Development Concept

Objective

Our theme is the water which is vital not only to the human being but also to all living things on Earth, but it is limited and precious. We contribute to Food/Living/Environment, by easing environmental burden.

Security

We comply with specifications and standards by Health Labor and Welfare Ministry.
Designated as specified agricultural chemicals by Ministry of Agriculture, Forestry and Fisheries.

Safety

We comply with specifications and standards by Health Labor and Welfare Ministry.
Designated as specified agricultural chemicals by Ministry of Agriculture, Forestry and Fisheries.

Eco

The technology is friendly to the human being and global environment.

Main features

Security

☆ Designated as a food additive disinfectant by Health Labor and Welfare Ministry.

- The electrolyzed-water-producing apparatus which our company developed conforms to “production criteria, and ingredient definition” for weakly acidic hypochlorous acid water by Health Labor and Welfare Ministry and is designated as an apparatus for producing a food additive disinfectant.

Safety

☆Since no chemicals are used, anyone can use it safely.

- Both sterile water and cleaning water can be produced by using only water, unique refined salt of our own and electricity.
- No residues are produced and the water gets back to ordinary water after use, therefore no secondary pollution is brought about.
- No supervisor for chemicals is required, as in the case of using hydrochloric acid.

High functionality

☆Both sterile water and cleaning water can be produced at will.

- PATPEND electrolysis structure allows production of sterile water and cleaning alkaline water at will (separately).

Energy saving

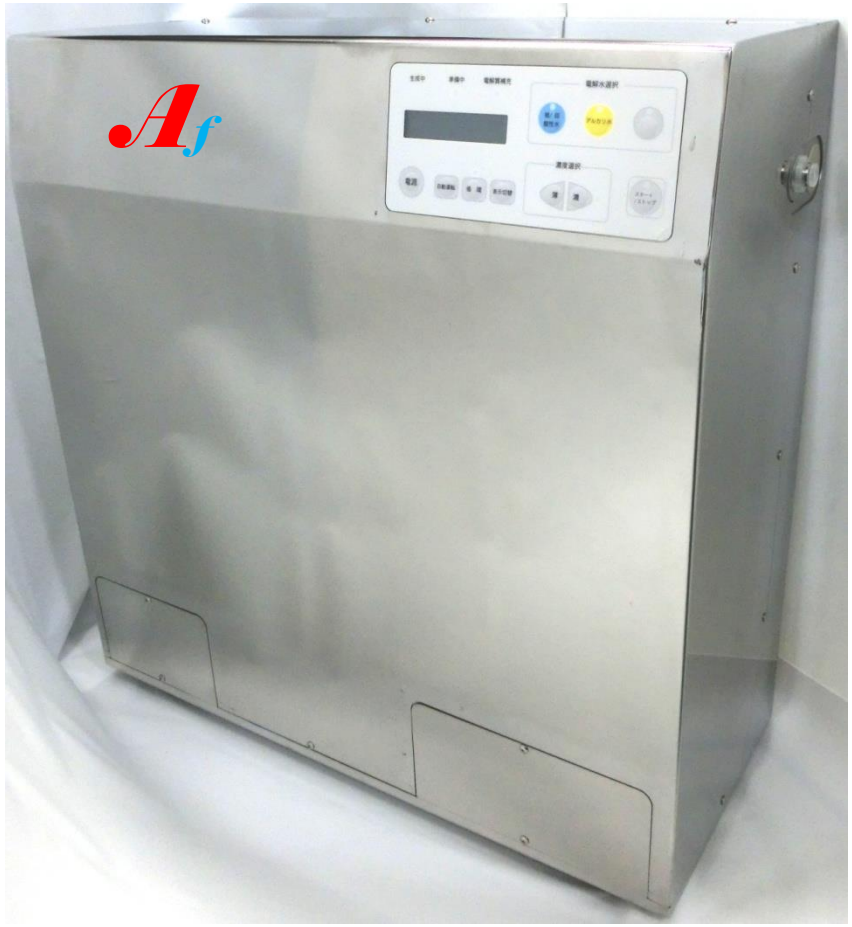
☆The apparatus is made compact and energy-saving by realizing high efficiency.

- PATPEND high efficient electrolysis method has achieved efficiency about twice higher than electrolysis theory.

Electrolyzed-water-producing

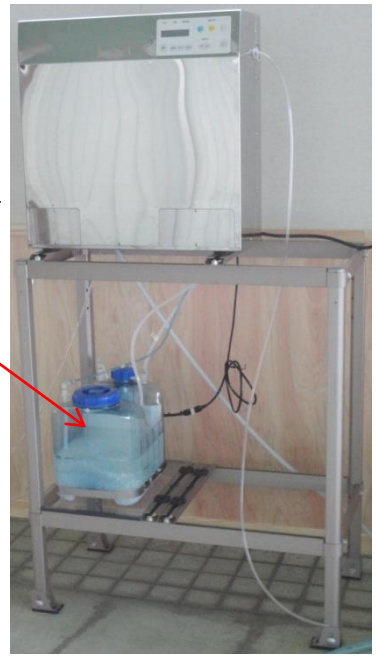
Both sterile/odor-eliminating electrolyzed water and cleaning electrolyzed alkaline water can be produced separately at will.

H530mm × W530mm × D220mm



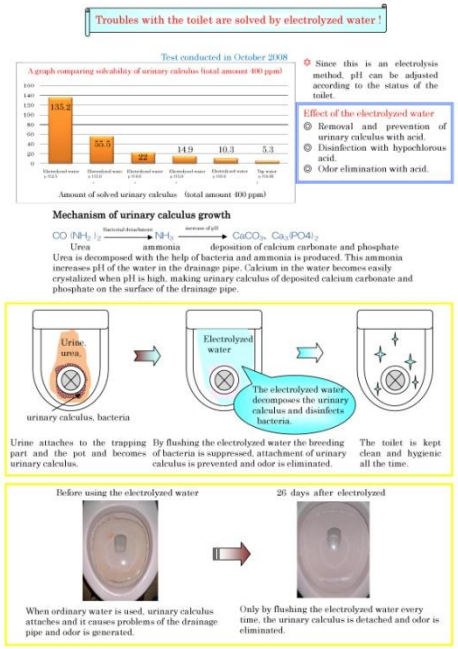
Example of setting a special rack.

A tank for electrolysis-promoting agent.



Usage examples

Removal of urinary calculus



Dish washer

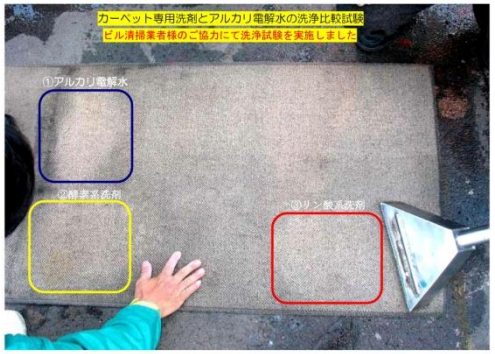
介護施設設置食器洗浄機電解水装置

Hydraulic blasting (paint stripping)

Car washing

Train-car-washing

Cleaning inside and outside of a building



Examples of specific usage of the products which we developed

★ Plant raising with reduced amount of chemicals, disease protection, growth promotion.
※Designated as specified agricultural chemicals by Ministry of Agriculture, Forestry and Fisheries.

Cleaning and/or disinfection of kitchens, food processing plants, cut vegetables, and cooking devices, etc.

