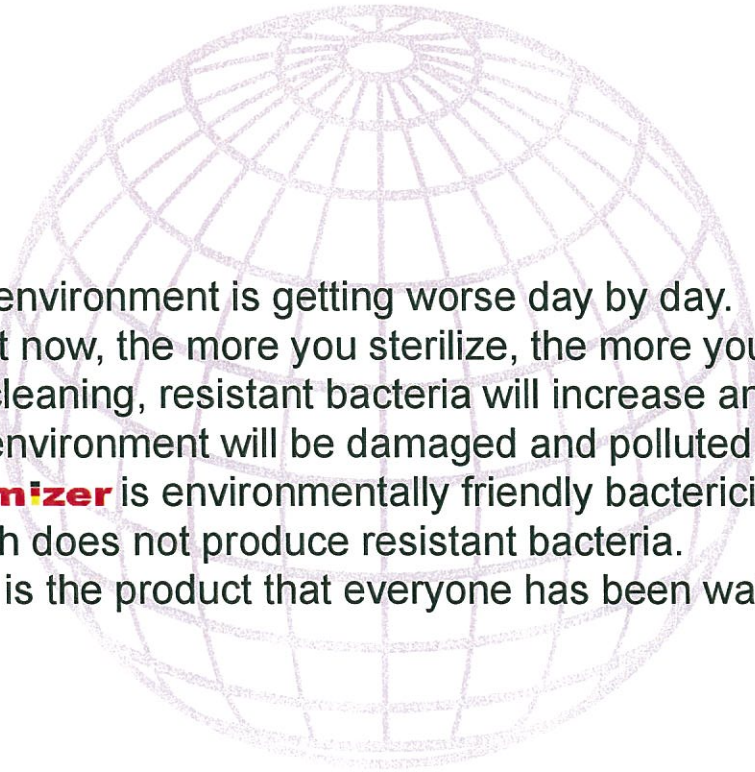
Biomizer
TECHNICAL GUIDANCE

Biomizer Technical Guidance



Our environment is getting worse day by day.
Right now, the more you sterilize, the more you do the cleaning, resistant bacteria will increase and the environment will be damaged and polluted.
Biomizer is environmentally friendly bactericide which does not produce resistant bacteria.
This is the product that everyone has been waiting for.

This booklet is edited as technical guidance highlighting the features of **Biomizer** with every possible indications of data.

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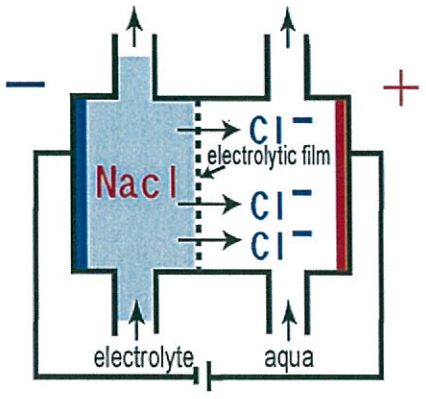
Contents

1. What is **Biomizer**?

- **Biomizer** is solution produced through the electrolysation of water (soft water) and can be categorized as strongly acidic electrolytic water.
- Mainly in the field of medicine, **Biomizer** is used to kill bacteria below the※ mid-level of sterilization.

  ※ The mid level of sterilization refers to the termination of microbe except Bacillus.
- **Biomizer** is environmentally friendly bactericide.

〔Image of electrolysis〕



$$H_2O \rightarrow \frac{1}{2}O_2 + 2H^+ + 2e^-$$
$$2cl^- \rightarrow cl_2 + 2e^-$$
$$cl_2 \rightarrow H_2O \rightleftarrows HCl + HClO$$

[Principle and formula are available through PCT(Patent Cooperation Treaty)]

Bactericidal effectiveness Test 〔pH2.54 ORP 1134mv effective density of chlorine 20mg/kg (ppm)〕

