERSON et al.) 25 March 2004 See abstract, paragraphs [0032], [0035], [0047], [0051] and figure 1	1-29
A	US 2008-0008621 A1 (IKEDA, MASAHIRO et al.) 10 January 2008 See abstract, paragraphs [0021]-[0024] and claim 1.	1-29
A	US 2010-0183745 A1 (ROSSI PAOLO et al.) 22 July 2010 See abstract, paragraphs [0010], [0013]-[0015] and claim 1.	1-29

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:
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"P" document published prior to the international filing date but later than the priority date claimed
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"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents,such combination being obvious to a person skilled in the art
"&" document member of the same patent family

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INTERNATIONAL SEARCH REPORT

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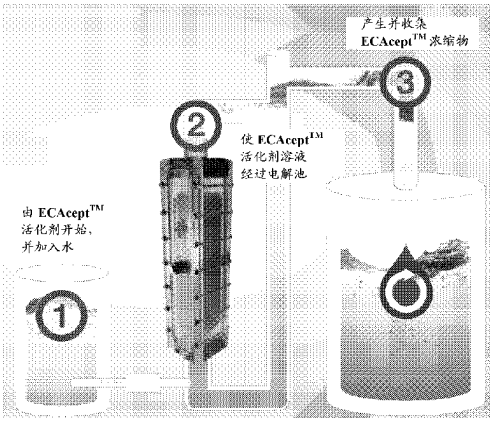
(54)发明名称

用于产生杀菌组合物的系统和方法

(57)摘要

本发明涉及用于产生杀菌组合物的系统和方法，所述组合物用于各种各样的装置，包括农业装置、食品生产装置、招待装置、健康护理装置、健身俱乐部装置、运动设备装置、基于研究的装置、兽医装置、医疗装置、水力压裂装置和/或需要消毒的任何装置。



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1. 一种系统，所述系统包含氯化钠溶液、水、电解池和至少一个室，

其中所述电解池设置为 a) 接受与所述水混合的所述氯化钠溶液，b) 从与所述水混合的所述氯化钠溶液除去氢，和 c) 产生杀菌组合物，

其中所述室设置为接受使用所述电解池产生的所述杀菌组合物。

2. 权利要求 1 的系统，其中所述杀菌组合物通过从与所述水混合的所述氯化钠溶液除去氢而产生。

3. 权利要求 1 的系统，其中所述电解池设置为产生所述杀菌组合物，所述组合物包含氯、次氯酸盐、次氯酸和二氧化氯的组合。

4. 权利要求 1 的系统，其中所述系统设置为产生选自以下的量：

在 24 小时时间段内，约 1,440,000 PPM 的 FAC 至约 4,800,000 PPM 的 FAC 的量；和

在 24 小时生产时间段内，125,000 PPM 的 FAC 至 25,000,000 PPM 的 FAC 的量。

5. 权利要求 1 的系统，所述系统还包含一种或多种另外的剂，其中所述一种或多种另外的剂储存的方式允许产生的杀菌组合物与一种或多种所述另外的剂的任何组合的组合。

6. 权利要求 5 的系统，其中所述组合设置为自动发生。

7. 权利要求 6 的系统，其中所述系统设置为提供所述一种或多种另外的剂的任何程序量，用于组合的目的。

8. 权利要求 5 的系统，其中所述一种或多种另外的剂选自水、洗涤剂聚合物、表面活性剂、染料、柠檬酸、软化剂、添味剂、隔离剂、无机酸和药用剂。

9. 权利要求 5 的系统，其中所述一种或多种剂为水、洗涤剂聚合物、表面活性剂、水溶助长剂和染料。

10. 权利要求 9 的系统，其中所述组合产生设置用于挤奶前乳房准备用途的组合物。

11. 权利要求 5 的系统，其中所述一种或多种剂为水、洗涤剂聚合物、柠檬酸、表面活性剂、软化剂、隔离剂和染料。

12. 权利要求 11 的系统，其中所述组合产生设置用于挤奶后乳头用途的组合物。

13. 权利要求 5 的系统，其中所述一种或多种剂为水、表面活性剂、隔离剂、添味剂和染料。

14. 权利要求 13 的系统，其中所述组合产生设置用于洗衣用途的组合物。

15. 权利要求 5 的系统，其中所述一种或多种剂为水、隔离剂和洗涤剂聚合物。

16. 权利要求 15 的系统，其中所述组合产生设置用于原位清洗用途的组合物。

17. 权利要求 5 的系统，其中所述一种或多种剂为水、洗涤剂聚合物、氢氧化钠、水溶助长剂和表面活性剂。

18. 权利要求 17 的系统，其中所述组合产生设置用于房屋用途的组合物。

19. 权利要求 5 的系统，其中所述一种或多种剂为水、表面活性剂和无机酸。

20. 权利要求 19 的系统，其中所述组合产生设置用于足浴用途的组合物。

21. 权利要求 1 的系统，其中所述系统为封闭系统。

22. 权利要求 1 的系统，所述系统还包含执行算法的处理器。

23. 权利要求 22 的系统，其中所述算法设置为调节所述杀菌组合物的所述产生。

24. 权利要求 5 的系统，其中所述算法设置为调节所述杀菌组合物与所述两种或更多种另外的剂的所述组合。

25. 权利要求 22 的系统，其中所述算法设置为呈现关于所述系统的警报。

26. 权利要求 25 的系统，其中所述警报选自：杀菌组合物的量水平、时间段、另外的剂的量水平、所用的另外的剂的识别、系统故障、无菌污染、与所述另外的剂组合的所述杀菌组合物的量水平。

27. 权利要求 1 的系统，其中所述杀菌组合物设置为杀灭与水力压裂关联的细菌和 / 或微生物。

28. 一种用权利要求 1-27 中任一项的系统产生组合物的方法，所述组合物包含与另外的剂组合的杀菌组合物。

29. 一种用权利要求 1-28 中任一项的系统产生的组合物。

用于产生杀菌组合物的系统和方法

发明领域

[0001] 本发明涉及用于产生杀菌组合物的系统和方法，所述组合物用于各种各样的装置，包括农业装置、食品生产装置、招待装置、健康护理装置、健身俱乐部装置、运动设备装置、基于研究的装置、兽医装置、医疗装置、水力压裂装置和 / 或需要消毒的任何装置。