Protection against Legionella Bacteria at a bathroom/nursing-care bathroom.

Hygiene control and mist-spray odor elimination of utensils at nursing-care facility, nursery schools and hospitals.

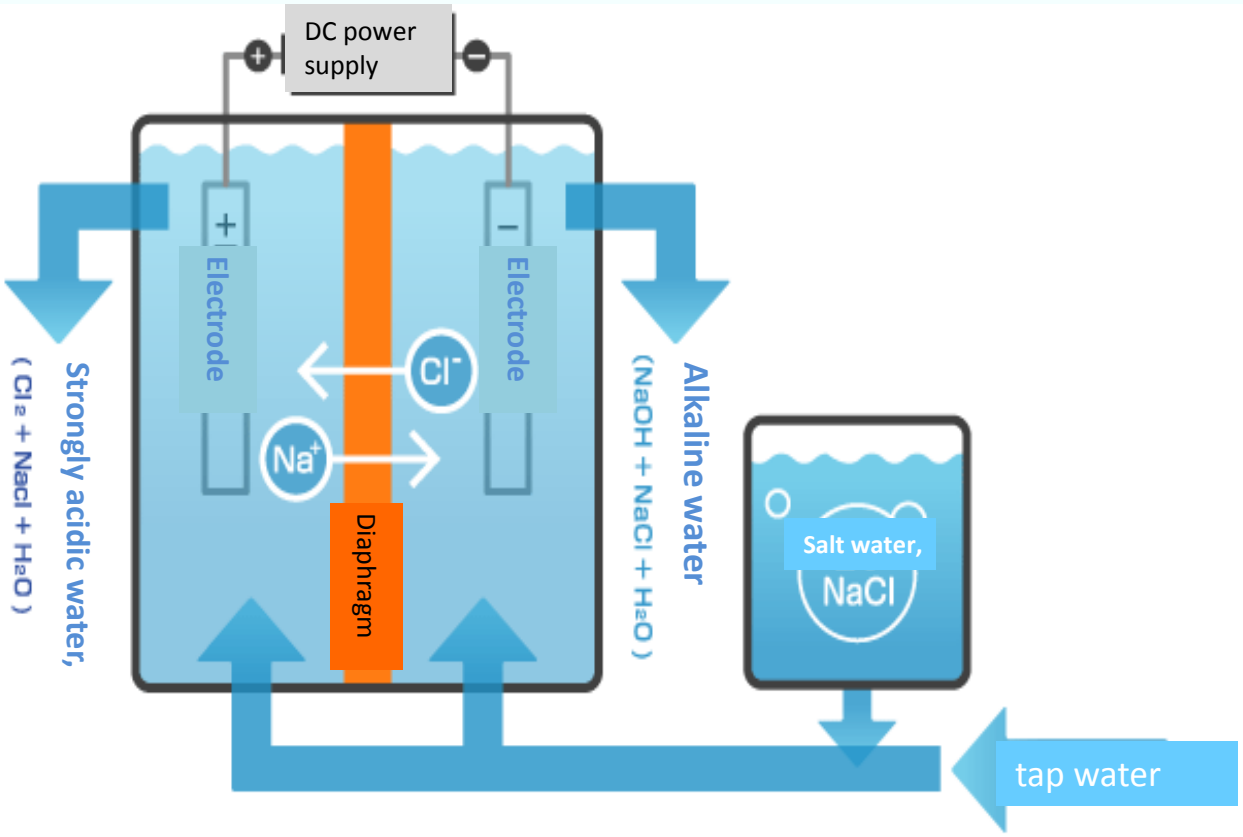
Cleaning and disinfection of foods like fresh fish, vegetables and fruits.

Degreasing cleaning of industrial parts, hydraulic blasting (paint stripping).

Cleaning of underwear, lab-coats, and sheets (bleaching, disinfection, odor elimination).

Conventional method of electrolysis

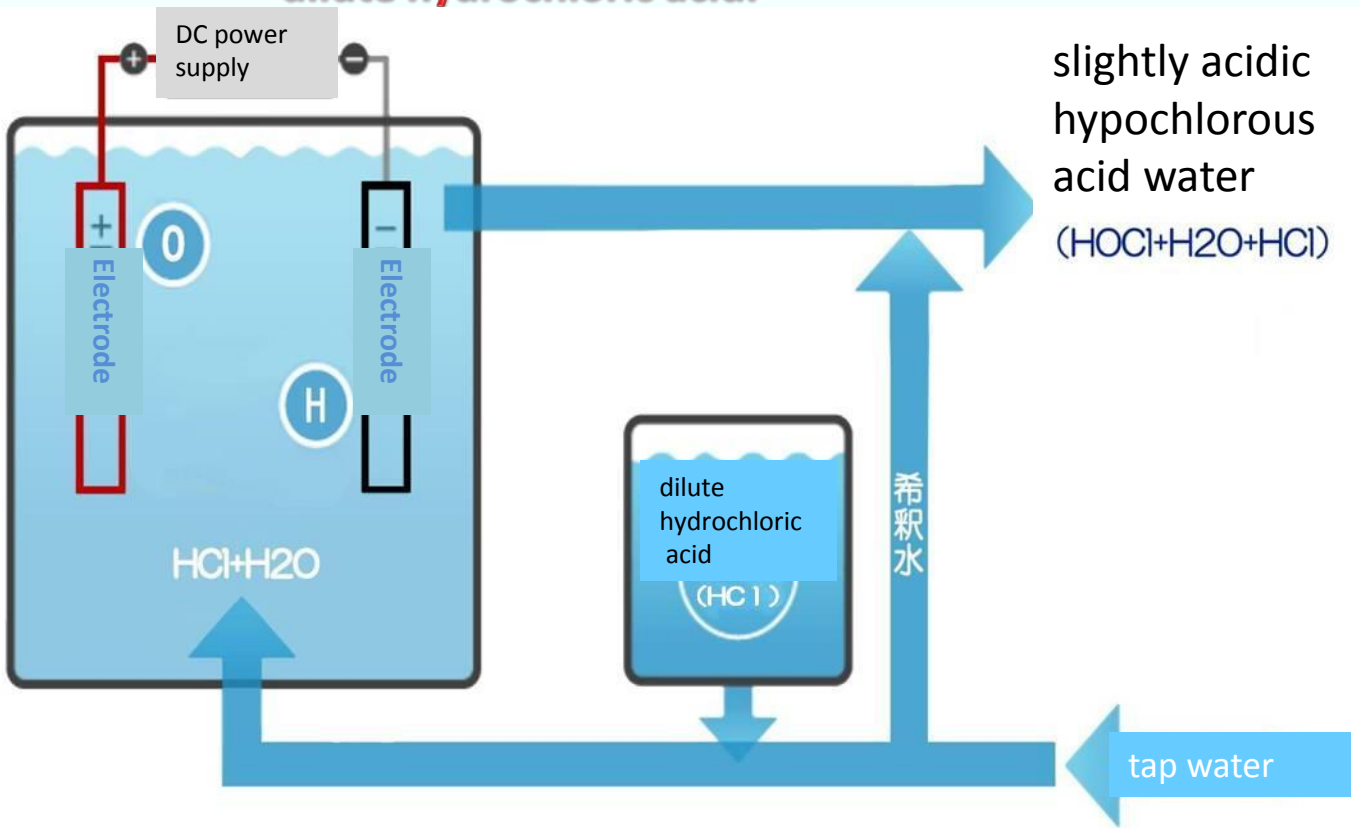
- In the conventional method of generating electrolyzed water, it is customary to produce both acidic water and alkaline water at the same time. Since salt water is directly added to the raw water for electrolysis, the produced electrolyzed water contains salt (NaCl) which causes corrosion (rust).
- Since acidic water and alkaline water are produced at the same time, the one which is not used must be discarded or stored in a spare tank.