Tested bacteria	Initial number of bacteria (CFU/ml)	Process Time		Purified water 3 minutes later (CFU/ml)
		15sec	3mins	
Staphylococcus aureus (1101677)	4.5×10^6	<10	<10	4.9×10^6
Salmonella enteritidis (MBRC3313)	5.6×10^6	<10	<10	5.9×10^6
Escherichia coli (MBRC3927)	5.1×10^6	<10	<10	5.0×10^6
Pseudomonas aeruginasa (MBRC13275)	5.2×10^6	<10	<10	5.5×10^6
Candida albicans (IF01594)	3.1×10^6	<10	<10	2.2×10^6

(Incorporated foundation : Japan Food Research Laboratory)

2. The features of Biomizer

- **Biomizer** has a wide range of bactericidal spectrum and can be a replacement for a number of medicine.

A chart of range of bactericidal spectrum and replacement for medicine.
(O Usable Δ Usable under some conditions X Unusable)

Category	disinfectant	Popular names	Objects for disinfection				Target bacteria						
			Enviroment	Equipment	Skin	membrana mucosa	bacteria	MRSA	Mycobacterium tuberculosis	Aspergillus fumigatus	Bacillus	HIV	HBV
	strongly acidic electrolytic solution (Biomizer)		O	O	O	O	O	O	O	O	O	O	O
※	glutaric aldehyde	Sterihyde	O	O	×	×	O	O	O	O	O	O	O
The middle standard disinfectant	sodium hypochlorite	Milton	Δ	O	Δ	Δ	O	O	O	O	O	Δ	×
	disinfectant ethanol		Δ	O	O	×	O	O	O	O	×	O	×
	Welpas		×	×	O	×	O	O	O	O	×	O	×
	isopropanol		Δ	O	O	×	O	O	O	O	×	O	×
	povidone iodine	Isodine	×	×	O	O	O	O	O	O	Δ	O	×
	dilute iodine solution		×	×	O	×	O	O	O	O	Δ	×	×
The low standard disinfectant	cresol and soap solution		Δ	Δ	Δ	Δ	O	O	O	Δ	×	×	×
	benzalkonium chloride	Osvan	O	O	O	O	O	Δ	×	Δ	×	×	×
	benzethonium chloride	Hiamin	O	O	O	O	O	Δ	×	Δ	×	×	×
	chlorhexyne	Hibitane	O	O	O	×	O	Δ	×	Δ	×	×	×
	ampholytic surface active agent	Deco51	O	O	O	O	O	Δ	Δ	Δ	×	×	×

※ The high standard disinfectant

(Manual for bactericide and disinfection Medicine Publication)

Medicine had to be changed for each object, but **Biomizer** can be applied for many kinds of bacteria.

- **Biomizer** contains very little ※ undecomposed salt.
(one tenth of other companies)

Analysis items	**Biomizer**	strongly acidic electrolytic solution	Methods
Natrium and its compounds	82mg/kg	More than 1, 000mg/kg	inductively coupled plasmalight emitting spectrochemical analysis

(Incorporated foundation: KITASATO Research Center of Environmental Sciences)

Hence, **Biomizer** doesn't cause any rust or any risk for human body. It's safe to use.

※ Undecomposed salt refers to the salt residue in solution which is intact through electrolysation.

Biomizer's time of bactericidal effectiveness is short and does not produce resistant bacteria.

Category	Bacteria names	Time required for disinfection
bacteria	staphylococcus aureus	<15sec
	pseudomonas aeruginosa	<15sec
	Escherichia coli	<15sec
	Bacillus cereus	<5min
	Salmonella typhi	<15sec
	Mycobacterium tuberculosis	<2.5min
aspergillus fumigatus	candida albicans	15sec
	Trichophyton rubrum	<1min
virus	Herpes virus	<15sec
	influenza virus	<15sec

The chart shows how long it takes to disinfect(10 ^{8}CFU<10CFU) some of the typical bacteria.
The time for disinfection is short, but disinfection is thorough, so the bacteria cannot produce any tolerance. In fact, we have no reports about sensitive bacteria.

(Incorporated foundation : Japan Food Research Laboratory)

Biomizer has no harm for human bodies and does not have any side effect.Safety standard for tab water is higher than that of **Biomizer**.
Biomizer does not harm human bodies and it is safe.