[0002] 背景

当今的消费者要求提供给他们的产品具有最高品质并且食用或饮用安全。安全、营养、高品质牛奶和食物的生产和处理由农场开始。随着农场变得更大，防护和控制其操作免于害虫和有害微生物的能力变得甚至更加关键。纯水、动物和房屋卫生在良好管理的操作（例如，农业装置）中是必不可少的。

[0003] 需要改进的和更加综合的农场卫生工具，其带来安全和卫生的基于农业的产品（例如，牛奶和食物产品）和用于产生这样的产品的健康动物。

[0004] 发明概述

本发明涉及用于产生杀菌组合物的系统和方法，所述组合物用于各种各样的装置，包括农业装置、食品生产装置、招待装置、健康护理装置、健身俱乐部装置、运动设备装置、基于研究的装置、兽医装置、医疗装置、水力压裂装置和 / 或需要消毒的任何装置。

[0005] 本发明的系统和方法以当前杀菌备选物的部分成本提供新的卫生保护水平，提供现场产生的溶液，具有优良的杀菌效力。例如，本发明的系统和方法以常见消毒剂的部分成本提供产生浓缩杀菌溶液的能力，以用于大量农场施用。此外，本发明提供设置用于特定消毒剂用途的组合物。

[0006] 因此，在某些实施方案中，本发明提供系统，所述系统包含氯化钠溶液、水、电解池和至少一个室，其中所述电解池设置为 a) 接受与水混合的氯化钠溶液、b) 从与水混合的氯化钠溶液除去氢和 c) 产生杀菌组合物，并且其中所述室设置为接受使用电解池产生的杀菌组合物。

[0007] 所述系统不局限于产生杀菌组合物的特定方式。在一些实施方案中，杀菌组合物通过从与水混合的氯化钠溶液除去氢而产生。在一些实施方案中，电解池设置为产生杀菌组合物，所述组合物包含氯、次氯酸盐、次氯酸和二氧化氯的组合。

[0008] 在一些实施方案中，测量所述杀菌组合物游离的可用氯 (FAC)，以百万分率 (PPM) 计。氯的组合（例如，氯、次氯酸盐、次氯酸和二氧化氯的组合）已证明比常见的氯漂白剂（次氯酸钠）更有效许多倍，并且当施用于皮肤组织时安全。在一些实施方案中，可改变在杀菌组合物中 FAC 的 PPM 以满足各种各样的乳制品尺寸和期望用途 / 需求的要求。在一些实施方案中，本发明的系统和方法能以任何期望的量和 / 或浓度产生杀菌组合物（例如，在 24 小时生产时间段内，125,000 PPM 的 FAC 至 25,000,000 PPM 的 FAC 的量）（例如，在 24 小时生产时间段内，范围为 1,440,000 PPM 的 FAC（例如，180 加仑的 8,000 PPM 的 FAC) 至 4,800,000 PPM 的 FAC))。

[0009] 本发明的系统不局限于在特定的装置内使用。实际上，在一些实施方案中，系统可用于设备装置（例如，外部卫生设备；室内地面卫生设备；器械卫生设备；交通工具卫生设

备；等）、食物装置（例如，食物制备装置；动物进食装置；食物储存装置）、水处理装置和/或动物卫生装置。

[0010] 在一些实施方案中，系统还包含两种或更多种另外的剂，其中所述两种或更多种另外的剂以允许产生的杀菌组合物与两种或更多种另外的剂的任何组合（例如，通过共混/混合）组合的方式储存。

[0011] 本发明不局限于杀菌组合物与两种或更多种另外的剂的组合的特定方式。在一些实施方案中，组合设置为自动发生。在一些实施方案中，系统设置为提供两种或更多种另外的剂的任何程序量，用于组合的目的。

[0012] 本发明不局限于特定的另外的剂。另外的剂的实例包括但不限于水、洗涤剂聚合物（例如，Acusol）、表面活性剂（例如，tomadol 乙氧基化物）（例如，离子表面活性剂）（例如，非离子表面活性剂）（例如，阳离子季铵化合物（例如，西吡氯铵（例如，Ammonyx））（例如，烷基二甲基苄基氯化铵（例如，BTC-835））（例如，两性表面活性剂（例如，KDC-3）（例如，两性 LH））、水溶助长剂 (hydrotope)（例如，二甲苯磺酸钠）、染料（例如，酒石黄（染料 keyacid 酸黄））（例如，蓝色染料）（例如，黑绿豆）、柠檬酸、软化剂（例如，丙二醇）（例如，尿素）、隔离剂（例如，螯合剂（例如，versene 100/sequestrene 30A））（例如，氢氧化钾（例如，苛性钾））（例如，氢氧化钠（例如，苛性钠））（例如，氢氧化镁（例如，flogel））、添味剂（例如，香料）、无机酸（例如，Videt A-85）和药用剂，用于动物卫生、设备卫生、通用卫生设备、消毒和水处理准备用途。

[0013] 在一些实施方案中，系统产生以下的组合：杀菌组合物和水、洗涤剂聚合物（例如，Acusol）、表面活性剂（例如，tomadol 乙氧基化物）（例如，离子表面活性剂）（例如，非离子表面活性剂）（例如，阳离子季铵化合物（例如，西吡氯铵（例如，Ammonyx））（例如，烷基二甲基苄基氯化铵（例如，BTC-835））（例如，两性表面活性剂（例如，KDC-3）（例如，两性 LH））、水溶助长剂（例如，二甲苯磺酸钠）和染料（例如，酒石黄（染料 keyacid 酸黄））（例如，蓝色染料）（例如，黑绿豆）。在一些实施方案中，这样的组合设置用于挤奶前乳房准备用途。

[0014] 在一些实施方案中，系统产生以下的组合：杀菌组合物和水、洗涤剂聚合物（例如，Acusol）、柠檬酸、表面活性剂（例如，tomadol 乙氧基化物）（例如，离子表面活性剂）（例如，非离子表面活性剂）（例如，阳离子季铵化合物（例如，西吡氯铵（例如，Ammonyx））（例如，烷基二甲基苄基氯化铵（例如，BTC-835））（例如，两性表面活性剂（例如，KDC-3）（例如，两性 LH））、软化剂（例如，丙二醇）（例如，尿素）、隔离剂（例如，螯合剂（例如，versene 100/sequestrene 30A））（例如，氢氧化钾（例如，苛性钾））（例如，氢氧化钠（例如，苛性钠））（例如，氢氧化镁（例如，flogel））和染料（例如，酒石黄（染料 keyacid 酸黄））（例如，蓝色染料）（例如，黑绿豆）。在一些实施方案中，这样的组合设置用于挤奶后乳头用途。