Conventional method of generating slightly acidic hypochlorous acid water (diaphragm-free electrolysis method)

- A chemical (dilute hydrochloric acid) is used.
- Alkaline water (cleaning water) is not generated.

Generation method by electrolyzing dilute hydrochloric acid.



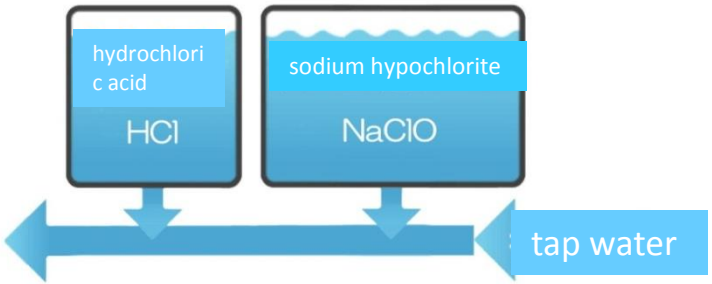
Other examples of generating method of weakly acidic hypochlorous acid water not designated as a food additive by Health Labor and Welfare Ministry.

①

NG

weakly acidic hypochlorous acid water

$(HOCl+NaClO+H_2O)$

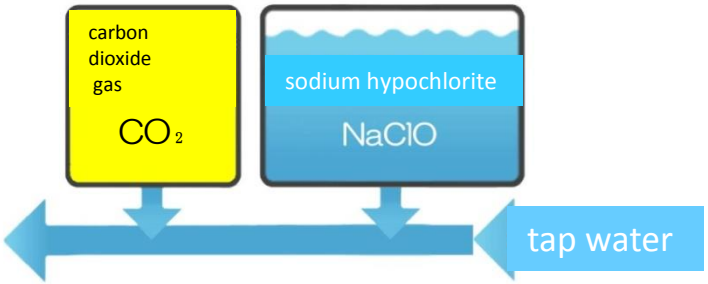


②

NG

weakly acidic hypochlorous acid water

$(HOCl+CO_2+H_2O)$

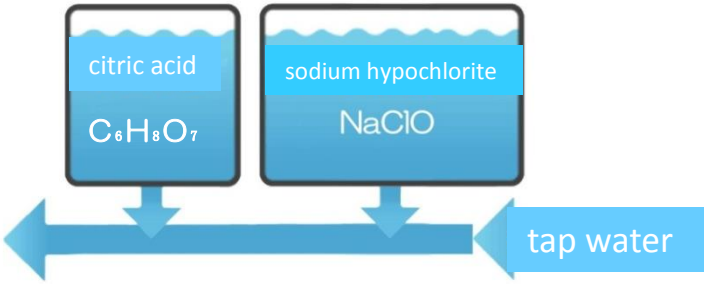


③

NG

weakly acidic hypochlorous acid water

$(HOCl+C_6H_8O_7+H_2O)$

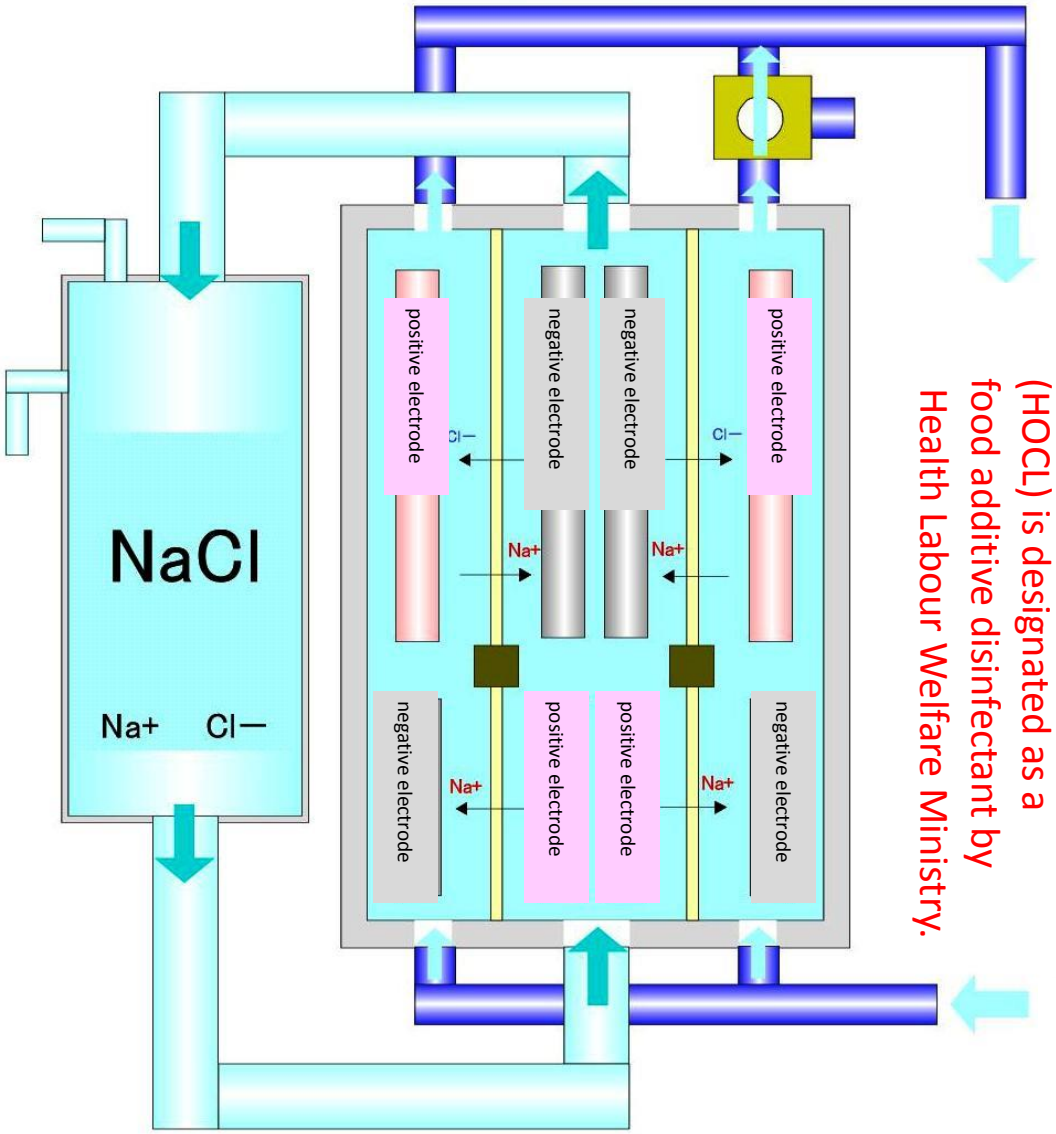


Patent pending

Pattern 1

3-cell 8-electrode electrolysis

Generation of slightly/weakly acidic hypochlorous acid water



※ Slightly/weakly acidic hypochlorous acid water (HOCL) is designated as a food additive disinfectant by Health Labour Welfare Ministry.