Analysis Test items	Results	Water Works Law Water quality standard
Chloroform	0.007 mg/L	0.06
Dibromochloromethane	0.003 mg/L	Less than 0.1 mg/L
All Trihalomethane (density summation of chloroform, Dibromochloromethaneand Bromodichloromethane)	0.015 mg/L	Less than 0.1 mg/L
Bromodichloromethane	0.005 mg/L	Less than 0.03 mg/L
Bromoform	Not detected	Less than 0.09 mg/L

(Incorporated foundation: KITASATO Research Center of Environmental Sciences)

Time for Laboratory test: 2006 June 21st 13:00
Laboratory test location: inside JWS tecnica 3-7-4 Kohinata Bunkyo-ku Tokyo
Laboratory Test conducted by: Umatani
Test conductor belongs to JWS Tecnica
NB1. By the method set by Health, Labor and Welfare Ministry(notification No.261
By Health, Labor and Welfare Ministry in 2003) Barge Trap- Gas Chromatograph Mass Spectrometer.

The test results based on OECD Guidelines for the toxicity test of Chemicals(1987) are shown below. The safety is confirmed by the following tests.
All the results belong to the same safety category: nonirritant.

No	Tests conducted	Results and evaluations
1	oral toxicity tested with mice	50mL/kg administered orally. No toxic symptoms are observed.
2	primary skin irritation test with rabbits	No reactions are observed on their skin. (1H, 24H, 48H,72H) Nonirritant
3	Eye Irritation Test with Rabbits	No abnormalities are observed with cornea, iris, or conjunctiva. Nonirritant

(Incorporated foundation : Japan Food Research Laboratory)

Biomizer's residual level is low and very environmentally friendly.

The bactericidal effect is compared between **Biomizer** and 0.1% sodium hypochlorite. [available chlorine 928 ppm] (10^6CFU → <10CFU)

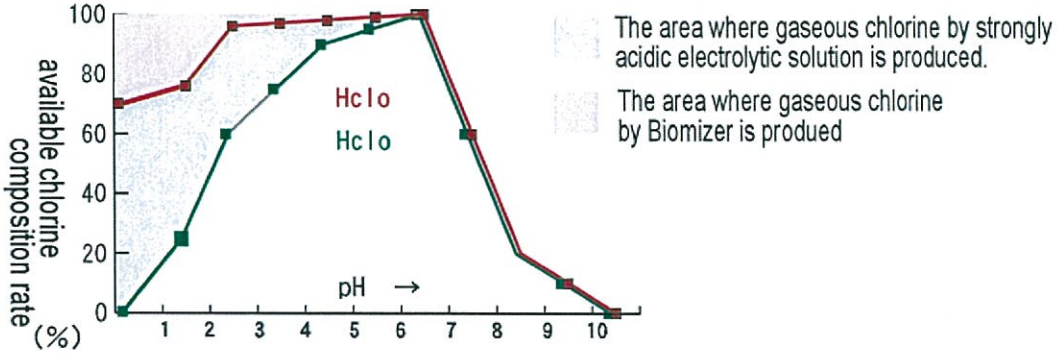
Tested Bacteria	Time for disinfection by Biomizer (PH2.54 ORP 1134mv available chlorine 20ppm)	Time for disinfection by 0.1% sodium hypochlorite
Staphylococcus aureus	<15sec	<15sec
Salmonella typhi	<15sec	<15sec
Escherichia coli	<15sec	<15sec
Pseudomonas aeruginosa	<15sec	<15sec
Bacillus cereus	<5min	<5min
Candida albicans	<15sec	<15sec
Trichophyton rubrum	<1min	<15sec
aspergillus fumigatus	<60sec	<5min
Influenza virus	<15sec	<15sec

(Incorporated foundation : Japan Food Research Laboratory)

When **Biomizer's** available chlorine is 20 ppm, the bactericidal effect is about the same as 928 Naclo.(available chlorine approximately 1/50)

- **Biomizer's** residual level is low and very environmentally friendly. **Biomizer** has no harm for human bodies. **Biomizer** is safe and does not produce so much gaseous chlorine.
  Please compare Biomizer to the conventional strongly acidic electrolytic solution.