[0015] 本发明还提供挤奶后乳头溶液，当施用于组织（例如，乳头）时，所述溶液具有显著的颜色（例如，蓝色、红色、黄色、黑色、橙色）。在一些实施方案中，颜色设置为当施用于组织经延长的时间段（例如，1 分钟、10 分钟、20 分钟、1 小时、6 小时、12 小时、1 天等）时保持显著。

[0016] 在一些实施方案中，系统产生以下的组合：杀菌组合物和水、表面活性剂（例如，

tomadol 乙氧基化物）（例如，离子表面活性剂）（例如，非离子表面活性剂）（例如，阳离子季铵化合物（例如，西吡氯铵（例如，Ammonyx））（例如，烷基二甲基苄基氯化铵（例如，BTC-835））（例如，两性表面活性剂（例如，KDC-3）（例如，两性 LH））、隔离剂（例如，螯合剂（例如，versene 100/sequestrene 30A））（例如，氢氧化钾（例如，苛性钾））（例如，氢氧化钠（例如，苛性钠））（例如，氢氧化镁（例如，flogel））、添味剂（例如，香料）和染料（例如，酒石黄（染料 keyacid 酸黄））（例如，蓝色染料）（例如，黑绿豆）。在一些实施方案中，这样的组合设置用于洗衣用途。

[0017] 在一些实施方案中，系统产生以下的组合：杀菌组合物和水、隔离剂（例如，螯合剂（例如，versene 100/sequestrene 30A））（例如，氢氧化钾（例如，苛性钾））（例如，氢氧化钠（例如，苛性钠））（例如，氢氧化镁（例如，flogel））和洗涤剂聚合物（例如，Acusol）。在一些实施方案中，这样的组合设置用于原位清洗用途。

[0018] 在一些实施方案中，系统产生以下的组合：杀菌组合物和水、洗涤剂聚合物（例如，Acusol）、隔离剂（例如，螯合剂（例如，versene 100/sequestrene 30A））（例如，氢氧化钾（例如，苛性钾））（例如，氢氧化钠（例如，苛性钠））（例如，氢氧化镁（例如，flogel））、水溶助长剂（例如，二甲苯磺酸钠）、表面活性剂（例如，tomadol 乙氧基化物）（例如，离子表面活性剂）（例如，非离子表面活性剂）（例如，阳离子季铵化合物（例如，西吡氯铵（例如，Ammonyx））（例如，烷基二甲基苄基氯化铵（例如，BTC-835））（例如，两性表面活性剂（例如，KDC-3）（例如，两性 LH））。在一些实施方案中，这样的组合设置用于房屋用途。

[0019] 在一些实施方案中，系统产生以下的组合：杀菌组合物和水、表面活性剂（例如，tomadol 乙氧基化物）（例如，离子表面活性剂）（例如，非离子表面活性剂）（例如，阳离子季铵化合物（例如，西吡氯铵（例如，Ammonyx））（例如，烷基二甲基苄基氯化铵（例如，BTC-835））（例如，两性表面活性剂（例如，KDC-3）（例如，两性 LH））和无机酸（例如，Videt A-85）。在一些实施方案中，这样的组合设置用于足浴用途。

[0020] 在一些实施方案中，系统产生杀菌组合物，其设置用于水力压裂装置。系统不局限于特定的水力压裂装置。在一些实施方案中，水力压裂装置涉及提取油。在一些实施方案中，水力压裂装置涉及提取天然气。杀菌组合物不局限于在水力压裂装置内的特定用途。在一些实施方案中，杀菌组合物用于抑制和 / 或杀灭与水力压裂装置关联的细菌和 / 或微生物的生长。在一些实施方案中，杀菌组合物设置为防止细菌和 / 或微生物产生污染副产物（例如，气体）。在一些实施方案中，杀菌组合物设置为防止细菌和 / 或微生物干扰（例如，分解）用于水力压裂的剂（例如，凝胶化剂）（例如，压裂流体）。在一些实施方案中，用于抑制和 / 或杀灭与水力压裂装置关联的细菌和 / 或微生物的生长的杀菌组合物与一种或多种另外的剂组合。另外的剂的实例包括但不限于水、洗涤剂聚合物（例如，Acusol）、表面活性剂（例如，tomadol 乙氧基化物）、西吡氯铵（例如，Ammonyx）、二甲苯磺酸钠、两性表面活性剂（例如，KDC-3）、表面活性剂（例如，tomadol 乙氧基化物）（例如，离子表面活性剂）（例如，非离子表面活性剂）（例如，阳离子季铵化合物（例如，西吡氯铵（例如，Ammonyx））（例如，烷基二甲基苄基氯化铵（例如，BTC-835））（例如，两性表面活性剂（例如，KDC-3）（例如，两性 LH））、染料（例如，酒石黄（染料 keyacid 酸黄））、柠檬酸、软化剂（例如，丙二醇）（例如，尿素）、蓝色染料、隔离剂（例如，螯合剂（例如，versene 100/sequestrene

30A))（例如，氢氧化钾（例如，苛性钾））（例如，氢氧化钠（例如，苛性钠））（例如，氢氧化镁（例如，flogel））、添味剂（例如，香料）、染料（例如，黑绿豆）、烷基二甲基苄基氯化铵（例如，BTC-835）、无机酸（例如，Videt A-85）和药用剂。在一些实施方案中，杀菌组合物与另外的杀菌剂和/或生物杀灭剂（例如，2,2-二溴-3-次氮基丙酰胺、多核芳烃、多环有机物质、戊二醛）共同施用。

[0021] 在一些实施方案中，系统为封闭系统（例如，用于保持无菌装置）（例如，用于保持受控装置）。

[0022] 在一些实施方案中，系统还包含执行算法的处理器。在一些实施方案中，算法设置为调节杀菌组合物的产生。在一些实施方案中，算法设置为调节杀菌组合物与两种或更多种另外的剂的组合。在一些实施方案中，算法设置为呈现关于系统的警报。这样的警报的实例包括但不限于杀菌组合物的量水平、时间段、所用的另外的剂的识别、系统故障、另外的剂的量水平、无菌污染（sterility contamination）、与另外的剂组合的杀菌组合物的量水平。