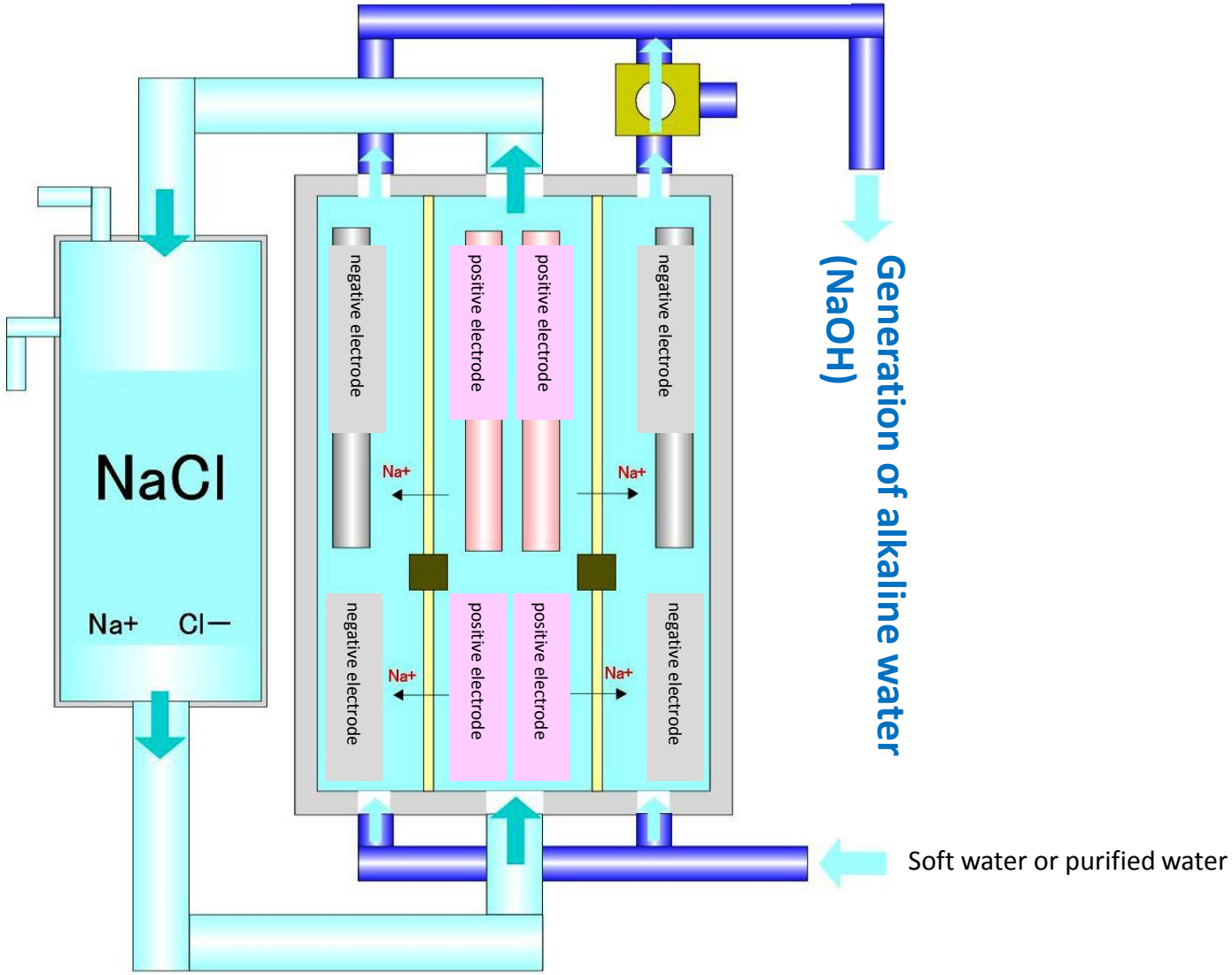
Soft water or purified water

Patent pending

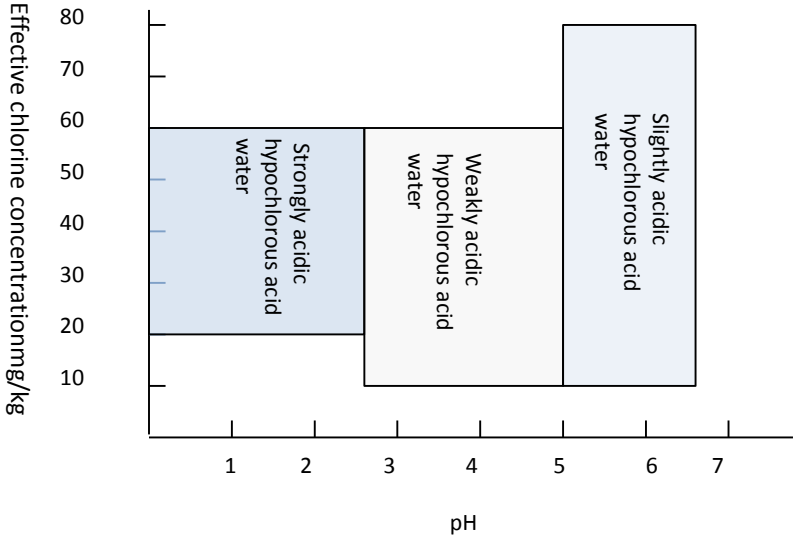
Pattern 2

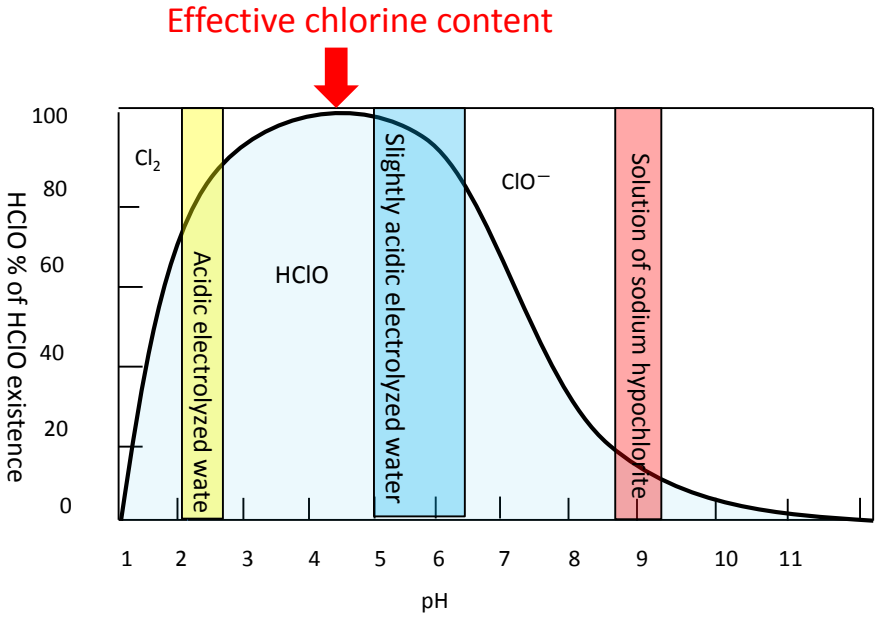
3-cell 8-electrode electrolysis

Generation of alkaline water



pH dependence of effective chlorine ratio





Usage examples classified by concentration

For a particular usage, hypochlorous acid water should be diluted with water to the appropriate concentration (ppm).

Usage examples of slightly/weakly acidic hypochlorous acid water classified by its concentration.