The chart below shows pH territory and existential condition of chloride ion density.



Biomizer shows valid Hclo (sodium hypochlorite) density around pH 1.6.
Biomizer does not scatter gaseous chlorine in the air and prolongs the use of the gas. Therefore the generation of highly dense solution is possible.
Biomizer neither generates gaseous chlorine nor harms its surroundings and any animals. **Biomizer** is extremely safe to use.
[FYI : The minimum lethal concentration of the gaseous chlorine for inhalation is 430 ppm/30 minutes.]

- Three kinds of **Biomizer** are available depending on usages.

Type	Aspects			Usage
	pH	ORP	available chlorine	
A	More than 1.7 under 1.9	More than 1170 mv	More than 120 ppm Under 200 ppm	Use after the dilution with tap water.
B	More than 1.9 under 2.4	More than 1150 mv	More than 50 ppm Under 120 ppm	For the dissection of fish and meat that type C cannot deal with.
C	More than 2.4 under 3.1	More than 1100 mv	More than 15 ppm Under 50 ppm	Average disinfection level

3. Bactericidal mechanism of **Biomizer**

- The **Biomizer's** central player for bactericidal mechanism is sodium hypochlorite(Hclo).

  It is highly oxidative and it instantly oxidizes and kills bacteria.
  In fact, when the density of sodium hypochlorite (Hclo) goes up, bactericidal effect sharpens, too.

- When **Biomizer's** available chlorine is 20 ppm, the bactericidal effect is about the same as 928 Naclo. (Refer to page 4)
  This means that the disinfection does not entirely depend on sodium hypochlorite (Hclo).

The chart below shows the results of inactiveness test of feline calysis virus.

Type	aspects		conditions	TCID 50/50μl calysis virus	evaluations
A	pH	2. 54	**Biomizer**	≦2. 5	Disinfection effectives
	ORP	1154 mv			
	Cl	32 ppm			
B	pH	2. 61	The combination of cat's blood and raw water 1:200	<7. 4	No effects
	ORP	543 mv			
	Cl	0. 09 ppm			
C	pH	2. 55	Idem 1:500	<7. 6	No effects
	ORP	666 mv			
	Cl	0. 95 ppm			
D	pH	2. 57	Idem 1:2000	≦2. 5	Disinfection effectives
	ORP	1114 mv			
	Cl	25 ppm			
E	pH	2. 43	**Biomizer** Preserved for three months	≦2. 5	Disinfection effectives
	ORP	1100 mv			
	Cl	0. 8 ppm			
F	pH	2. 60	Heated at 56℃ 3H left to open air	<6. 9	No effects
	ORP	795 mv			
	Cl	0. 05 ppm			

(Kitazato University veterinary stockbreeding department)

Disinfection is effective for the types whose ORP is more than 1100mv regardless of available chlorine density.
This means that ORP is thought to be an important factor for disinfection.

ORP(oxidation-reduction potential) has a close relationship with Pe.

Pe can be expressed as $Pe = 16.9\ Eh.$ (Eh is ORP (v))

$Pe = -\log(e^-)$

ORP 1100 mv(1.1v) is $\frac{1}{10^{16.9\times1.1}}$, this can be expressed as $\frac{1}{10^{18.9}}$

The water is very low in electron density. When something touches the water like this, the electron is instantly lost and gets oxidized.

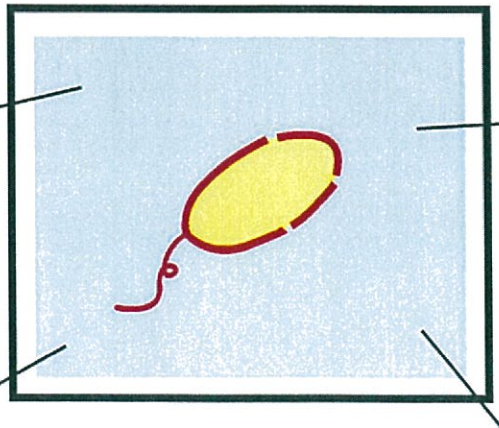
pH 5.3 being an isoelectric point, by getting far away from this range, the solubility of protein increases due to the electrostatic function caused by positive charge of proton.