[0023] 在某些实施方案中，本发明提供使用这样的系统产生组合物的方法，所述组合物包含与另外的剂组合的杀菌组合物。

[0024] 在某些实施方案中，本发明提供使用这样的系统和/或方法产生的组合物。

[0025] 附图简述

图1描述涉及电化学活化的过程，其涉及以下过程：将氯化钠溶液和经处理的水（1）通过电解池（2），以通过电化学能量转化产生杀菌活性溶液（3）。

[0026] 图2显示一种系统，所述系统用于产生ECAcept浓缩物（参见，例如，盐水槽和过程槽），并且通过混合站将其与另外的剂（参见，例如，添加剂1A、添加剂2A和添加剂3A）组合，以产生改性EACcept浓缩物（参见，例如，1B、2B、3B）。

[0027] 发明详述

本发明的系统和方法不局限于在特定的装置内使用和/或施用。在一些实施方案中，本发明的系统和方法在基于动物的装置（例如，农业、兽医、学术、基于研究的等）内使用。在一些实施方案中，本发明的系统和方法在水力压裂装置内使用。在一些实施方案中，本发明的系统和方法在需要使用和/或施用消毒剂的任何装置内使用。

[0028] 特别是，本发明利用电化学活化（ECA）。本发明不局限于与ECA关联的特定的技术或机制。在一些实施方案中，ECA涉及以下过程：将氯化钠溶液和经处理的水（1）通过电解池（2），以通过电化学能量转化产生杀菌活性溶液（3）（参见，例如，图1）。因此，本发明提供利用ECA的装置、系统和方法。

[0029] 本发明不局限于特定的氯化钠溶液。在一些实施方案中，氯化钠溶液为ECAcept活化剂溶液。本发明不局限于特定的ECAcept活化剂溶液。在一些实施方案中，ECAcept活化剂溶液包含含水、纯化的氯化钠溶液。在一些实施方案中，氯化钠溶液为盐水溶液。本发明不局限于用于氯化钠溶液的特定浓度和/或纯化参数。

[0030] 本发明不局限于特定的电解池。在一些实施方案中，电解池设置为有效和可靠地由基础溶液（例如，包含氯化钠溶液的基础溶液）产生氯。在一些实施方案中，电解池设置为从基础溶液（例如，包含氯化钠溶液的基础溶液）释放氢。在一些实施方案中，电解池设置用于被动和/或主动的氢去除。在一些实施方案中，电解池设置用于高速电解质

流、氯化钠溶液传导率控制、全波 D.C. 校正、再循环池回路和 / 或无池电极渗透。在一些实施方案中，电解池设置为从氯化钠溶液产生包含氯、次氯酸盐、次氯酸和二氧化氯的溶液。在一些实施方案中，电解池如美国专利号 7,897,022、美国专利申请序号 13/026,947 和 13/026,939 所描述或与它们类似；各自通过引用而全文结合到本文中。

[0031] 本发明不局限于特定的杀菌活性溶液。在一些实施方案中，杀菌活性溶液为 ECAcept 浓缩物。本发明的系统和方法不局限于特定的 ECAcept 浓缩物。在一些实施方案中，ECAcept 浓缩物溶液为例如氯、次氯酸盐、次氯酸和二氧化氯的组合。

[0032] 因此，本发明提供包含 ECAcept 浓缩物的组合物。ECAcept 浓缩物不局限于特定的测量和 / 或浓度参数。在一些实施方案中，测量 ECAcept 浓缩物的游离可用氯 (FAC)，以百万分率 (PPM) 计。氯的组合已证明比常见的氯漂白剂（次氯酸钠）更有效许多倍，并且当施用于皮肤组织上时安全。在一些实施方案中，可改变在 ECAcept 浓缩物中 FAC 的 PPM 以满足各种各样的乳制品尺寸和期望的用途 / 需求的需要。在一些实施方案中，本发明的系统和方法能以任何期望的量和 / 或浓度产生 ECAcept 浓缩物（例如，在 24 小时生产时间段内 125,000 PPM 的 FAC 至 25,000,000 PPM 的 FAC 的量）（例如，在 24 小时生产时间段内，范围为 1,440,000 PPM 的 FAC（例如，180 加仑的 8,000 PPM 的 FAC) 至 4,800,000 PPM 的 FAC)。

[0033] ECAcept 浓缩物不局限于特定的用途或功能。在一些实施方案中，ECAcept 浓缩物为强有力的消毒剂。实际上，在开发本发明的实施方案的过程中进行的实验证明，产生的 ECAcept 浓缩物在相同的稀释率下在杀灭有害微生物方面比标准商品漂白剂（例如，5.25%-12.5% 次氯酸钠）有效 10 倍，而没有腐蚀、侵蚀、皮肤伤害特性。ECAcept 浓缩物不局限于特定的消毒剂用途。在一些实施方案中，ECAcept 浓缩物用于动物卫生消毒剂用途。例如，在一些实施方案中，ECAcept 浓缩物用于挤奶前和 / 或挤奶后卫生用途。例如，在一些实施方案中，ECAcept 浓缩物用于蹄处理。在一些实施方案中，ECAcept 浓缩物用于房屋卫生用途。例如，在一些实施方案中，ECAcept 浓缩物用于清洁、消毒和 / 或卫生处理结构房屋（例如，外墙、平台等）。在一些实施方案中，ECAcept 浓缩物用于器械清洁、消毒和 / 或卫生处理。在一些实施方案中，ECAcept 浓缩物用于清洁、消毒和 / 或卫生处理牛棚、治疗和 / 或医院区域。在一些实施方案中，ECAcept 浓缩物用于清洁、消毒和 / 或卫生处理原位清洗 (CIP) 位置。在一些实施方案中，ECAcept 浓缩物用于清洁、消毒和 / 或卫生处理洗衣位置。在一些实施方案中，ECAcept 浓缩物用于水处理。例如，在一些实施方案中，ECAcept 浓缩物用于从水源修复铁和 / 或锰。在一些实施方案中，ECAcept 浓缩物用于从水源去除生物膜。在一些实施方案中，ECAcept 浓缩物用于消毒水源。在一些实施方案中，产生具有相对中性 pH 的 ECAcept 浓缩物，以保持溶液对皮肤接触（例如，与奶牛乳头和皮肤组织接触）安全。