20～50ppm	50～100ppm	100～150ppm	150～200ppm以上
Cleaning of fingers and hands.  Gargle (oral care)  Ultrasonic misting device Disinfection in the room, elimination of odor 	Cleaning of foods/disinfection, cleaning of fingers and hands   Disinfection of cooking utensils  Oral care 	Daily disinfection /cleaning  Disinfection and odor elimination of toilet and kitchen floor.  Spray disinfection of cooking utensils 	Emergency disinfection of bacteria contamination.  

Oct.31 2005
No. 1705597

Report on antibacterial tests of electrolyzed hypochlorous acid water

Agency of testing and verification
Shimane Environment & Health Public Corporation
1-4-6 Koshibara, Matsue City, Shimane Prefecture
Yukio Nakajima, Director

1. Generation date of electrolyzed hypochlorous acid water: Oct. 12, 2005
2. 2. Test date: ①②③ Oct. 20, 2005
   ④ ⑤Legionella bacteria Oct. 14, 2005
3. 3. pH of electrolyzed hypochlorous acid water: pH6.1
4. 4. Concentration of effective chlorine: 30mg/kg
5. Client: Aqua Flex Co., Ltd.
6. Results: as shown below
7. Pictures of test specimen: photos on separate sheets

	Process time	Species	Culture time, fungus concentration	Temperature	Temperature	Results
①	1min 10min	Candida albicans ATCC10231	48H、 4.3×10^{7} cfu/ml	24.6℃	①nutrient medium: GPLP nutrient agar ① Temp.: 35℃ Time: 48 h	①＜10cfu/ml ②＜10cfu/ml
②	1min 10min	Staphylococcus aureusATCC65389	48H、 1.3×10^{9} cfu/ml	24.6℃	①SCDLP nutrient agar ②35℃ 48 h	①＜10cfu/ml ②＜10cfu/ml
③	1min 10min	Pseudomonas aeruginosa ATCC9027	48H、 1.3×10^{8} cfu/ml	24.6℃	① SCDLP nutrient agar ② 35℃ 4 8 h	①＜10cfu/ml ②＜10cfu/ml
④	1min 10min	Legionellaneumphila SG-1	72H、 1.1×10^{9} cfu/ml	24.6℃	① BCYE-α nutrient agar ② 36℃ 72h	①＜100cfu/ml ②＜100cfu/ml
⑤	1min 10min	Legionellaneumphila SG-5	72H、 8×10^{8} cfu/ml	24.6℃	①BCYE-α nutrient agar ② 36℃ ③ 72h	①＜100cfu/ml ②＜100cfu/ml

On the antibacterial tests of electrolyzed hypochlorous acid water

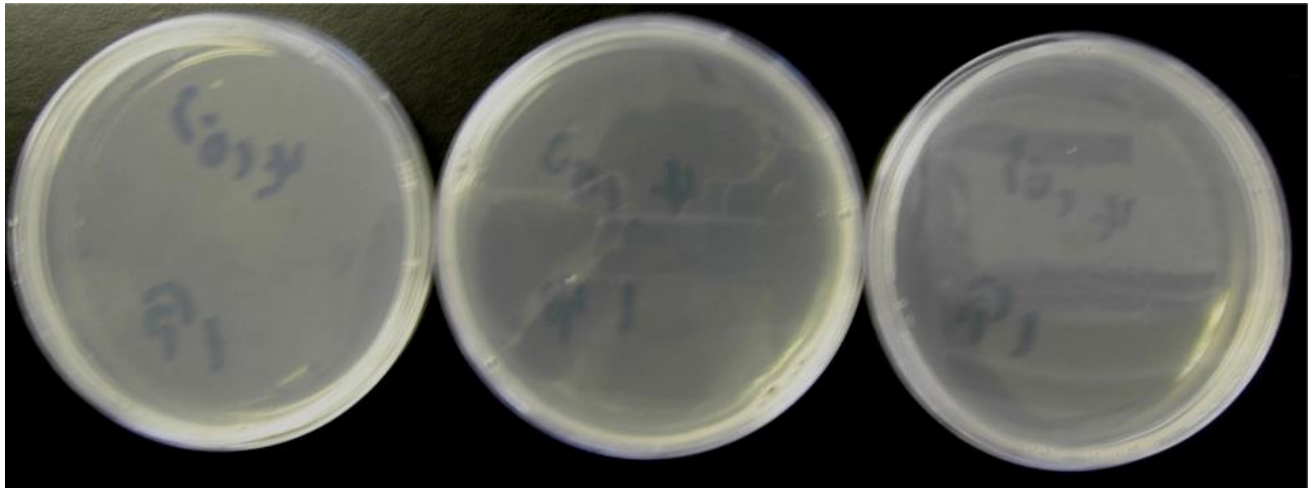
Control area 4.3×10^4 cfu/ml

・Species: *Candida albicans* ATCC10231 (mold)
・Culture time and fungus concentration, 24 hours 4.3×10^7 cfu/ml
・ Condition of generating electrolyzed water

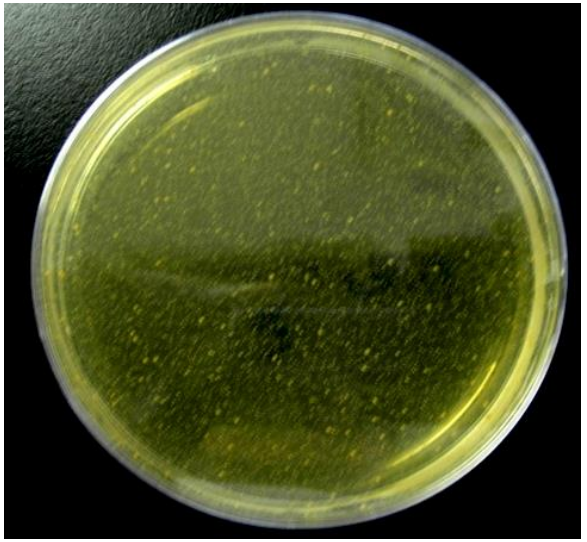
1. HOCL concentration 30mg/kg
2. Power-on time 1 min.
3. Processing time 1 min.
4. Culture conditions

①Nutrient medium : GPLP nutrient agar
②Culture temperature: 35℃
③Culture time: 48 hours