The bactericidal effectiveness of **Biomizer** depends on the following conditions.

The bactericidal effectiveness of Biomizer is believed to consist of the collective strength of the three powers: hypochlorite, ORP and pH.

pH range	2.4 ～ 3.1
ORP range	more than 1100 mv
available chlorine density	10～50 mg/kg(ppm)

Disinfection image



A
The water is devoid of electron and it makes bacteria lose its electron. (oxidization)

B
Hhydrogen ion is dense and the protein can be solved by the electrostatic function.

C
Chlorine in hypochlorite has a strong power to oxidize bacteria

D
By getting electron, it becomes chlorine ion. Chlorine substitutes cell water and prevents the generation of enzyme.

4. Instructions for the use of **Biomizer**

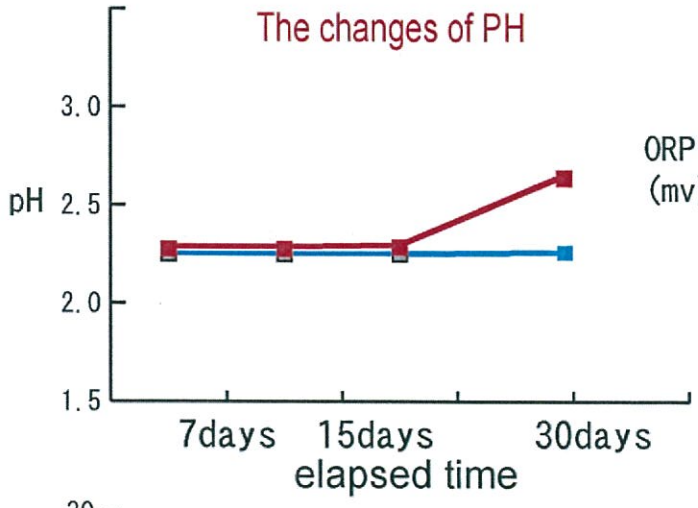
Biomizer is environmentally friendly bactericide and it is safe.

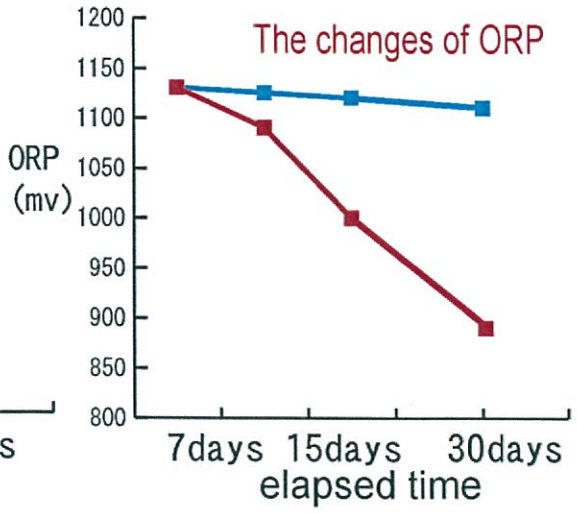
However, it is not residue-prone, so the bactericidal effectiveness cannot be kept for a long time. The dispersion should be repeated or **Biomizer** has to be renewed as often as possible.