[0034] 在一些实施方案中，在其产生后，将 ECAcept 浓缩物进一步改性，用于增强的目的和 / 或用途。本发明不局限于改性 ECAcept 浓缩物的特定方式。在一些实施方案中，通过与另外的剂组合，将 ECAcept 浓缩物进一步改性。

[0035] 例如，在一些实施方案中，挤奶前乳房准备溶液通过使 ECAcept 浓缩物与另外的剂组合而产生。本发明不局限于特定的剂。在一些实施方案中，挤奶前乳房准备溶液通过将 ECAcept 浓缩物与例如以下一个或多个组合而产生：水、洗涤剂聚合物（例如，Acusol)、

表面活性剂（例如，tomadol 乙氧基化物）（例如，离子表面活性剂）（例如，非离子表面活性剂）（例如，阳离子季铵化合物（例如，西吡氯铵（例如，Ammonyx））（例如，烷基二甲基苄基氯化铵（例如，BTC-835））（例如，两性表面活性剂（例如，KDC-3）（例如，两性 LH））、水溶助长剂（例如，二甲苯磺酸钠）和染料（例如，酒石黄（染料 keyacid 酸黄））（例如，蓝色染料）（例如，黑绿豆）。在一些实施方案中，挤奶前乳房准备溶液还包含软化剂（例如，丙二醇）（例如，尿素）。挤奶前乳房准备溶液不局限于特定的成分参数（例如，相对于其它成分的量、浓度、pH 水平、稀释量等）。

[0036] 在一些实施方案中，挤奶后乳头溶液通过使 ECAcept 浓缩物与另外的剂组合而产生。本发明不局限于特定的剂。在一些实施方案中，挤奶后乳头溶液通过将 ECAcept 浓缩物与例如以下一个或多个组合而产生：水、洗涤剂聚合物（例如，Acusol）、柠檬酸、表面活性剂（例如，tomadol 乙氧基化物）（例如，离子表面活性剂）（例如，非离子表面活性剂）（例如，阳离子季铵化合物（例如，西吡氯铵（例如，Ammonyx））（例如，烷基二甲基苄基氯化铵（例如，BTC-835））（例如，两性表面活性剂（例如，KDC-3）（例如，两性 LH））、软化剂（例如，丙二醇）（例如，尿素）、隔离剂（例如，螯合剂（例如，versene 100/sequestrene 30A））（例如，氢氧化钾（例如，苛性钾））（例如，氢氧化钠（例如，苛性钠））（例如，氢氧化镁（例如，flogel））和染料（例如，酒石黄（染料 keyacid 酸黄））（例如，蓝色染料）（例如，黑绿豆）。在一些实施方案中，挤奶后乳头溶液还包含聚乙烯醇（例如，celvol 205-S）。挤奶后乳头溶液不局限于特定的成分参数（例如，相对于其它成分的量、浓度、pH 水平、稀释量等）。

[0037] 在一些实施方案中，洗衣溶液通过使 ECAcept 浓缩物与另外的剂组合而产生。本发明不局限于特定的剂。在一些实施方案中，洗衣溶液通过使 ECAcept 浓缩物与例如以下一个或多个组合而产生：水、表面活性剂（例如，tomadol 乙氧基化物）（例如，离子表面活性剂）（例如，非离子表面活性剂）（例如，阳离子季铵化合物（例如，西吡氯铵（例如，Ammonyx））（例如，烷基二甲基苄基氯化铵（例如，BTC-835））（例如，两性表面活性剂（例如，KDC-3）（例如，两性 LH））、隔离剂（例如，螯合剂（例如，versene 100/sequestrene 30A））（例如，氢氧化钾（例如，苛性钾））（例如，氢氧化钠（例如，苛性钠））（例如，氢氧化镁（例如，flogel））、添味剂（例如，香料）和染料（例如，酒石黄（染料 keyacid 酸黄））（例如，蓝色染料）（例如，黑绿豆）。洗衣溶液不局限于特定的成分参数（例如，相对于其它成分的量、浓度、pH 水平、稀释量等）。

[0038] 在一些实施方案中，原位清洗 (CIP) 溶液通过使 ECAcept 浓缩物与另外的剂组合而产生。本发明不局限于特定的剂。在一些实施方案中，原位清洗溶液通过使 ECAcept 浓缩物与例如以下一个或多个组合而产生：水、隔离剂（例如，螯合剂（例如，versene 100/sequestrene 30A））（例如，氢氧化钾（例如，苛性钾））（例如，氢氧化钠（例如，苛性钠））（例如，氢氧化镁（例如，flogel））和洗涤剂聚合物（例如，Acusol）。原位清洗溶液不局限于特定的成分参数（例如，相对于其它成分的量、浓度、pH 水平、稀释量等）。

[0039] 在一些实施方案中，房屋溶液通过使 ECAcept 浓缩物与另外的剂组合而产生。本发明不局限于特定的剂。在一些实施方案中，房屋溶液通过使 ECAcept 浓缩物与例如以下一个或多个组合而产生：水、洗涤剂聚合物（例如，Acusol）、隔离剂（例如，螯合剂（例如，versene 100/sequestrene 30A））（例如，氢氧化钾（例如，苛性钾））（例如，氢氧化钠（例

如，苛性钠））（例如，氢氧化镁（例如，flogel））、水溶助长剂（例如，二甲苯磺酸钠）、表面活性剂（例如，tomadol 乙氧基化物）（例如，离子表面活性剂）（例如，非离子表面活性剂）（例如，阳离子季铵化合物（例如，西吡氯铵（例如，Ammonyx））（例如，烷基二甲基苄基氯化铵（例如，BTC-835））（例如，两性表面活性剂（例如，KDC-3）（例如，两性 LH））。房屋溶液不局限于特定的成分参数（例如，相对于其它成分的量、浓度、pH 水平、稀释量等）。

[0040] 在一些实施方案中，足浴溶液通过使 ECAcept 浓缩物与另外的剂组合而产生。本发明不局限于特定的剂。在一些实施方案中，足浴溶液通过使 ECAcept 浓缩物与例如以下一个或多个组合而产生：水、表面活性剂（例如，tomadol 乙氧基化物）（例如，离子表面活性剂）（例如，非离子表面活性剂）（例如，阳离子季铵化合物（例如，西吡氯铵（例如，Ammonyx））（例如，烷基二甲基苄基氯化铵（例如，BTC-835））（例如，两性表面活性剂（例如，KDC-3）（例如，两性 LH））和无机酸（例如，Videt A-85）。足浴溶液不局限于特定的成分参数（例如，相对于其它成分的量、浓度、pH 水平、稀释量等）。