1 min. all of the three<10 cfu/ml



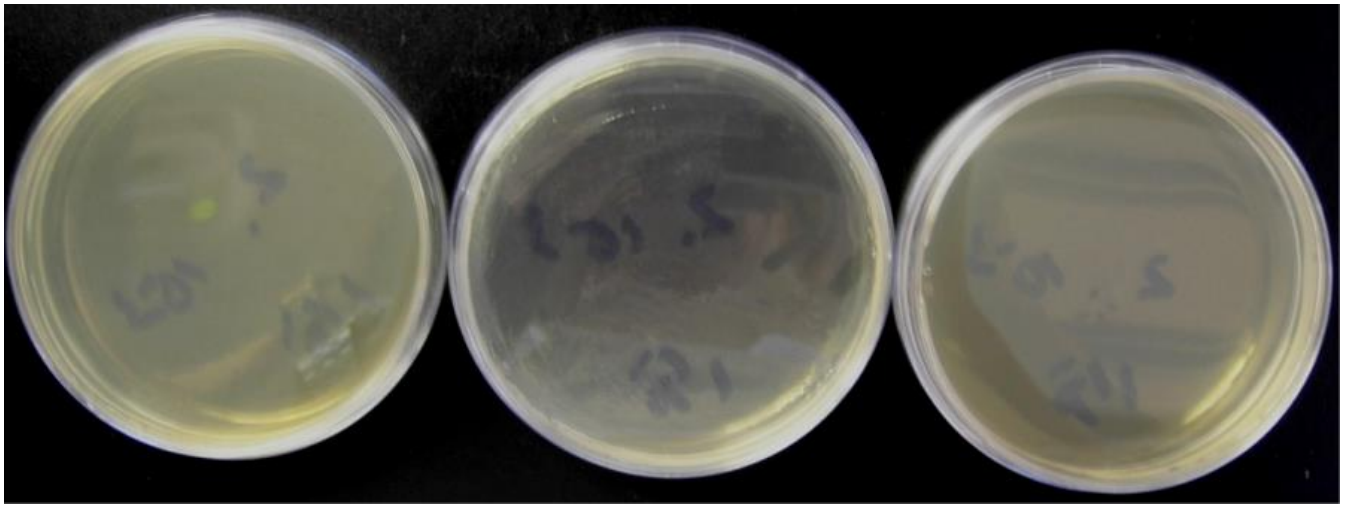
Control area $1.3x10^6$ cfu/ml



- Species: *Staphylococcus aureus* ATCC65389
- Culture time and fungus concentration, 24 hours $1.3x10^9$ cfu/ml
- Condition of generating electrolyzed water
  1. HOCL concentration 30mg/kg
  2. Power-on time 1 min.
  3. Processing time 1 min.
  4. Culture conditions

①Nutrient medium : GPLP nutrient agar
②Culture temperature: 35℃
③Culture time: 48 hours

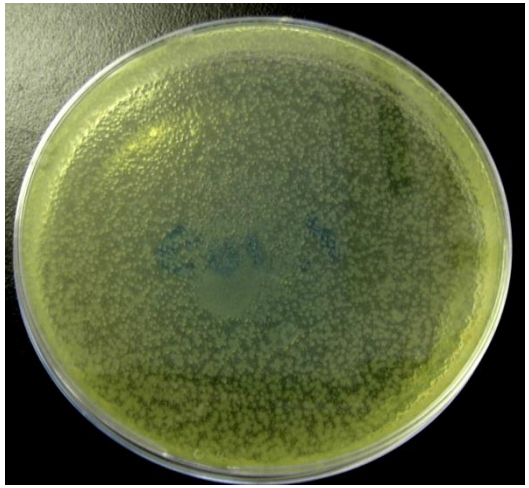
1 min. all of the three<10 cfu/ml



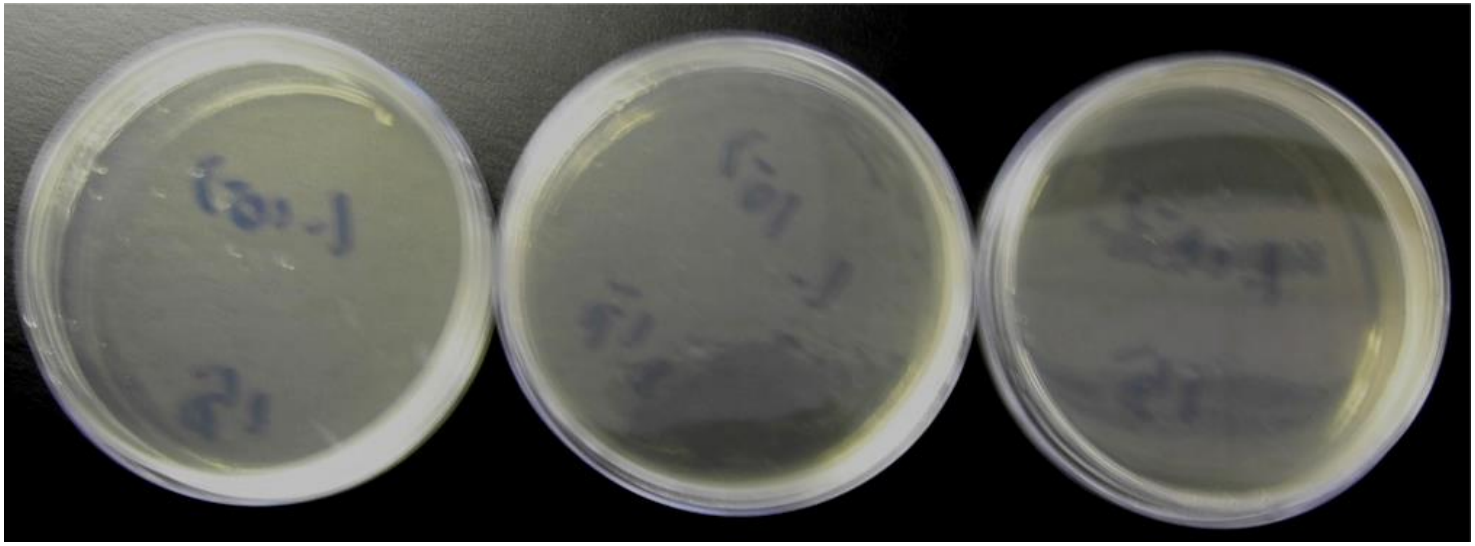
Control area 1.3×10^5 cfu/ml

- Species: *Pseudomonas aeruginosa* ATCC9027
- Culture time and fungus concentration, 24 hours 1.3×10^8 cfu/ml
- Condition of generating electrolyzed water
  1. HOCL concentration 30mg/kg
  2. Power-on time 1 min.
  3. Processing time 1 min.
  4. Culture conditions

①Nutrient medium : GPLP nutrient agar
②Culture temperature: 35℃
③Culture time: 48 hours