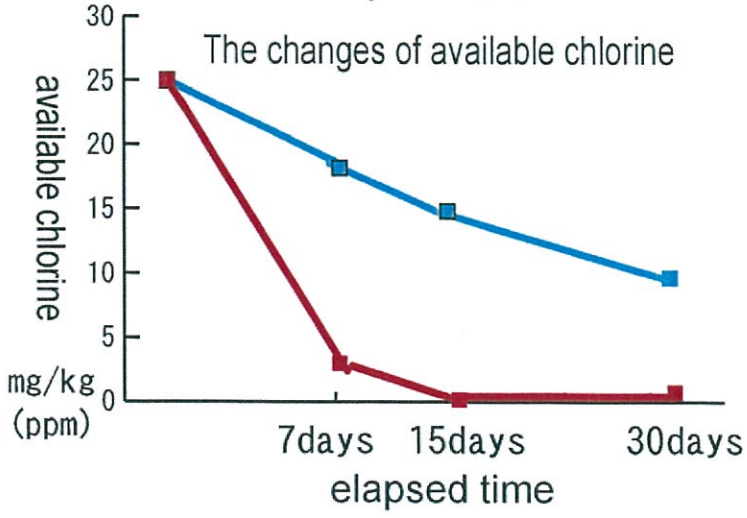
Biomizer cannot be preserved for a long time.

Biomizer, when it is generated, has to be used as soon as possible. **Biomizer** can be kept in a shade glass container. When hermetically seated, it can be kept for about a month, but it should be used as soon as possible.

The following chart shows the changes in the course of time.







- pH 2. 30
- **Biomizer** with ORP 1138mv
- available chlorine 25ppm

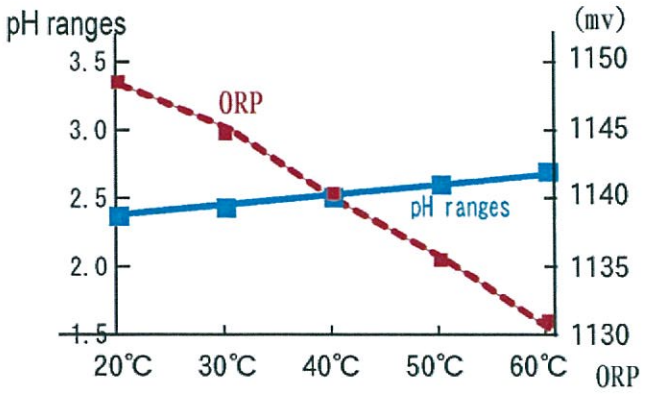
Open

Hermetically seated in shade
(A vinyl chloride tank is used.)

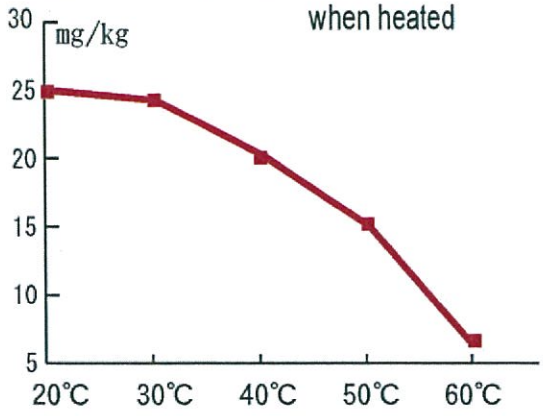
Biomizer cannot be used heated.

When heated, the density of available chlorine goes down and bactericidal effectiveness is weakened. In case of heating **Biomizer**, please make sure that the temperature does not go beyond 60℃.

◎ The changes of pH,ORP when heated



◎ The density of available chlorine when heated



Things get "deactivated" when they touch a large amount of blood or organic matter.

In this case, things can be washed with **ECOMIZER** or they can be washed thoroughly with a great amount of **Biomizer**.

There are three typical usages of **Biomizer**. See below:

- Wash fingers and hands
- Vegetables, Fish and Meat
- Floor face
- Surgical tool
- Tableware

etc

Running water method

- Floor, Walls
- Toilet, Bathroom, Corridor
- Bed, Doorknob
- Consultation seat

etc

Spray method

- Linen
- Sheets
- Hospital Robe
- Surgical gear
- Tableware
- Vegetables, Fish

etc

Immersion method

- Before you use **Biomizer**, please confirm **Biomizer** you use stays in the range where disinfection is working. For confirmation, please use the following equipment.

pH gauge
TOA DKK
HM-21P

Please adjust pH gauge daily.