[0041] 在一些实施方案中，药用溶液通过使 ECAcept 浓缩物与另外的剂组合而产生。在一些实施方案中，药用溶液设置用于局部施用。在一些实施方案中，药用溶液设置用于口腔给药。在一些实施方案中，药用溶液设置用于静脉内给药。本发明不局限于特定的剂。在一些实施方案中，药用溶液通过使 ECAcept 浓缩物与例如一种或多种设计用于预防和 / 或治疗医疗状况的剂组合而产生（例如，抗生物剂、抗微生物剂、镇静剂、止痛剂、特定的医疗状况治疗剂（例如，设计用于治疗和 / 或预防乳腺炎的剂）（例如，设计用于治疗和 / 或预防与粘膜和非粘膜组织关联的状况的剂）（例如，设计用于治疗和 / 或预防红眼病、组织皮疹的剂）（例如，设计用于治疗和 / 或预防与创伤关联的状况的剂）、生长诱导剂（例如，激素）、维生素等）。

[0042] 本发明不局限于用于将 ECAcept 浓缩物与另外的剂组合的特定的技术。在一些实施方案中，将另外的剂储存在产生 ECAcept 浓缩物的系统 / 装置内。例如，图 2 显示一种系统，该系统用于产生 ECAcept 浓缩物（参见，例如，盐水槽和过程槽），并且通过混合站将其与另外的剂（参见，例如，添加剂 1A、添加剂 2A 和添加剂 3A）组合，以产生改性 EACcept 浓缩物（参见，例如，1B、2B、3B）（例如，挤奶前乳房准备溶液；挤奶后乳头溶液；洗衣溶液；原位清洗溶液；房屋溶液；足浴溶液）。在一些实施方案中，另外的剂储存在产生 ECAcept 浓缩物的系统 / 装置内，其方式允许与产生的 ECAcept 浓缩物在封闭的装置内组合（例如，从而保持受控和 / 或无菌的装置）（例如，示于图 2 的系统）。在一些实施方案中，另外的剂以与 RFID 技术相容的方式储存（例如，标记 RFID 标签的另外的剂容器），并且系统具有 RFID 标签。在一些这样的实施方案中，系统设置为仅当 RFID 标签以期望的方式匹配时运行（例如，以不具有与系统 RFID 标签匹配的 RFID 标签的方式储存的另外的剂导致无系统运行）。在一些实施方案中，系统设置为使得 ECAcept 浓缩物的产生和与另外的剂组合在相同装置（例如，相同的位置）内发生。在一些实施方案中，系统设置为使得 ECAcept 浓缩物的产生和与另外的剂组合在不同的位置发生。在一些实施方案中，改性 ECAcept 浓缩物的产生（例如，挤奶前乳房准备溶液；挤奶后乳头溶液；洗衣溶液；原位清洗溶液；房屋溶液；足浴溶液）在产生 ECAcept 浓缩物之前由使用者控制。在一些实施方案中，改性 ECAcept 浓缩物的产生（例如，挤奶前乳房准备溶液；挤奶后乳头溶液；洗衣溶液；原位清洗溶液；房屋溶液；足浴溶液）在产生 ECAcept 浓缩物之后由使用者控制。在一些实施方案中，改性

ECAcept 浓缩物的产生由使用者物理完成。在一些实施方案中，改性 ECAcept 浓缩物的产生自动发生（例如，无需使用者）。

[0043] 本发明提供系统，其设置用于产生 ECAcept 浓缩物和 / 或改性 ECAcept 浓缩物（例如，挤奶前乳房准备溶液；挤奶后乳头溶液；洗衣溶液；原位清洗溶液；房屋溶液；足浴溶液）。在一些实施方案中，系统包含氯化钠溶液、水、电解池和用于收集 / 储存产生的 ECAcept 浓缩物的室。在一些实施方案中，系统包含氯化钠溶液、水、电解池、用于产生改性 ECAcept 浓缩物的另外的剂以及用于收集 / 储存产生的 ECAcept 浓缩物和 / 或改性 ECAcept 浓缩物的室。在一些实施方案中，系统的所有方面可由使用者控制。例如，可控制 ECAcept 浓缩物和 / 或改性 ECAcept 浓缩物的量（例如，经过一定的时间段），可控制特定的浓度（例如，FAC 的 PPM）。此外，可控制当产生改性 ECAcept 浓缩物（例如，挤奶前乳房准备溶液；挤奶后乳头溶液；洗衣溶液；原位清洗溶液；房屋溶液；足浴溶液）时使用的另外的剂的量，以产生精确期望的最终产品。此外，在一些实施方案中，系统具有处理器（例如，计算机界面）（例如，算法），用于促进该控制。在一些实施方案中，处理器与 html5 或更高格式相容。在一些实施方案中，系统可现场或异地（例如，通过无线（例如，wi-fi）互动）控制。在一些实施方案中，系统可通过应用（例如，可下载的电话应用）控制。在一些实施方案中，系统设置为向使用者呈现数据（例如，特定的 ECAcept 浓缩物溶液和 / 或改性 ECAcept 浓缩物溶液的浓度水平）（例如，特定的 ECAcept 浓缩物溶液和 / 或改性 ECAcept 浓缩物溶液的量）（例如关于特定的 ECAcept 浓缩物溶液和 / 或改性 ECAcept 浓缩物溶液的警告（例如，该量太高或太低的警告））（例如，无菌污染）。在一些实施方案中，系统可编程，以自动产生期望的 ECAcept 浓缩物和 / 或改性 ECAcept 浓缩物溶液（例如，编程为当发生特定事件（例如，储存量达到特定的水平，经过特定的时间段等）时自动产生更多的溶液）。在一些实施方案中，系统设置为监测 ECAcept 浓缩物和 / 或改性 ECAcept 浓缩物的产生，以确保根据程序参数的适当产生和 / 或确保品质控制。系统还设置用于以受控和 / 或无菌方式、以任何期望的量、在任何延长的时间量内储存产生的 ECAcept 浓缩物和 / 或改性 ECAcept 浓缩物。系统还设置用于以紧密受控方式、以任何期望的量、在任何延长的时间量内储存产生的 ECAcept 浓缩物和 / 或改性 ECAcept 浓缩物。系统还设置用于在任何给定的时间储存 ECAcept 浓缩物、改性 ECAcept 浓缩物和 / 或另外的剂的多个溶液。系统还设置用于以受控和 / 或无菌方式、以任何期望的量、在任何延长的时间量内分配产生的 ECAcept 浓缩物和 / 或改性 ECAcept 浓缩物。系统还设置用于以紧密受控方式、以任何期望的量、在任何延长的时间量内分配产生的 ECAcept 浓缩物和 / 或改性 ECAcept 浓缩物。本发明提供使用这样的系统产生 ECAcept 浓缩物和 / 或改性 ECAcept 浓缩物的方法（例如，挤奶前乳房准备溶液；挤奶后乳头溶液；洗衣溶液；原位清洗溶液；房屋溶液；足浴溶液）。