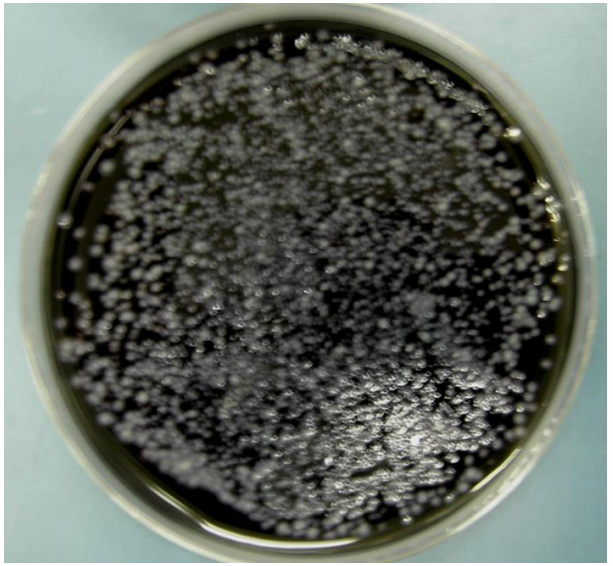
1 min. all of the three<10 cfu/ml



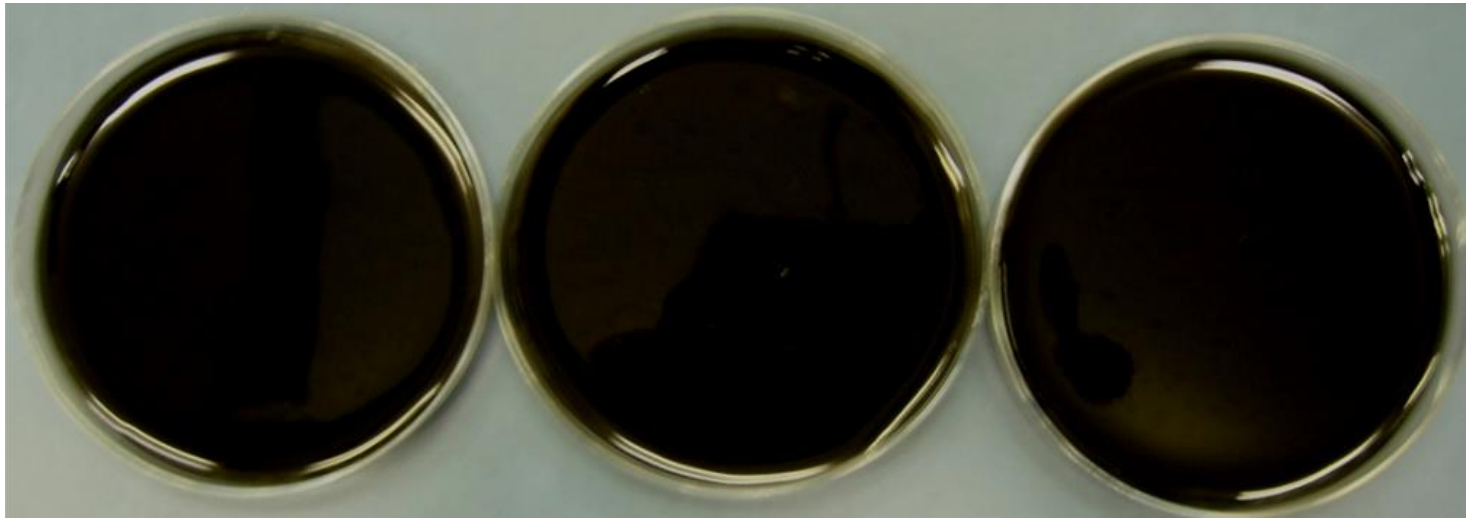
Control area $1.1x10^5$ cfu/ml

- Species: *Legionellaneumophila* SG-1
- Culture time and fungus concentration, 48 hours $1.1x10^9$ cfu/ml
- Condition of generating electrolyzed water
  1. HOCL concentration 30mg/kg
  2. Power-on time 1 min.
  3. Processing time 1 min.
  4. Culture conditions

①Nutrient medium : GPLP nutrient agar
②Culture temperature: 35℃
③Culture time: 48 hours



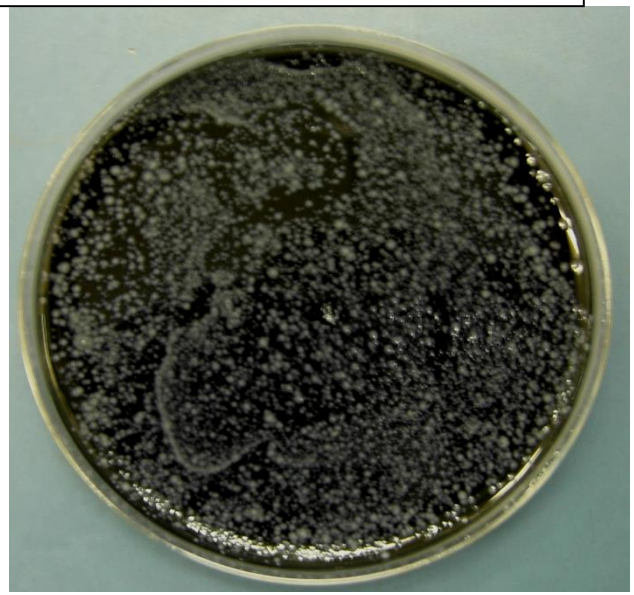
1 min. processing <100 cfu/ml



Control area 8.0×10^5 cfu/ml

- Species: *Legionellaneumophila* SG-5
- Culture time and fungus concentration, 48 hours 8.0×10^8 cfu/ml
- Condition of generating electrolyzed water
  1. HOCL concentration 30mg/kg
  2. Power-on time 1 min.
  3. Processing time 1 min.
  4. Culture conditions

①Nutrient medium : GPLP nutrient agar
②Culture temperature: 35℃
③Culture time: 48 hours



1 min. processing <100 cfu/ml

On the alkaline water

Features of strongly alkaline electrolyzed water

★ It has a power to remove protein or grease.

★ It contains the same hydroxide ions as are contained in the soap.

So, it has a high detergent power. Also it makes surface tension lower and penetration power stronger, solving and emulsifying contamination and removing it.

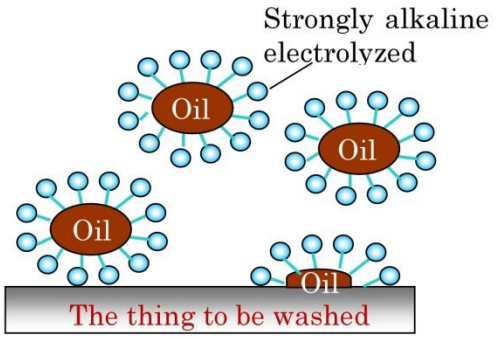
※ The surface tension of the electrolyzed alkaline water is 62.4 din/cm, the same as that of water at 80 degree C, to be compared with that of the ordinary water at 20 degree C, 72.25 din/cm.

★ ORP (oxidation-reduction potential) is low, which prevents oxidation (corrosion) of metals, and prevents rust by alkaline-reduction effects.

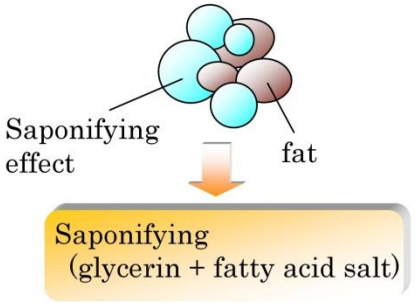
Detergent mechanism of electrolyzed alkaline water

It has a high detergent power.

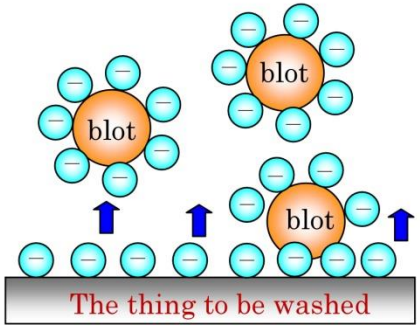
① Emulsifying and dispersing power



② Saponifying effect



③ Blot-detaching effect by ions.