ORP gauge
TOA DKK
RM-20P

available chlorine gauge

- When an object happens to be a piece of metal, make sure to wash it with water or it has be neutralized with **Ecomizer**.
  If **Biomizer** remains on the object, **Biomizer** reacts to water and produces hydrochloric acid which corrupts metals.
- When **Biomzer** is mixed with hydrochloric acid or sodium hypochlorite, it generates gaseous chlorine.
  Please do not mix **Biomizer** with these chemicals.

In comparison with other disinfectants, **Biomizer** has a lot more advantages.
However when you use **Biomizer**, please understand its characteristics and **Biomizer** requires tight control.

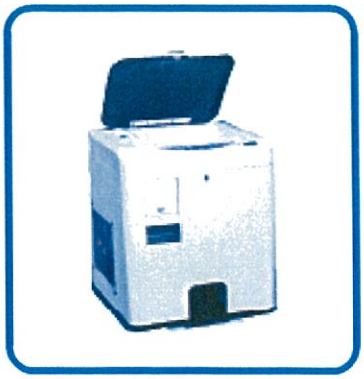
5. Applications of Biomizer

Biomizer is being used in the in the field of { medicine, food, agriculture and stockbreeding }

Application in the field of medicine

- Wash hands and fingers
  More effective than alcohol disinfectant. **Biomizer** does not chap your skin.

- Wash Endoscopes.
  - **Biomizer** has the same level of bactericidal effectiveness as the conventional glutaric aldehyde disinfectant.(The middle standard disinfectant level)
  - Unlike glutaric aldehyde, **Biomizer** is safe for operators and surroundings.
  - Unlike glutaric aldehyde, **Biomizer's** residue does not hurt any human bodies.
  - **Biomizer** is extremely easy to keep and drain.
    (Glutaric aldehyde requires an operation as medical industrial waste.)
  - Rinsing is also easy and this shortens washing time. It goes without saying that it is very economical in comparison with other washing methods.
  - **Biomizer** contains almost no undecomposed salt, so it does not impair Endoscopes orcause any rust.
  - **Biomizer** generated very little gaseous chlorine. It can be used in an airtight space.
  - It is more effective when used with **Ecomizer**.



This is an automatic Endoscope washing machine which uses **Biomizer** and **Ecomizer**.
(Washing and Disinfection can be done in ten minutes.)

Applications in the fields except for washing fingers, hands and Endoscopes.

◎ For medical treatment.....

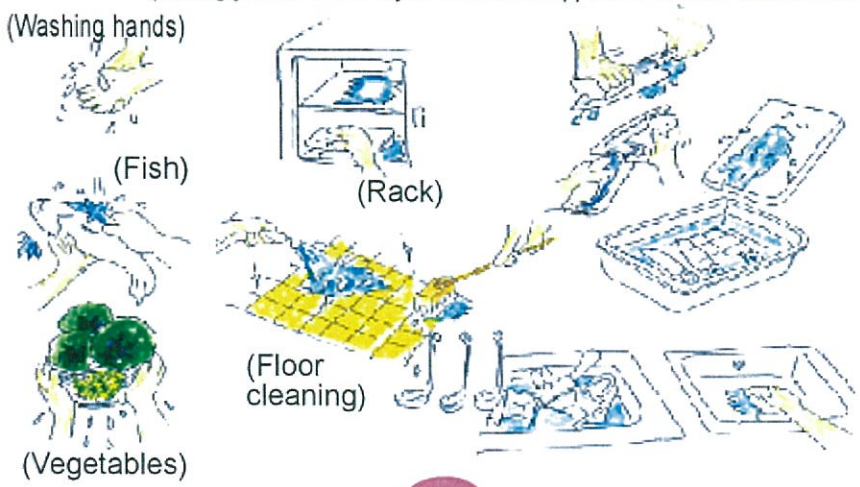
Uses	Purposes of use Results
Bed bath for skin (Burns, atopic dermatitis)	· Can be used for washing and the prevention of infection of affected areas to without hurting skin structure. · Can be used for odor eliminating of sulfur compound.
Bed bath for boils	· Can be used for washing away pus and the prevention of infection. For curing injuries completely. · Can be used for promoting self-healing, minimizing the damage of living organism.
Use in ENT clinic	· Can be used for the prevention of Pseudomonas aeruginosa after an inner ear operation. · Can be used for the prevention of candida in a month and pneumonia.