[0044] 在一些实施方案中，系统产生杀菌组合物，其设置用于水力压裂装置。系统不局限于特定的水力压裂装置。在一些实施方案中，水力压裂装置涉及提取油。在一些实施方案中，水力压裂装置涉及提取天然气。水力压裂用于例如提高或恢复可由地下天然储层生产流体（例如石油、水或天然气）的速率。储层通常为例如，多孔砂岩、石灰石或白云石岩石，而且还包括’非常规的储层’，例如页岩或煤床。水力压裂能够由低于地表的（通常 5,000-20,000 英尺 (1,500-6,100 m)）深岩层生产天然气和油。在这样的深度，可能没有足够的渗透性或储层压力以允许天然气和油以经济的速率从岩石流入井眼。因此，因为页岩

极低的天然渗透性，在岩石中产生传导性压裂对于从页岩储层提取气体是必要的。压裂提供使储层的较大区域与井连接的传导性路径，从而提高可从目标岩层回收天然气和液体的区域。

[0045] 与有效的水力压裂产量关联的问题包括，例如，产生污染物气体、分解凝胶化剂和降低压裂流体粘度的细菌和微生物。为了克服这些问题，本发明提供杀菌组合物，其用于抑制和/或杀灭与水力压裂装置关联的细菌和/或微生物的生长。在一些实施方案中，杀菌组合物设置为防止细菌和/或微生物产生污染副产物（例如，气体）。在一些实施方案中，杀菌组合物设置为防止细菌和/或微生物干扰（例如，分解）用于水力压裂的剂（例如，凝胶化剂）（例如，压裂流体）。在一些实施方案中，将用于抑制和/或杀灭与水力压裂装置关联的细菌和/或微生物的生长的杀菌组合物与一种或多种另外的剂组合。另外的剂的实例包括但不限于水、洗涤剂聚合物（例如，Acusol）、表面活性剂（例如，tomadol 乙氧基化物）（例如，离子表面活性剂）（例如，非离子表面活性剂）（例如，阳离子季铵化合物（例如，西吡氯铵（例如，Ammonyx））（例如，烷基二甲基苄基氯化铵（例如，BTC-835））（例如，两性表面活性剂（例如，KDC-3）（例如，两性 LH））、西吡氯铵（例如，Ammonyx）、二甲苯磺酸钠、染料（例如，酒石黄（染料 keyacid 酸黄））、柠檬酸、软化剂（例如，丙二醇）（例如，尿素）、蓝色染料、隔离剂（例如，螯合剂（例如，versene 100/sequestrene 30A））（例如，氢氧化钾（例如，苛性钾））（例如，氢氧化钠（例如，苛性钠））（例如，氢氧化镁（例如，flogel））、添味剂（例如，香料）、染料（例如，黑绿豆）、二甲苯磺酸钠、烷基二甲基苄基氯化铵（例如，BTC-835）、无机酸（例如，Videt A-85）和药用剂。在一些实施方案中，杀菌组合物与另外的杀菌剂和/或生物杀灭剂（例如，2,2- 二溴 -3- 次氮基丙酰胺、多核芳烃、多环有机物质、戊二醛）共同施用。

[0046] 通过参考并入

每一件本文提及的专利文献和科学论文的所有公开内容通过引用结合到本文中，用于所有目的。

[0047] 等价物

在不偏离本发明的精神或基本特性下，本发明可以其它特定形式体现。因此，在所有方面，前述实施方案应看作是说明性的，而不是限制本文描述的发明。因此，本发明的范围由所附权利要求而不是前述描述来表明，并且落入和权利要求等价的含义和范围内的所有变化旨在包括在其中。