④ Penetration effect

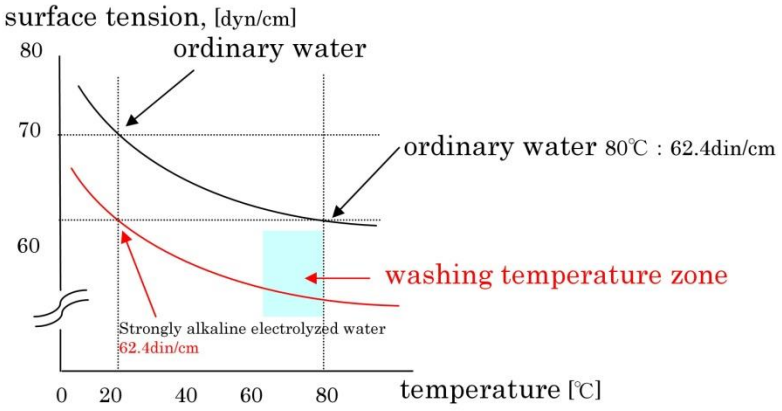
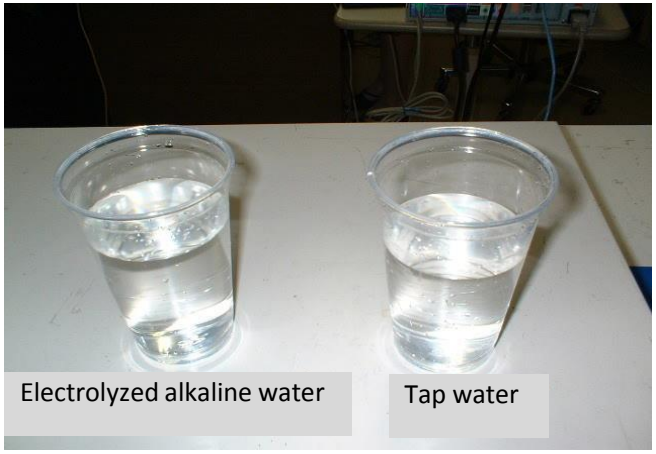
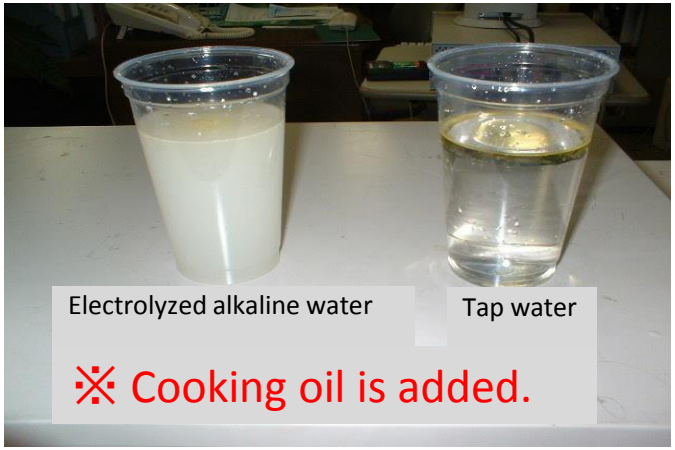


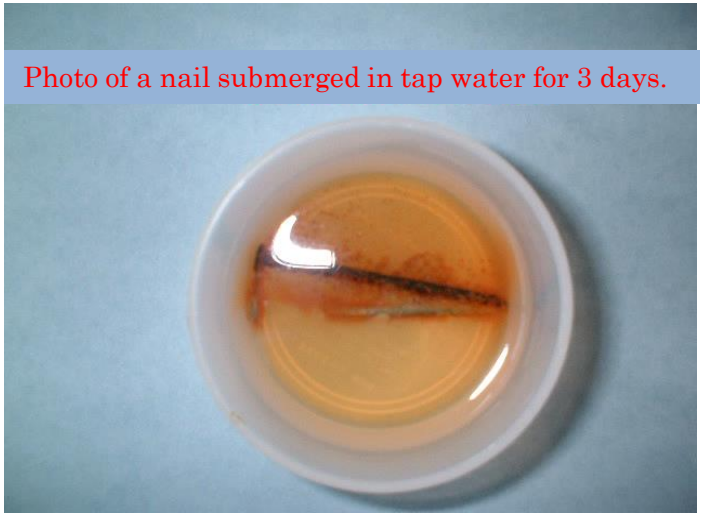
Photo of a nail submerged in electrolyzed alkaline water for 3 days.

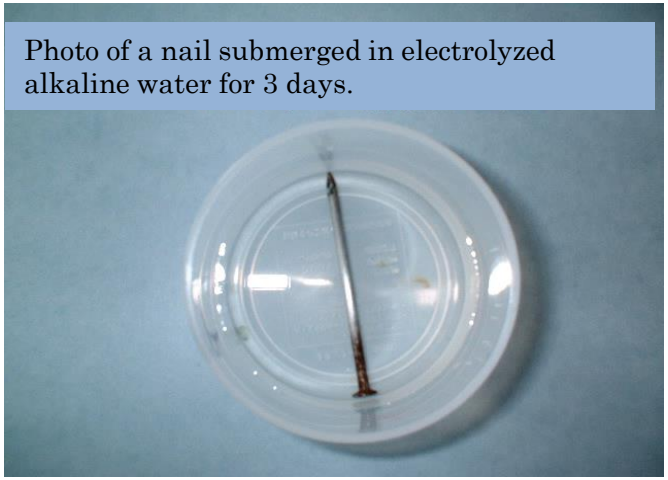
Fat-emulsification power of electrolyzed alkaline water





Iron does not get rusted because of reduction effect of the electrolyzed alkaline water.





Specification of the product: Type GI

Water generation method	Electrolysis pH adjustment method (one-pass generation)
Changing over of the kind of water to be generated	One-touch reverse mechanism
Kind of water to be generated	Slightly/weakly acidic hypochlorous acid water or alkaline water
Amount of generation	0.9～1.0L/min. (54～60L/hour)
Concentration/pH	Effective chlorine concentration: 150～200 ppm (±10%) pH3.0~6.5 (within the allowed range for designated food additive) Alkaline water: pH 11.5～12.0 (±10%) * Effective chlorine concentration and pH change according to the water quality used.
Auxiliary substance for electrolysis	Food additive solid salt (specially refined low bromine salt)
Additive	None
Electric power	AC-100 V (grounded 3-wire AC plug)
Power consumption	About 150W (during running)
Weight	About 20 kg * weight of the body
Size	H530 x W530 x D220mm *size of the body
Casing material	SUS304
Water to be used and pressure	Soft water or purified water is recommended. Caution: pressure must be strictly kept within 0.25～0.5 mpa. * If other water is used, maintenance contract will not apply.
Estimated running cost	**6.1 yen/L (for the case of usage at effective chlorine concentration of 200 ppm)** ※ The above cost includes 'auxiliary substance for electrolysis', 'electricity', 'consumables for soft water generator', 'parts of periodicalreplacement'. ※ The above cost applies in the case of maintenance contract.

Specification of the product: Type G Ⅱ

Water generation method	Electrolysis pH adjustment method (one-pass generation)
Changing over of the kind of water to be generated	One-touch reverse mechanism
Kind of water to be generated	Slightly/weakly acidic hypochlorous acid water or alkaline water
Amount of generation	0.9～1.0L/min. (54～60L/hour)
Concentration/pH	Effective chlorine concentration: 300～400 ppm (±10%) pH3.0~6.5 (within the allowed range for designated food additive) Alkaline water: pH 12.0～12.4 (±10%) * Effective chlorine concentration and pH change according to the water quality used.
Auxiliary substance for electrolysis	Food additive solid salt (specially refined low bromine salt)
Additive	None
Electric power	AC-100 V (grounded 3-wire AC plug)
Power consumption	About 200W (during running)
Weight	About 25 kg * weight of the body
Size	H530 x W530 x D220mm *size of the body
Casing material	SUS304
Water to be used and pressure	Soft water or purified water is recommended. Caution: pressure must be strictly kept within 0.25～0.5 mpa. * If other water is used, maintenance contract will not apply.
Estimated running cost	**9.1 yen/L (for the case of usage at effective chlorine concentration of 400 ppm)** ※ The above cost includes 'auxiliary substance for electrolysis', 'electricity', 'consumables for soft water generator', 'parts of periodicalreplacement'. ※ The above cost applies in the case of maintenance contract.