◎ For sanitary supervision in a clinic.....

Uses	Purposes of use Results
Examination Counter, Wait room, Sofa	· Prevention of resistant bacteria · Prevention of infection(inside hospital) Effective odor eliminating
Floor face, Mops, Consultation room, Toilet, Wash room	· High bactericidal effectiveness, Prevention of resistant bacteria · No medicine odor , Prevention of infection(inside hospital)
Bathroom	· Safety maintenance of Bathroom (measured for Legionella) · Sanitary supervision of bathroomPrevention of infection
Sewage treatment	· Decomposition of sulfur compound and protein · Prevention of infection from human waste

Application in the field of foods.

(Strongly acidic electrolytic solution is approved as food additive on June 20th 2002.)



◎ Sanitary supervision of food materials with **Biomizer**.

Amount of Bacteria (<300CFU electronegative) ※ pH2.54, ORP 1134 mv, and available chlorine 20 ppm for **Biomizer**

	Items	processing method	Index	Disinfection Test Results		Qt.
				※ **Biomizer**	sodium hypochlorite	
Vegetables	Cabbage	Stir with running water 60 sec Immersion 600 sec	4.4×10^4	2.0×10^1	2.0×10^1	CFU/No.
Vegetables	Lettuce	idem	4.9×10^2	<10	<10	CFU/No.
Fruits	Orange	idem	6.4×10^2	<10	<10	CFU/No.
Fruits	Apple	Stir with running water 120 sec	2.0×10^4	<10	1.0×10^2	CFU/No.
Egg	Egg	Hand wash with running water 10 sec	7.8×10^3	<10	<10	CFU/No.
Fish	Yellow tail	Hand wash with running water 10 sec	5.3×10^3	3.0×10^2	2.3×10^3	CFU/10_{cm^2}
Fish	Horse mackere	Hand wash with running water 10 sec	5.8×10^5	1.5×10^4	1.4×10^4	CFU/10_{cm^2}

※ CFU Testing unit was based on the number of objects or $10cm^2$
It is thus proven that **Biomizer** is very effective.

Application in the field of agriculture and stockbreeding.

◎ Agriculture (Safe and economical agriculture can be realized with Ecomizer.)

- **Biomizer** can drastically reduce the use of agricultural chemicals.
- **Biomizer** maintains healthy and fertile soil.
- **Biomizer** inhibits chemical fertilizer.

This would bring about differentiation

No mask and gloves are required.

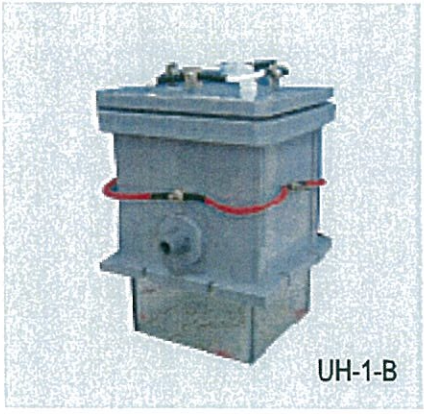
◎ Stockbreeding

From various studies, it has been reported that **Biomizer** (strongly acidic electrolytic solution) is generally effective for bacteria including virus. **Biomizer** can realize the followings:

- Sanitary environment and maintenance for cow barn, pigsty, and chicken house (Disinfection and odor eliminating)
- Protection from virus infection.
- Medical treatment of bite wounds, pus-filled wound, skin blobs or tympanitis.
- Cools down or warms up feedlots
- Protection from flies

As a result, the death rate will go down.

Multifaceted&Emultiple circulating electrolytic machine UH-1



UH-1-B

- **Biomizer** is generated by UH-1 model electrolytic machine.
- UH-1 model is a compact, light-weight, high-capacity high-performance electrolytic machine.
- The main feature of UH-1 model is to generate and drain Biomizer only and lower the interfusion of undecomposed salt and the generation of gaseous chlorine.

JWS TECNICA

¥1,000 (tax included)