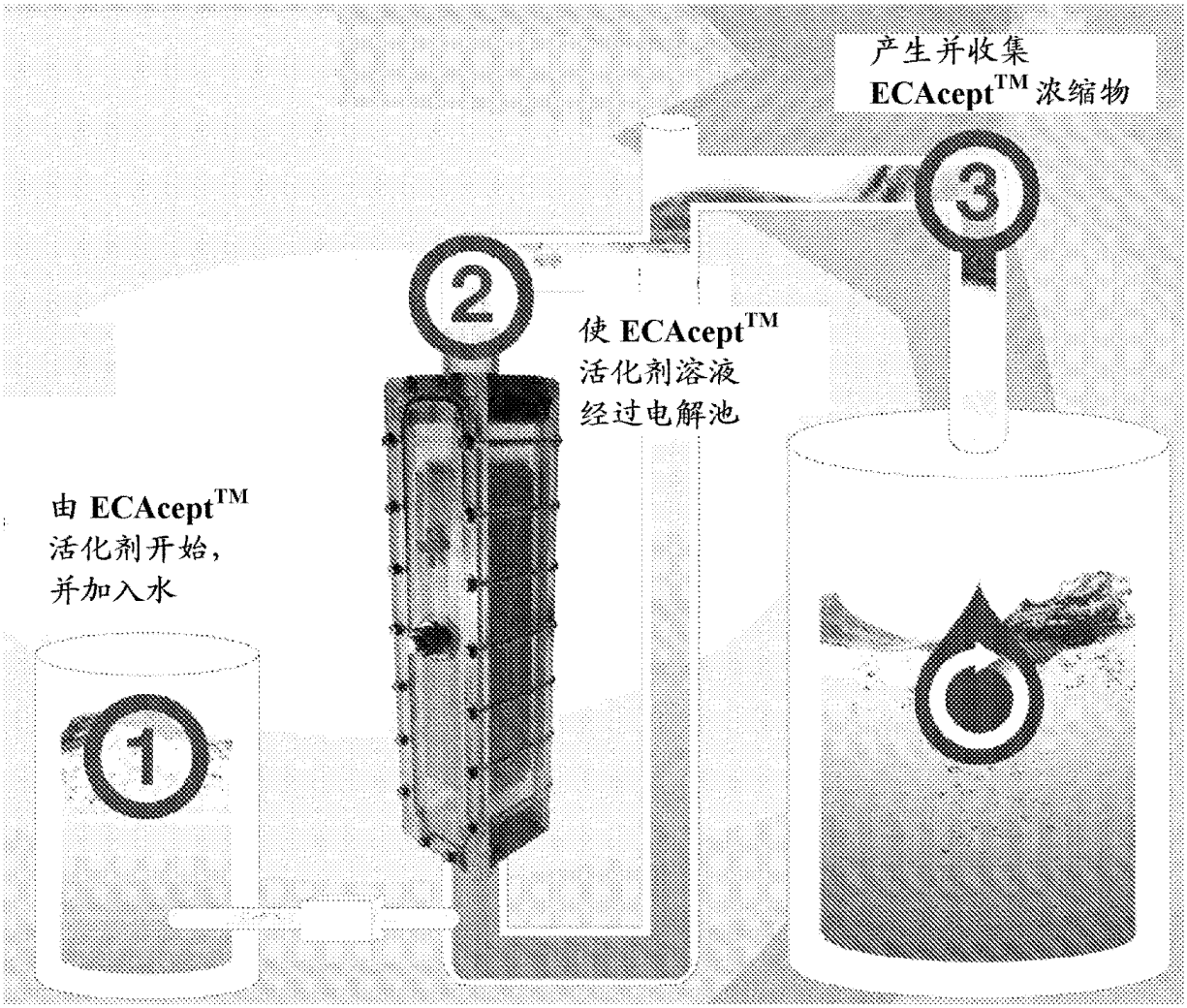
产生并收集
ECAcept™ 浓缩物
3
2
使 ECAcept™
活化剂溶液
经过电解池
由 ECAcept™
活化剂开始，
并加入水
1

图 1

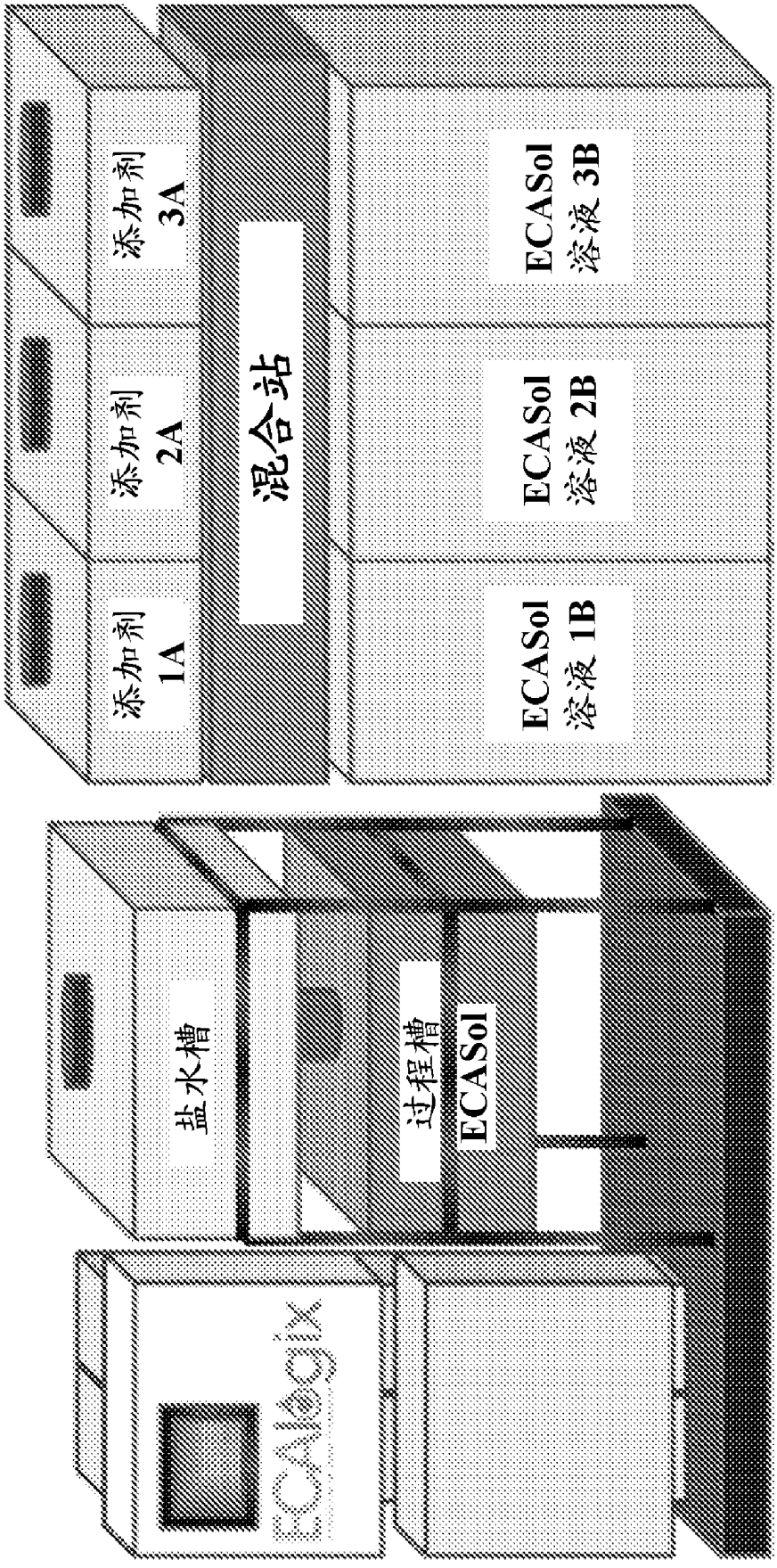
添加剂 3A
添加剂 2A
添加剂 1A
混合站
ECASol 溶液 3B
ECASol 溶液 2B
ECASol 溶液 1B
盐水槽
过程槽
ECASol
ECAlogix

图 2